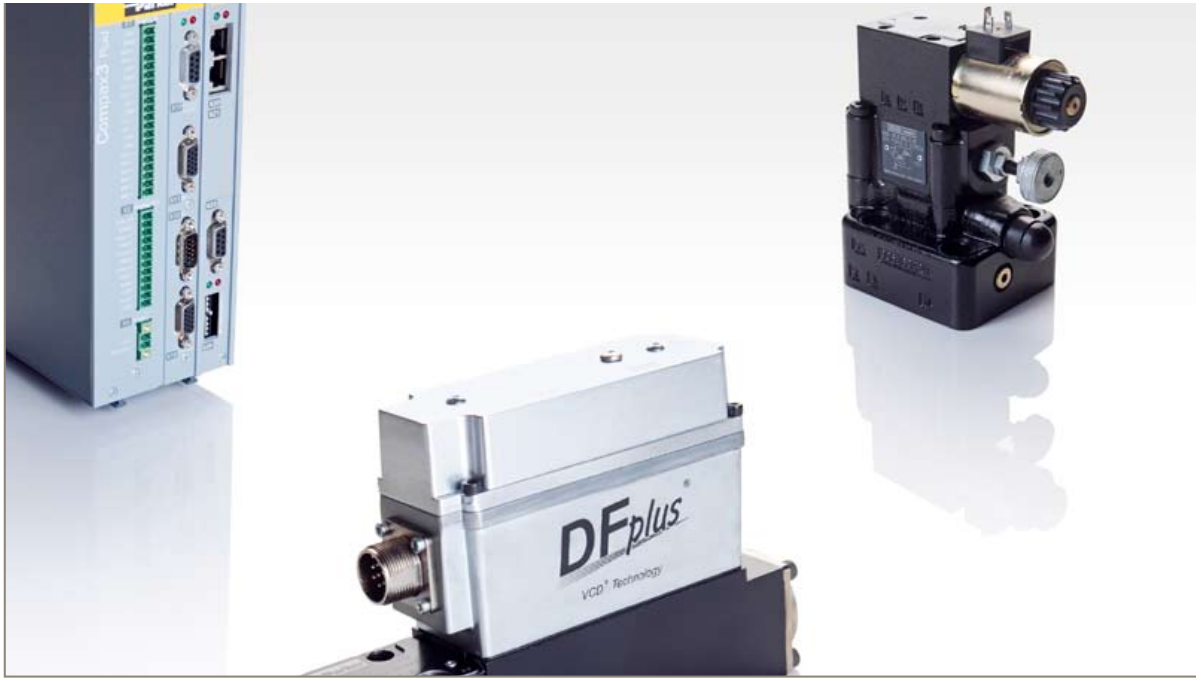
Product program
Series from A to Z



Hydraulic Valves Industrial Standard

Including Denison Hydraulics

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

Parker

ENGINEERING YOUR SUCCESS.

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Introducing 1
Product Index, 4 Brands under 1 Roof, System Solutions

Directional Control Valves 2
Seated valves, spool valves, direct and pilot operated

Proportional DC Valves 3
Standard dynamics; high dynamics; VCD® dynamics

Pressure Valves 4
Subplate and screw-in mounting

Flow Valves 5
Throttle and flow control valves, subplate and screw-in mounting

Check Valves 6
Direct and pilot operated, subplate and screw-in mounting

Sandwich Valves 7
For pressure, check and flow functions

Slip-In Cartridge Valves 8
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SAE Flange Valves 9
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With pressure, directional, flow and check functions

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Starting up hydraulic systems, hydraulic fluids

Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

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Alpha-Numerical Product Index

1

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1

Parker develops superior products. Over the years we have added many market leading lines in order to provide you with the best offering in the world:

Towler was founded in 1866 as a pioneer in press hydraulics at very high pressures. The design of a range of slip-in cartridges for manifolds brought unlimited flexibility into hydraulic circuits and enhanced hydraulics in many applications. A wide range of proportional valves was developed from pressure controls over directional controls to fast acting cartridge valves.

Parker was founded in 1918 and started with hydraulics for aircrafts. The Colorflow flow and pressure valves, manually adjustable with visual setting control, were a revolutionary offering for the industrial market, followed by various lines of solenoid operated directional control valves. New on the market: wet solenoids for leak-free hydraulics.

Denison was founded in 1931 and another pioneer in press hydraulics. They were the first to introduce a seat-type pilot operated cartridge relief valve to the market and set the trend for all manufacturers. The valve is still unbeaten in its ease of use and performance in all applications. Various housing options are successfully used in all market segments.

Hydraulik Ring was formed in 1967 as a dedicated manufacturer of high precision hydraulics for an association of German machine tool makers. Their product strength was precise flow control in open or closed loop applications, high performance pressure control and pressure intensification for clamping.

This catalogue contains the best industrial valves of these brands. It is an outperforming and full range of industrial valves for any kind of application. In order to allow our new customers from the latest line addition to carry on with model codes in existing parts lists we show some of the valves under the Denison brand and model code in parallel to the Parker brand and model code.

Dr. Gerd Scheffel
General Manager

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Systems Solutions

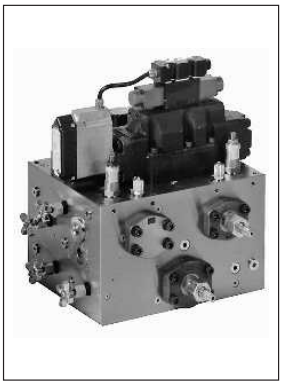
Parker is more than a supplier of excellent components. Together with our customers, we develop innovative systems solutions. In this industrial valves catalogue, we would like to point out to you our special competence in industrial control units. Our experienced, highly motivated team answers technical needs with complete, sound solutions.

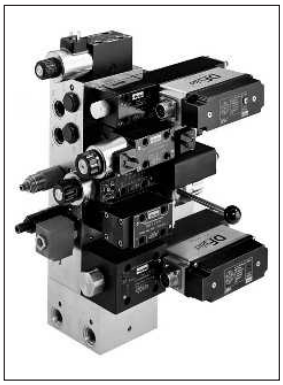
Our performance spectrum comprises a complex understanding of the job, project management, design, and production, including final tests of control units on our modern, automated test beds. In addition we offer compact hydraulic axis controls.

When you entrust us with your system requirements, you can rely on getting an optimal solution from the Parker valves program with all components used in accordance with their characteristics. Furthermore you can rely on us taking full responsibility for all our valves, electronics and combined functions within the system.

Parker is strong in customized solutions but we also supply standardized press controls (e.g. certified versions in nominal sizes NG 06 through NG50) as fully shown in our brochure HY11-3235/UK on Hydraulics for Press Controls.

Contact your Parker representation for information and offerings concerning your hydraulics.



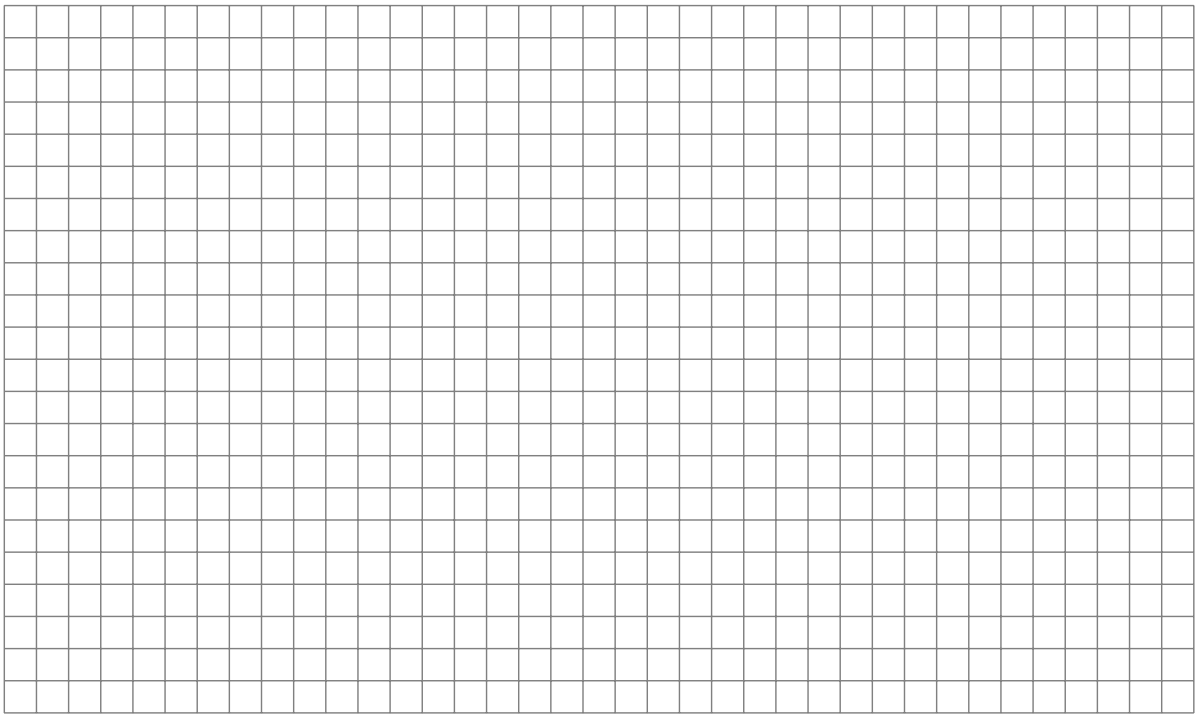




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Notes

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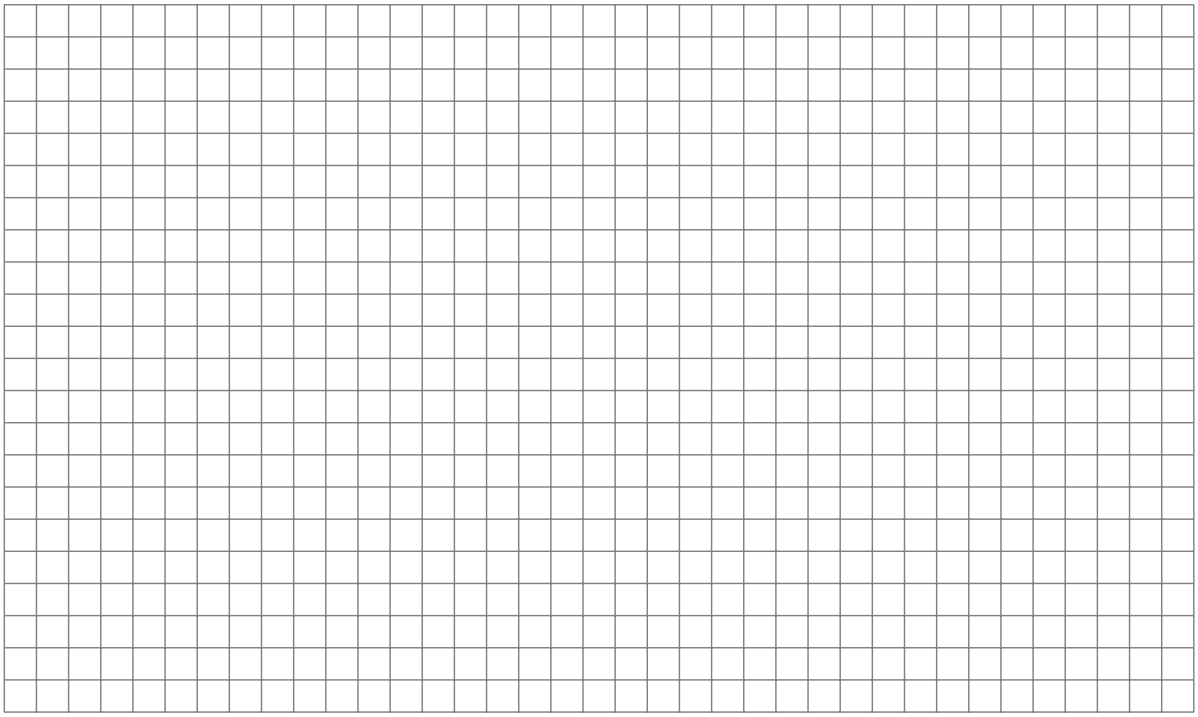
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Series Parker	Series Denison	Description	Direct operated					Pilot operated				Page
		DIN / ISO	06	10	16	25	32	10	16	25	32	
		Seat valves, electrically operated										
D1SE	–		•									2-3
		Spool valves, electrically operated										
D1VW	4D01	Standard, soft shift	•									2-7
D1VW	–	8 Watt solenoid	•									2-15
D1VW	–	Inductive position control	•									2-21
D1VW	–	Explosion proof (conform to ATEX)	•									2-27
D1MW	–	For wash down applications	•									2-31
D3W	4D02	Standard		•								2-37
D3W	–	Inductive position control		•								2-47
D3MW	–	For wash down applications		•								2-53
D31DW	–	Standard and position control						•				2-59
–	4D02V	Highest flow						•				
D41VW	–	Standard and position control							•			
–	4D03	Standard							•			
D81/91VW	–	Standard and position control								•		
–	4D06	Standard								•		
D111VW	–	Standard and position control									•	
		Spool valves, hydraulically operated										
D1VP	–		•									2-75
D3DP	–			•								
D4P	–				•							
D9P	–					•						
D11P	–						•					
		Spool valves, mechanically operated										
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D3DL	–			•								
D4L	–				•							
D9L	–					•						
		Accessories										
		Plugs Actuator kits O-rings and seal kits Mounting patterns										2-97

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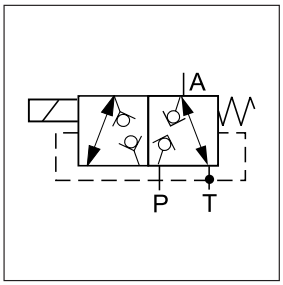


The directional valve type D1SE is equipped with a wet pin armature solenoid, drain free tapered poppet valve and compatible with the standards DIN NG06, CETOP 03, and NFPA D03. Due to the 3/2 way design, port A is either connected with P or discharged in the tank. The neutral position (solenoid not activated) is taken automatically by a return spring. This position remains until the solenoid is energized.

The valve poppet including activation lever and armature of the solenoid are located in the pressurized oil chamber of connection T. The valve poppet is designed such that there can be no differential area in its axial operational direction (opening, closing). Thus it is statically pressure-balanced so that the valve can be switched in both flow directions even under pressure.

The unit has an all-steel design, the important functional inner parts are hardened, the poppet and seat are grinded.





Technical data

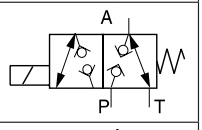
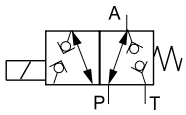
General					
Design		Directional poppet valve			
Actuation		Solenoid			
Size		DIN NG6 / CETOP 03 / NFPA D03			
Mounting interface		DIN 24340 A6 / ISO 4401 / CETOP RP 121-H / NFPA D03			
Mounting position		Unrestricted			
Ambient temperature	[°C]	-25...+50, observe permissible duty cycle			
Weight	[kg]	1.5			
Hydraulic					
Max. operating pressure P, A and T	[bar]	350			
Fluid		Hydraulic oil in accordance with DIN 51524 / 51525			
Fluid temperature	[°C]	-25 ... +70			
Viscosity permitted	[cSt] / [mm²/s]	10...500			
Viscosity recommended	[cSt] / [mm²/s]	30...80			
Filtration		ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)			
Flow max.	[l/min]	20			
Static / Dynamic					
Step response	[ms]	Energized: approx. 50			
	[ms]	De-energized: approx. 60			
Electrical characteristics					
Duty ratio		See diagram			
Max. switching frequency	[1/h]	2000			
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)			
	Code	K	J	U	G
Supply voltage	[V]	12 V =	24 V =	98 V =	205 V =
Tolerance supply voltage	[%]	±10	±10	±10	±10
Current consumption	[A]	1.95	1.1	0.25	0.13
Power consumption	[W]	23.4	26.4	24.3	26.6
Solenoid connection		Connector as per EN 175301-803			
Wiring min.	[mm²]	3 x 1.5 recommended			
Wiring length max.	[m]	50 recommended			

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

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2

D	1	S	E		B			W	
Directional control valve	**Size DIN NG06 CETOP 03 NPPA D03**	**Seat valve**	**Wet pin armature solenoid, flanged**	**Spool type**	**Style**	**Seals**	**Solenoid voltage**	**Connector as per EN 175301-803 without plug [1]**	**Design Series** (not required for ordering)

Code	Spool type
30	
83	

Code	Voltage
K	12V=
J	**24V=**
U [2]	98V=
G [2]	205V=

[2] To be used with rectifier plug when DC solenoids are used with AC input.

Code	Seals
N	**NBR**
V	FPM

Bold letters =
Short-term availability

[1] Please order plug separately.

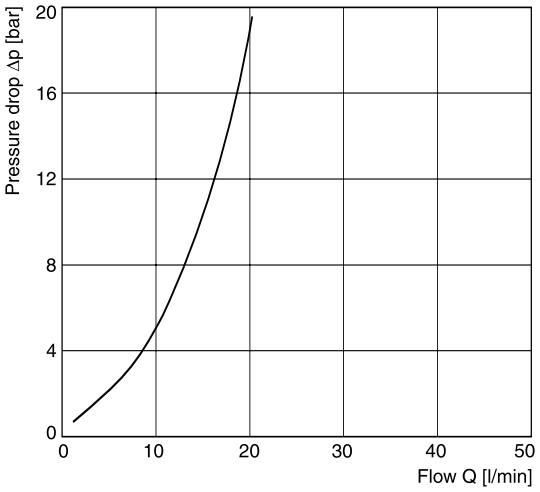
Solenoids for repair

Voltage	Ordering code
12V=	7329700 - 12V
24V=	7329700 - 24V
98V=	7329700 - 98V
205V=	7329700 - 205V

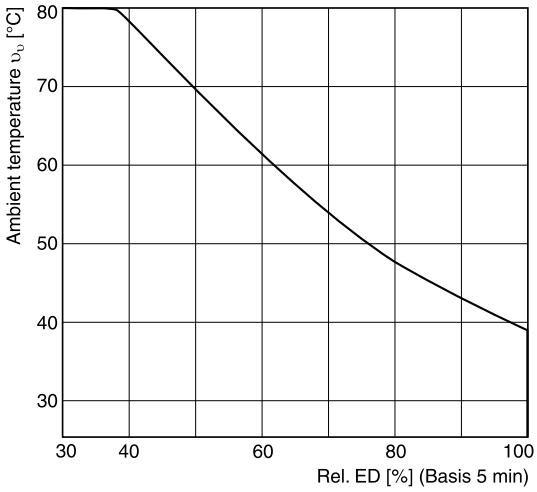
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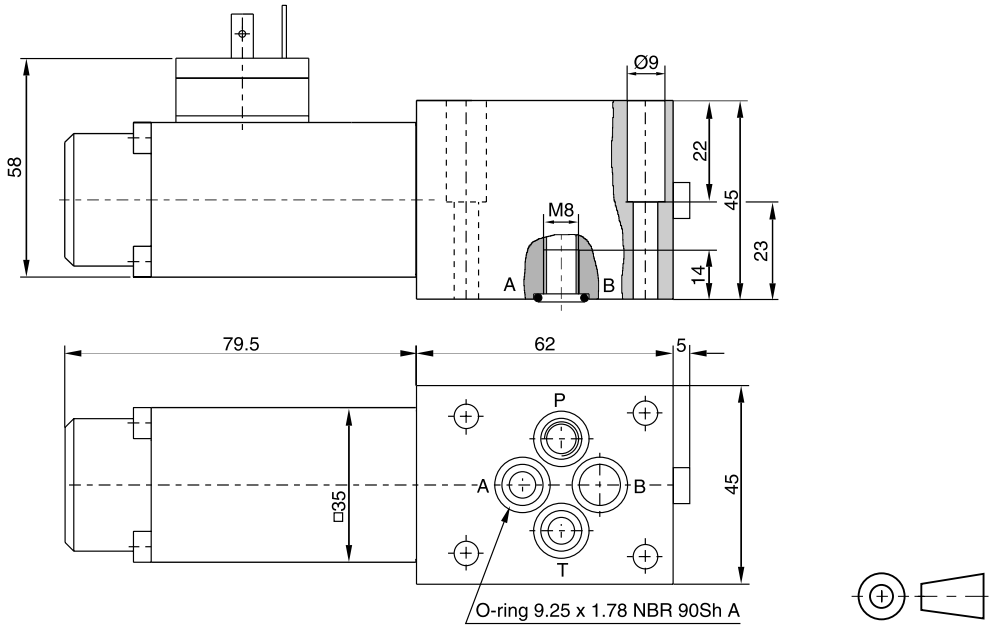
Performance curve Δp-Q



Duty cycle versus ambient temperature



Dimensions



Surface finish	Kit			Kit
R_{max}6.3 ⏥ 0.01/100	BK375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	**NBR: SK-D1SE-70** FPM: DK-D1SE-V70

Subplates and manifolds see chapter 12.

The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

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Notes

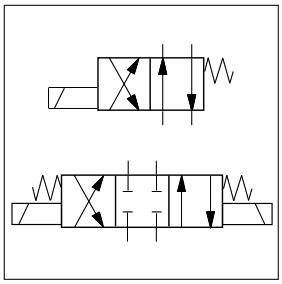
The new NG06 directional control valve is available with both Parker (D1VW) and Denison (4D01) model codes.

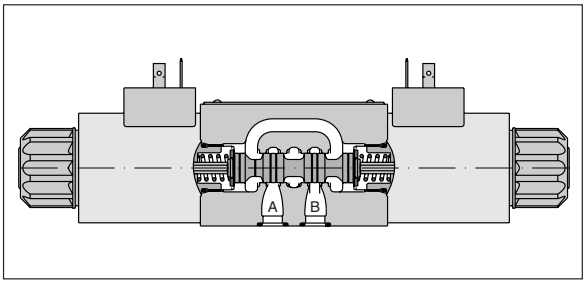
The new design provides high functional limits up to 80 l/min in combination with a very low, energy-saving pressure drop.

A wide variety of spool options allows to design an unlimited number of hydraulic circuits.

Versions with 8 watt coils, position control, Atex approval, surface protection and connector variants are shown in the following chapters.







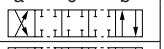
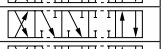
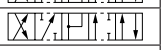
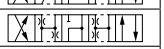
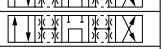
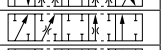
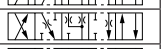
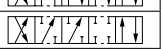
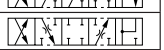
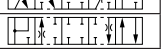
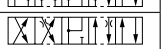
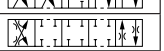
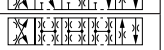
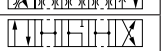
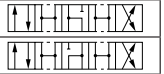
Technical data

General							
Design			Directional spool valve				
Actuation			Solenoid				
Nominal size			DIN NG06 / CETOP 03 / NFPA D03				
Mounting interface			DIN 24340 A6 / ISO 4401 / CETOP RP 121-H / NFPA D03				
Mounting position			unrestricted, preferably horizontal				
Ambient temperature		[°C]	-25...+50				
Weight		[kg]	1.5 (1 solenoid), 2.1 (2 solenoids)				
Hydraulic							
Max. operating pressure		[bar]	P, A B: 350; T: 210 (DC), T: 140 (AC)				
Fluid			Hydraulic oil in accordance with DIN 51524 / 51525				
Fluid temperature		[°C]	-25 ... +70				
Viscosity permitted		[cSt] / [mm²/s]	2.8...400				
Viscosity recommended		[cSt] / [mm²/s]	30...80				
Filtration			ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)				
Flow max.		[l/min]	80				
Leakage at 50 bar		[ml/min]	Up to 10 per flow path, depending on spool				
Static / Dynamic							
Step response			see table response time				
Electrical characteristics							
Duty ratio			100% ED; CAUTION: coil temperature up to 150 °C possible				
Max. switching frequency		[1/h]	15000				
Protection class			IP 65 in accordance with EN 60529 (plugged and mounted)				
		Code	K	J	U	G	Y	T
Supply voltage		[V]	12 V =	24 V =	98 V =	205 V =	110V at 50Hz/ 120V at 60Hz	230V at 50Hz/ 240V at 60Hz
Tolerance supply voltage		[%]	±10	±10	±10	±10	±5	±5
Current consumption	hold	[A]	2.58	1.29	0.32	0.15	0.6 / 0.55	0.3 / 0.27
Current consumption	in rush	[A]	2.58	1.29	0.32	0.15	2.5 / 2.4	1.25 / 1.2
Power consumption	hold		31 W	31 W	31 W	31 W	70 / 70 VA	70 / 70 VA
Power consumption	in rush		31 W	31 W	31 W	31 W	280 / 290 VA	280 / 290 VA
Solenoid connection			Connector as per EN 175301-803, solenoid identification as per ISO 9461 (code W).					
Wiring min.		[mm²]	3 x 1.5 recommended					
Wiring length max.		[m]	50 recommended					

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

2

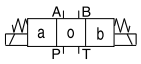
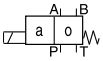
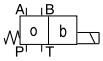
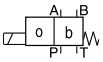
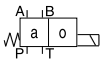
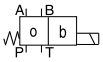
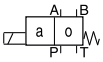
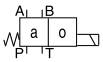
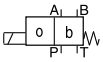
D	1	V	W	☐	☐	☐
Directional control valve	Size DIN NG06 CETOP 03 NFPA D03	3-chamber valve	Wet pin armature solenoid, threaded in tube	Spool type	Spool position	Seals

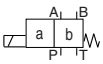
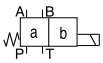
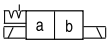
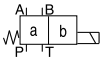
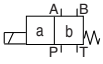
3 position spools		
Code	Spool type	
	a 0 b	
001		
002		
003		
004		
005		
006		
007		
008 [1]		
009 [1]		
010		
011		
014		
015		
016		
021		
022		
031		
032		
034		
035		
061		
081		
082		
102		
204 [1]		
205 [1]		

2 position spools		
Code	Spool type	
	a b	
020		
026		
030		
083 [1]		
101		
208		

[1] Consider specific spool position.

Code	Seals
N	**NBR**
V	FPM

3 position spools			
Code	Spool position		
C			**3 positions.** **Spring offset in position “0“.** **Operated in position “a“ or “b“.**
	Standard	Spool type 008,009, 204, 205	
E	 **Operated in position “a“.**	 **Operated in position “b“.**	**2 positions.** **Spring offset in position “0“.**
F	 Spring offset in position “b“.	 Spring offset in position “a“.	2 positions. Operated in position “0“.
K	 **Operated in position “b“.**	 **Operated in position “a“.**	**2 positions.** **Spring offset in position “0“.**
M	 Spring offset in position “a“.	 Spring offset in position “b“.	2 positions. Operated in position “0“.

2 position spools			
Code	Spool position		
	Standard	Spool type 083	
B			**2 positions.** **Spring offset in position “b“.** **Operated in position “a“.**
D			**2 positions.** **Operated in position “a“ or “b“.** **No centre or offset position.**
H			**2 positions.** **Spring offset in position “a“.** **Operated in position “b“.**

Bold letters =
Short-term availability

D1VW-4D01_UK.INDD CM_10.03.2008.1

Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

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	W		
Solenoid voltage	**Solenoid connector as per EN 175301-803, without plug** (other connectors are available for D1MW Series)	**Solenoid option**	**Design series** (not required for ordering)

Code	Voltage
K	**12V =**
J	**24V =**
U [2]	98V =
G [2]	205V =
Y	110V 50Hz / 120V 60Hz
T	230V 50Hz / 240V 60Hz

[2] Rectifier needed for DC solenoid when used with AC input.

Code	Solenoid option
omit	**Standard solenoid with manual override**
T	without manual override
S2 [3]	Soft shift orifice size 0.5 mm.
S3 [3]	Soft shift orifice size 0.75 mm.

[3] with built-in orifice (DC only)

The Parker model code should be used for all new applications. Otherwise also refer to Denison model code.

Further spool types, solenoid voltages and connectors on request.

2

4D01	–	3	□	□	–	□	□	–	C	□	□	–	□
Directional control valve size DIN NG06 CETOP 03		Body 3-chamber design	Control	Spool type		Spool position	End cap		Design series	Seals	Solenoid voltage		Options

Code	Control
1	1 solenoid
2	2 solenoids
7	2 solenoids and 2 pos. detents (only for spool types 11, 12, 51)

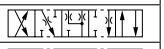
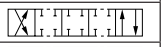
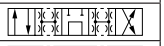
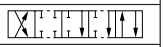
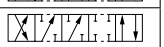
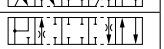
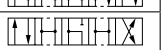
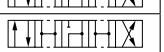
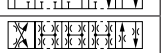
Code	Options
omit	Standard valve
G3 [3]	Soft shift with 0.75 mm orifice in anchor tube
32	Solenoid tube without manual override

[3] DC only

Code	Solenoid voltage
G0R	12V =
G0Q	24V =
GAR	98V =
GAG	205V =
W30	110V 50Hz/120V 60Hz
W31	230V 50Hz/240V 60Hz

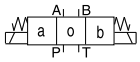
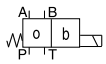
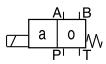
Code	Seals
1	NBR
5	FPM

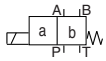
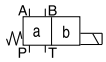
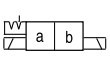
Code	End cap
01	for control 1
02	for controls 2 and 7

3 position spools	
Code	Spool type a 0 b
01	
02	
03	
07	
08	
09	
10	
13	
14	
46	
55	
56	
64	
65	
AR	
OT	
OX	

2 position spools	
Code	Spool type a b
11	
12	
51	
52	
71	
81 [1]	
81 [2]	

[1] Spool position code 01
[2] Spool position code 02

3 position spools		
Code	Spool position	
03		3 positions. Spring centered to “0“.
05		2 positions. Spring centered to “0“. Energized to “b“.
06		2 positions. Spring centered to “0“. Energized to “a“.

2 position spools		
Code	Spool position	
01		2 positions. Spring offset to “b“. Energized to “a“.
02		2 positions. Spring offset to “a“. Energized to “b“.
09		2 positions detent. Operated in “a“ or “b“. No centre or spring offset position.

DENISON Hydraulics

The Denison model code is available for existing applications. For new applications we advise to refer to Parker model code.

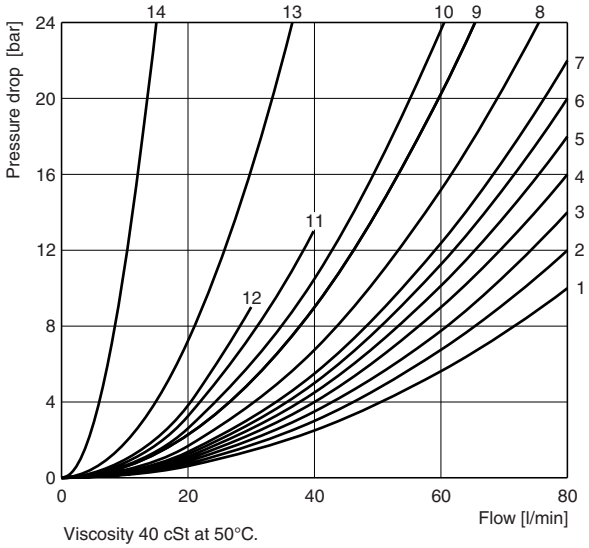
Further spool types and voltages on request.

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Flow curve



Viscosity 40 cSt at 50°C.

Spool		Position "b"			Position "a"			Position "0"				
		P-A	B-T	P-B	P-B	A-T	P-A	P-A	P-B	A-T	B-T	P-T
D1VW	4D01											
001	03	2	2		2	2						
002	01	1	4		1	4		1	1	5	5	2
003	10	3	4		3	6				7		
004	08	2	3		2	3				7	7	
005	13	2	2		2	2		12				
006	46	1	4		1	4		7	7			
007		3	2		2	2			3		2	7
010	BN	3			3							
011	02	2	2		2	2				14	14	
014		3	2		2	2		3		2		7
015	09	3	6		3	4					7	
016	14	2	2		2	2			12			
020B	51	4	4		2	3						
026B	12	4			4							
030B	11	2	3		1	2						
034	AR	4		8	3	3				5	7	
035	OT	3	3		4		8			7	5	
081		13	13		13	13						
082		13	13		13	13						
101B		11	10		10	9						
102	0X	1	4		1	4		5	5	8	8	6
61		1	3		1	3		3	2			
83H	71	5	2		5	2						
104		1			2	5		3		14		14
208	52	3			2							
		P-B	A-T		P-A	B-T		P-A	P-B	A-T	B-T	P-T
008		4	5		4	5						9
009	07	5	5		6	7						7
83B		5	2		5	2						
204	64	1	3		4	3		7		4		7
205	65	4	3		1	3			7		4	5

Spool		Position "b"			Position "a"		
		P-A	P-B	A-B	P-B	A-T	
021	55	2	4		4	2	
		P-A	B-T		P-A	P-B	A-B
022	56	6	2		5	2	
	81	2	2				
	81				2	2	

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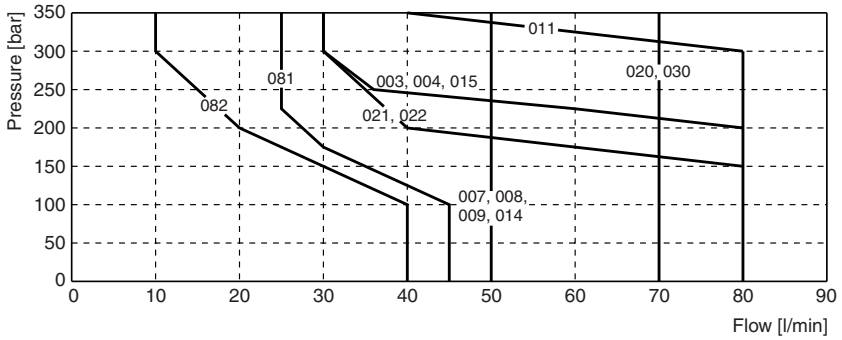
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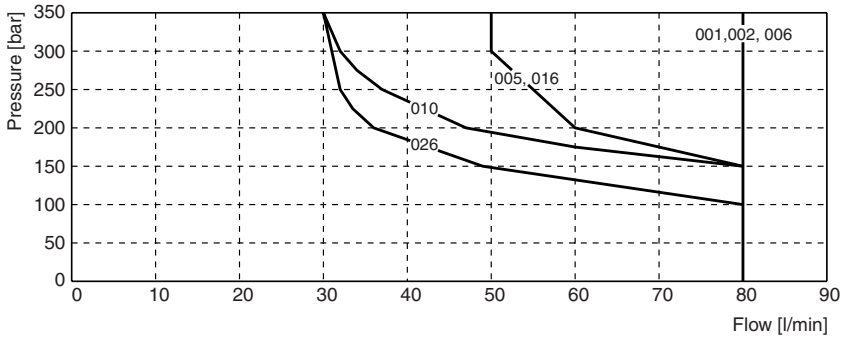
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The diagram below specifies the shift limits for valves with DC solenoids. Valves with spool position “F” or “M” can only be operated up to 70% of the limits. The specifications apply to a viscosity of 40mm²/s and balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions. To avoid flow rates beyond the shift limits, a plug-in orifice can be inserted in the P-port.

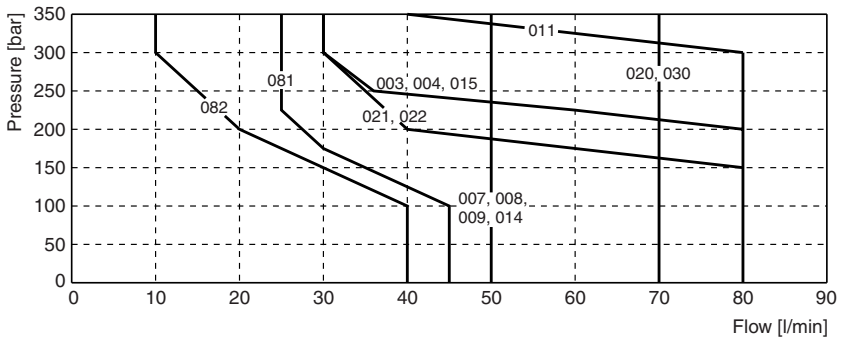
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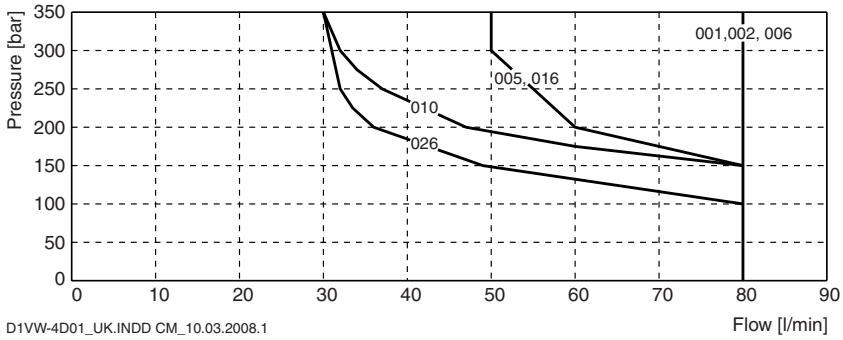
Valve with standard DC solenoid





Valve with standard AC solenoid





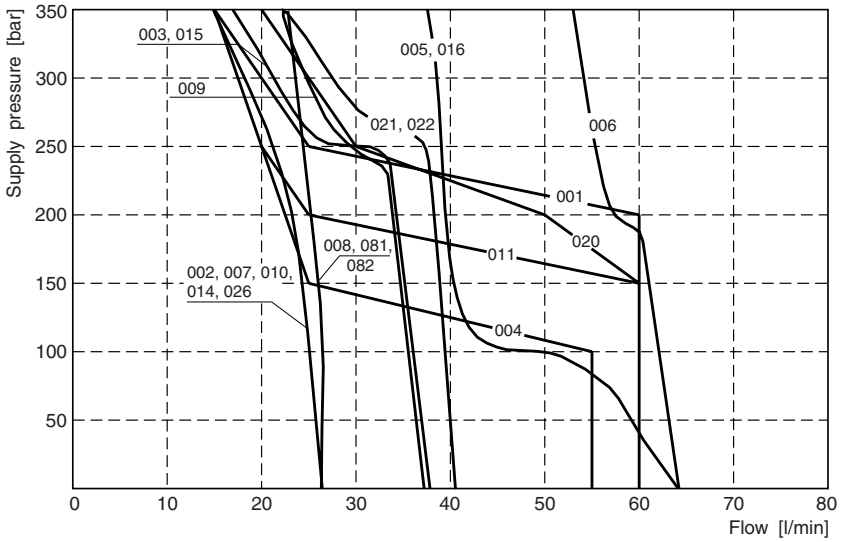
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Parker	Denison
001	03
002	01
003	10
004	08
005	13
006	46
007	–
008	–
009	07
010	BN
011	02
014	–
015	09
016	14
020	51
021	55
022	56
026	12
030	11
081	–
082	–
001 F/M	81
204	64
205	65
208	52

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Shift limit diagram - Soft shift



Response times D1VW Standard and Soft Shift

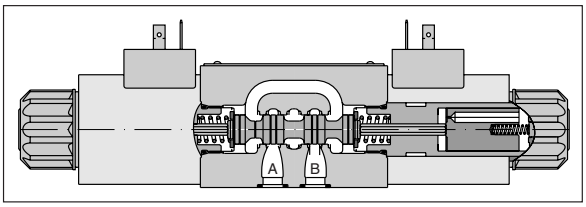
X-Number	Orifice size	3 positions: spool center condition				2 positions	
		Closed		Open			
		Energize	De-energize	Energize	De-energize	Energize	De-energize
(Standard)	–	32 ms (DC) 13 ms (AC)*	40 ms (DC) 20 ms (AC)*	32 ms (DC) 13 ms (AC)*	40 ms (DC) 20 ms (AC)*	32 ms (DC) 13 ms (AC)*	40 ms (DC) 20 ms (AC)*
S2	0.50	200 ms (DC)	650 ms (DC)	700 ms (DC)	650 ms (DC)	175 ms (DC)	225 ms (DC)
S3 (G3)	0.75	125 ms (DC)	325 ms (DC)	550 ms (DC)	550 ms (DC)	100 ms (DC)	100 ms (DC)

* For AC input and soft shift use rectifier plug.

Step response times were obtained under the following conditions: υ = 40 mm²/s at 50°C with the valve operating at nominal pressure and flow. Published response times are nominal and may vary with spool, flow, pressure and temperature.

Acceleration for orifice size 0.75, code “S3” (archived against a valve without soft shift)



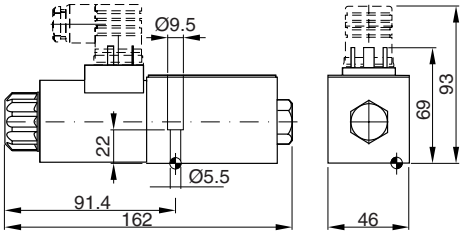


For even softer shifting, the proportional spools 081, 082, 101 and 102 can be used.

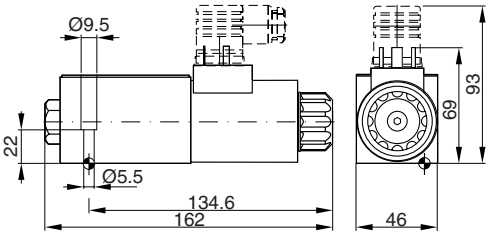
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2

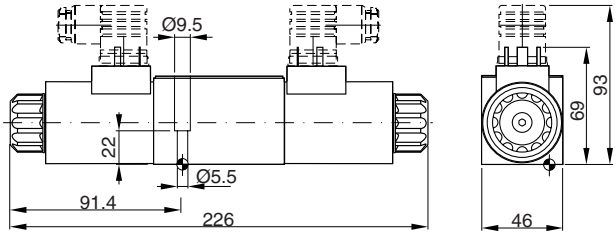
Interface EN 175301-803, DC solenoid
B, E, F / 01, 06 -style



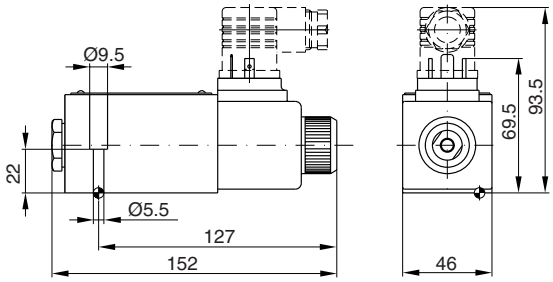
H, K, M / 02, 05 -style



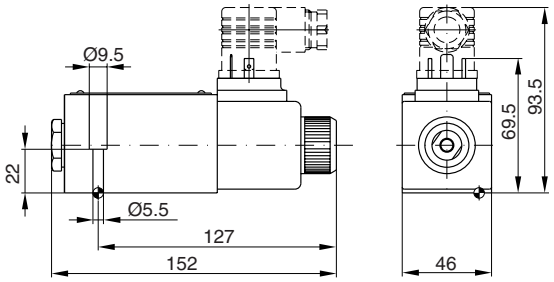
C, D / 03, 09 -style



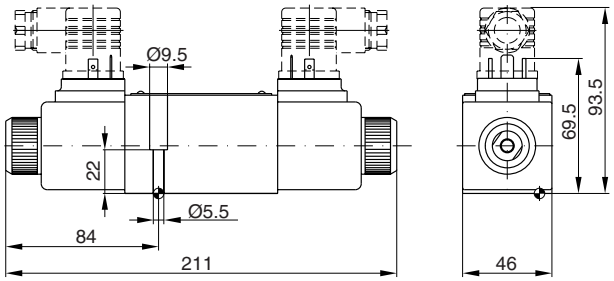
Interface EN 175301-803, DC solenoid
B, E, F / 01, 06 -style

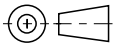


H, K, M / 02, 05 -style



C, D / 03, 09 -style



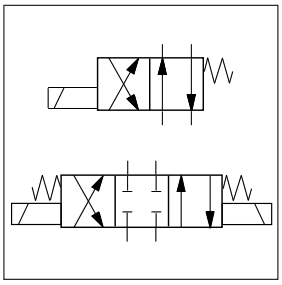


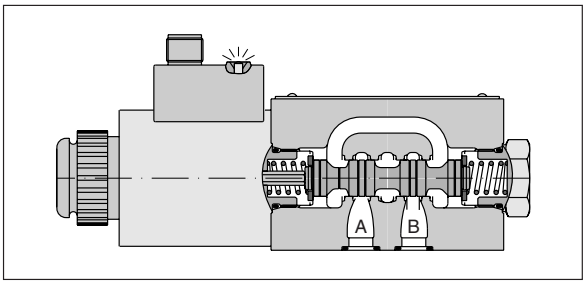
Surface finish	Kit			Kit
$\sqrt{R_{max}6.3}$ 0.01/100	BK375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	NBR: SK-D1VW-N-91 FPM: SK-D1VW-V-91

The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

The D1VW 8 Watt series is based on the standard D1VW design. The low watt, low current (<0.5 A) solenoid allows direct connection to a PLC or a bus knot. The valves are offered with standard solenoid connection (as per EN175301-803) and M12 x 1 connection. The version with M12 x 1 connection and LEDs are conform to the DESINA standard (**D**istribut**E**d and **S**tandardised **IN**st**A**l-lation technology) for machine tools and manufacturing systems.







Technical data

General		
Design		Directional spool valve
Actuation		Solenoid
Size		DIN NG06 / CETOP 03 / NFPA D03
Mounting interface		DIN 24340 A6 / ISO 4401 / CETOP RP 121-H / NFPA D03
Mounting position		unrestricted, preferably horizontal
Ambient temperature	[°C]	-25...+50
Weight	[kg]	1.5 (1 solenoid), 2.1 (2 solenoids)
Hydraulic		
Max. operating pressure	[bar]	P, A B: 350, T: 210
Fluid		Hydraulic oil in accordance with DIN 51524 / 51525
Fluid temperature	[°C]	-25 ... +70
Viscosity permitted	[cSt] / [mm²/s]	2.8...400
Viscosity recommended	[cSt] / [mm²/s]	30...80
Filtration		ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)
Flow max.	[l/min]	45
Leakage at 50 bar	[ml/min]	Up to 10 per flow path, depending on spool
Static / Dynamic		
Step response at 95%	[ms]	Energized: 80...120; De-energized: 35...55
Electrical characteristics		
Duty ratio		100% ED; CAUTION: coil temperature up to 70 °C possible
Max. switching frequency	[1/h]	10000
Protection class		IP 65 in accordance with EN 60529 (plugged and mounted)
	Code	J
Supply voltage	[V]	24 V =
Tolerance supply voltage	[%]	±10
Current consumption	[A]	0.33
Power consumption	[W]	8
Solenoid connection		Connector as per EN 175301-803, solenoid identification as per ISO 9461 (code W).
		Plug M12x1 on coil as per IEC 61076-2-101 (code D).
Wiring min.	[mm²]	3 x 1.5 recommended
Wiring length max.	[m]	50 recommended

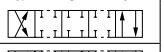
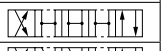
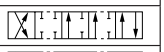
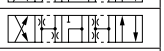
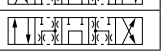
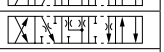
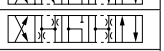
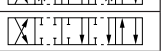
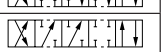
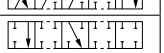
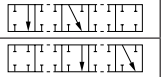
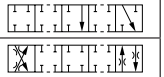
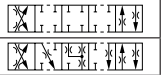
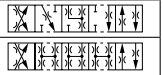
With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

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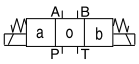
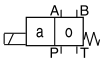
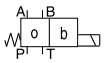
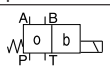
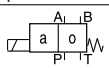
D	1	V	W			
Directional control valve	Size DIN NG06 CETOP 03 NFPA D03	3-chamber valve	Wet pin solenoid	Spool type	Spool position	Seals

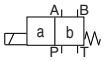
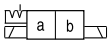
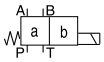
3 position spools	
Code	Spool type a 0 b
001	
002	
003	
004	
005	
006	
007	
008 [1]	
009 [1]	
010	
011	
014	
015	
016	
076	
078	
081	
082	
102	

2 position spools	
Code	Spool type a b
020	
026	
030	
101	

[1] Consider specific spool position.

Code	Seals
N	**NBR**
V	FPM

3 position spools			
Code	all 3 position spools		
C			**3 positions. Spring offset in position “0“. Operated in position “a“ or “b“.**
	Standard	Spool type 008, 009	
E	 Operated in position “a“.	 Operated in position “b“.	2 positions. Spring offset in position “0“.
K	 Operated in position “b“.	 Operated in position “a“.	2 positions. Spring offset in position “0“.

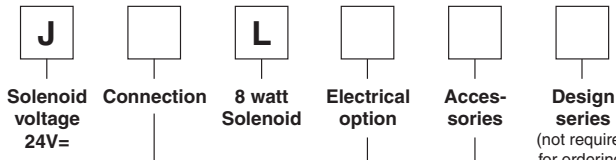
2 position spools		
Code	Spool position	
B		**2 positions. Spring offset in position “b“. Operated in position “a“.**
D [2]		**2 positions. Operated in position “a“ or “b“. No centre or offset position.**
H		**2 positions. Spring offset in position “a“. Operated in position “b“.**

[2] Only for spool 020 available.

Bold letters =
Short-term availability

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Code	Connection
D [3]	M12x1 on coil as per IEC 61076-2-101
W [3]	**Connector as per EN 175301-803, without plug**

[3] Please order plug separately.

Code	Accessories
omit	**Standard valve (in combination with solenoid connection "W")**
5	In combination with solenoid connection "D"

Solenoid identification acc. to ISO 9461

Code	Electrical option
omit	**Standard valve (in combination with solenoid connection "W")**
J	Surge diode with LED, max. voltage peak 50V (only available in combination with solenoid conn. "D")

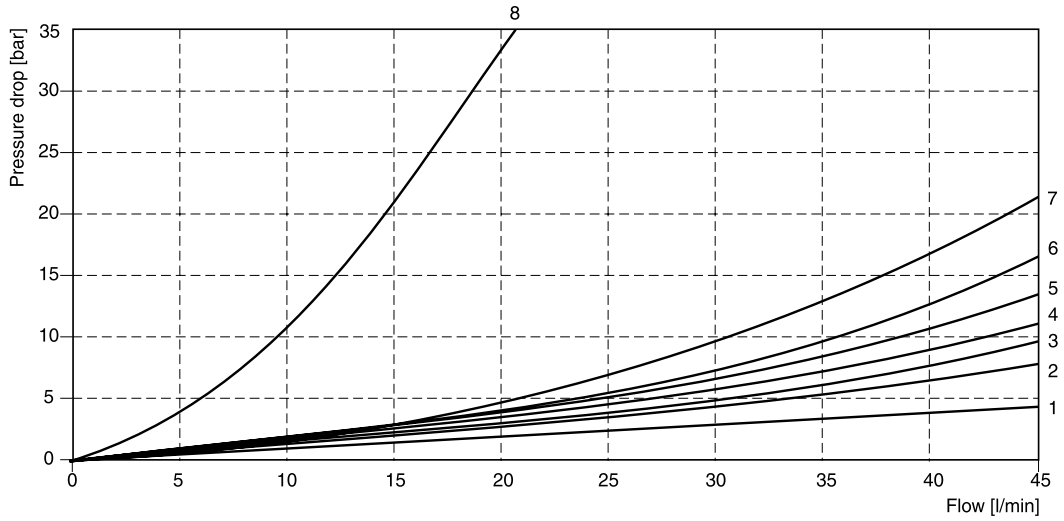
Further spool types on request.
To get a DESINA valve, order the combination: JDLJ5

The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number for each spool type, operating position and flow direction is given in the table below.

2

	Position „b“		Position „a“		Position „0“					
Spool	P ->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T	A->B
001	3	1	3	1	–	–	–	–	–	–
002	2	1	2	1	2	2	1	1	2	1
003	5	1	5	1	–	–	1	–	–	–
004	4	1	4	1	–	–	1	1	–	8
005	4	2	5	2	7	–	–	–	–	–
006	2	4	2	4	7	7	–	–	–	7
007	6	1	4	2	–	2	–	1	4	–
010	6	–	5	–	–	–	–	–	–	–
011	6	2	6	2	–	–	8	8	–	–
014	4	2	6	1	2	–	1	–	4	–
015	5	1	5	1	–	–	–	1	–	–
016	5	2	4	2	–	7	–	–	–	–
020	5	3	5	3	–	–	–	–	–	–
026	6	–	6	–	–	–	–	–	–	–
030	3	1	3	1	–	–	–	–	–	–
	P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T	A-> B
008	6	6	6	6	–	–	–	–	7	–
009	6	7	6	7	–	–	–	–	3	–

Flow curve diagram



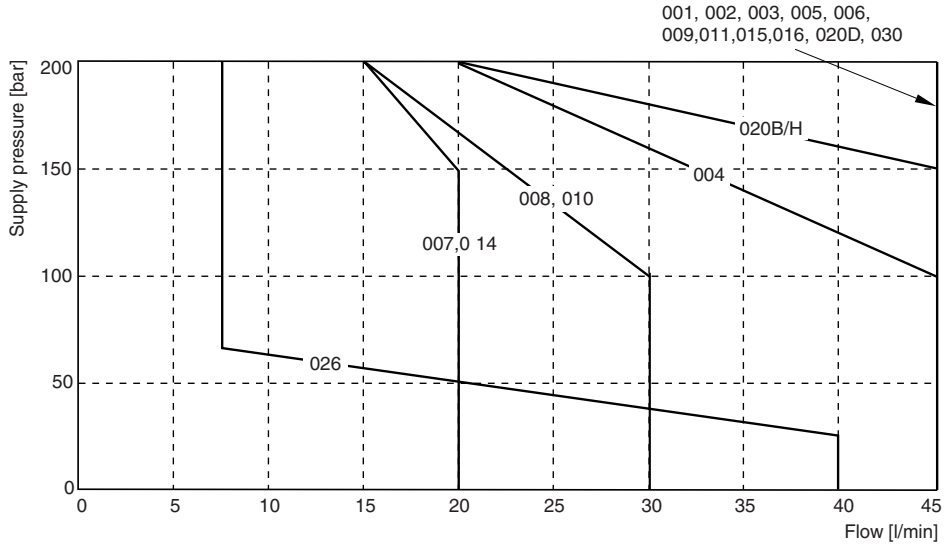
D1VW 8W_UK.INDD CM_21.01.2008.1

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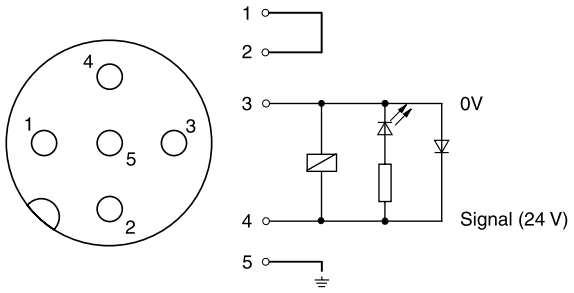
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The diagram below specifies the shift limits. Valves with spool position “F” or “M” can only be operated up to 70% of the limits. The specifications apply to a viscosity 40mm²/s and balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions. To avoid flow rates beyond the shift limits, a plug-in orifice can be inserted in the P-port.

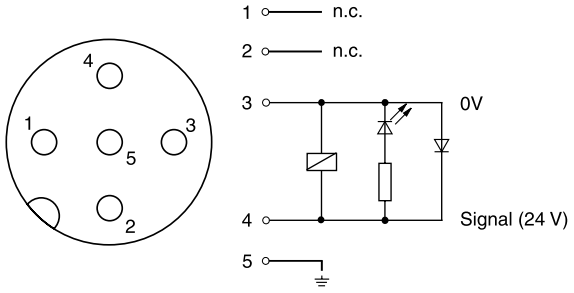
Shift limit



M12 pin assignment DESINA design (code „JDLJ5“), Pins 1 and 2 connected



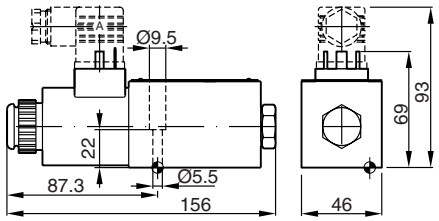
M12 pin assignment code “JDL“, Pins 1 and 2 not connected



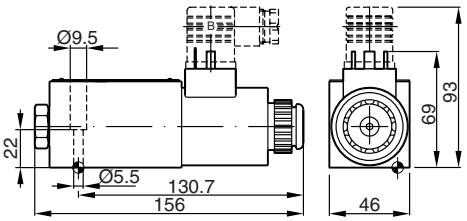
2

Interface EN 175301-803, DC solenoid

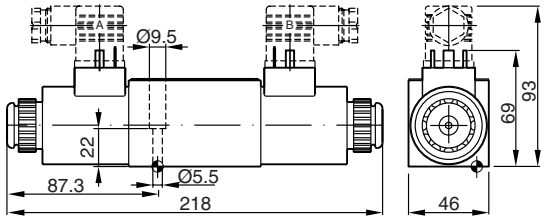
Style B, E



Style H, K

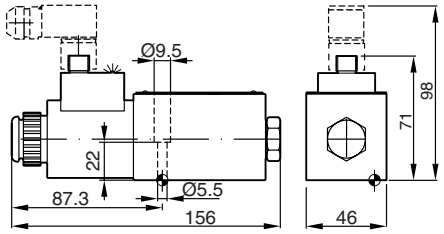


Style C, D

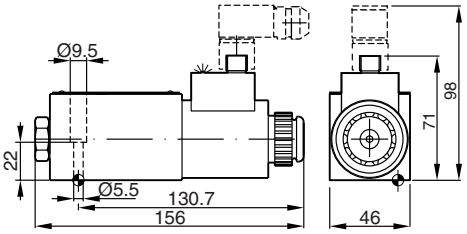


M12x1 connector, DC solenoid, JDLJ5 (DESINA) or JDL

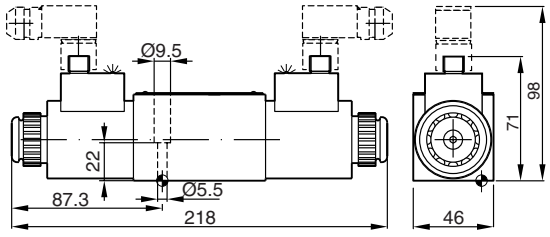
Style B, E



Style H, K



Style C, D



DESINA

Surface finish	Kit			Kit
$\sqrt{R_{max}6.3}$ 0.01/100	BK375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	**NBR: SK-D1VW-N-91** FPM: SK-D1VW-V-91

The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

D1VW 8W_UK.INDD CM_21.01.2008.1

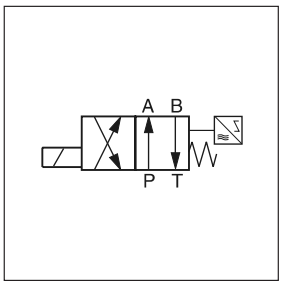
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The direct operated 4/2 directional valves with inductive position control are typically used in safety relevant applications. The start or end position can be monitored. The position control is only available for single solenoid valves.

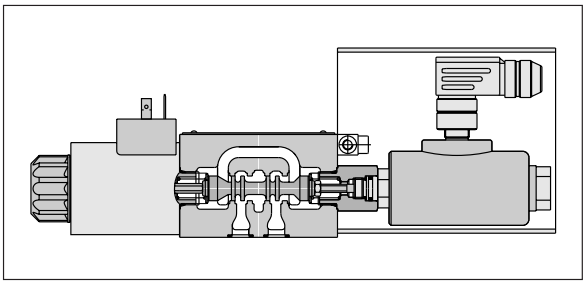
The fail-safe position of the directional valve during power failure is the spring offset position.





Attention

The adjustment of the position control is factory set and sealed. Replacement and repairs can only be undertaken by the manufacturer.



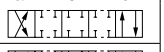
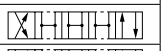
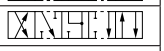
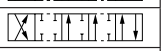
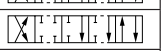
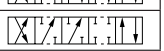
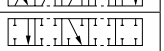
Technical data

General					
Design		Directional spool valve			
Actuation		Solenoid			
Size		DIN NG06 / CETOP 03 / NFPA D03			
Mounting interface		DIN 24340 A6 / ISO 4401 / CETOP RP 121-H / NFPA D03			
Mounting position		unrestricted, preferably horizontal			
Ambient temperature	[°C]	0...+50			
Weight	[kg]	1.8 (1 solenoid)			
Hydraulic					
Max. operating pressure	[bar]	P, A B: 350 ; T: 210			
Fluid		Hydraulic oil in accordance with DIN 51524 / 51525			
Fluid temperature	[°C]	-25 ... +70			
Viscosity permitted	[cSt] / [mm²/s]	2.8...400			
Viscosity recommended	[cSt] / [mm²/s]	30...80			
Filtration		ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)			
Flow max.	[l/min]	80			
Leakage at 50 bar	[ml/min]	Up to 10 per flow path, depending on spool			
Static / Dynamic					
Step response at 95%	[ms]	Energized: 32 ; De-energized: 40			
Electrical characteristics					
Duty ratio		100% ED; CAUTION: coil temperature up to 150 °C possible			
Max. switching frequency	[1/h]	15000			
Protection class		IP 65 in accordance with EN 60529 (plugged and mounted)			
	Code	K	J	U	G
Supply voltage	[V]	12 V =	24 V =	98 V =	205 V =
Tolerance supply voltage	[%]	±10	±10	±10	±10
Current consumption	[A]	2.5	1.25	0.31	0.15
Power consumption	[W]	30	30	30	30
Solenoid connection		Connector as per EN 175301-803, solenoid identification as per ISO 9461.			
Wiring min.	[mm²]	3 x 1.5 recommended			
Wiring length max.	[m]	50 recommended			

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

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D	1	V	W			
Directional control valve	**Size DIN NG06 CETOP 03 NFPA D03**	**3-chamber valve**	**Wet pin solenoid**	**Spool type**	**Spool position**	**Seals**

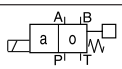
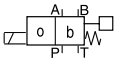
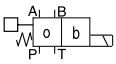
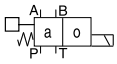
3 position spools	
Code	Spool type
	a 0 b
001	
002	
003 [1]	
004	
005	
015 [2]	
016	
076	
078	

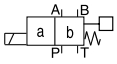
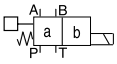
2 position spools	
Code	Spool type
	a b
020	
026	
030	

[1] Only available for spool position “E“ and “F“.

[2] Only available for spool position “K“ and “M“.

Code	Seals
N	**NBR**
V	FPM

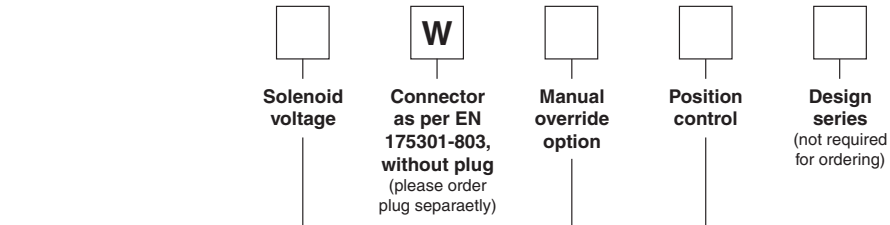
3 position spools		
Code	Standard	
E	 Operated in position “a“.	**2 positions. Spring offset in position “0“.**
F	 Spring offset in position “b“.	2 positions. Operated in position “0“.
K	 Operated in position “b“.	**2 positions. Spring offset in position “0“.**
M	 Spring offset in position “a“.	2 positions. Operated in position “0“.

2 position spools		
Code	Spool position	
B		**2 positions. Spring offset in position “b“. Operated in position “a“.**
H		**2 positions. Spring offset in position “a“. Operated in position “b“.**

Bold letters =
Short-term availability

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Code	Voltage
K	12V=
J	**24V=**
U [3]	98V=
G [3]	205V=

[3] To be used with rectifier plug when DC solenoids are used with AC input.

Code	Spool position	Position control
I2N	E, F, B (Solenoid on a-side)	End position monitored side B
I5N [4]		**Start position monitored side B**
I1N	K, M, H (Solenoid on b-side)	End position monitored side A
I4N [4]		**Start position monitored side A**

Code	Manual override
omit	**Standard valve with manual override**
T [4]	without manual override

[4] For hydraulic presses according to the safety regulations EN 693, solenoid option "T" (without manual override) and accessories "I4N" or "I5N" (start position monitored) are required.

Further spool types and voltages on request.

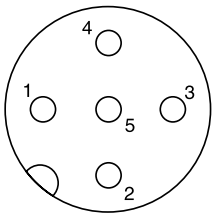
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2

Electrical characteristics of position control as per IEC 61076-2-101 (M12x1)

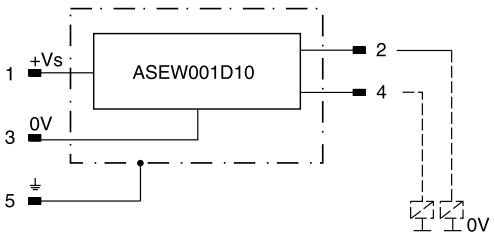
Protection class		IP 65 in accordance with EN 60529 (plugged and mounted)
Ambient temperature	[°C]	0...+50
Supply voltage / ripple	[V]	18...42 / 10%
Current consumption without load	[mA]	≤ 30
Max. output current per channel, ohmic	[mA]	400
Min. output load per channel, ohmic	[kOhm]	100
Max. output drop at 0.2A	[V]	≤ 1.1
Max. output drop at 0.4A	[V]	≤ 1.6
EMC		EN50081-1 / EN50082-2
Max. tolerance ambient field strength	[A/m]	<1200
Min. distance to next AC solenoid	[m]	>0.1
Interface		M12x1
Wiring min.	[mm²]	5 x 0.25 brad shield recommended
Wiring length max.	[m]	50 recommended

M12 pin assignment



Start position monitored
1 + Supply 18...42V
2 Normally open B
3 0V
4 Normally open A
5 Earth ground

End position monitored
1 + Supply 18...42V
2 Normally closed B
3 0V
4 Normally open A
5 Earth ground



Definitions

Start position monitored:

The valve is de-energized. The inductive switch gives a signal at the moment when the spool leaves the spring offset position (below 15% spool stroke).

The switch can only be located on the opposite side of the solenoid for direct operated valves.

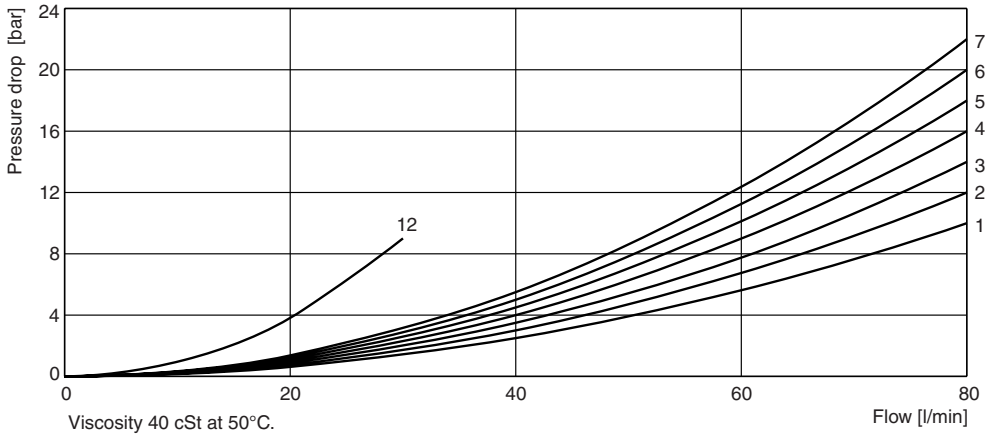
End position monitored:

The inductive switch gives a signal before the end position is reached (above 85% spool stroke).

The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number for each spool type, operating position and flow direction is given in the table below.

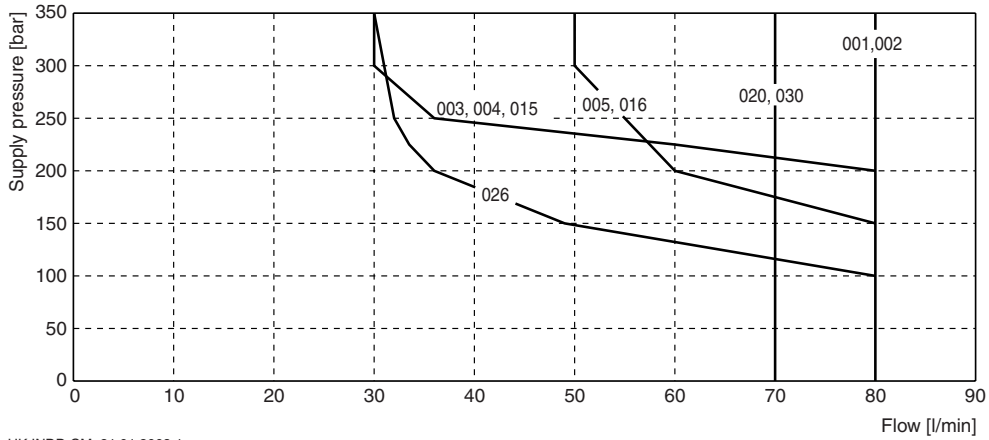
	Position „b“		Position „a“		Position „0“				
Spool	P->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T
001	2	2	2	2	–	–	–	–	–
002	1	4	1	4	1	1	5	5	2
003	3	4	3	6	–	–	7	–	–
004	2	3	2	3	–	–	7	7	–
005	2	2	2	2	12	–	–	–	–
015	3	6	3	4	–	–	–	7	–
016	2	2	2	2	–	12	–	–	–
020 B	4	4	2	3	–	–	–	–	–
026 B	4	–	4	–	–	–	–	–	–
030 B	2	3	1	2	–	–	–	–	–

Flow curve diagram



Shift limit diagram

The diagram below specifies the shift limits. Valves with spool position “F” or “M” can only be operated up to 70% of the limits. The specifications apply to a viscosity 40mm²/s and balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions. To avoid flow rates beyond the shift limits, a plug-in orifice can be inserted in the P-port.

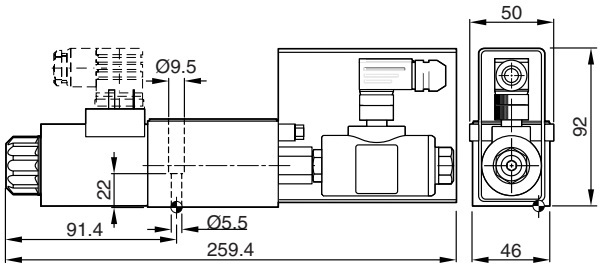


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Hydraulic Controls Division
Kaarst, Germany

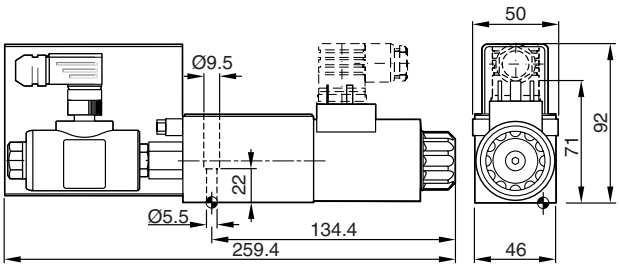
Tel: +45 63 12 83 00 | Email: ps@hymatik.com | www.hymatik.com | Hvidkaervej 27a, DK-5250 Odense SV, Denmark

2

Interface EN 175301-803, DC solenoid, with plug M12x1*
B, E, F -style



H, K, M -style



* Delivery includes plug M12 x 1 (see accessories, plug M12x1; order no.: 5004109).

Surface finish	Kit			Kit
R_{max}6.3 0.01/100	BK375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	**NBR: SK-D1VW-N-91** FPM: SK-D1VW-V-91

The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

Attention

The adjustment of the position control is factory set and sealed. Replacement and repairs can only be undertaken by the manufacturer.

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The D1VW with explosion proof solenoids is based on the standard D1VW series. The specific solenoid design allows the use in hazardous environments.

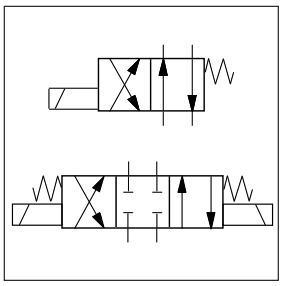
The explosion proof class is

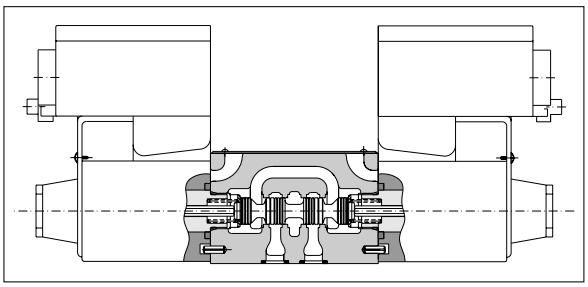
CE Ex II 2 G
EEx me II T4

for use in zone 1.

All explosion proof solenoids are DC design. For AC (code P and N) the input voltage is internally rectified.







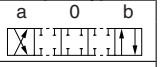
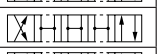
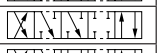
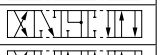
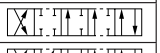
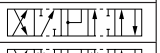
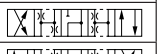
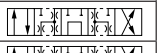
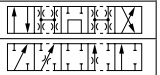
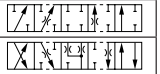
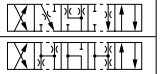
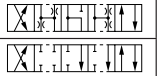
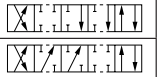
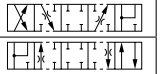
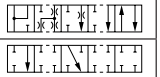
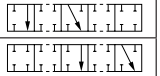
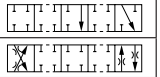
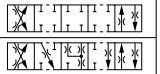
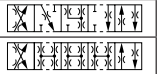
Technical data

General				
Design		Directional spool valve		
Actuation		Solenoid		
Size		DIN NG06 / CETOP 03 / NFPA D03		
Mounting interface		DIN 24340 A6 / ISO 4401 / CETOP RP 121-H / NFPA D03		
Mounting position		unrestricted, preferably horizontal		
Ambient temperature	[°C]	-25...+50		
Weight	[kg]	1.8 (1 solenoid), 2.7 (2 solenoids)		
Hydraulic				
Max. operating pressure	[bar]	P, A B: 350 T: 210		
Fluid		Hydraulic oil in accordance with DIN 51524 / 51525		
Fluid temperature	[°C]	-25 ... +60		
Viscosity permitted	[cSt] / [mm²/s]	2.8...400		
Viscosity recommended	[cSt] / [mm²/s]	30...80		
Filtration		ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)		
Flow max.	[l/min]	80		
Leakage at 50 bar	[ml/min]	Up to 10 per flow path, depending on spool		
Static / Dynamic				
Step response at 95%	[ms]	Energized: 32 (DC) De-energized: 40 (DC)		
Electrical characteristics				
Duty ratio		100% ED; CAUTION: coil temperature up to 130 °C possible		
Max. switching frequency	[1/h]	15000		
Protection class		CE Ex II 2 G , EEx me II T4, IP66		
	Code	J	Y	T
Supply voltage / ripple	[V]	24 V =	110/50Hz / 120/60Hz	230/50Hz / 240/60Hz
Tolerance supply voltage	[%]	±10	±5	±5
Current consumption	[A]	1.25	0.32	0.15
Power consumption	[W]	30	30	30
Solenoid connection		Box with M20x1.5 entry for cable glands. Solenoid identification as per ISO 9461.		
Wiring min.	[mm²]	3 x 1.5 recommended		
Wiring length max.	[m]	50 recommended		

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

2

D	1	V	W					E	E	
Directional control valve	Size DIN NG06 CETOP 03 NFPA D03	3-chamber valve	Wet pin solenoid	Spool type	Spool position	Seals	Solenoid voltage	Connection: Explosion proof with cable glands	Solenoid options: Explosion proof EEx me II	Design series (not required for ordering)

3 position spools	
Code	Spool type a 0 b
001	
002	
003	
004	
005	
006	
007	
008 [1]	
009 [1]	
010	
011	
014	
015	
016	
021	
022	
031	
032	
076	
078	
081	
082	
102	

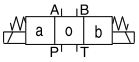
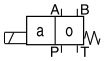
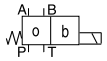
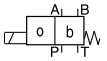
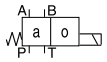
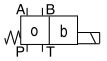
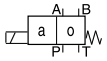
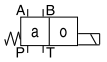
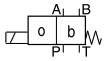
2 position spools	
Code	Spool type a b
020	
026	
030	
101	

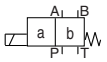
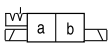
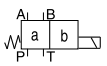
[1] Consider specific spool position.

Further spool types, styles, and combinations on request.

Code	Voltage
J	24V=
Y	110V 50Hz 120V 60Hz
T	230V 50Hz 240V 60Hz

Code	Seals
N	NBR
V	FPM

3 position spools			
Code	all 3 position spools		
C			3 positions. Spring offset in position “0“. Operated in position “a“ or “b“.
	Standard	Spool type 008, 009	
E	 Operated in position “a“.	 Operated in position “b“.	2 positions. Spring offset in position “0“.
F	 Spring offset in position “b“.	 Spring offset in position “a“.	2 positions. Operated in position “0“.
K	 Operated in position “b“.	 Operated in position “a“.	2 positions. Spring offset in position “0“.
M	 Spring offset in position “a“.	 Spring offset in position “b“.	2 positions. Operated in position “0“.

2 position spools		
Code	Spool position	
B		2 positions. Spring offset in position “b“. Operated in position “a“.
D		2 positions. Operated in position “a“ or “b“. No centre or offset position.
H		2 positions. Spring offset in position “a“. Operated in position “b“.

D1VW expl_UK.INDD CM_21.01.2008.1

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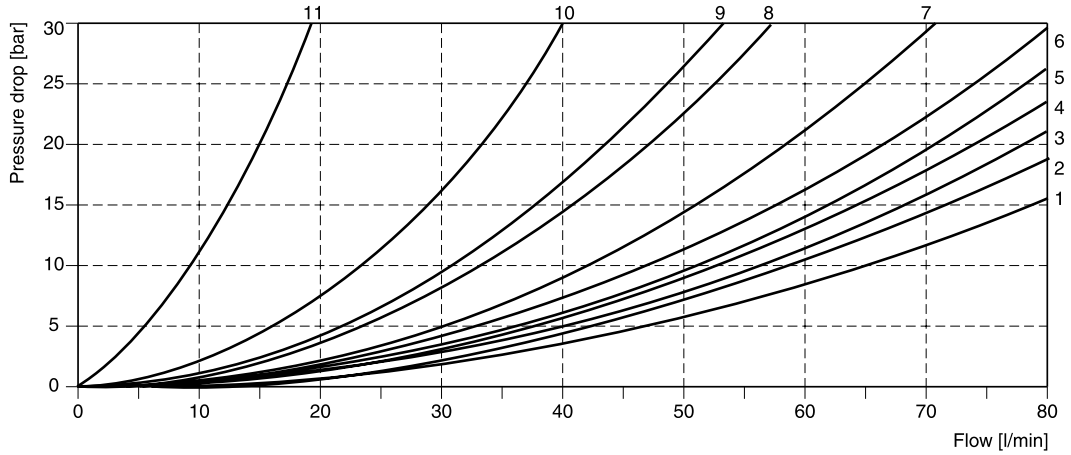
The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number for each spool type, operating position and flow direction is given in the table below.

	Position „b“		Position „a“		Position „0“					
Spool	P->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T	A->B
001	4	1	4	1	–	–	–	–	–	–
002	5	2	5	2	4	4	1	1	6	1
003	4	1	4	2	–	–	8	–	–	–
004	4	2	4	2	–	–	7	7	–	9
005	4	1	5	1	9	–	–	–	–	–
006	5	1	5	1	9	9	–	–	–	9
007	5	2	4	1	–	5	–	1	7	–
010	4	–	4	–	–	–	–	–	–	–
011	4	2	4	2	–	–	11	11	–	–
014	4	1	5	2	5	–	1	–	7	–
015	4	2	4	1	–	–	–	8	–	–
016	5	1	4	1	–	9	–	–	–	–
020	5	1	5	1	–	–	–	–	–	–
026	6	–	6	–	–	–	–	–	–	–
030	5	1	5	1	–	–	–	–	–	–
076	–	2	–	–	–	–	3	–	–	–
078	–	–	–	2	–	–	–	3	–	–
081	10	10	10	10	–	–	–	–	–	–
082	10	10	10	10	–	–	[1]	[1]	–	–
	P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T	A-> B
008	2	2	2	2	–	–	–	–	8	–
009	3	3	3	3	–	–	–	–	9	–

	Position „b“			Position „a“		
	P->A	P->B	A->B	P->B	A->T	
021	3	3	3	6	1	
	P->A	B->T		P->A	P->B	A->B
022	6	1		3	3	3

[1] Only for pressure compensation, no high flow possible.

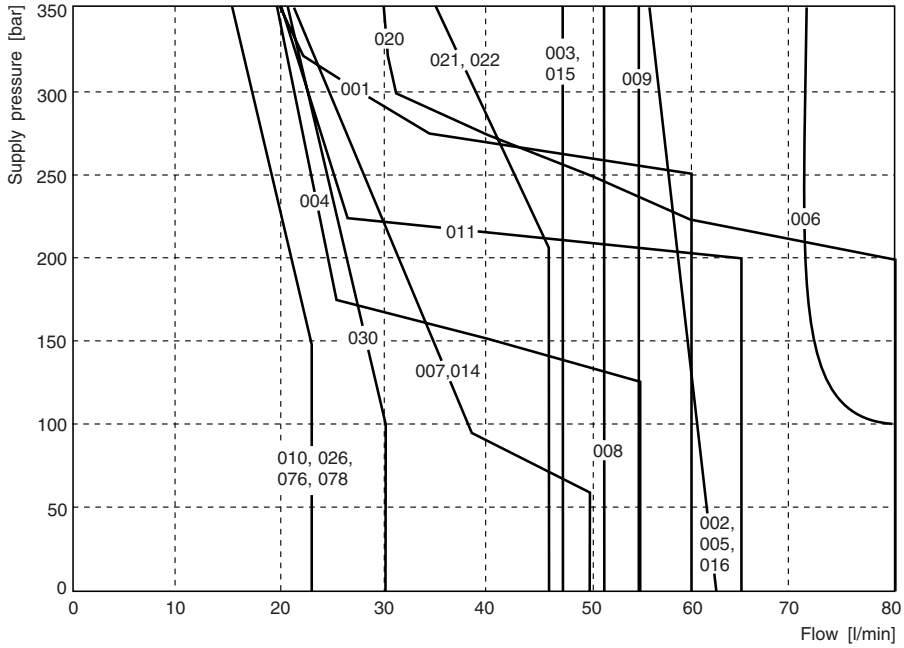
Flow curve diagram



2

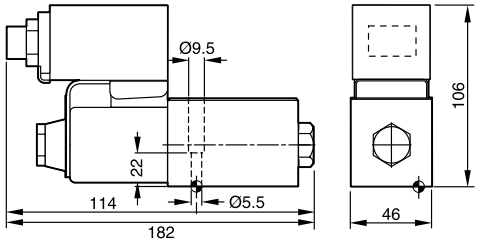
The diagram below specifies the shift limits for valves with DC solenoids. Valves with spool position “F” or “M” can only be operated up to 70% of the limits. The specifications apply to a viscosity 40mm²/s and balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions. To avoid flow rates beyond the shift limits, a plug-in orifice can be inserted in the P-port.

Shift limit diagram

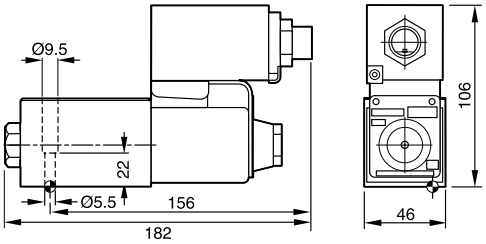


Dimensions

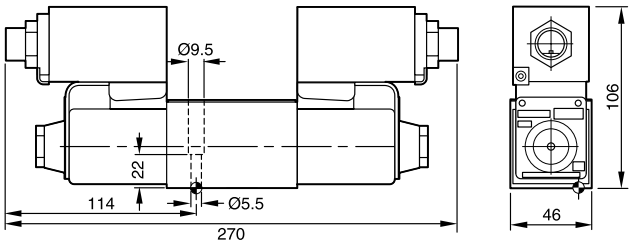
B, E, F -style



H, K, M -style



C, D -style



Surface finish	Kit			Kit NBR
R_{max}6.3 ⏥ 0.01/100	BK375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	**NBR: SK-D1VW-N-91** FPM: SK-D1VW-V-91

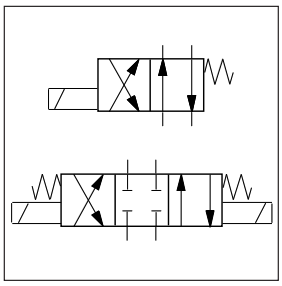
D1VW expl_UK.INDD CM_21.01.2008.1

Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

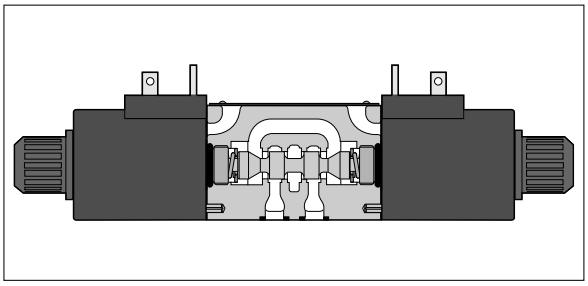
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The new D1MW is based on the D1VW series of directional control valves size NG06, but offers additional corrosion protection of the valve body, the solenoid coil and the anchor tube as well as the typical solenoid connections for the mobile market such as AMP Junior Timer and DP4 “Deutsch”.





With AMP Junior Timer



With connector as per EN 175301-803

Technical features

- High corrosion protection (optional)
- Solenoid connection:
  - Standard (as per EN175301-803)
  - AMP Junior Timer
  - DP4 2-pin “Deutsch”
- Robust design for rough applications
- Extended manual override with rubber cover (optional)

Technical data

General			
Design		Directional spool valve	
Actuation		Solenoid	
Size		DIN NG06 / CETOP 03 / NFPA D03	
Mounting interface		DIN 24340 A6 / ISO 4401 / CETOP RP 121-H / NFPA D03	
Mounting position		Unrestricted, preferably horizontal	
Ambient temperature	[°C]	-25...+50	
Weight	[kg]	1.5 (1 solenoid), 2.1 (2 solenoids)	
Hydraulic			
Max. operating pressure	[bar]	P, A B: 350; T: 210	
Fluid		Hydraulic oil in accordance with DIN 51524 / 51525	
Fluid temperature	[°C]	-25 ... +70	
Viscosity permitted	[cSt] / [mm²/s]	2.8...400	
Viscosity recommended	[cSt] / [mm²/s]	30...80	
Filtration		ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)	
Flow max.	[l/min]	80	
Leakage at 50 bar	[ml/min]	Up to 10 per flow path, depending on spool	
Static / Dynamic			
Step response at 95%	[ms]	Energized: 32 De-energized: 40	
Electrical characteristics			
Duty ratio		100% ED; CAUTION: coil temperature up to 150 °C possible	
Max. switching frequency	[1/h]	15000	
Protection class		IP 65 in accordance with EN 60529 (plugged and mounted)	
	Code	K	J
Supply voltage	[V]	12 V =	24 V =
Tolerance supply voltage	[%]	±10	±10
Current consumption hold	[A]	2.5	1.25
Power consumption hold	[W]	30	30
Solenoid connection		Connector as per EN 175301-803 (code W), AMP Junior Timer (code A), DP4 2-pin “Deutsch“ connector (code J). Solenoid identification as per ISO 9461.	
Wiring min.	[mm²]	3 x 1.5 recommended	
Wiring length max.	[m]	50 recommended	

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

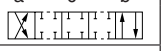
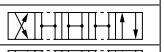
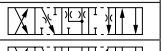
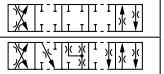
D1MW_UK.INDD CM_21.01.2008.1

Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

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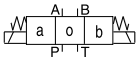
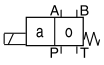
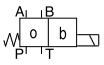
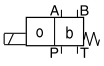
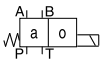
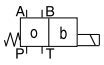
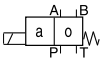
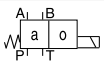
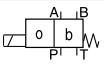
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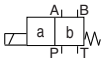
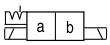
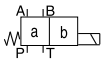
D	1	M	W			N
Directional control valve	Size DIN NG06 CETOP 03 NFPA D03	3-chamber valve for mobile and marine applications	Wet pin armature solenoid, threaded in tube	Spool type	Spool position	NBR Seal

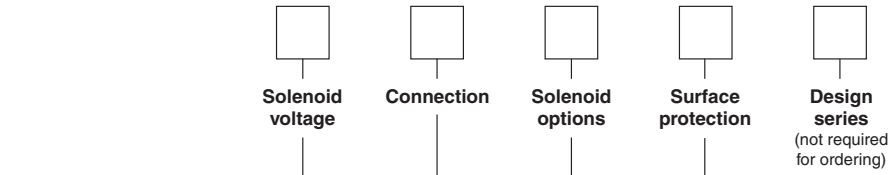
3 position spools	
Code	Spool type a 0 b
001	
002	
004	
006	
008 [1]	
011	
021	
022	
081	
082	

2 position spools	
Code	Spool type a b
020	
030	

[1] Consider specific spool position.

3 position spools			
Code	all 3 position spools		
C			3 positions. Spring offset in position “0“. Operated in position “a“ or “b“.
	Standard	Spool type 008	
E	 Operated in position “a“.	 Operated in position “b“.	2 positions. Spring offset in position “0“.
F	 Spring offset in position “b“.	 Spring offset in position “a“.	2 positions. Operated in position “0“.
K	 Operated in position “b“.	 Operated in position “a“.	2 positions. Spring offset in position “0“.
M	 Spring offset in position “a“.	 Spring offset in position “b“.	2 positions. Operated in position “0“.

2 position spools		
Code	Spool position	
B		2 positions. Spring offset in position “b“. Operated in position “a“.
D		2 positions. Operated in position “a“ or “b“. No centre or offset position.
H		2 positions. Spring offset in position “a“. Operated in position “b“.



Code	Voltage
K	12V =
J	24V =

Code	Connection
W [2]	Connector as per EN 175301-803
J [2]	Connector “Deutsch“ DP4 2-pin
A [2]	2-pin AMP Junior Timer

[2] Please order plug separately.

Code	Solenoid option
omit	Standard solenoid
T	without manual override
W	extended manual override with rubber cover

Code	Surface protection
omit	Standard, only for connection “J“ and “A“
1P	Anti corrosion coating acc. to DIN 50021SS for extreme conditions. For all connection options

Other spool types on request.

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The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number for each spool type, operating position and flow direction is given in the table below.

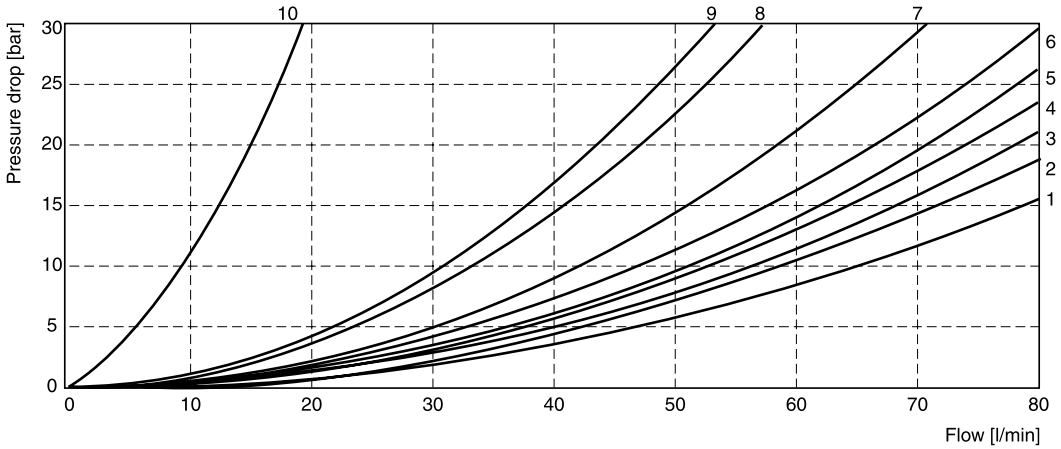
2

	Position „b“		Position „a“		Position „0“					
Spool	P ->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T	A->B
001	3	1	3	1	–	–	–	–	–	–
002	2	1	2	1	2	2	1	1	2	1
004	4	1	4	1	–	–	1	1	–	9
006	2	4	2	4	7	7	–	–	–	7
011	6	2	6	2	–	–	9	9	–	–
020	5	3	5	3	–	–	–	–	–	–
030	3	1	3	1	–	–	–	–	–	–
081	10	10	10	10	–	–	–	–	–	–
082	10	10	10	10	–	–	[1]	[1]	–	–
	P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T	A-> B
008	2	2	2	2	–	–	–	–	8	–

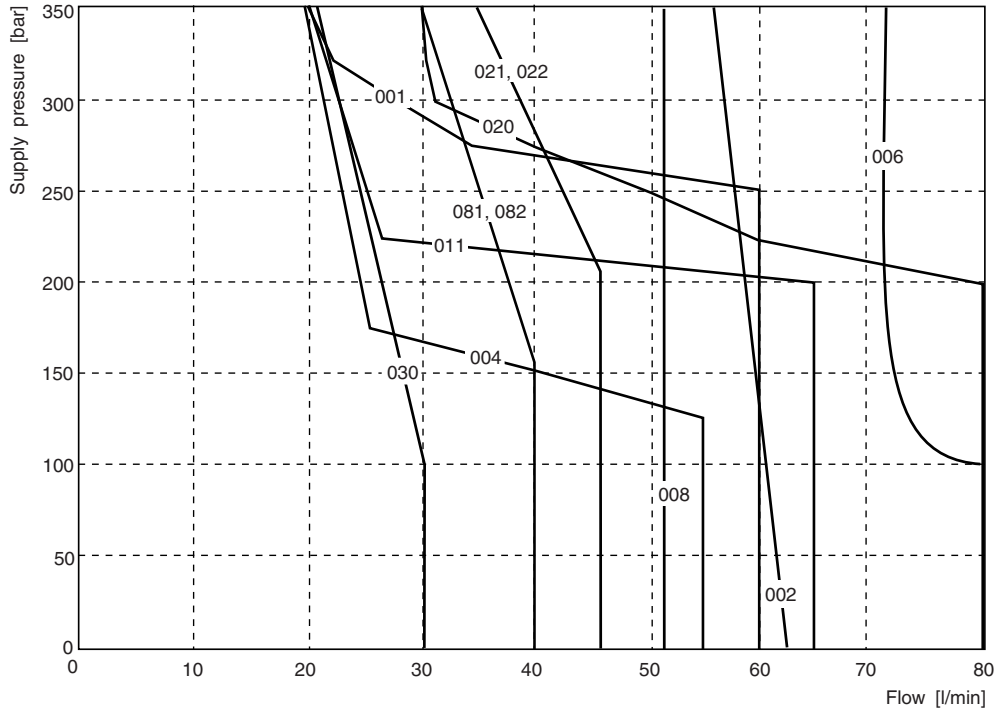
	Position „b“			Position „a“		
	P->A	P->B	A->B	P->B	A->T	
021	3	3	3	6	1	
	P->A	B->T		P->A	P->B	A->B
022	6	1		3	3	3

[1] Only for pressure compensation, no higher flow possible.

Flow curve diagram



The diagram below specifies the shift limits. Valves with spool position “F” or “M” can only be operated up to 70% of the limits. The specifications apply to a viscosity 40mm²/s and balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions. To avoid flow rates beyond the shift limits, a plug-in orifice can be inserted in the P port.

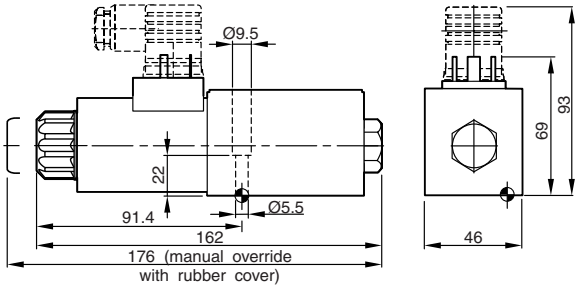


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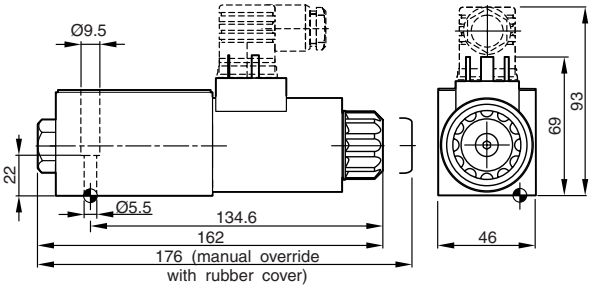
2

Dimensions with EN 175301-803 Connector

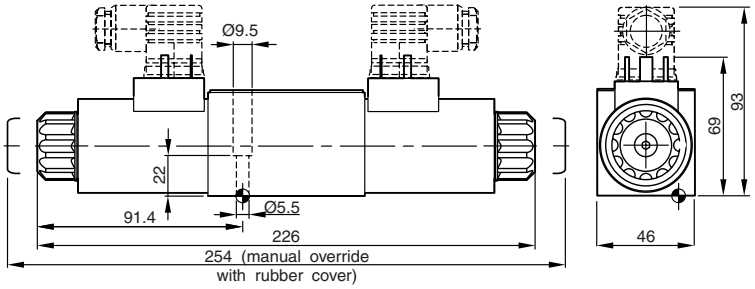
B, E, F -style



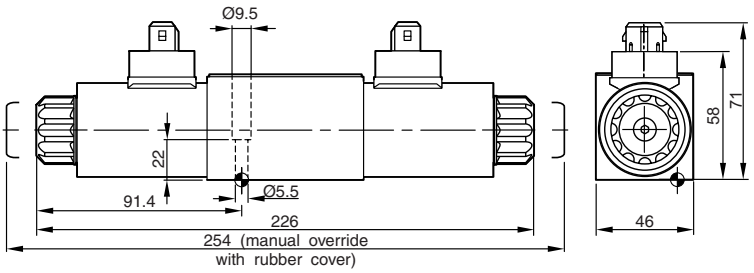
H, K, M -style



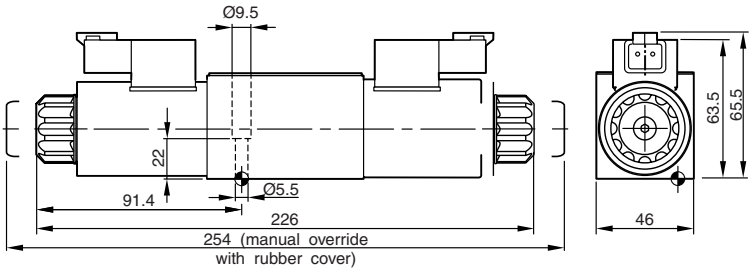
C and D -style

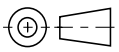


Dimensions with 2pin AMP Junior Timer Connector (only C and D -style shown)



Dimensions with "Deutsch" DP4 2pin Connector (only C and D -style shown)





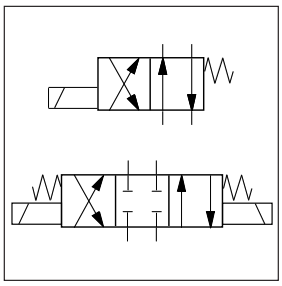
Surface finish	Kit			Kit
R_{max}6.3 0.01/100	BK375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	**NBR: SK-D1VW-N-91** FPM: SK-D1VW-V-91

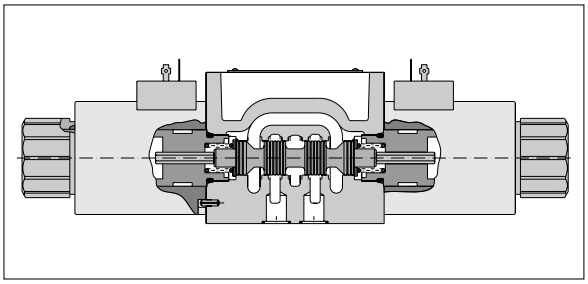
The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

The direct operated directional control valve size NG10 is available with both Parker (series D3W) and Denison (series 4D02) model codes.

Both series are available with a soft shift option for smooth operation. An additional orifice in the solenoid anchor dampens the shifting time for D3W. For the 4D02 the orifice is located in the valve body.







Technical data

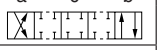
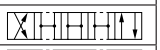
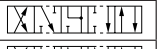
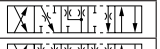
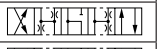
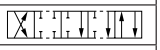
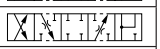
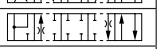
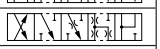
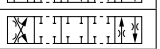
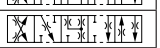
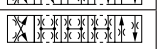
General							
Design		Directional spool valve					
Actuation		Solenoid					
Size		DIN NG10 / CETOP 05 / NFPA D05					
Mounting interface		DIN 24340 A10 / ISO 4401 / CETOP RP 121-H / NFPA D05					
Mounting position		unrestricted, preferably horizontal					
Ambient temperature	[°C]	-25...+50					
Weight	[kg]	4.8 (1 solenoid), 6.3 (2 solenoids)					
Hydraulic							
Max. operating pressure	[bar]	P, A B: 350; T: 210 (DC), 105 (AC), 210 (AC Code “H“)					
Fluid		Hydraulic oil in accordance with DIN 51524 / 51525					
Fluid temperature	[°C]	-25 ... +70					
Viscosity permitted	[cSt] / [mm²/s]	2.8...400					
Viscosity recommended	[cSt] / [mm²/s]	30...80					
Filtration		ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)					
Flow max.	[l/min]	150 (DC); 115 (AC)					
Leakage at 50 bar	[ml/min]	Up to 20 per flow path, depending on spool					
Static / Dynamic							
Step response		see table response time					
Electrical characteristics							
Duty ratio		100% ED; CAUTION: coil temperature up to 150 °C possible					
Max. switching frequency	[1/h]	10000					
Protection class		IP 65 in accordance with EN 60529 (plugged and mounted)					
	Code	K	J	U	G	Y	T
Supply voltage / ripple	[V]	12 V =	24 V =	98 V =	205 V =	110V at 50Hz/ 120V at 60Hz	230V at 50Hz/ 240V at 60Hz
Tolerance supply voltage	[%]	±10	±10	±10	±10	±5	±5
Current consumption hold	[A]	3	1.5	0.37	0.18	0.8 / 0.72	0.4 / 0.36
Current consumption in rush	[A]	3	1.5	0.37	0.18	3.41 / 3.31	1.75 / 1.7
Power consumption hold	[W]	36	36	36	36	88 / 86	88 / 86
Power consumption in rush	[W]	36	36	36	36	375 / 397	385 / 408
Solenoid connection		Connector as per EN 175301-803, solenoid identification as per ISO 9461.					
Wiring min.	[mm²]	3 x 1.5 recommended					
Wiring length max.	[m]	50 recommended					

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

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2

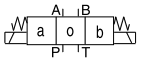
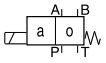
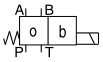
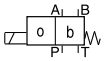
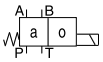
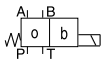
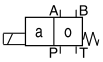
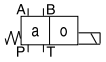
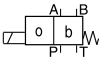
D	3	W			
Directional control valve	Size DIN NG10 CETOP 05 NFPA D05	Wet pin solenoid	Spool type	Spool position	Seals

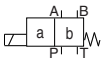
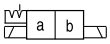
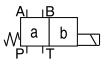
3 position spools		
Code	Spool type	
	a 0 b	
1		
2		
3		
4		
5		
6		
7		
8 [1]		
9 [1]		
10 [2]		
11		
12		
14		
15		
16		
21 [2]		
22 [2]		
31 [2]		
32 [2]		
81 [2]		
82 [2]		
102 [2]		

2 position spools	
Code	Spool type
	a b
20	
26	
30	
101 [2]	

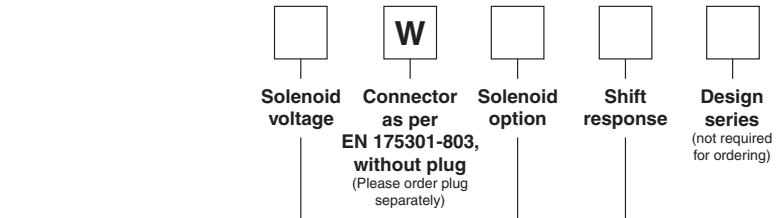
[1] Consider specific spool position.
[2] Only available for DC voltage.

Code	Seals
N	**NBR**
V	FPM

3 position spools			
Code	all 3 position spools		
C			**3 positions.** **Spring offset in position “0“.** **Operated in position “a“ or “b“.**
	Standard	Spool type 8 and 9	
E	 Operated in position “a“.	 Operated in position “b“.	**2 positions.** **Spring offset in position “0“.**
F	 Spring offset in position “b“.	 Spring offset in position “a“.	2 positions. Operated in position “0“.
K	 Operated in position “b“.	 Operated in position “a“.	**2 positions.** **Spring offset in position “0“.**
M	 Spring offset in position “a“.	 Spring offset in position “b“.	2 positions. Operated in position “0“.

2 position spools		
Code	Spool position	
B		**2 positions.** **Spring offset in position “b“.** **Operated in position “a“.**
D		**2 positions.** **Operated in position “a“ or “b“.** **No centre or offset position.**
H		**2 positions.** **Spring offset in position “a“.** **Operated in position “b“.**

Bold letters =
Short-term availability



Code	Solenoid voltage
K	**12V =**
J	**24V =**
U [3]	98V =
G [3]	205V =
Y	110V 50Hz / 120V 60Hz
T	230V 50Hz / 240V 60Hz

[3] To be used with retifier plug when DC solenoids are used with AC input.

Code	Solenoid option
omit	**Standard solenoid with manual override**
H	High pressure solenoid tube for AC. Tank pressure up to 210bar
T	without manual override

Code	Shift response
omit	Standard response
S4 [4]	orifice diameter 1.0 mm
S7 [4]	orifice diameter 1.5 mm

[4] Only for DC

The Parker model code should be used for all new applications. Otherwise also refer to Denison model code.

Further spool types and solenoid voltages on request.

2

4D02 – □ □ □ – □ □ – **C**

Directional control valve size DIN NG10 CETOP 05 NFPA D05

Body

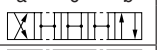
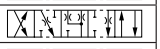
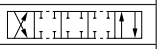
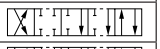
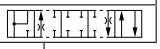
Code	Body
3	Standard 3-chamber
D	5-chamber for soft-shift (G3)

Control

Code	Control
1	1 solenoid
2	2 solenoids
7	2 solenoids and 2 pos. detent (only for spool types 11 and 51)

Spool type

3 position spools

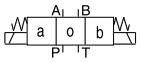
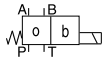
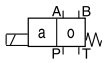
Code	Spool type (a 0 b)
01	
02	
03	
07	
08	
09	
10	
46	
55	
56	

2 position spools

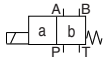
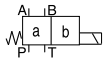
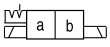
Code	Spool type (a b)
11	
12	
51	

Spool position

3 position spools

Code	Spool position	
03		3 positions. Spring centered to “0“.
05		2 positions. Spring centered energized to “b“.
06		2 positions. Spring centered energized to “a“.

2 position spools

Code	Spool position	
01		2 positions. Spring offset to “b“ energized to “a“.
02		2 positions. Spring offset to “a“ energized to “b“.
09		2 positions detent. Operated in “a“ or “b“. No centre or spring offset position.

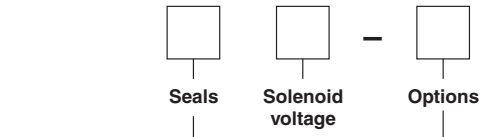
End cap

Code	End cap
01	for control 1
02	for control 2 and 7

Design series

C

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Code	Seals
1	NBR
5	FPM

Code	Solenoid voltage
G0R	12V =
G0Q	24V =
GAR *	98V =
GAG *	205V =
W30	110V 50Hz / 120V 60Hz
W31	230V 50Hz / 240V 60Hz

* To be used with retifier plug when DC solenoids are used with AC input.

Code	Options
omit	Solenoid connector as per EN 175301-803 without plug. With manual override
G3	Soft shift with orifice in body (for DC and body D only)
32	Without manual override

DENISON Hydraulics

The Denison model code is available for existing applications. For new applications we advise to refer to Parker model code.

Further spool types and solenoid voltages on request.

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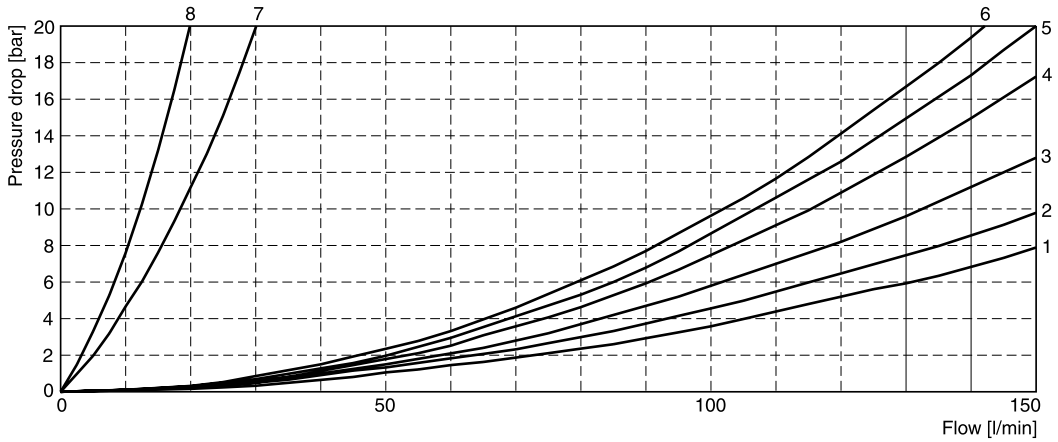
2

The flow curve diagram shows the flow versus pressure drop curves for all spool types. For each spool type, operating position and flow direction the relevant curve number is given in the table below.

Spool		Position „b“		Position „a“		Position „0“					
D3W	4D02	P->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T	A->B
1	**03**	4	3	4	3	–	–	–	–	–	–
2	**01**	4	1	4	1	3	3	1	1	5	1
3	**10**	4	3	5	2	–	–	4	–	–	–
4	**08**	4	2	4	2	–	–	3	3	–	5
5	–	4	3	5	3	5	–	–	–	–	–
6	**46**	4	3	4	3	6	6	–	–	–	6
7	–	5	1	4	3	–	4	–	2	6	–
10	–	4	–	4	–	–	–	–	–	–	–
11	**02**	4	3	4	3	–	–	8	8	–	–
12	–	4	3	4	3	7	7	7	7	8	8
14	–	4	3	5	1	4	–	2	–	6	–
15	**09**	5	2	4	3	–	–	–	4	–	–
16	–	5	3	4	3	–	5	–	–	–	–
20	**51**	4	3	4	3	–	–	–	–	–	–
26	**12**	4	–	4	–	–	–	–	–	–	–
30	**11**	4	2	4	2	–	–	–	–	–	–
		P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T	A->B
8	–	4	3	4	3	–	–	–	–	6	–
9	**07**	4	4	4	4	–	–	–	–	6	–

		Position „b“			Position „a“		
		P->A	P->B	A->B	P->B	A->T	
21	**55**	5	4	6	3	3	
		P->A	B->T		P->A	P->B	A->B
22	**56**	3	3		4	5	6

Flow curve diagram



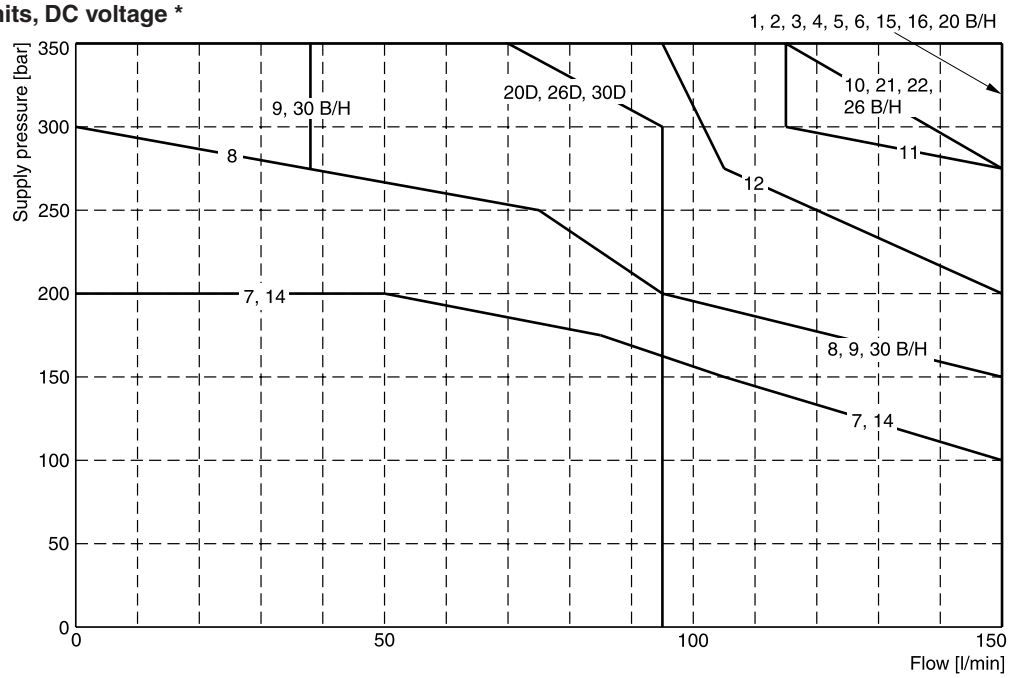
D3W stand_UK.INDD CM_21.01.2008.1

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Kaarst, Germany

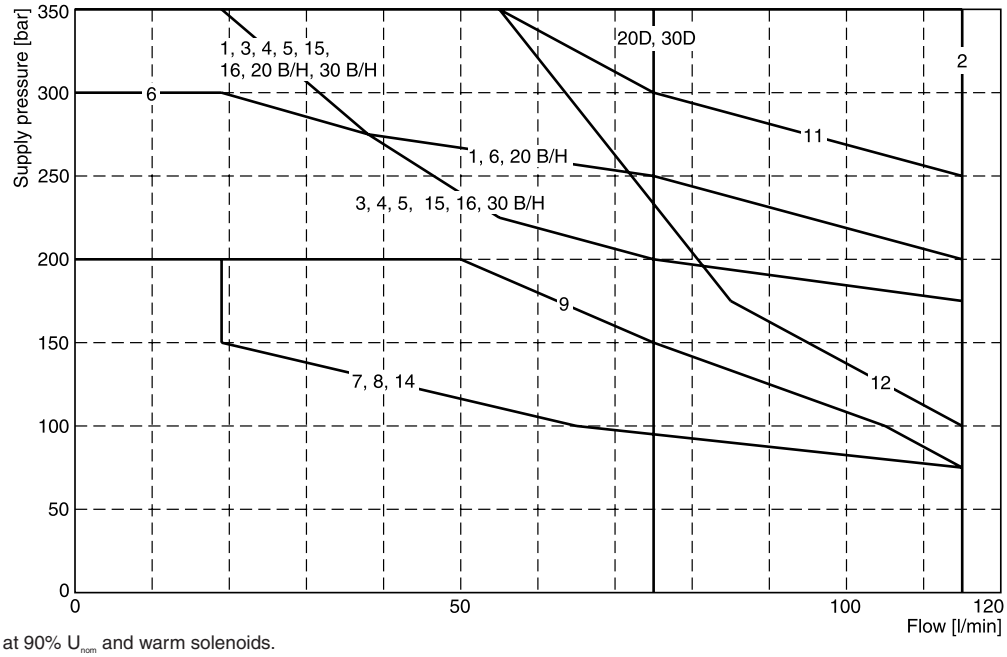
Tel: +45 63 12 83 00 | Email: ps@hymatik.com | www.hymatik.com | Hvidkaervej 27a, DK-5250 Odense SV, Denmark

The diagram below specifies the shift limits for valves with DC and AC solenoids. Valves with spool position “F” or “M” can only be operated up to 70% of the limits. The specifications apply to a viscosity 35mm²/s and balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions. To avoid flow rates beyond the shift limits, a plug-in orifice can be inserted in the P-port.

Shift limits, DC voltage *



Shift limits, AC voltage *



Measured at 90% U_{nom} and warm solenoids.

* For 4D02 spool code see flow curve table.

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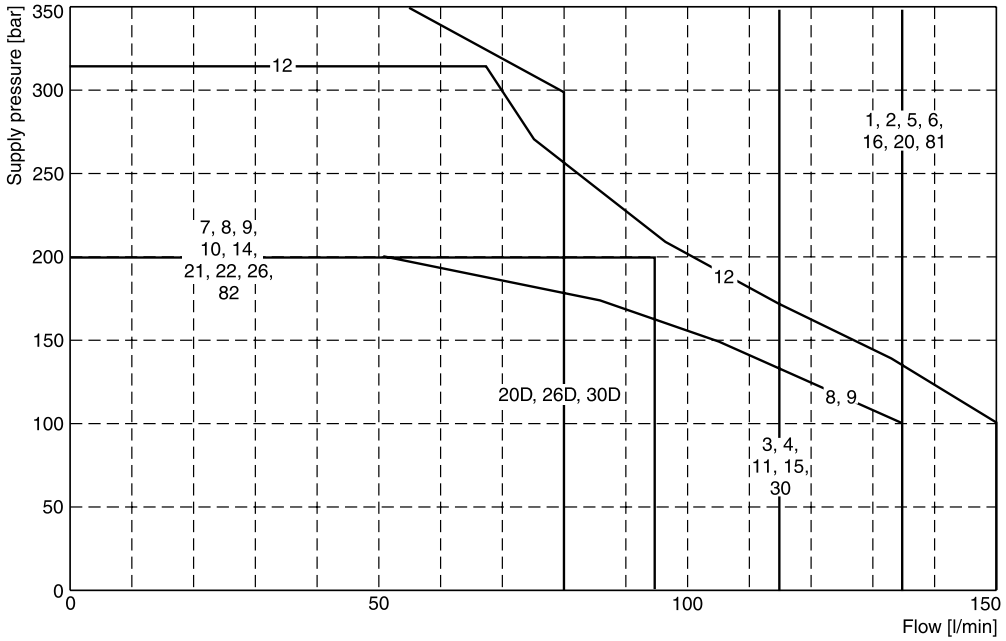
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2

Shift limits soft shift

The diagram below specifies the shift limits. Valves with spool position “F” or “M” can only be operated up to 70% of the limits. The specifications apply to a viscosity 35mm²/s and balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions. To avoid flow rates beyond the shift limits, a plug-in orifice can be inserted in the P-port.



Measured at 90% U_{nom} and warm solenoids.

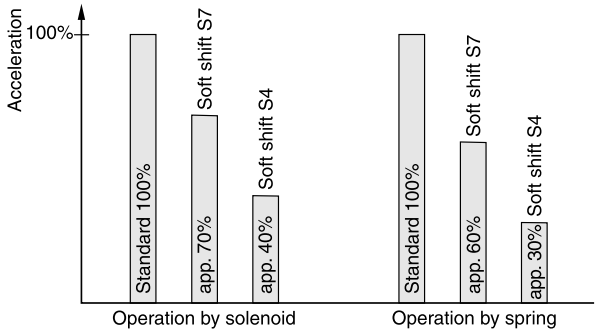
Response times D3W Soft Shift

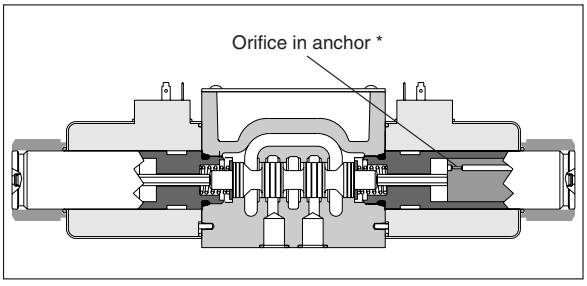
Code	Orifice size	Energize	De-energize
(Standard)	–	105 ms (DC) 21 ms (AC)*	85 ms (DC) 35 ms (AC)*
S4	1.0 mm	320 ms	550 ms
S7	1.75 mm	160 ms	370 ms

Step response times were obtained under the following conditions: υ = 35 mm²/s at 50°C with the valve operating at 175 bar and 65 l/min. Published response times are nominal and may vary with spool, flow, pressure and temperature.

* For AC input and soft shift use rectifier plug.

Acceleration for different orifice sizes (archived against a valve without soft shift)





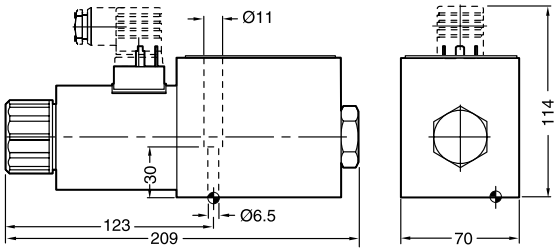
* Note: For 4D02 the orifice is located in the Z-channel of the valve body.

For even softer shifting, the proportional spools 81, 82, 101 and 102 can be used.

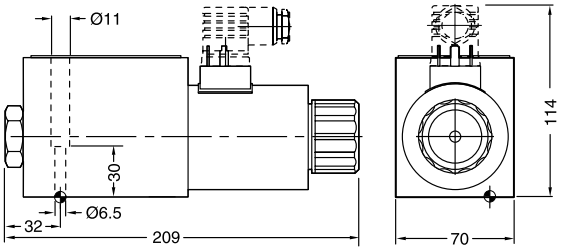
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Interface EN 175301-803, DC solenoid

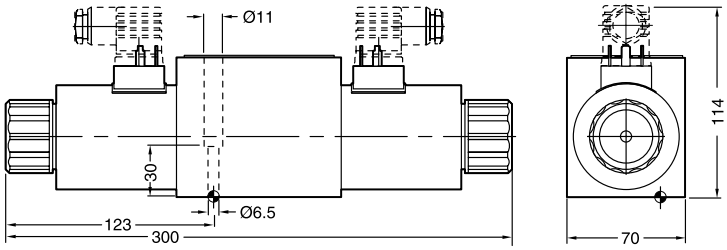
B, E, F -style



H, K, M -style

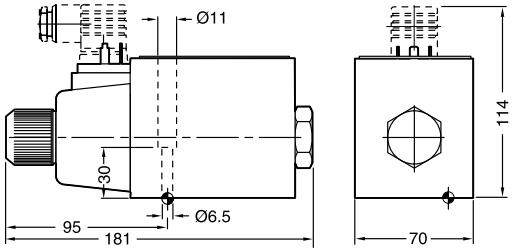


C, D -style

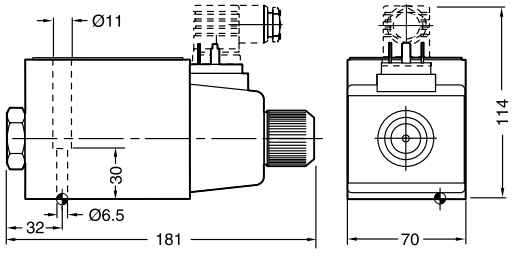


Interface EN 175301-803, AC solenoid

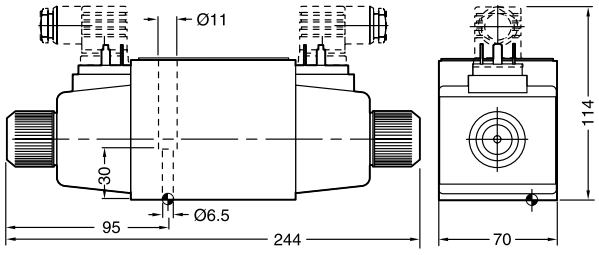
B, E, F -style



H, K, M -style



C, D -style



Surface finish	Kit			Kit
R_{max}6.3 ⏥ 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm ±15%	**NBR: SK-D3W-30** FPM: SK-D3W-V30

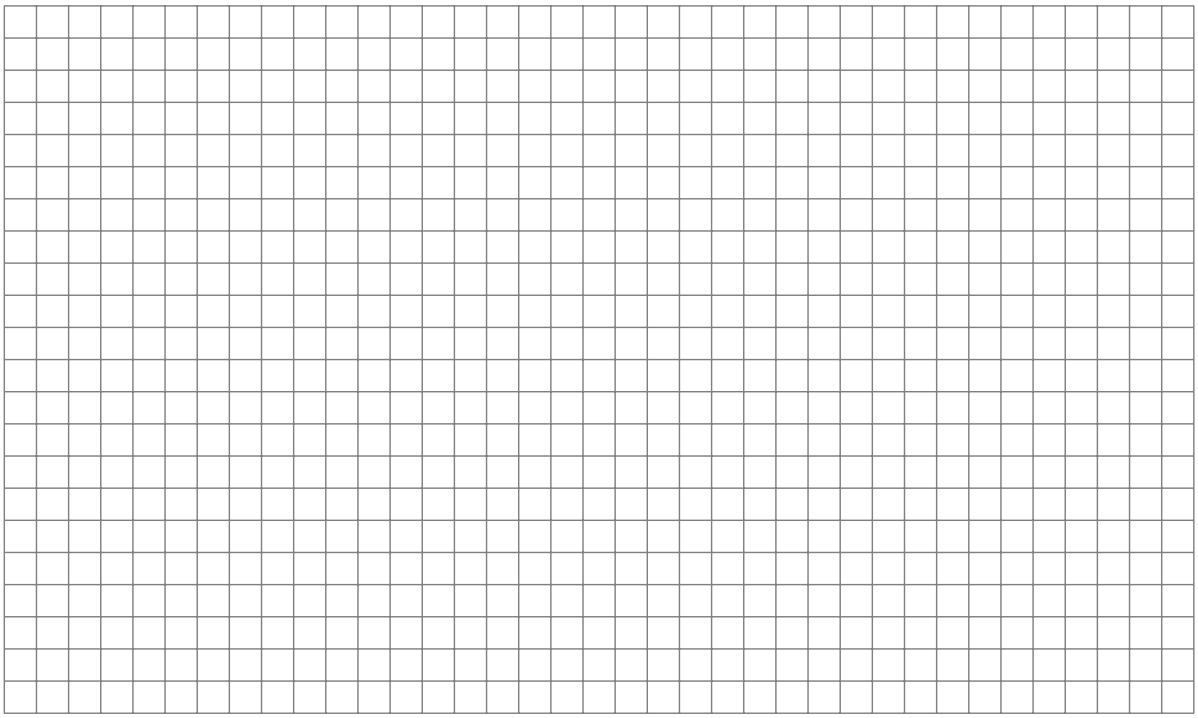
The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

D3W stand_UK.INDD CM_21.01.2008.1

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Notes



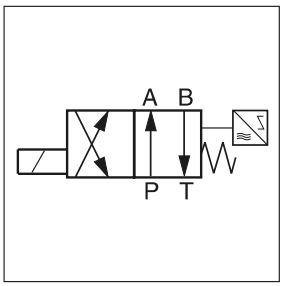
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The 4/2 directional valves operated directly by solenoids with inductive position control are used as monitoring valves. The start or end position can be monitored. The position control is only available for single solenoid valves.

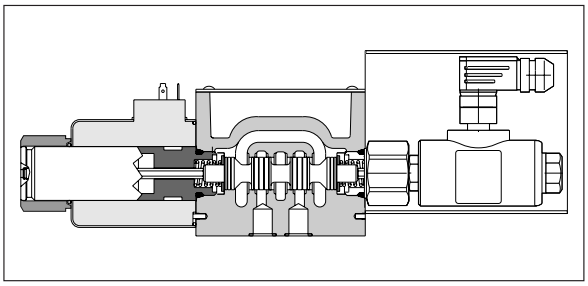
The fail-safe position of the directional valve during power failure is the spring offset position.





Attention

The adjustment of the position control is factory set and sealed. Replacement and repairs can only be undertaken by the manufacturer.



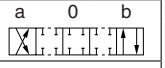
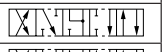
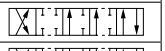
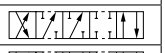
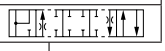
Technical data

General					
Design		Directional spool valve			
Actuation		Solenoid			
Size		DIN NG10 / CETOP 05 / NFPA D05			
Mounting interface		DIN 24340 A10 / ISO 4401 / CETOP RP 121-H / NFPA D05			
Mounting position		unrestricted, preferably horizontal			
Ambient temperature	[°C]	0...+50			
Weight	[kg]	5.2			
Hydraulic					
Max. operating pressure	[bar]	P, A, B: 350; T: 210			
Fluid		Hydraulic oil in accordance with DIN 51524 / 51525			
Fluid temperature	[°C]	0 ... +70			
Viscosity permitted	[cSt] / [mm²/s]	2.8...400			
Viscosity recommended	[cSt] / [mm²/s]	30...80			
Filtration		ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)			
Flow max.	[l/min]	150			
Leakage at 50 bar	[ml/min]	Up to 20 per flow path, depending on spool			
Static / Dynamic					
Step response at 95%		Energized: 105; De-energized: 85			
Electrical characteristics					
Duty ratio		100% ED; CAUTION: coil temperature up to 150 °C possible			
Max. switching frequency	[1/h]	10000			
Protection class		IP 65 in accordance with EN 60529 (plugged and mounted)			
	Code	K	J	U	G
Supply voltage / ripple	[V]	12 V =	24 V =	98 V =	205 V =
Tolerance supply voltage	[%]	±10	±10	±10	±10
Current consumption hold	[A]	3	1.5	0.37	0.18
Power consumption hold	[W]	36	36	36	36
Solenoid connection		Connector as per EN 175301-803, solenoid identification as per ISO 9461.			
Wiring min.	[mm²]	3 x 1.5 recommended			
Wiring length max.	[m]	50 recommended			

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

2

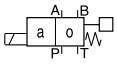
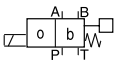
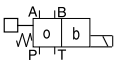
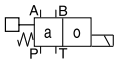
D	3	W			
Directional control valve	Size DIN NG10 CETOP 05 NFPA D05	Wet pin solenoid	Spool type	Spool position	Seals

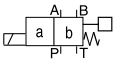
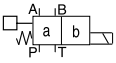
3 position spools	
Code	Spool type a 0 b
1	
2	
3 [1]	
4	
5 [2]	
15 [2]	
16 [1]	
21 [1]	
22 [2]	

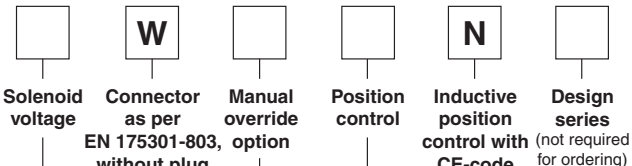
2 position spools	
Code	Spool type a b
20	
26	
30	

[1] Only available for spool pos. “K“ and “M“
[2] Only available for spool pos. “E“ and “F“

Code	Seals
N	NBR
V	FPM

Code	3 position spools	
E		2 positions. Spring offset in position “0“. Operated in position “a“.
F		2 positions. Spring offset in position “b“. Operated in position “0“.
K		2 positions. Spring offset in position “0“. Operated in position “b“.
M		2 positions. Spring offset in position “a“. Operated in position “0“.

2 position spools		
Code	Spool position	
B		2 positions. Spring offset in position “b“. Operated in position “a“.
H		2 positions. Spring offset in position “a“. Operated in position “b“.



Solenoid voltage

Code	Solenoid voltage
K	12V =
J	24V =
U [3]	98V =
G [3]	205V =

[3] For alternating current use plug with rectifier.
Please order rectifier plug separately.

Connector as per EN 175301-803, without plug
(Please order plug separately)

Manual override option

Code	Solenoid option
omit	Standard valve without options
T [4]	without manual override

[4] For hydraulic presses according to the safety regulations EN 693, solenoid option "T" (without manual override) and accessories "I4" or "I5" (start position monitored) are required.

Position control

Code	Spool position	Position control
I2	E, F, B (Solenoid on a-side)	End position monitored side B
I5 [4]		Start position monitored side B
I1	K, M, H (Solenoid on b-side)	End position monitored side A
I4 [4]		Start position monitored side A

Inductive position control with CE-code

Design series (not required for ordering)

2

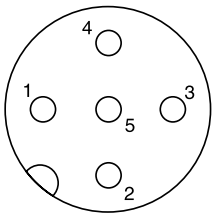
Further spool types and solenoid voltages on request.

2

Electrical characteristics of position control as per IEC 61076-2-101 (M12x1)

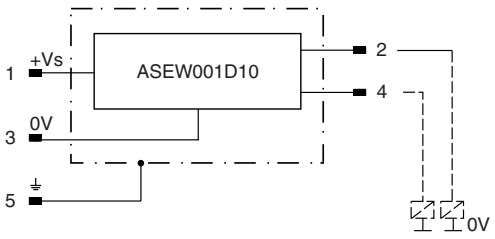
Protection class		IP 65 in accordance with EN 60529 (plugged and mounted)
Ambient temperature	[°C]	0...+50
Supply voltage / ripple	[V]	18...42 / 10%
Current consumption without load	[mA]	≤ 30
Max. output current per channel, ohmic	[mA]	400
Min. output load per channel, ohmic	[kOhm]	100
Max. output drop at 0.2A	[V]	≤ 1.1
Max. output drop at 0.4A	[V]	≤ 1.6
EMC		EN50081-1 / EN50082-2
Max. tolerance ambient field strength	[A/m]	<1200
Min. distance to next AC solenoid	[m]	>0.1
Interface		M12x1
Wiring min.	[mm²]	5 x 0.25 brad shield recommended
Wiring length max.	[m]	50 recommended

M12 pin assignment



Start position monitored
1 + Supply 18...42V
2 Normally open B
3 0V
4 Normally open A
5 Earth ground

End position monitored
1 + Supply 18...42V
2 Normally closed B
3 0V
4 Normally open A
5 Earth ground



Definitions

Start position monitored:

The valve is de-energized. The inductive switch gives a signal at the moment when the spool leaves the spring offset position (below 15% spool stroke).

The switch can only be located on the opposite side of the solenoid for direct operated valves.

End position monitored:

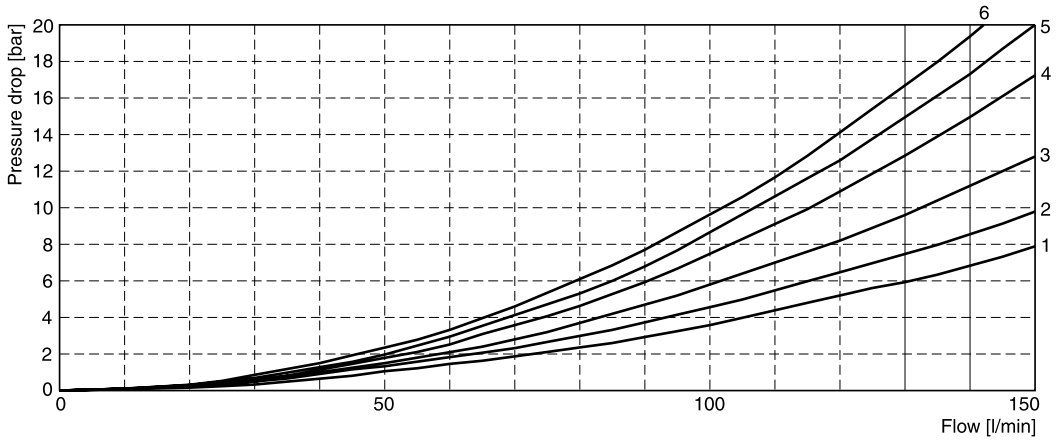
The inductive switch gives a signal before the end position is reached (above 85% spool stroke).

The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number for each spool type, operating position and flow direction is given in the table below.

	Position „b“		Position „a“		Position „0“					
Spool	P->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T	A->B
1	4	3	4	3	–	–	–	–	–	–
2	4	1	4	1	3	3	1	1	5	1
3	4	3	–	–	–	–	4	–	–	–
4	4	2	4	2	–	–	3	3	–	5
5	–	–	5	3	5	–	–	–	–	–
15	–	–	4	3	–	–	–	4	–	–
16	5	3	–	–	–	5	–	–	–	–
20	4	3	4	3	–	–	–	–	–	–
26	4	–	4	–	–	–	–	–	–	–
30	4	2	4	2	–	–	–	–	–	–

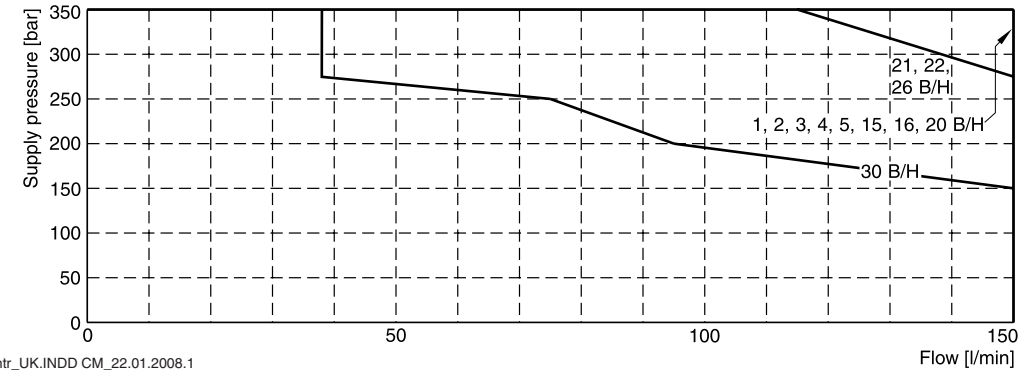
	Position „b“			Position „a“		
	P->A	P->B	A->B	P->B	A->T	
21	5	4	6	–	–	
	P->A	B->T		P->A	P->B	A->B
22	–	–		4	5	6

Flow curve diagram



Shift limit diagram

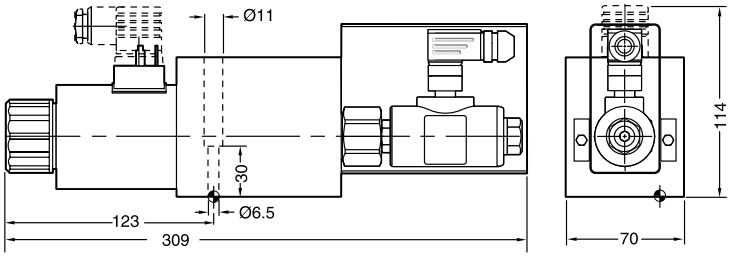
The diagram below specifies the shift limits. Valves with spool position “F” or “M” can only be operated up to 70% of the limits. The specifications apply to a viscosity 35mm²/s and balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions. To avoid flow rates beyond the shift limits, a plug-in orifice can be inserted in the P-port.



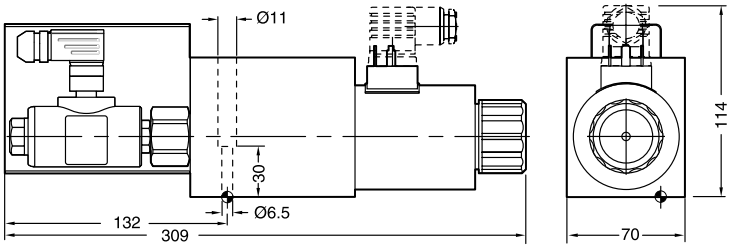
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2

Interface EN 175301-803, DC solenoid, with plug M12x1*
B, E, F -style



H, K, M -style



* Delivery includes plug M12 x 1 (see accessories, plug M12x1; order no.: 5004109).

Surface finish	Kit			Kit
R_{max}6.3 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm ±15%	**NBR: SK-D3W-30** FPM: SK-D3W-V30

The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

Attention

The adjustment of the position control is factory set and sealed. Replacement and repairs can only be undertaken by the manufacturer.

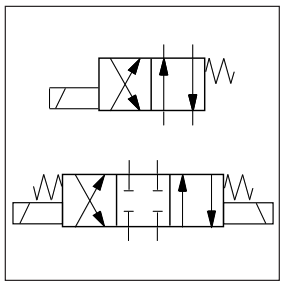
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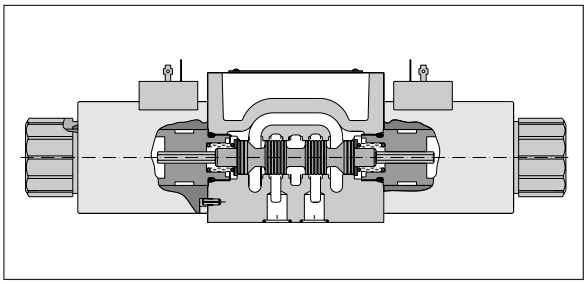
The D3MW is a solenoid operated directional control valve size NG10 in 3-chamber design. It is direct operated by wet pin solenoids.

The D3MW is designed for mobile and marine applications.

It is based on the D3W series, but offers additional corrosion protection of the valve body, the solenoid coil and the anchor tube as well as the typical solenoid connections for the mobile market such as AMP Junior Timer.







Technical features:

- High corrosion protection
- Solenoid connection:
  - Standard (as per EN175301-803)
  - AMP Junior Timer
- Robust design for rough applications

Technical data

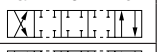
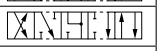
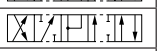
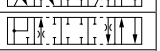
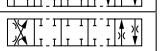
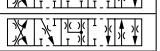
General			
Design		Directional spool valve	
Actuation		Solenoid	
Size		DIN NG10 / CETOP 05 / NFPA D05	
Mounting interface		DIN 24340 A10 / ISO 4401 / CETOP RP 121-H / NFPA D05	
Mounting position		unrestricted, preferably horizontal	
Ambient temperature	[°C]	-25...+50	
Weight	[kg]	4.8 (1 solenoid), 6.3 (2 solenoids)	
Hydraulic			
Max. operating pressure	[bar]	P, A B: 350; T: 210	
Fluid		Hydraulic oil in accordance with DIN 51524 / 51525	
Fluid temperature	[°C]	-25 ... +70	
Viscosity permitted	[cSt] / [mm²/s]	2.8...400	
Viscosity recommended	[cSt] / [mm²/s]	30...80	
Filtration		ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)	
Flow max.	[l/min]	150	
Leakage at 50 bar	[ml/min]	Up to 20 per flow path, depending on spool	
Static / Dynamic			
Step response at 95%	[ms]	Energized: 105	
		De-energized: 85	
Electrical characteristics			
Duty ratio		100% ED; CAUTION: coil temperature up to 150 °C possible	
Max. switching frequency	[1/h]	10000	
Protection class		IP 65 in accordance with EN60529 (plugged and mounted)	
	Code	K	J
Supply voltage / ripple	[V]	12 V =	24 V =
Tolerance supply voltage	[%]	±10	±10
Current consumption	[A]	3	1.5
Power consumption	[W]	36	36
Solenoid connection		Connector as per EN 175301-803, AMP Junior Timer, Solenoid ident. as per ISO 9461.	
Wiring min.	[mm²]	3 x 1.5 recommended	
Wiring length max.	[m]	50 recommended	

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

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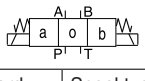
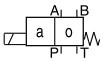
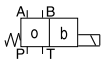
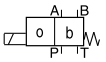
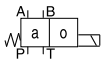
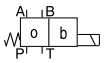
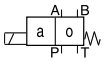
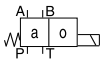
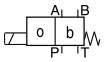
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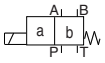
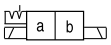
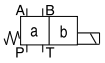
D	3	M	W			N
Directional control valve	Size DIN NG 10 CETOP 05 NFPA D05	3-chamber valve for mobile and marine applications	Wet pin solenoid	Spool type	Spool position	NBR Seal

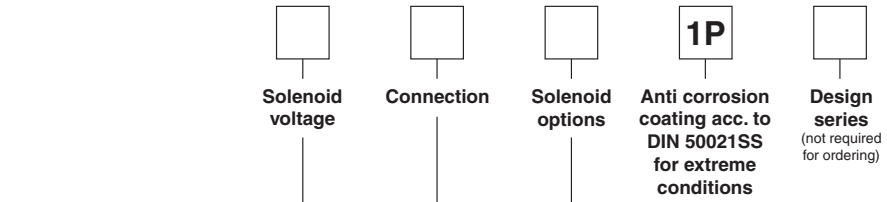
3 position spools	
Code	Spool type a 0 b
1	
2	
4	
6	
8 [1]	
11	
21	
22	
81	
82	

2 position spools	
Code	Spool type a b
20	
30	

[1] Consider specific spool position.

3 position spools			
Code	all 3 position spools		
C			3 positions. Spring offset in position “0“. Operated in position “a“ or “b“.
	Standard	Spool type 8 and 9	
E	 Operated in position “a“.	 Operated in position “b“.	2 positions. Spring offset in position “0“.
F	 Spring offset in position “b“.	 Spring offset in position “a“.	2 positions. Operated in position “0“.
K	 Operated in position “b“.	 Operated in position “a“.	2 positions. Spring offset in position “0“.
M	 Spring offset in position “a“.	 Spring offset in position “b“.	2 positions. Operated in position “0“.

2 position spools		
Code	Spool position	
B		2 positions. Spring offset in position “b“. Operated in position “a“.
D		2 positions. Operated in position “a“ or “b“. No centre or offset position.
H		2 positions. Spring offset in position “a“. Operated in position “b“.



Code	Voltage
K	12V =
J	24V =

Code	Connection
W [2]	Connector as per EN 175301-803
A [2]	2-pin AMP Junior Timer

[2] Please order plug separately.

Code	Solenoid option
omit	Standard solenoid
T	without manual override

Further spool types on request.

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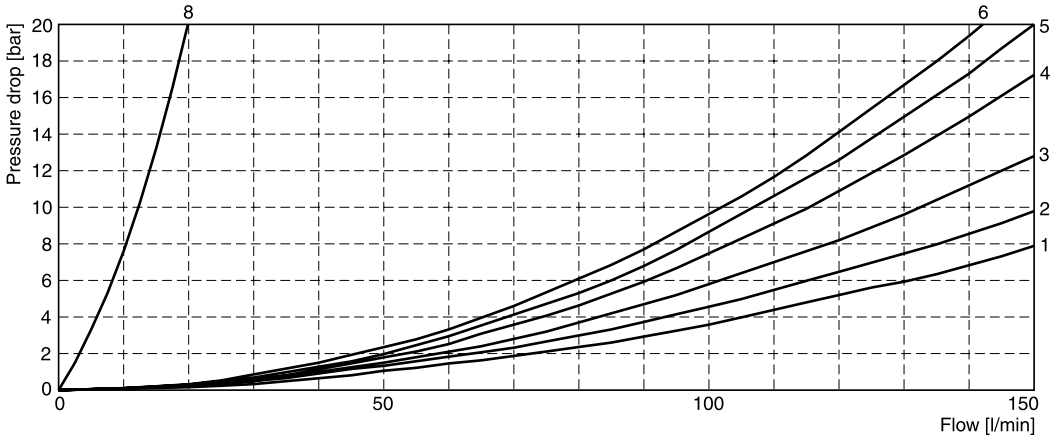
The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number for each spool type, operating position and flow direction is given in the table below.

2

	Position „b“		Position „a“		Position „0“					
Spool	P ->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T	A->B
1	4	3	4	3	–	–	–	–	–	–
2	4	1	4	1	3	3	1	1	5	1
4	4	2	4	2	–	–	3	3	–	5
6	4	3	4	3	6	6	–	–	–	6
11	4	3	4	3	–	–	8	8	–	–
20	4	3	4	3	–	–	–	–	–	–
30	4	2	4	2	–	–	–	–	–	–
	P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T	A-> B
8	4	3	4	3	–	–	–	–	6	–

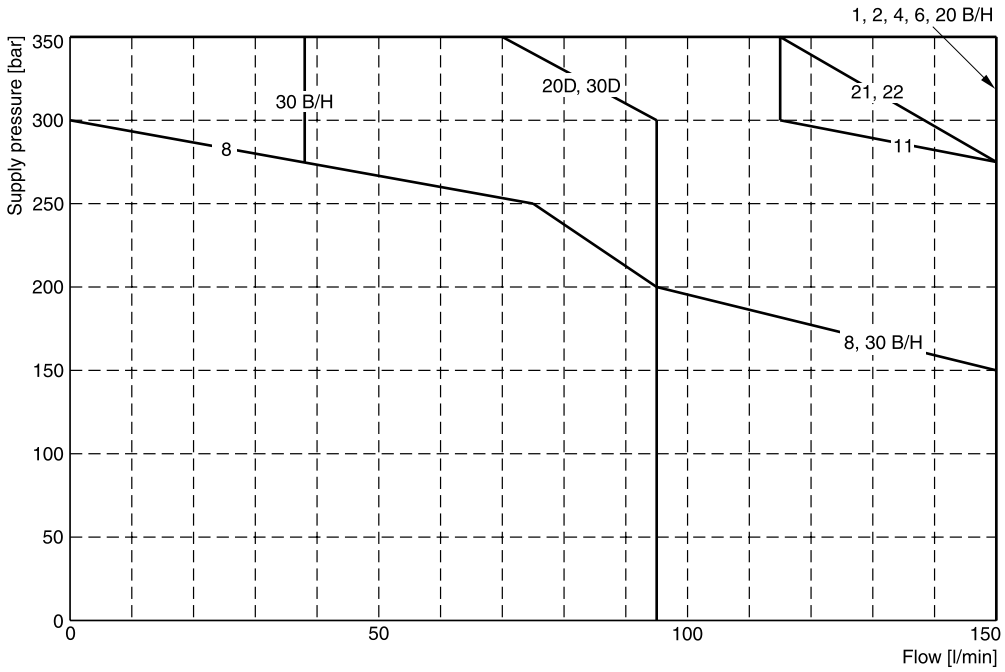
	Position „b“			Position „a“		
	P->A	P->B	A->B	P->B	A->T	
21	5	4	6	3	3	
	P->A	B->T		P->A	P->B	A->B
22	3	3		4	5	6

Flow curve diagram



The diagram below specifies the shift limits for valves with DC solenoids. Valves with spool position “F” or “M” can only be operated up to 70% of the limits. The specifications apply to a viscosity 35mm²/s and balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions. To avoid flow rates beyond the shift limits, a plug-in orifice can be inserted in the P-port.

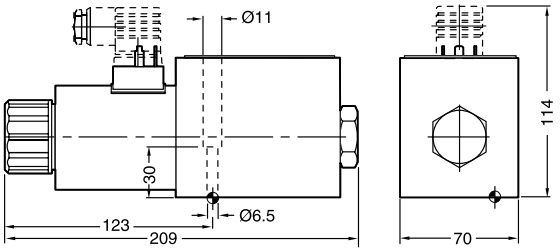
Shift limits, DC voltage



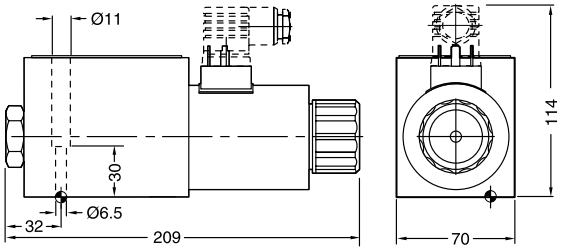
Measured at 90% U_{nom} and warm solenoids.

2

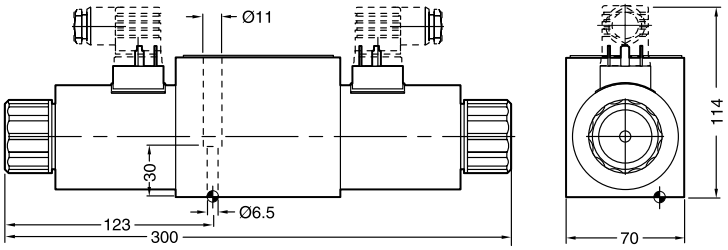
Interface EN 175301-803, DC solenoid
B, E, F -style



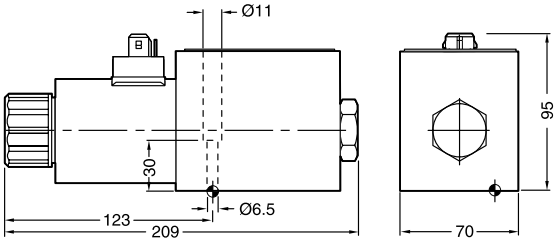
H, K, M -style



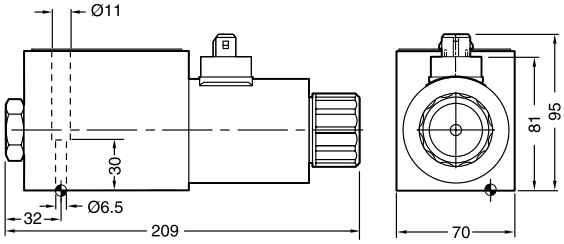
C, D -style



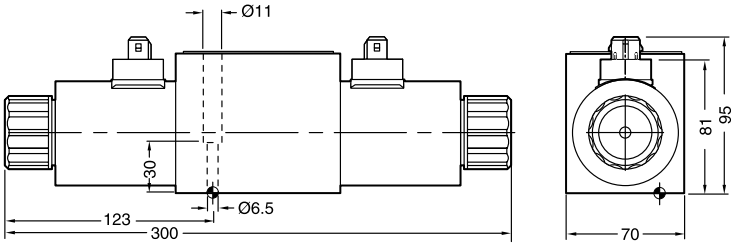
Dimensions with AMP Connector
B, E, F -style



H, K, M -style



C, D -style



Surface finish	Kit			Kit
$R_{max}6.3$ 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm ±15%	**NBR: SK-D3W-30** FPM: SK-D3W-V30

The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

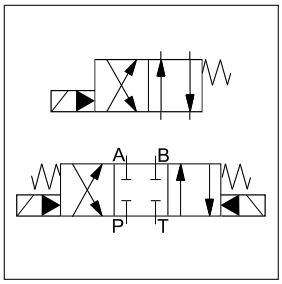
The pilot operated directional valves are available with both Parker (series D31DW, D41VW, D81/D91VW and D111VW) and Denison (series 4D02V, 4D03, 4D06) model codes. All valves are pilot operated by an NG6 valve.

Pressure and flow of the pilot oil have a significant influence on the response time of the spool in the main stage.

In order to guarantee a save switching of the spool please choose the appropriate pilot oil supply and drain option. (Spools with a connection P to T need an external pressure supply or an integral check valve. For spools with negative cross-over position the same options are recommended.)

The minimum pilot pressure must be ensured for all operating conditions of the directional valve.





D31DW





4D02V

D41VW

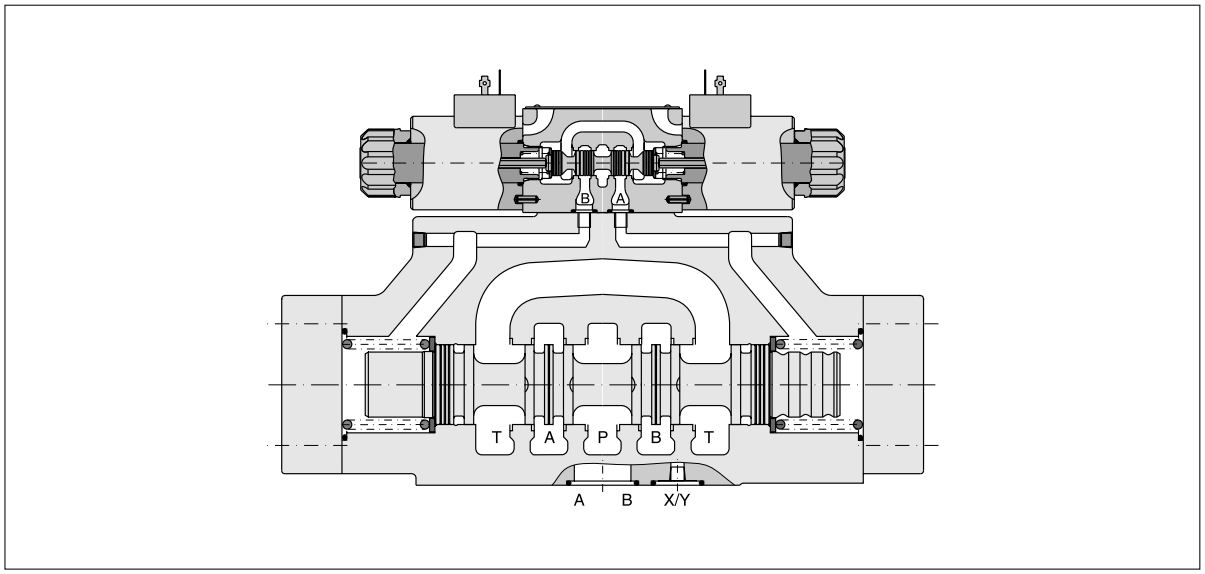




D81VW

D111VW

D81VW

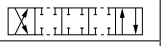
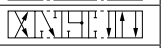
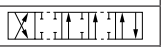
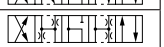
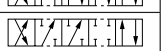
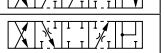
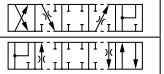
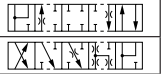
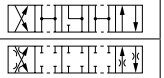
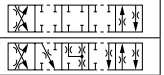


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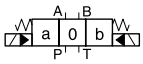
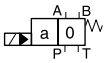
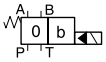
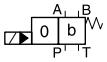
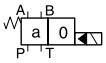
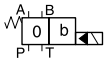
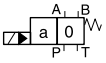
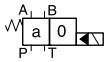
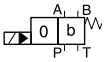
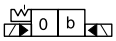
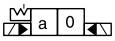
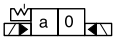
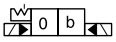
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Directional control valve	Series	Pilot NG 06	Style	Electrically operated	Spool type	Spool position

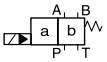
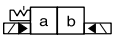
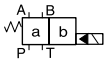
Code	Bore	Size
3	**Ø11mm**	**NG10**
4	**Ø20mm**	**NG16**
8	**Ø26mm**	**NG25**
9	Ø32mm	NG25
11	Ø50mm	NG32

Code	Style
D	**D3**
V	**D4, D8/9, D111**

3 position spools	
Code	Spool type a 0 b
001 2)	
002 2)	
003 3)	
004 3)	
005 3)	
006 3)	
007 3)	
009 1)2)	
011 3)	
014 3)	
015 3)	
016 3)	
021 3)	
022 3)	
031 5)	
032 5)	
054 4)	
081 2)	
082 2)	

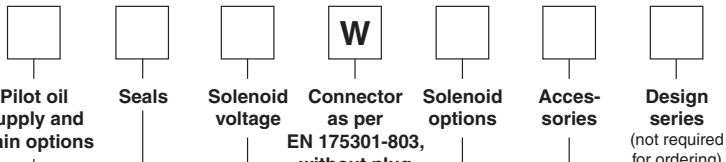
2 position spools	
Code	Spool type a b
020 2)	
026 3)	
030 2)	

3 position spools			
Code	all 3 position spools		
C 2)			**3 positions. Spring offset in position “0“. Operated in position “a“ or “b“.**
	Standard	Spool type 009	
E 2)	 Operated in position “a“.	 Operated in position “b“.	2 positions. Spring offset in position “0“.
F 2)	 Spring offset in position “b“.	 Spring offset in position “a“.	2 positions. Operated in position “0“.
K 2)	 Operated in position “b“.	 Operated in position “a“.	2 positions. Spring offset in position “0“.
M 2)	 Spring offset in position “a“.	 Spring offset in position “b“.	2 positions. Operated in position “0“.
R 3)	 No centre in offset position.	 No centre in offset position.	2 positions, detent. Operated in position “0“ or “b“.
S 3)	 No centre in offset position.	 No centre in offset position.	2 positions, detent. Operated in position “0“ or “a“. No centre in offset position.

2 position spools	
Code	Spool position
B 2)	 **Spring offset in position “b“. Operated in position “a“.**
D 3)	 Detent, operated in position “a“ or “b“. No centre or offset position.
H 2)	 Spring offset in position “a“. Operated in position “b“.

[1] Consider specific spool position.
[2] All sizes (D31, D41, D81, D 91, D111) available
[3] Only D31, D41, D81, D91 available
[4] Only D41, D81, D91, D111 available
[5] Only D31, D81, D91 available

Bold letters =
Short-term availability



Code	Inlet	Outlet
1	**Internal**	**External**
2	External	External
3 [6]	Integral check valve	External
4 [7]	**Internal**	**Internal**
5	External	Internal
6 [6]	Integral check valve	Internal

[6] Only D41, D81 available.
[7] Not for spools 002, 007, 009, 014, 030, 031, 032, 054 available.

Code	Seals
N	**NBR**
V	FPM

Code	Voltage
K	12V =
J	**24V =**
U [8]	98V =
G [8]	205V =
Y	110V 50Hz / 120V 60Hz
T	230V 50Hz / 240V 60Hz

[8] For AC voltage use plug with rectifier.
Please order rectifier plug separately.

Code	Solenoid option
omit	**Standard solenoid without options**
T	without manual override

Code	Accessories
omit	**Standard valve w/o accessories**
3C	Pilot with press. reducing valve
3A	Pilot choke, meter-out
3D [9]	Stroke adjustment side B
3E [9]	Stroke adjustment side A
3B	Pilot choke, meter-in
3F	Stroke adjustment side A and B

[9] Only D31, D41, D81, D91 available.

Bold letters =
Short-term availability

Further spool types and solenoid voltages on request.
Explosion proof solenoids EEx me II on request.

Tel: +45 63 12 83 00 | Email: ps@hymatik.com | www.hymatik.com | Hvidkaervej 27a, DK-5250 Odense SV, Denmark

2

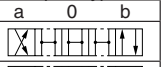
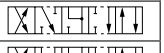
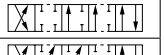
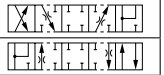
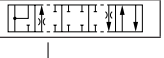
4D □ – □ □ □ – □ □

Directional control valve | **Size** | **Body** | **Control** | **Spool type** | **Spool position** | **End cap**

Code	Size
02	NG10
03	NG16
06	NG25

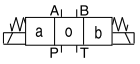
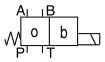
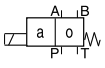
Code	Body
V	for 4D02
3	for 4D03/06

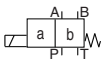
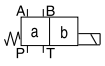
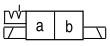
Code	Control
A	1 solenoid
B	2 solenoids
C	2 solenoids and 2 pos. detent pilot valve

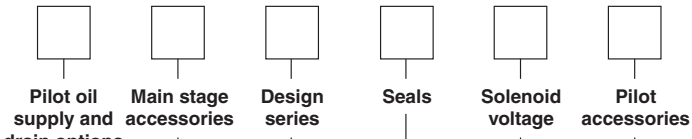
3 position spools	
Code	Spool type
	a 0 b
01	
02	
03	
07	
08	
09	
10	
13	
14	
46	
55	
56	

2 position spools	
Code	Spool type
	a b
11	
51	

Code	End cap
03	Standard
09	With stroke adjustment on both sides

3 position spools		
Code	Spool position	
03		3 positions. Spring centered to “0“.
05		2 positions. Spring centered to “0“. Energized to “b“.
06		2 positions. Spring centered to “0“. Energized to “a“.

2 position spools		
Code	Spool position	
01		2 positions. Spring offset to “b“. Energized to “a“.
02		2 positions. Spring offset to “a“. Energized to “b“.
04		2 positions detent. Operated in “a“ or “b“. No centre or spring offset position.



Code	Inlet	Outlet
1	Internal	Internal
2	Internal	External
3	External	Internal
4	External	External

Code	Accessories
0	Without
1	Shifting time adjustment (meter-in)
2	Shifting time adjustment (meter-out)
4	Integral check valve in P
5	Shifting time adjustment (meter-in) integral check valve in P
8	Shifting time adjustment (meter-out) integral check valve in P

Code	Pilot accessories
10 *	1.0 mm orifice (Standard for 4D02V)
15 *	1.5 mm orifice (Standard for 4D03/06)

* in P port of pilot valve

Code	Solenoid voltage
G0R	12V =
G0Q	24V =
GAR	98V =
GAG	205 =
W30	110V / 50Hz 120V / 60Hz
W31	230V / 50Hz 240V / 60Hz

Code	Seals
1	NBR
5	FPM

Code	Design series
B	4D02V
C	4D03, 4D06

Further spool types, solenoid voltages, position control, hydraulic and mechanical operation on request.

Tel: +45 63 12 83 00 | Email: ps@hymatik.com | www.hymatik.com | Hvidkaervej 27a, DK-5250 Odense SV, Denmark

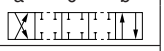
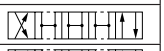
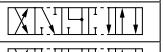
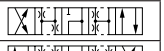
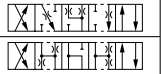
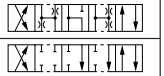
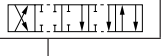
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With inductive position control

D		1		W		
Directional control valve	Series	Pilot NG 06	Style	Electrically operated	Spool type	Spool position

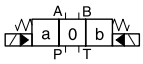
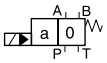
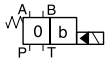
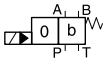
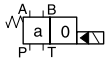
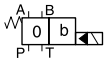
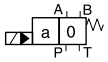
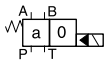
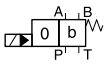
Code	Bore	Size
3	Ø11mm	NG10
4	Ø20mm	NG16
8	Ø26mm	NG25
9	Ø32mm	NG25
11	Ø50mm	NG32

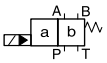
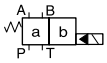
Code	Style
D	D3
V	D4, D8/9, D111

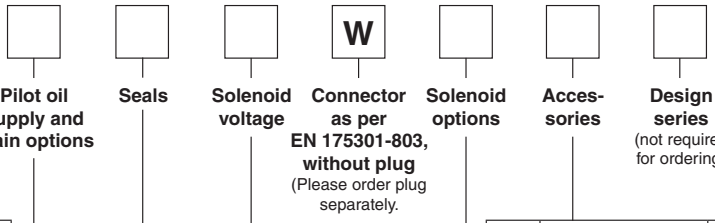
3 position spools		
Code	Spool type	
	a 0 b	
001 [2]		
002 [5]		
003 [3]		
004 [3]		
007 [5]		
009 [1][4]		
011 [5]		
014 [5]		
015 [3]		

2 position spools		
Code	Spool type	
	a b	
020 [2]		
030 [5]		

[1] Consider specific spool position.
[2] All sizes (D31, D41, D81, D91, D111) available
[3] Only D31, D41, D81, D91 available
[4] Only D41, D81, D91, D111 available
[5] Only D41, D81, D91 available

3 position spools			
Code	all 3 position spools		
C			3 positions. Spring offset in position “0“. Operated in position “a“ or “b“.
	Standard	Spool type 009	
E	 Operated in position “a“.	 Operated in position “b“.	2 positions. Spring offset in position “0“.
F	 Spring offset in position “b“.	 Spring offset in position “a“.	2 positions. Operated in position “0“.
K	 Operated in position “b“.	 Operated in position “a“.	2 positions. Spring offset in position “0“.
M	 Spring offset in position “a“.	 Spring offset in position “b“.	2 positions. Operated in position “0“.

2 position spools		
Code	Spool position	
B		Spring offset in position “b“. Operated in position “a“.
H		Spring offset in position “a“. Operated in position “b“.



Code	Inlet	Outlet
1	Internal	External
2	External	External
3 [6]	Integral check valve	External
4 [7]	Internal	Internal
5	External	Internal
6 [6]	Integral check valve	Internal

[6] Only D41, D81 available.
[7] Not for spools 002, 007, 009, 014, 030 available.

Code	Seals
N	NBR
V	FPM

Code	Voltage
K	12V =
J	24V =
U [8]	98V =
G [8]	205V =

[8] For AC voltage use plug with rectifier.
Please order rectifier plug separately.

Code	Solenoid option
omit	Standard solenoid without options
T [9]	without manual override

[9] For hydraulic presses according to the safety regulations EN 693, solenoid option "T" (without manual override) and accessories "I4N", "I5N" or "I6N" (start position monitored) are required.

Code	Spool position	Position control
I3N	C	End position monitored, side A and B
I6N [9]		Start position monitored, side A and B
I2N	C, B, E, F (all spools) C, K, M (spool 9)	End position monitored, side B
I5N [9]		Start position monitored, side B
I1N	C, H, K, M (all spools) C, E, F (spool 9)	End position monitored, side A
I4N [9]		Start position monitored, side A

The plug M12 x 1 for the position control is included. The monitor switch has to be located on the side to which the spool moves from the spring offset position.

Attention

The adjustment of the position control is factory set and sealed. Replacement and repairs can only be undertaken by the manufacturer.

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General							
Design			Directional spool valve				
Actuation			Solenoid				
Series	Parker /Denison		**D31 / (4D02V)**	**D41 / 4D03**	**D81/91 / 4D06**	**D111 / –**	
Size			NG10	NG16	NG25	NG32	
Weight (1/ 2 solenoids)		[kg]	6.0 / 6.6 (7.6 / 8.1)	9.7 / 10.3	17.9 / 18.6	67.4 / 68.0	
Mounting interface			DIN 24340 A10 ISO 4401 NFPA D05	DIN 24340 A16 ISO 4401 NFPA D07	DIN 24340 A25 ISO 4401 NFPA D08	DIN 24340 A32 ISO 4401 NFPA D10	
			CETOP RP 121-H				
Mounting position			unrestricted, preferably horizontal				
Ambient temperature		[°C]	-25...+50 (without inductive position control)				
		[°C]	0...+50 (with inductive position control)				
Hydraulic							
Max. operating pressure		[bar]	Pilot drain internal: P, A B, X: 350; T, Y: 105 (4D02V: P, A, B, X: 315; T, Y: 140)				
			Pilot drain external: P, A B, T, X: 350; Y: 105 (4D02V: P, A, B, T, X: 315; Y:140)				
Fluid			Hydraulic oil in accordance with DIN 51524 / 51525				
Fluid temperature		[°C]	-25 ... +70				
Viscosity permitted		[cSt] / [mm²/s]	2.8...400				
Viscosity recommended		[cSt] / [mm²/s]	30...80				
Filtration			ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)				
Flow max.		[l/min]	150 / (170)	300	700	2000	
Leakage at 350 bar (per flow path)		[ml/min]	up to 100* / (72...422*)	up to 200*	up to 800*	up to 5000*	
*depending on spool							
Opening pressure integral check valve		[bar]	n.a.	see p/Q diagram	see p/Q diagram	n.a.	
Minimum pilot supply pressure		[bar]	5 / (7)	5			
Static / Dynamic							
Step response at 95%		[ms]	Energized / De-energized				
DC solenoids	Pilot pressure	50 bar	60 / 40 (50/60)	95 / 65	150 / 170	470 / 390	
		100 bar	55 / 40 (50/60)	75 / 65	110 / 170	320 / 390	
		250 bar	55 / 40 (50/50)	60 / 65	90 / 170	210 / 390	
		350 bar	55 / 40 (50/50)	60 / 65	85 / 170	200 / 390	
AC solenoids	Pilot pressure	50 bar	40 / 30 (30/50)	75 / 55	130 / 155	450 / 375	
		100 bar	35 / 30 (30/50)	65 / 55	90 / 155	300 / 375	
		250 bar	35 / 30 (30/50)	40 / 55	70 / 155	190 / 375	
		350 bar	35 / 30 (30/50)	40 / 55	65 / 155	180 / 375	
Electrical characteristics							
Duty ratio			100% ED; CAUTION: coil temperature up to 150 °C possible				
Protection class			IP 65 in accordance with EN 60529 (plugged and mounted)				
		Code	K	J	U	G	Y	T
Supply voltage / ripple		[V]	12 V =	24 V =	98 V =	205 V =	110V at 50Hz/ 120V at 60Hz	230V at 50Hz/ 240V at 60Hz
Tolerance supply voltage		[%]	±10	±10	±10	±10	±5	±5
Current consumption	hold	[A]	2.5	1.25	0.31	0.15	0.58 / 0.49	0.31 / 0.26
Current consumption	in rush	[A]	2.5	1.25	0.31	0.15	2.1 / 2.0	1.05 / 1.0
Power consumption	hold	[W]	30	30	30	30	64 / 59 VA	68 / 62 VA
Power consumption	in rush	[W]	30	30	30	30	231 / 240 VA	231 / 240 VA
Solenoid connection			Connector as per EN 175301-803, solenoid identification as per ISO 9461.					
Wiring min.		[mm²]	3 x 1.5 recommended					
Wiring length max.		[m]	50 recommended					

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

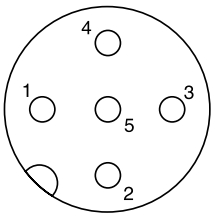
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2

Electrical characteristics of position control M12x1

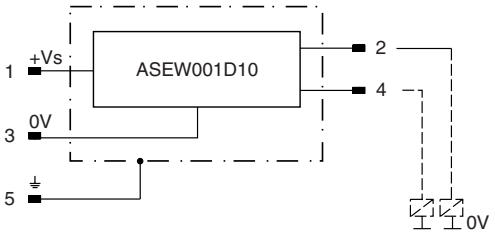
Protection class		IP 65 in accordance with EN 60529 (plugged and mounted)
Ambient temperature	[°C]	0...+50
Supply voltage / ripple	[V]	18...42 / 10%
Current consumption without load	[mA]	≤ 30
Max. output current per channel, ohmic	[mA]	400
Min. output load per channel, ohmic	[kOhm]	100
Max. output drop at 0.2A	[V]	≤ 1.1
Max. output drop at 0.4A	[V]	≤ 1.6
EMC		EN50081-1 / EN50082-2
Max. tolerance ambient field strength	[A/m]	<1200
Min. distance to next AC solenoid	[m]	>0.1
Interface		M12x1 nach IEC 61076-2-101
Wiring min.	[mm²]	5 x 0.25 brad shield recommended
Wiring length max.	[m]	50 recommended

M12 pin assignment



Start position monitored
1 + Supply 18...42V
2 Normally open B
3 0V
4 Normally open A
5 Earth ground

End position monitored
1 + Supply 18...42V
2 Normally closed B
3 0V
4 Normally open A
5 Earth ground



Definitions

Start position monitored:

The valve is de-energized. The inductive switch gives a signal at the moment (below 15% spool stroke) when the spool leaves the spring offset position.

End position monitored:

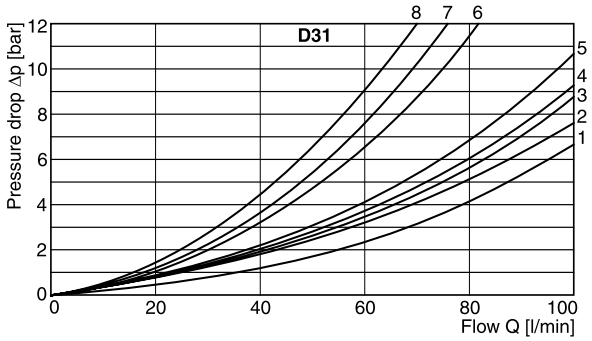
The inductive switch gives a signal before the end position is reached. (above 85% spool stroke).

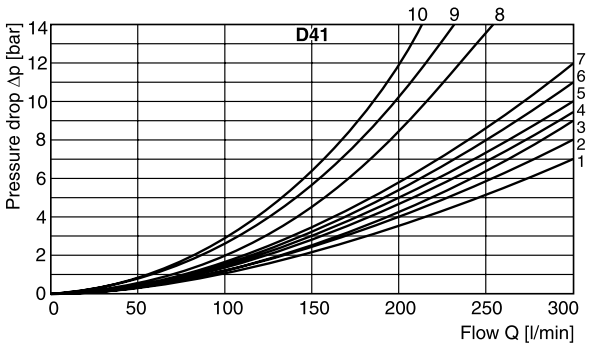
2

The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number for each spool type, operating position and flow direction is given in the table below.

D31DW and D41VW / 4D03

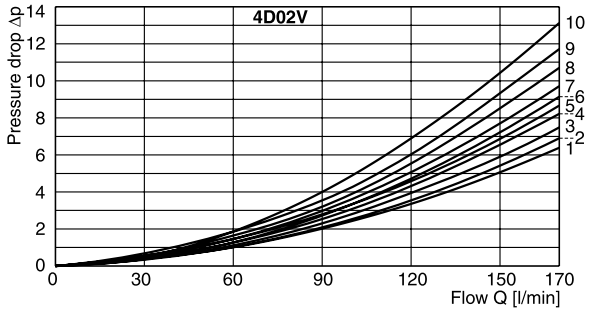
Spool Code	Curve number									
	P-A		P-B		P-T		A-T		B-T	
	D3	D4	D3	D4	D3	D4	D3	D4	D3	D4
001	3	1	3	1	–	–	1	4	1	5
002	3	1	3	2	4	6	1	4	1	6
003	3	1	4	2	–	–	1	5	1	6
004	3	1	3	1	–	–	1	5	1	5
005	3	2	4	2	–	–	1	3	1	5
006	3	1	3	2	–	–	1	3	1	6
007	4	1	3	1	–	6	1	4	1	5
009	3	2	3	9	8	8	1	7	1	10
011	3	1	3	1	–	–	1	4	1	5
014	3	1	4	1	–	6	1	4	1	5
015	4	1	3	2	–	–	1	4	1	6
016	4	2	3	2	–	–	1	3	1	5
020	3	3	4	5	–	–	1	3	1	5
021	4	2	3	8	–	–	1	2	–	–
022	3	8	4	2	–	–	–	–	1	3
026	3	3	3	5	–	–	–	–	–	–
030	3	2	1	3	–	–	1	6	1	7
054	–	2	–	3	–	–	–	6	–	7





4D02V

Spool Code	Curve number				
	P-A	P-B	P-T	A-T	B-T
01	3	3	7	4	3
02	3	3	–	2	4
03	3	3	–	2	5
07	4	6	6	4	10
08	2	3	–	4	4
09	2	2	–	1	4
10	2	3	–	4	4
11	5	3	–	2	5
13	2	4	–	1	4
14	4	3	–	2	4
46	8	9	–	7	9
51	6	4	–	3	6
55	–	7	–	8	–
56	4	–	–	9	–

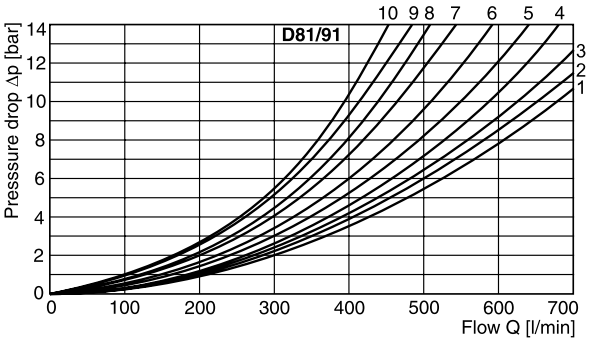


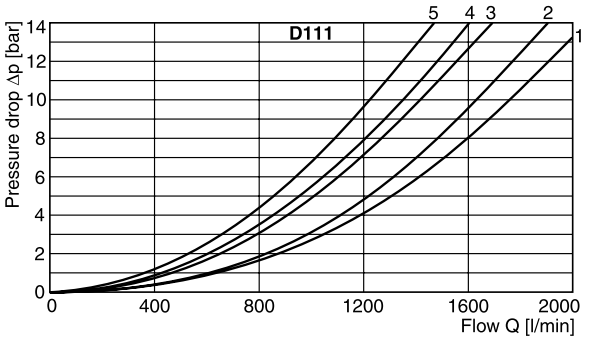
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2

D81/D91VW / 4D06 and D111VW

Spool Code	Curve number									
	P-A		P-B		P-T		A-T		B-T	
	D8/9	D11	D8/9	D11	D8/9	D11	D8/9	D11	D8/9	D11
001	3	5	2	5	–	–	3	4	5	1
002	2	5	1	5	1	5	3	4	5	1
003	4	–	2	–	–	–	3	–	6	–
004	4	–	3	–	–	–	3	–	5	–
005	1	–	2	–	–	–	4	–	5	–
006	2	–	2	–	–	–	4	–	6	–
007	3	–	1	–	7	–	3	–	5	–
009	4	3	8	3	9	2	4	3	10	1
011	3	–	2	–	–	–	3	–	5	–
014	1	–	2	–	8	–	3	–	5	–
015	3	–	3	–	–	–	4	–	5	–
016	3	–	3	–	–	–	4	–	5	–
020	6	5	5	5	–	–	6	3	8	1
021	5	–	10	–	–	–	3	–	–	–
022	10	–	5	–	–	–	–	–	5	–
026	6	–	5	–	–	–	–	–	–	–
030	3	5	2	5	–	–	3	4	5	1
054	4	5	3	5	–	–	3	4	5	1

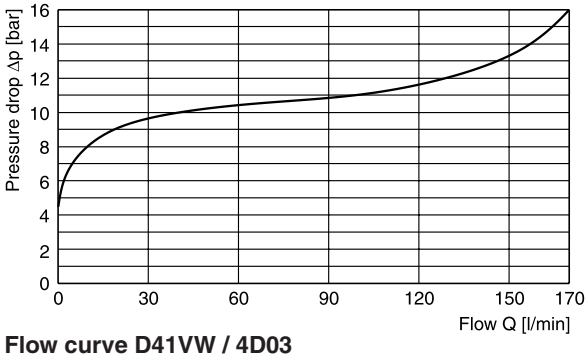




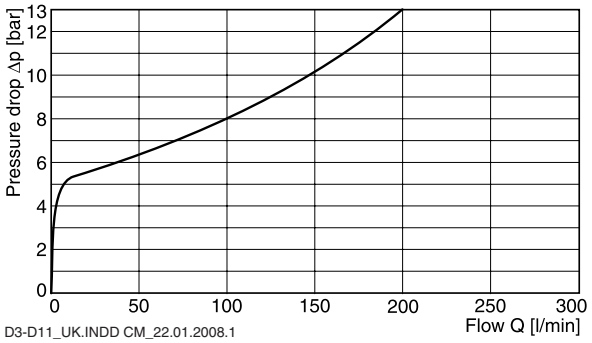
Integral check valve in the P port

Mounting an integral check valve in the P port is necessary to build up pilot pressure for valves with P to T connection and internal pilot oil supply. The pressure difference at the integral check valve (see performance curves) is to be added to all flow curves of the P-port of the main valve. Directional valves with an integral check valve are available for the series 4D02V, D41/4D03 and D81/4D06.

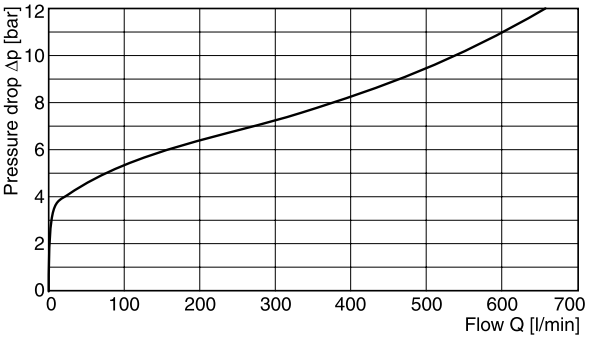
Flow curve 4D02V



Flow curve D41VW / 4D03



Flow curve D81VW / 4D06



D3-D11_UK.INDD CM_22.01.2008.1

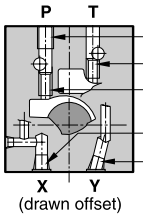
Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

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2

Pilot oil inlet (supply) and outlet (drain)

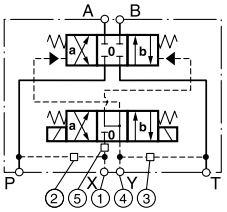
Series D31DW



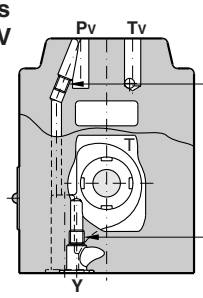
⑤ M6 DIN906
③ M6 DIN906
② M5 DIN906
① 1/16 NPTF
④ 1/16 NPTF
(drawn offset)

○ open, ● closed

Pilot oil Inlet	Outlet	1	2	3	4	5
internal	external	●	○	●	○	Orifice Ø1.2
external	external	○	●	●	○	Orifice Ø1.2
internal	internal	●	○	○	●	Orifice Ø1.2
external	internal	○	●	○	●	Orifice Ø1.2



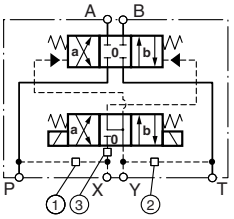
Series 4D02V



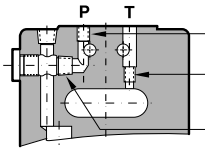
③ Slip-in orifice in pilot p-port
① M6 DIN906
② M6 DIN906
(drawn offset)

○ open, ● closed

Pilot oil Inlet	Outlet	1	2	3
internal	external	○	●	Orifice Ø1.0
external	external	●	●	Orifice Ø1.0
internal	internal	○	○	Orifice Ø1.0
external	internal	●	○	Orifice Ø1.0



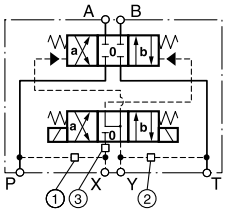
Series D41VW



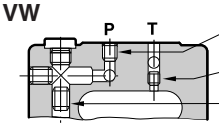
③ M6 DIN906
② M6 DIN906
① 1/16 NPTF

○ open, ● closed

Pilot oil Inlet	Outlet	1	2	3
internal	external	○	●	Orifice Ø1.5
external	external	●	●	Orifice Ø1.5
internal	internal	○	○	Orifice Ø1.5
external	internal	●	○	Orifice Ø1.5



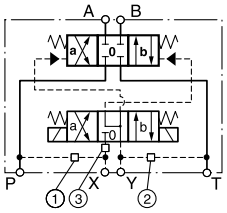
Series D81/91VW



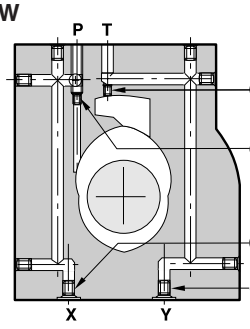
③ M6 DIN906
② M6 DIN906
① 1/16 NPTF

○ open, ● closed

Pilot oil Inlet	Outlet	1	2	3
internal	external	○	●	Orifice Ø1.5
external	external	●	●	Orifice Ø1.5
internal	internal	○	○	Orifice Ø1.5
external	internal	●	○	Orifice Ø1.5



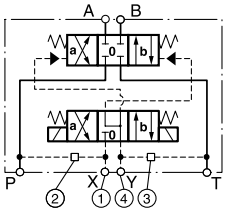
Series D111VW



③ 1/16 NPTF
② 1/16 NPTF
① 1/8 NPTF
④ 1/8 NPTF

○ open, ● closed

Pilot oil Inlet	Outlet	1	2	3	4
internal	external	●	Orifice Ø1.5	●	○
external	external	Orifice Ø1.5	●	●	○
internal	internal	●	Orifice Ø1.5	○	●
external	internal	Orifice Ø1.5	●	○	●



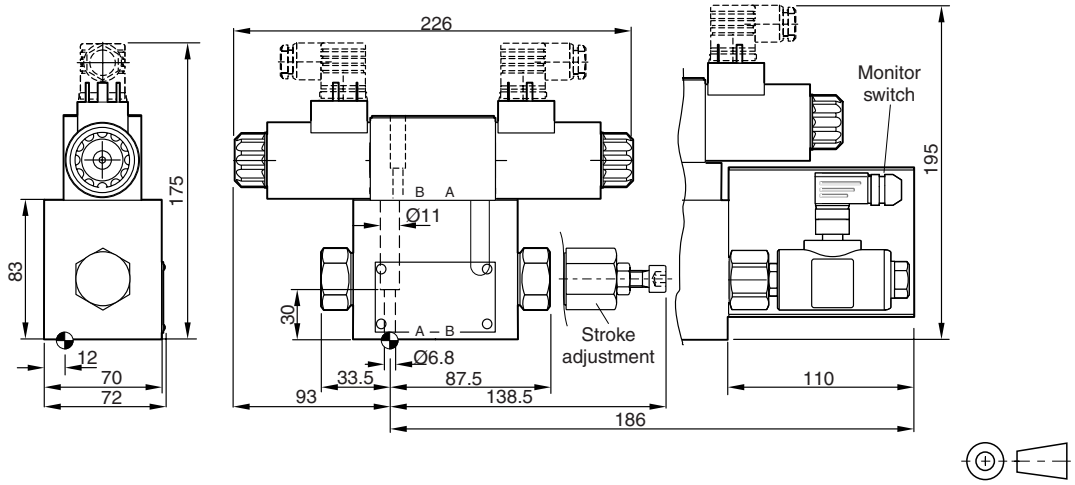
All orifice sizes for standard valves

D3-D11_UK.INDD CM_22.01.2008.1

Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

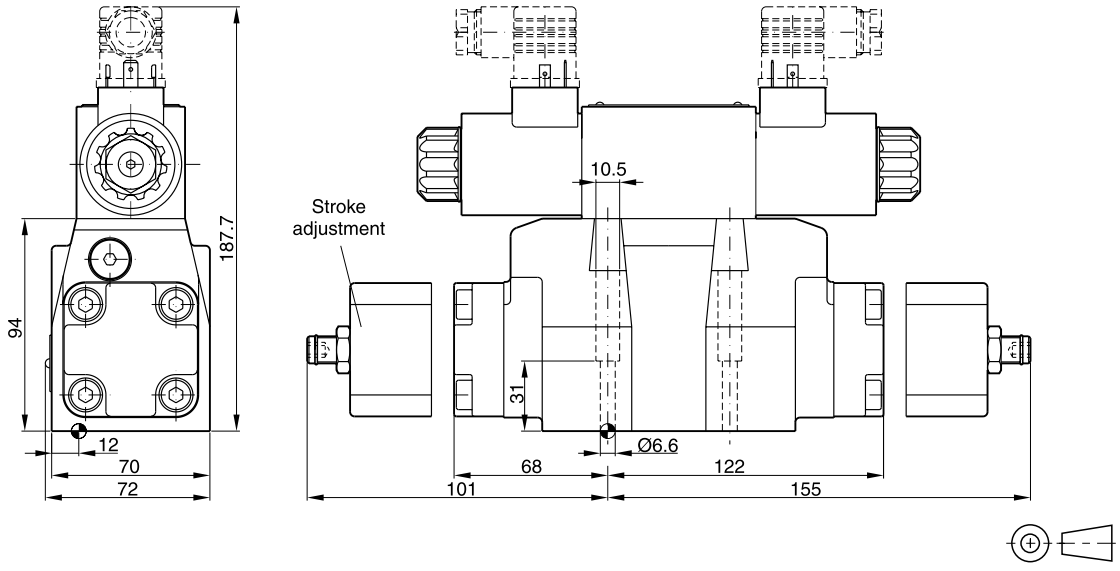
Tel: +45 63 12 83 00 | Email: ps@hymatik.com | www.hymatik.com | Hvidkaervej 27a, DK-5250 Odense SV, Denmark

D31DW



Surface finish	Kit			Kit
R_{max}6.3 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm ±15%	**NBR: SK-D31DW-N-91** FPM: SK-D31DW-V-91

4D02V



Surface finish	Kit			Kit
R_{max}6.3 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm	NBR: SK-4D02V-B1 FPM: SK-4D02V-B5

The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

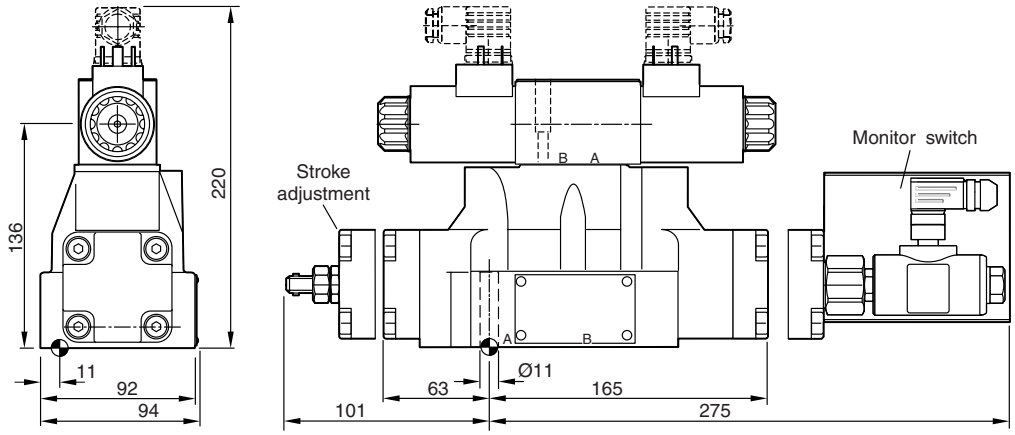
D3-D11_UK.INDD CM_22.01.2008.1

Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

Tel: +45 63 12 83 00 | Email: ps@hymatik.com | www.hymatik.com | Hvidkaervej 27a, DK-5250 Odense SV, Denmark

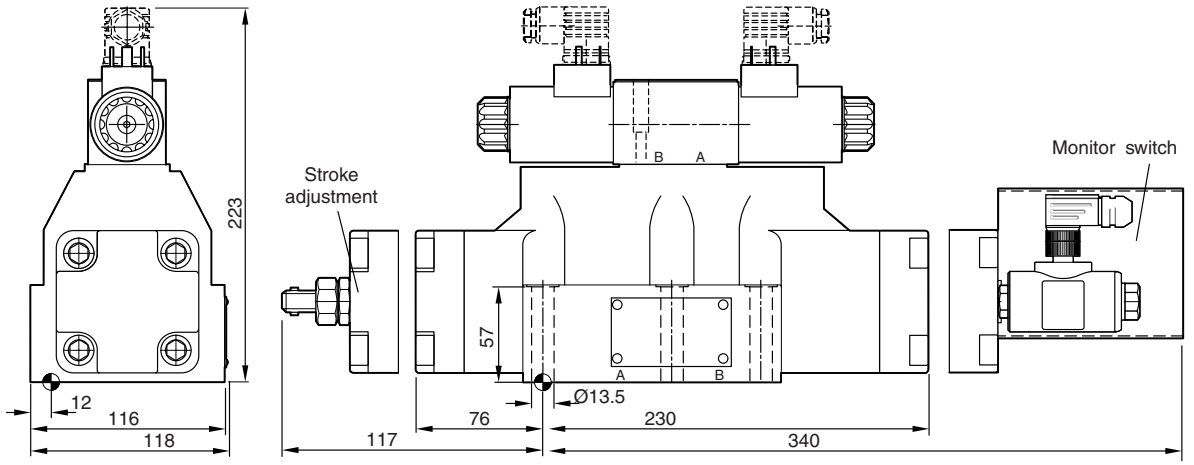
2

D41VW/4D03



Surface finish	Kit			Kit
R_{max}6.3 0.01/100	BK320	4x M10x60 2x M6x55 DIN 912 12.9	63 Nm ±15% 13.2 Nm ±15%	**NBR: SK-D41DW-N-91** FPM: SK-D41DW-V-91

D81VW/4D06, D91VW

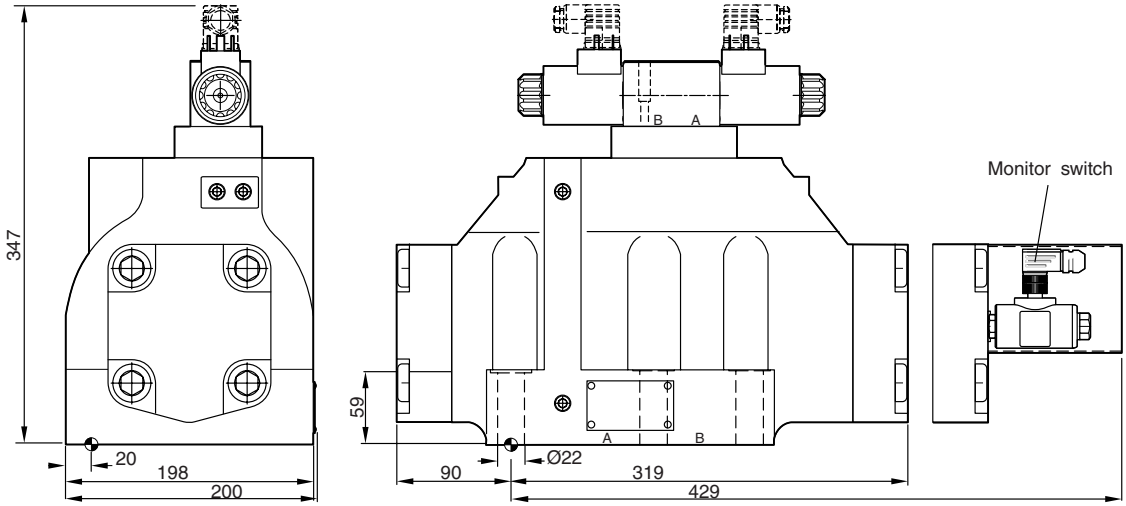


Surface finish	Kit			Kit
R_{max}6.3 0.01/100	BK360	6x M12x75 DIN 912 12.9	108 Nm ±15%	**NBR: SK-D81VW-N-91 / SK-D91VW-N-91** FPM: SK-D81VW-V-91 / SK-D91VW-V-91

The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

Tel: +45 63 12 83 00 | Email: ps@hymatik.com | www.hymatik.com | Hvidkaervej 27a, DK-5250 Odense SV, Denmark

D111VW



Surface finish	Kit			Kit
R_{max}6.3 0.01/100	BK386	6x M20x90 DIN 912 12.9	517 Nm ±15%	**NBR: SK-D111VW-N-91** FPM: SK-D111VW-V-91

The space necessary to remove the plug as per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

Notes

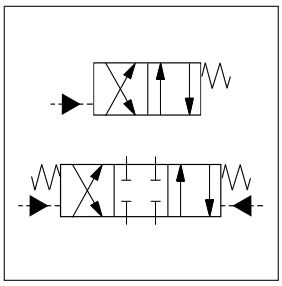
The D1VP is a hydraulically controlled 4/3 or 4/2 way directional control valve. The valve can be operated either by the pilot ports X and Y via the subplate or by the connection of an external pilot pipe directly on the valve body.

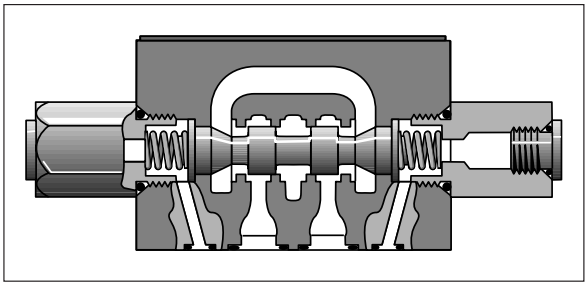
The D3DP, D4P, D9P and D11P are hydraulically controlled 4/3 or 4/2 way directional control valves. The valves are operated by the pilot ports X and Y via the subplate.

Pressure and flow of the pilot oil have a significant influence on the response time of the spool.

The minimum pilot pressure must be ensured for all operating conditions of the directional valve.







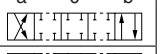
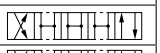
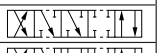
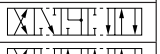
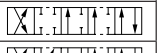
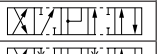
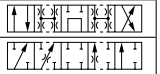
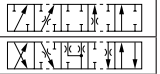
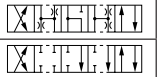
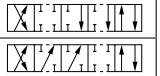
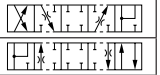
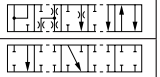
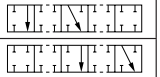
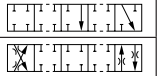
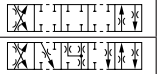
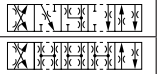
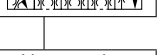
Technical data

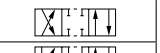
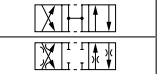
General						
Design		Directional spool valve				
Actuation		Hydraulic				
Series		**D1VP**	**D3DP**	**D4P**	**D9P**	**D11P**
Size		NG06	NG10	NG16	NG25	NG32
Weight	[kg]	1.3	3.7	9.0	17.0	66.0
Mounting interface		DIN 24340 A06 ISO 4401 NFPA D03	DIN 24340 A10 ISO 4401 NFPA D05	DIN 24340 A16 ISO 4401 NFPA D07	DIN 24340 A25 ISO 4401 NFPA D08	DIN 24340 A32 ISO 4401 NFPA D10
		CETOP RP 121-H				
Mounting position		unrestricted, preferably horizontal				
Ambient temperature	[°C]	-25...+50				
Hydraulic						
Max. operating pressure	[bar]	P, A B, T: 350; X, Y: 210	P, A B, T: 350; X, Y: 210	P, A B, T: 350; X, Y: 350 [1]	P, A B, T: 350; X, Y: 350 [1]	P, A B, T: 350; X, Y: 350 [1]
Fluid		Hydraulic oil in accordance with DIN 51524 / 51525				
Fluid temperature	[°C]	-25 ... +70				
Viscosity permitted	[cSt] / [mm²/s]	2.8...400				
Viscosity recommended	[cSt] / [mm²/s]	30...80				
Filtration		ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)				
Flow max.	[l/min]	80	130	300	700	2000
Leakage at 350 bar (per flow path) * depending on spool	[ml/min]	up to 60*	up to 100*	up to 200*	up to 800*	up to 5000*
Pilot supply pressure (min/max)	[bar]	15 /210	15 /210	5 / 350 [1]	5 / 350 [1]	5 / 350 [1]
Static / Dynamic						
Step response		The response times depend on the pilot oil pressure and on the speed of the increase / decrease of the pilot pressure.				
Recommended values are (act./deact.)	[ms]	13 / 28	20 / 30	50 / 60	100 / 150	300 / 370

[1] with monitor switch: 105 bar

2

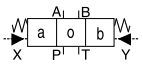
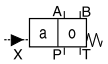
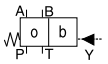
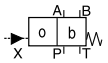
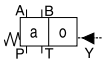
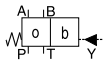
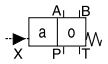
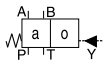
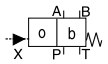
D	1	V	P				90	
Directional control valve	Size DIN NG 06 CETOP 03 NFPA D03		Hydraulically operated	Spool type	Spool position	Seals	Pilot port with G1/8 pipe thread	Design series (not required for ordering)

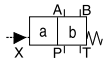
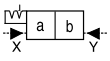
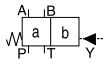
3 position spools		
Code	Spool type	
	a	0	b
1	
2	
3	
4	
5	
6	
7	
8 *	
9 *	
10	
11	
14	
15	
16	
21	
22	
31	
32	
76	
78	
81	
82	
102	

2 position spools	
Code	Spool type
	a	b
20	
26	
30	
101	

* Consider specific spool position.

Code	Seals
N	**NBR**
V	FPM

3 position spools			
Code	all 3 position spools		
C			**3 positions. Spring offset in position “0“. Operated in position “a“ or “b“.**
	Standard	Spool type 8 and 9	
E	 Operated in position “a“.	 Operated in position “b“.	2 positions. Spring offset in position “0“.
F	 Spring offset in position “b“.	 Spring offset in position “a“.	2 positions. Operated in position “0“.
K	 Operated in position “b“.	 Operated in position “a“.	2 positions. Spring offset in position “0“.
M	 Spring offset in position “a“.	 Spring offset in position “b“.	2 positions. Operated in position “0“.

2 position spools		
Code	Spool position	
B		**Spring offset in position “b“. Operated in position “a“.**
D		**Detent, operated in position “a“ or “b“. No centre or offset position.**
H		**Spring offset in position “a“. Operated in position “b“.**

Bold letters =
Short-term availability

Further spool types and styles on request.

D	3	D	P			2		
Directional control valve	Size DIN NG 10 CETOP 05 NFPA D05		Hydraulically operated	Spool type	Spool position	Pilot oil supply and drain external/ external	Seals	Design series (not required for ordering)

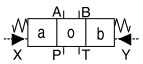
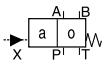
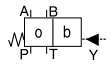
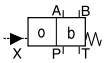
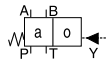
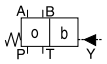
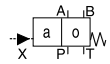
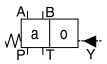
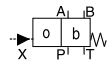
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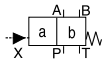
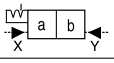
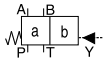
3 position spools	
Code	Spool type a 0 b
1	
2	
3	
4	
5	
6	
7	
8 *	
9 *	
10	
11	
14	
15	
16	
21	
22	
31	
32	
76	
78	
81	
82	
102	

2 position spools	
Code	Spool type a b
20	
26	
30	
101	

* Consider specific spool position.

Code	Seals
N	NBR
V	FPM

3 position spools			
Code	all 3 position spools		
C			3 positions. Spring offset in position “0“. Operated in position “a“ or “b“.
	Standard	Spool type 8 and 9	
E	 Operated in position “a“.	 Operated in position “b“.	2 positions. Spring offset in position “0“.
F	 Spring offset in position “b“.	 Spring offset in position “a“.	2 positions. Operated in position “0“.
K	 Operated in position “b“.	 Operated in position “a“.	2 positions. Spring offset in position “0“.
M	 Spring offset in position “a“.	 Spring offset in position “b“.	2 positions. Operated in position “0“.

2 position spools		
Code	Spool position	
B		Spring offset in position “b“. Operated in position “a“.
D		Detent, operated in position “a“ or “b“. No centre or offset position.
H		Spring offset in position “a“. Operated in position “b“.

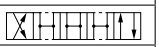
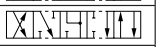
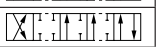
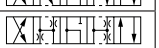
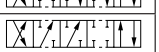
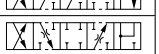
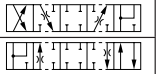
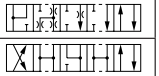
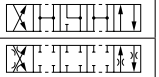
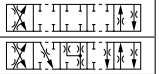
Further spool types and styles on request.

2

D		P		
Directional control valve	Size	Hydraulically operated	Spool type	Spool position

Code	Bore	Size
4	Ø20mm	NG16
9	Ø32mm	NG25
11	Ø50mm	NG32

3 position spools

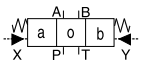
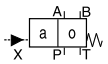
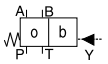
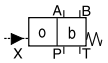
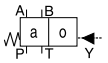
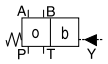
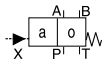
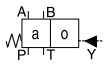
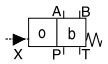
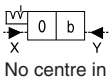
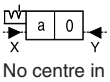
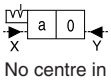
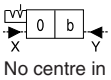
Code	Spool type a 0 b
1 [2]	
2 [2]	
3 [3]	
4 [3]	
5 [3]	
6 [3]	
7 [3]	
9 [1] [2]	
11 [3]	
14 [3]	
15 [3]	
16 [3]	
21 [3]	
22 [3]	
31 [4]	
32 [4]	
54 [2]	
81 [2]	
82 [2]	

2 position spools

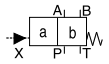
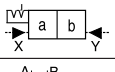
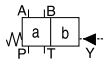
Code	Spool type a b
20 [2]	
26 [3]	
30 [2]	

[1] Consider specific spool position
[2] All sizes (D4, D9, D11) available
[3] Only D4 and D9 available
[4] Only D9 available

3 position spools

Code	all 3 position spools		
C [2]			3 positions. Spring offset in position “0“. Operated in position “a“ or “b“.
	Standard	Spool type 9	
E [2]	 Operated in position “a“.	 Operated in position “b“.	2 positions. Spring offset in position “0“.
F [2]	 Spring offset in position “b“.	 Spring offset in position “a“.	2 positions. Operated in position “0“.
K [2]	 Operated in position “b“.	 Operated in position “a“.	2 positions. Spring offset in position “0“.
M [2]	 Spring offset in position “a“.	 Spring offset in position “b“.	2 positions. Operated in position “0“.
R [3]	 No centre in offset position.	 No centre in offset position.	2 positions, detent. Operated in position “0“ or “b“.
S [3]	 No centre in offset position.	 No centre in offset position.	2 positions, detent. Operated in position “0“ or “a“. No centre in offset position.

2 position spools

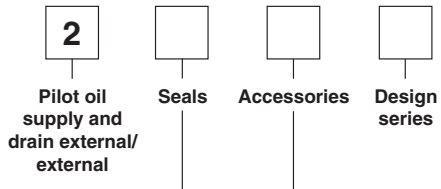
Code	Spool position	
B		Spring offset in position “b“. Operated in position “a“.
D [3]		Detent, operated in position “a“ or “b“. No centre or offset position.
H		Spring offset in position “a“. Operated in position “b“.

Further spool types and position control on request.

DVP_UK.INDD CM_22.01.2008.1

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Hydraulic Controls Division
Kaarst, Germany

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Code	Seals
N	NBR
V	FPM

Code	Accessories
omit [2]	Standard valve w/o accessories
7 [2]	Pilot choke, meter-out
8 [3]	Stroke adjustment side B
9 [3]	Stroke adjustment side A
60 [2]	Pilot choke, meter-in
89 [3]	Stroke adjustment side A and B

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2

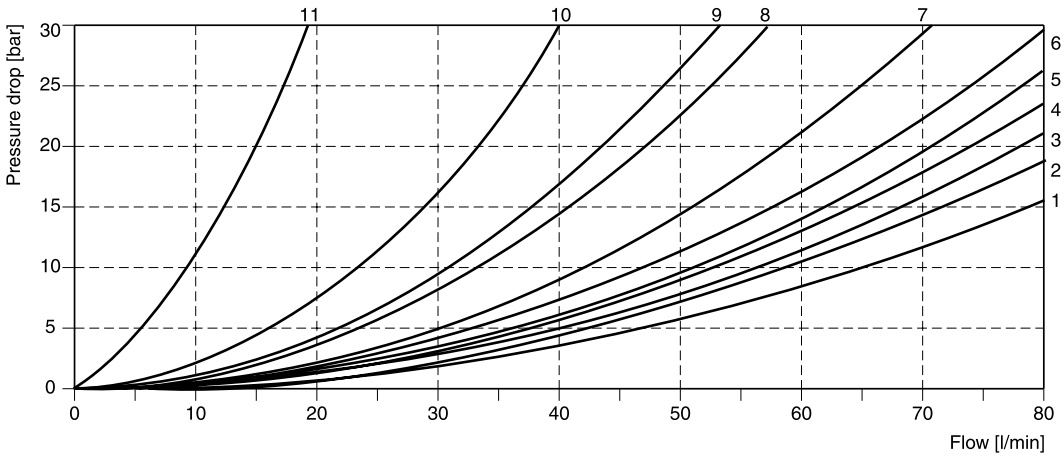
The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number for each spool type, operating position and flow direction is given in the table below.

	Position „b“		Position „a“		Position „0“					
Spool	P->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T	A->B
1	4	1	4	1	–	–	–	–	–	–
2	5	2	5	2	4	4	1	1	6	1
3	4	1	4	2	–	–	8	–	–	–
4	4	2	4	2	–	–	7	7	–	9
5	4	1	5	1	9	–	–	–	–	–
6	5	1	5	1	9	9	–	–	–	9
7	5	2	4	1	–	5	–	1	7	–
10	4	–	4	–	–	–	–	–	–	–
11	4	2	4	2	–	–	11	11	–	–
14	4	1	5	2	5	–	1	–	7	–
15	4	2	4	1	–	–	–	8	–	–
16	5	1	4	1	–	9	–	–	–	–
20	5	1	5	1	–	–	–	–	–	–
26	6	–	6	–	–	–	–	–	–	–
30	5	1	5	1	–	–	–	–	–	–
76	–	2	–	–	–	–	3	–	–	–
78	–	–	–	2	–	–	–	3	–	–
81	10	10	10	10	–	–	–	–	–	–
82	10	10	10	10	–	–	*	*	–	–
	P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T	A-> B
8	2	2	2	2	–	–	–	–	8	–
9	3	3	3	3	–	–	–	–	9	–

	Position „b“			Position „a“		
	P->A	P->B	A->B	P->B	A->T	
21	3	3	3	6	1	
	P->A	B->T		P->A	P->B	A->B
22	6	1		3	3	3

* Only for pressure compensation, no high flow possible.

Flow curve



DVP_UK.INDD CM_22.01.2008.1

Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

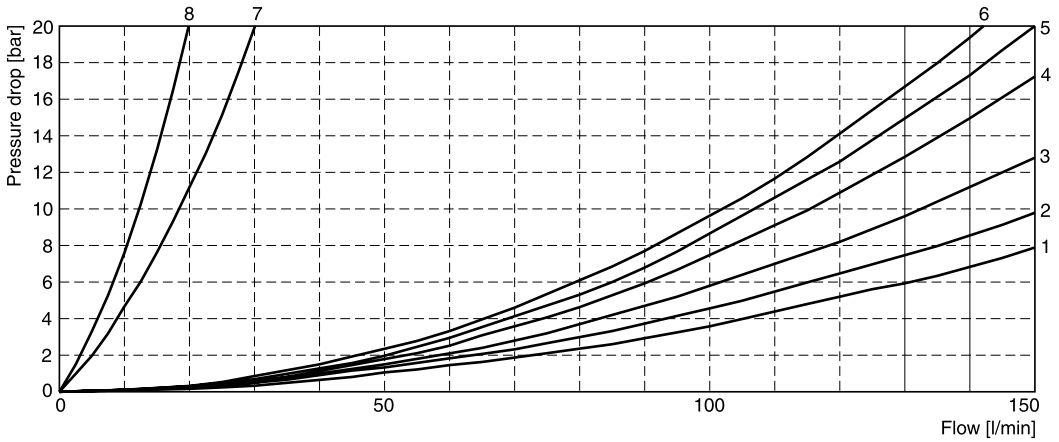
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The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number for each spool type, operating position and flow direction is given in the table below.

	Position „b“		Position „a“		Position „0“					
Spool	P->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T	A->B
1	4	3	4	3	–	–	–	–	–	–
2	4	1	4	1	3	3	1	1	5	1
3	4	3	5	2	–	–	4	–	–	–
4	4	2	4	2	–	–	3	3	–	5
5	4	3	5	3	5	–	–	–	–	–
6	4	3	4	3	6	6	–	–	–	6
7	5	1	4	3	–	4	–	2	6	–
10	4	–	4	–	–	–	–	–	–	–
11	4	3	4	3	–	–	8	8	–	–
12	4	3	4	3	7	7	7	7	8	8
14	4	3	5	1	4	–	2	–	6	–
15	5	2	4	3	–	–	–	4	–	–
16	5	3	4	3	–	5	–	–	–	–
20	4	3	4	3	–	–	–	–	–	–
26	4	–	4	–	–	–	–	–	–	–
30	4	2	4	2	–	–	–	–	–	–
	P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T	A-> B
8	4	3	4	3	–	–	–	–	6	–
9	4	4	4	4	–	–	–	–	6	–

	Position „b“			Position „a“		
	P->A	P->B	A->B	P->B	A->T	
21	5	4	6	3	3	
	P->A	B->T		P->A	P->B	A->B
22	3	3		4	5	6

Flow curve

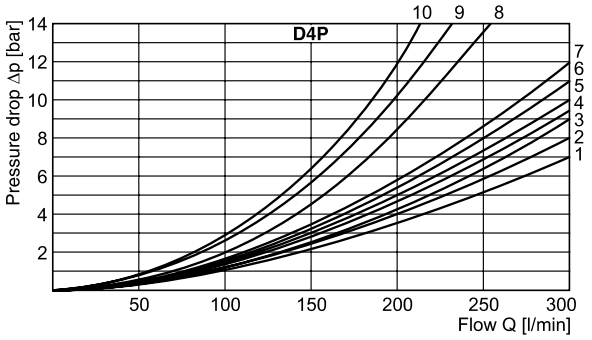


2

The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number for each spool type, operating position and flow direction is given in the table below.

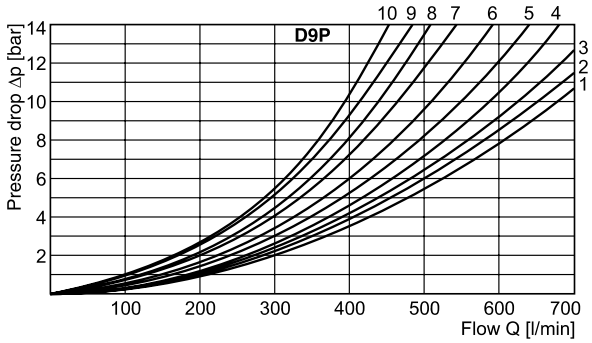
D4P

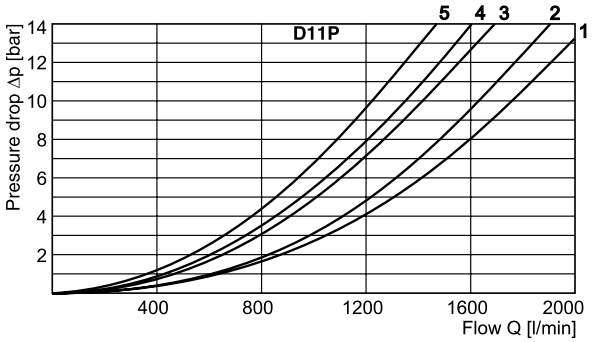
Spool Code	Curve number				
	P-A	P-B	P-T	A-T	B-T
1	1	1	–	4	5
2	1	2	6	4	6
3	1	2	–	5	6
4	1	1	–	5	5
5	2	2	–	3	5
6	1	2	–	3	6
7	1	1	6	4	5
9	2	9	8	7	10
11	1	1	–	4	5
14	1	1	6	4	5
15	1	2	–	4	6
16	2	2	–	3	5
20	3	5	–	3	5
21	2	8	–	2	–
22	8	2	–	–	3
26	3	5	–	–	–
30	2	3	–	6	7
54	2	3	–	6	7



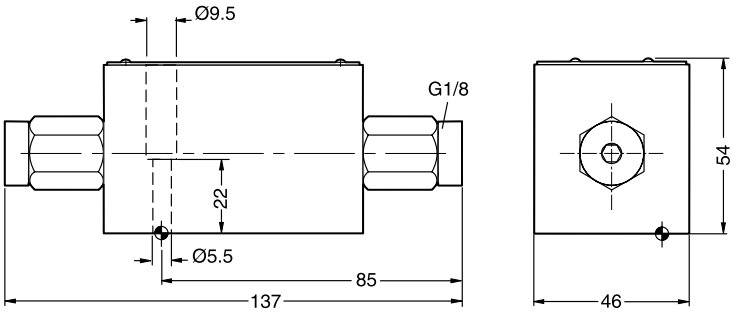
D9P and D11P

Spool Code	Curve number									
	P-A		P-B		P-T		A-T		B-T	
	D9	D11	D9	D11	D9	D11	D9	D11	D9	D11
1	3	5	2	5	–	–	3	4	5	1
2	2	5	1	5	1	5	3	4	5	1
3	4	–	2	–	–	–	3	–	6	–
4	4	–	3	–	–	–	3	–	5	–
5	1	–	2	–	–	–	4	–	5	–
6	2	–	2	–	–	–	4	–	6	–
7	3	–	1	–	7	–	3	–	5	–
9	4	3	8	3	9	2	4	3	10	1
11	3	–	2	–	–	–	3	–	5	–
14	1	–	2	–	8	–	3	–	5	–
15	3	–	3	–	–	–	4	–	5	–
16	3	–	3	–	–	–	4	–	5	–
20	6	5	5	5	–	–	6	3	8	–
21	5	–	10	–	–	–	3	–	–	–
22	10	–	5	–	–	–	–	–	5	–
26	6	–	5	–	–	–	–	–	–	–
30	3	5	2	5	–	–	3	4	5	1
54	–	5	–	5	–	–	–	4	–	1



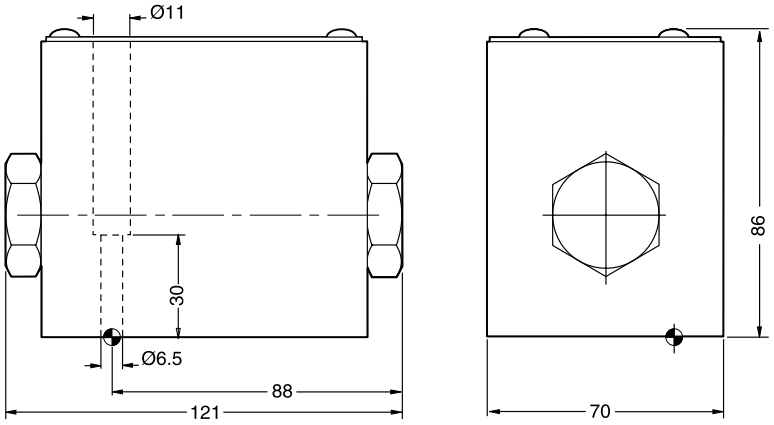


D1VP



Surface finish	Kit			Kit
R_{max}6.3 0.01/100	BK375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	**NBR: SK-D1VP-70** FPM: SK-D1VP-V70

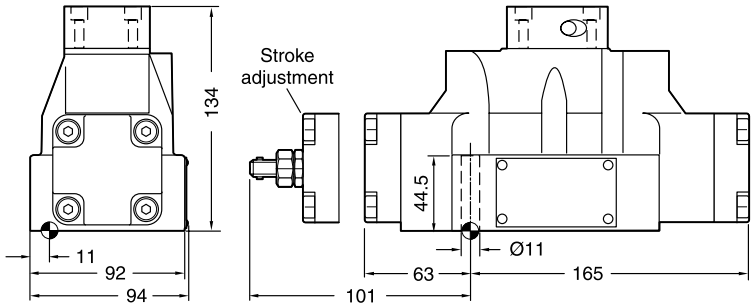
D3DP



Surface finish	Kit			Kit
R_{max}6.3 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm ±15%	**NBR: SK-D3DP-35** FPM: SK-D3DP-V35

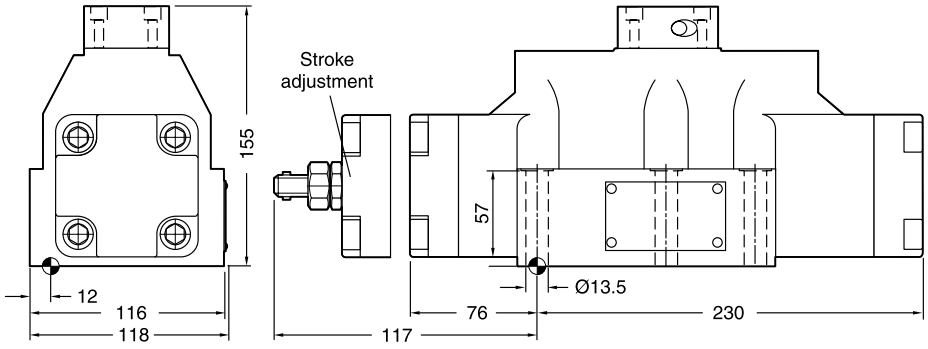
2

D4P



Surface finish	Kit			Kit
R_{max}6.3 0.01/100	BK320	4x M10x60 2 x M6x55 DIN 912 12.9	63 Nm ±15% 13.2 Nm ±15%	**NBR: SK-D41VW-70** FPM: SK-D41VW-V70

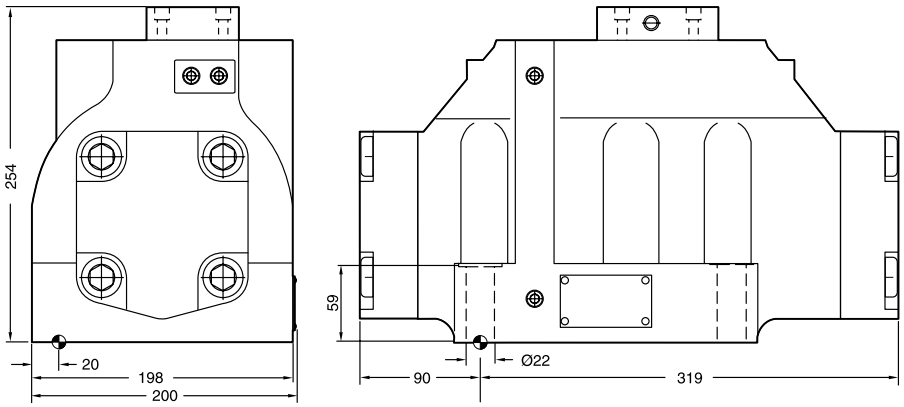
D9P



Surface finish	Kit			Kit
R_{max}6.3 0.01/100	BK360	6x M12x75 DIN 912 12.9	108 Nm ±15%	**NBR: SK-D91VW-70** FPM: SK-D91VW-V70

2

D11P



Surface finish	Kit			Kit
R_{max}6.3 0.01/100	BK386	6x M20x90 DIN 912 12.9	517 Nm ±15%	**NBR: SK-D111VW-70** FPM: SK-D111VW-V70

Notes

2

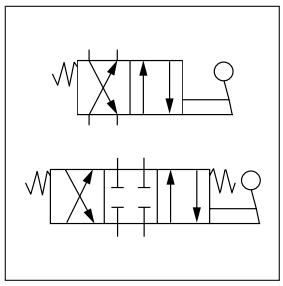
Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

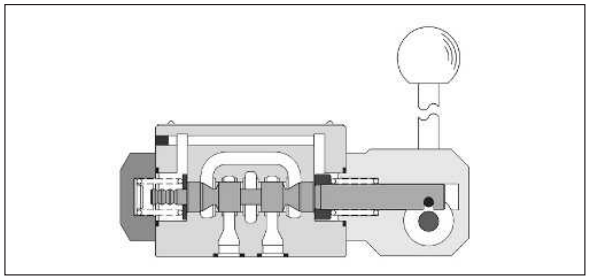
Tel: +45 63 12 83 00 | Email: ps@hymatik.com | www.hymatik.com | Hvidkaervej 27a, DK-5250 Odense SV, Denmark

The D1DL, D3DL, D4L and D9L are 5 chamber 4/3 or 4/2 way directional control valves. They are operated by a hand lever which is directly connected to the spool.

The hand lever can be located either on the A or B side. Spring offset and detent designs are available.







Technical data

General					
Design		Directional spool valve			
Actuation		Lever			
Series		**D1DL**	**D3DL**	**D4L**	**D9L**
Size		NG06	NG10	NG16	NG25
Weight	[kg]	1.4	3.7	9.0	17.0
Mounting interface		DIN 24340 A06 ISO 4401 NFPA D03	DIN 24340 A10 ISO 4401 NFPA D05	DIN 24340 A16 ISO 4401 NFPA D07	DIN 24340 A25 ISO 4401 NFPA D08
		CETOP RP 121-H			
Mounting position		unrestricted, preferably horizontal			
Ambient temperature	[°C]	-25...+50			
Hydraulic					
Max. operating pressure	[bar]	P, A B: 350; T: 10	P, A B: 350; T: 10	external drain P, A B, T: 350; X, Y: 10 internal drain P, A B: 350; T, X, Y: 10	external drain P, A B, T: 350; X, Y: 10 internal drain P, A B: 350; T, X, Y: 10
Fluid		Hydraulic oil in accordance with DIN 51524 / 51525			
Fluid temperature	[°C]	-25 ... +70			
Viscosity permitted	[cSt] / [mm²/s]	2.8...400			
Viscosity recommended	[cSt] / [mm²/s]	30...80			
Filtration		ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)			
Flow max.	[l/min]	80	130	300	700
Leakage at 350 bar (per flow path)	[ml/min]	up to 60*	up to 100*	up to 200*	up to 800*
* depending on spool					

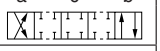
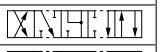
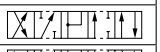
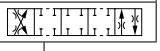
2

D		D					
Directional control valve	Size	5-chamber valve	Actuation	Spool type	Spool position	Seals	Design series (not required for ordering)

Code	Size
1	**DIN NG06, CETOP03 NFPA D03**
3	**DIN NG10, CETOP05 NFPA D05**

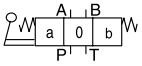
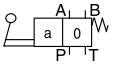
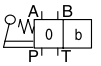
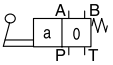
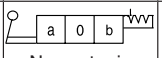
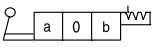
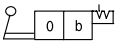
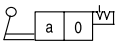
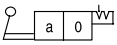
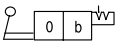
Code	Actuation
L	**Hand lever side B**
LB	**Hand lever side A**

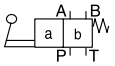
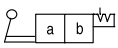
Code	Seals
N	**NBR**
V	FPM

3 position spools	
Code	Spool type a 0 b
1	
2	
4	
6 [1]	
9 [3]	
10 [1]	
42 [2]	

2 position spools	
Code	Spool type a b
20	

[1] Only available for D3DL
[2] Only available for D1DL
[3] Consider specific spool position.

3 position spools			
Code	all 3 position spools		
C			**3 positions. Spring offset in position “0“. Operated in position “a“ or “b“.**
	Standard	Spool type 9	
E	 Operated in position “a“.	 Operated in position “b“.	2 positions. Spring offset in position “0“.
K	 Operated in position “b“.	 Operated in position “a“.	2 positions. Spring offset in position “0“.
N	 No centre in offset position.	 No centre in offset position.	3 positions, detent. Operated in position “a“, “0“or “b“.
R	 No centre in offset position.	 No centre in offset position.	2 positions, detent. Operated in position “0“ or “b“.
S	 No centre in offset position.	 No centre in offset position.	2 positions, detent. Operated in position “0“ or “a“. No centre in offset position.

2 position spools		
Code	Spool position	
B [4]		**Spring offset in position “b“. Operated in position “a“.**
D		Detent, operated in position “a“ or “b“. No centre or offset position.
H [5]		Spring offset in position “a“. Operated in position “b“.

[4] For D1D only operation LB available
For D3D operation L and LB available
[5] For D1D only operation L available
For D3D operation L and LB available

Bold letters =
Short-term availability

Further spool types on request.

D							
Directional control valve	**Size**	**Actuation**	**Spool type**	**Spool position**	**Pilot oil drain**	**Seals**	**Design series** (not required for ordering)

Code	Bore	Size
4	Ø20mm	NG16
9	Ø32mm	NG25

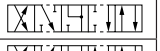
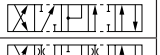
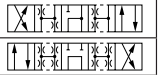
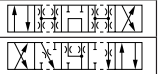
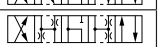
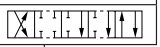
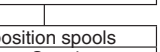
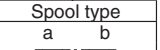
Code	Actuation
L	Lever side B
LB	Lever side A

Code	Seals
N	NBR
V	FPM

Code	Inlet	Outlet
2 [3]	External	External
5 [4]	External	Internal

[3] Pressure T-port > 10 bar
[4] Pressure T-port < 10 bar

3 position spools

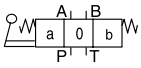
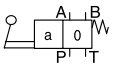
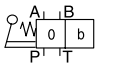
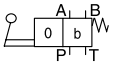
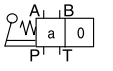
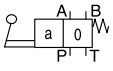
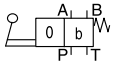
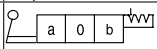
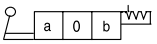
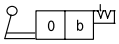
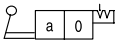
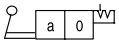
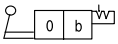
Code	Spool type a 0 b
1	
2	
3	
4	
6 [1]	
7	
9 [2]	
11	
14	
15	

2 position spools

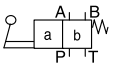
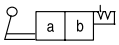
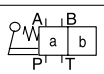
Code	Spool type a b
20	
30	

[1] Only available for D4L
[2] Consider specific spool position.

3 position spools

Code	all 3 position spools		
C			3 positions. Spring offset in position “0“. Operated in position “a“ or “b“.
	Standard	Spool type 9	
E	 Operated in position “a“.	 Operated in position “b“.	2 positions. Spring offset in position “0“.
F	 Operated in position “0“.	 Operated in position “0“.	2 positions. Spring offset in position “b“.
K	 Operated in position “b“.	 Operated in position “a“.	2 positions. Spring offset in position “0“.
M	 Operated in position “0“.	 Operated in position “0“.	2 positions. Spring offset in position “a“.
N	 No centre in offset position.	 No centre in offset position.	3 positions, detent. Operated in position “a“, “0“or “b“.
R	 No centre in offset position.	 No centre in offset position.	2 positions, detent. Operated in position “0“ or “b“.
S	 No centre in offset position.	 No centre in offset position.	2 positions, detent. Operated in position “0“ or “a“. No centre in offset position.

2 position spools

Code	Spool position	
B		Spring offset in position “b“. Operated in position “a“.
D		Detent, operated in position “a“ or “b“. No centre or offset position.
H		Spring offset in position “a“. Operated in position “b“.

Further spool types on request.

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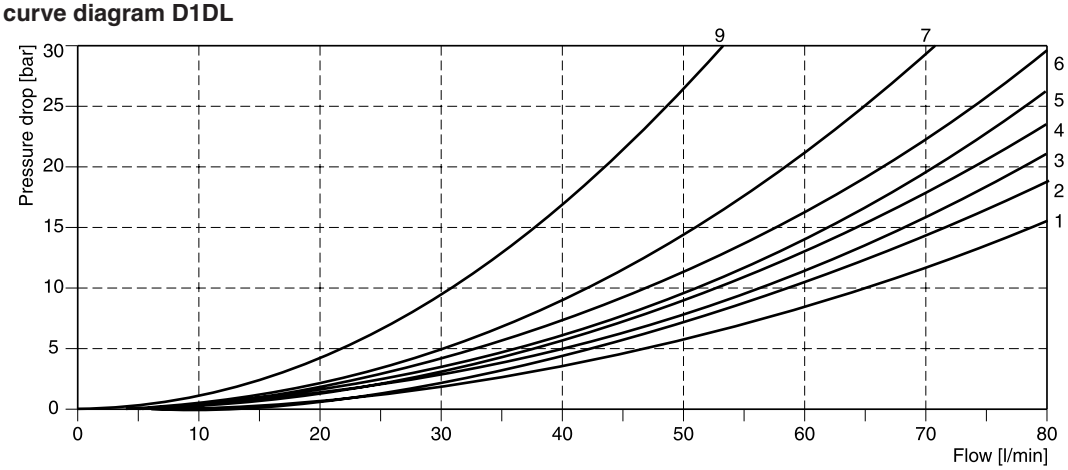
2

The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number for each spool type, operating position and flow direction is given in the table below.

D1DL

	Position „b“		Position „a“		Position „0“					
Spool	P->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T	A->B
1	4	1	4	1	–	–	–	–	–	–
2	5	2	5	2	4	4	1	1	6	1
4	4	2	4	2	–	–	7	7	–	9
20	5	1	5	1	–	–	–	–	–	–
	P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T	A-> B
9	3	3	3	3	–	–	–	–	9	–

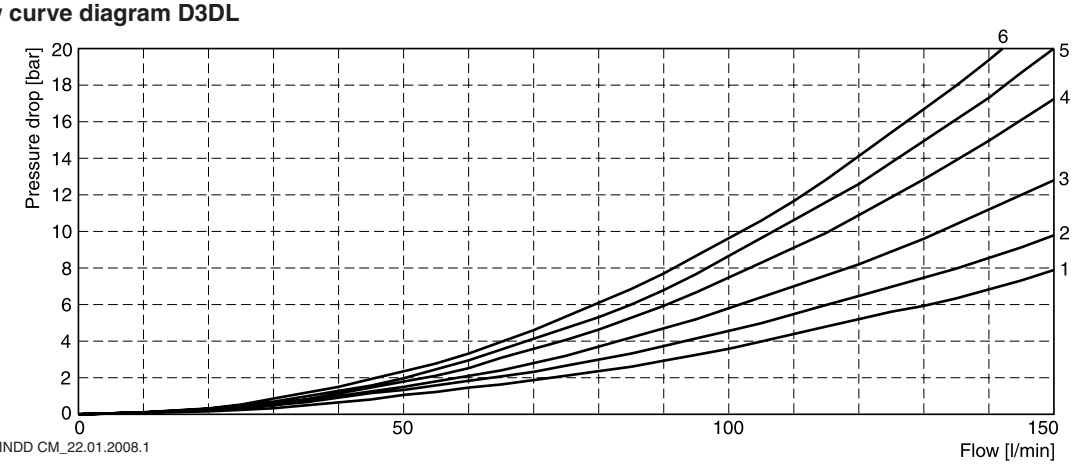
Flow curve diagram D1DL



D3DL

	Position „b“		Position „a“		Position „0“					
Spool	P->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T	A->B
1	4	3	4	3	–	–	–	–	–	–
2	4	1	4	1	3	3	1	1	5	1
4	4	2	4	2	–	–	3	3	–	5
6	4	3	4	3	6	6	–	–	–	6
10	4	–	4	–	–	–	–	–	–	–
20	4	3	4	3	–	–	–	–	–	–
	P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T	A-> B
9	4	4	4	4	–	–	–	–	6	–

Flow curve diagram D3DL



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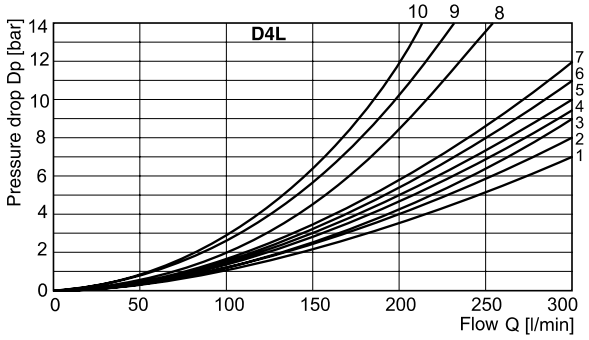
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The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number for each spool type, operating position and flow direction is given in the table below.

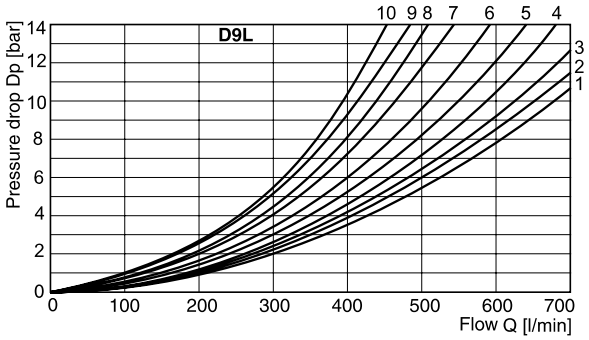
D4L

Spool Code	Curve number				
	P-A	P-B	P-T	A-T	B-T
1	1	1	–	4	5
2	1	2	6	4	6
3	1	2	–	5	6
4	1	1	–	5	5
6	1	2	–	3	6
7	1	1	6	4	5
9	2	9	8	7	10
11	1	1	–	4	5
14	1	1	6	5	4
15	2	1	–	6	5
20	3	5	–	3	5
30	2	3	–	6	7



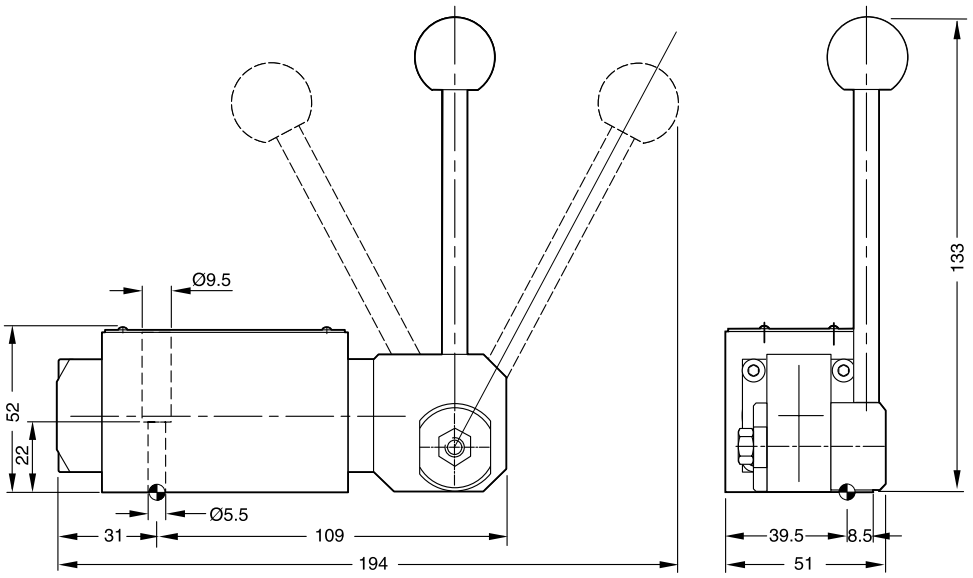
D9L

Spool Code	Curve number				
	P-A	P-B	P-T	A-T	B-T
1	3	2	-	3	5
2	2	1	1	3	5
3	4	2	-	3	6
4	4	3	-	3	5
7	3	1	7	3	5
9	4	8	9	4	10
14	1	3	7	5	3
15	2	4	-	5	3
20	6	5	-	6	8
30	3	2	-	3	5

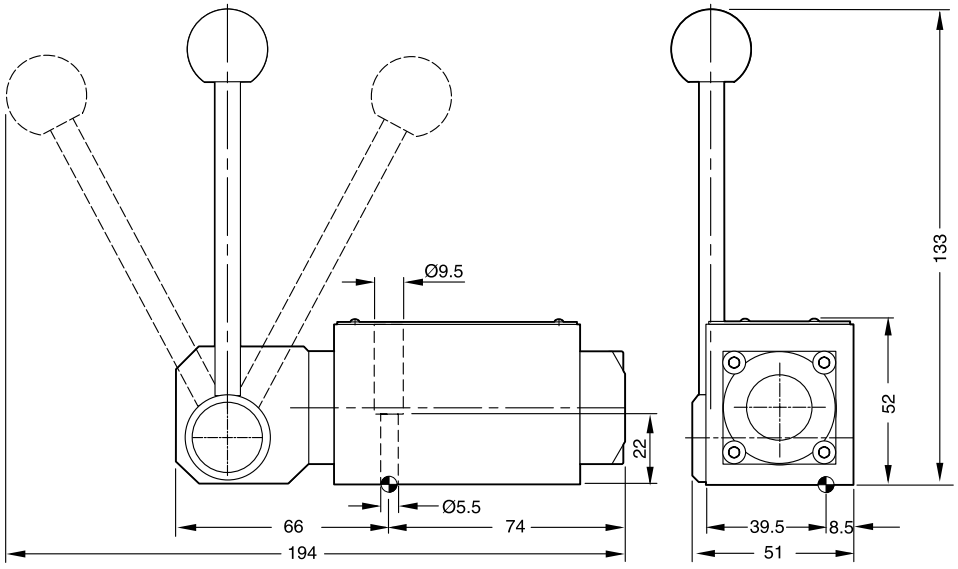


2

D1DL



D1DLB



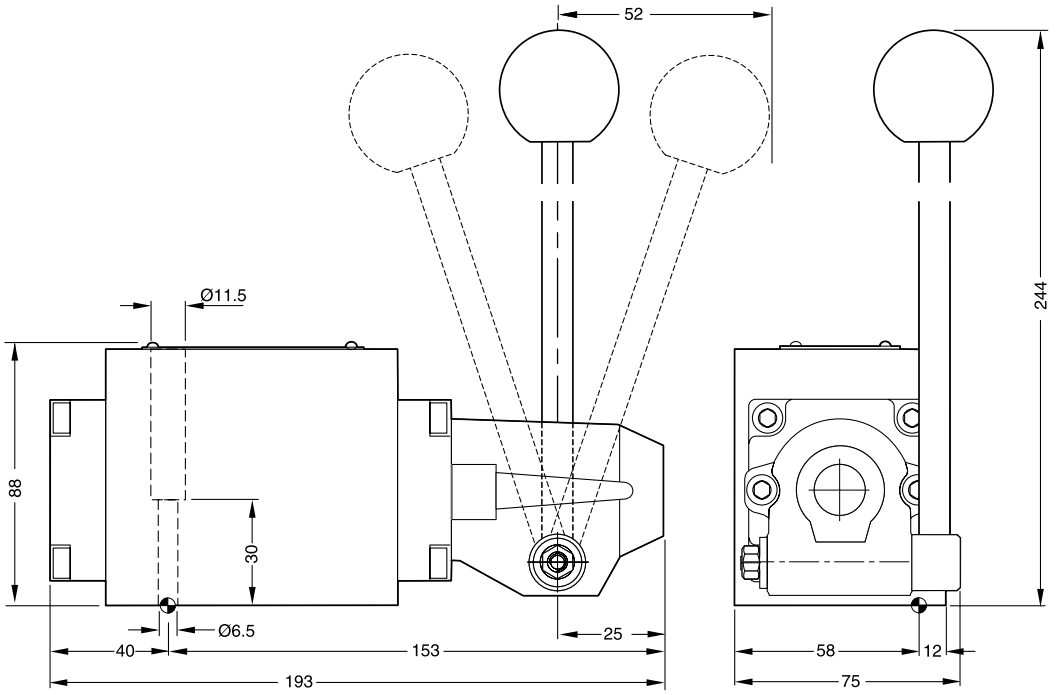
Surface finish	Kit			Kit
R_{max}6.3 0.01/100	BK375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	**NBR: SK-D1DL-77** FPM: SK-D1DL-V77

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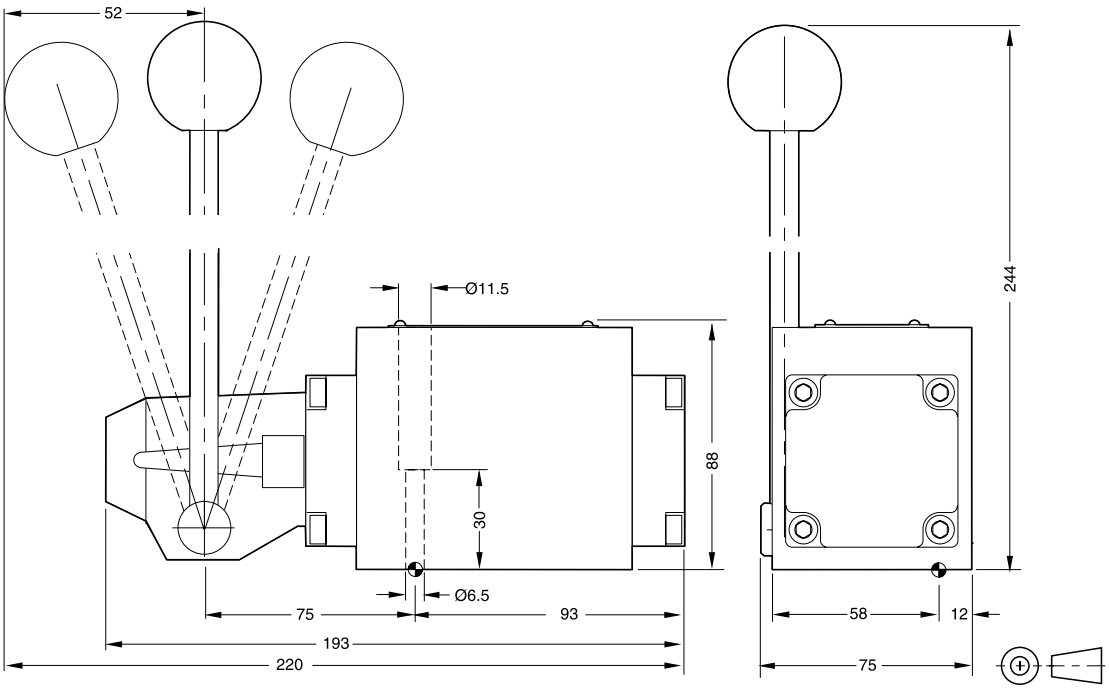
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D3DL



D3DLB



Surface finish	Kit			Kit
R_{max}6.3 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm ±15%	**NBR: SK-D3DL-35** FPM: SK-D3DL-V35

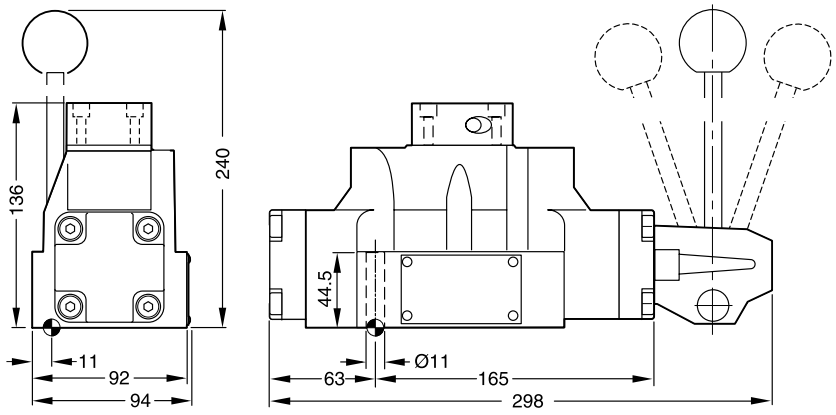
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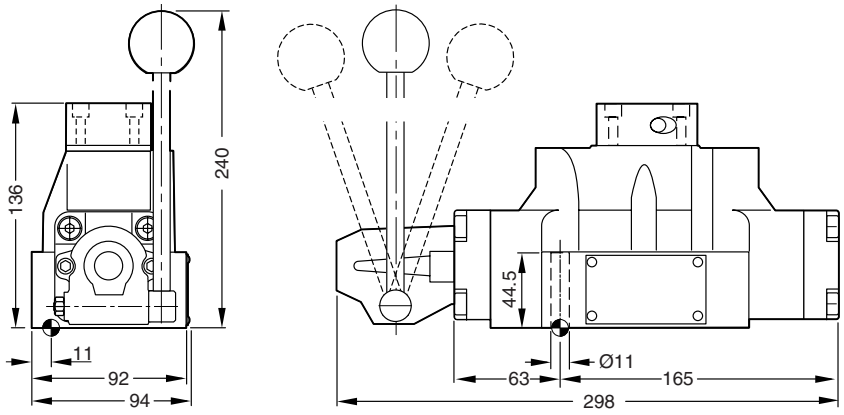
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2

D4L



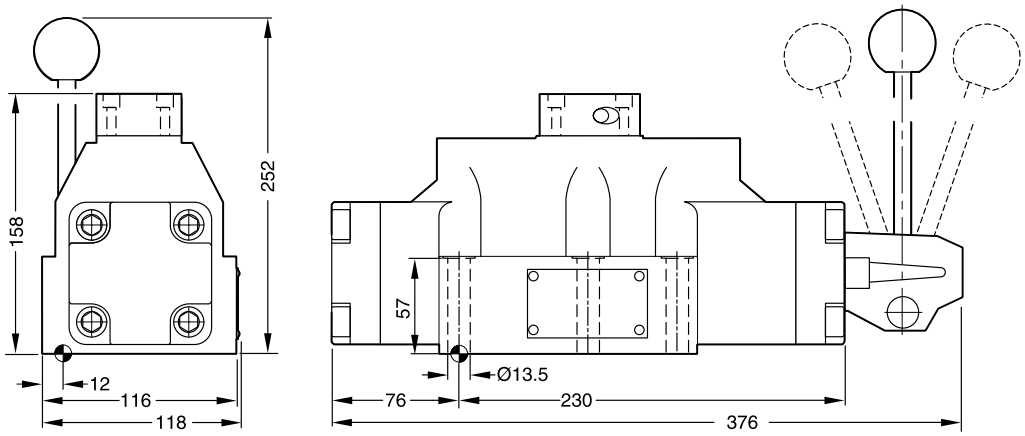
D4LB



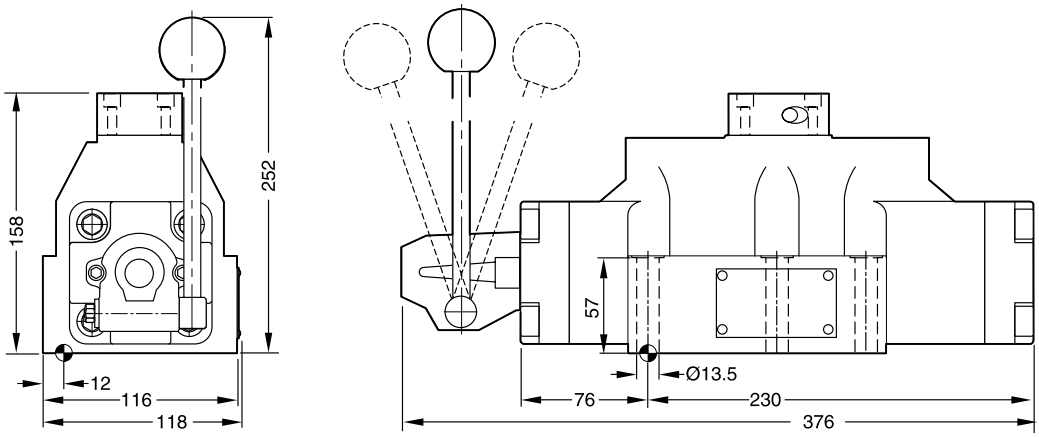
Surface finish	Kit			Kit
R_{max}6.3 0.01/100	BK320	4x M10x60 2x M6x55 DIN 912 12.9	63 Nm 13.2 Nm ±15%	**NBR: SK-D4L-60** FPM: SK-D4L-V60

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D9L



D9LB



Surface finish	Kit			Kit
R_{max}6.3 0.01/100	BK360	6x M12x75 DIN 912 12.9	108 Nm ±15%	**NBR: SK-D9L-70** FPM: SK-D9L-V70

Notes

2

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Description	Cable connection	Figure circuit	Order No. black (B)	Order No. grey (A)
Plug EN 175301-803 *, style AF Protection class IP 65 for voltages up to 250V	PG 9 PG 11	Fig. 1	5001710 5001716	5001711 5001717
Plug with LED 24V DC	PG 11	Fig. 1 and 3	5001571	5001572
Plug with lamp insert 120V AC Plug with lamp insert 230V AC	PG 11	Fig. 1 and 4	5001573 5001575	5001574 5001576
Plug with LED 24 V DC and suppressing circuit	PG 11	Fig. 1 and 5	5001708	5001709
Plug with rectifier: Bridge-type rectifier with silicon diodes. Varistors are used to protect the diodes against power surges from the power supply up to 250V AC.	PG 11	Fig. 1 and 6	5001737	5001738
Plug with cable strain relief and transparent cover	PG 11	Fig. 2	5001723	5001724

Inserts for plug 5001723 and 5001724	Cicuit	Order No.
Bridge-type rectifier up to 250V AC 7	7	5001727
Bridge-type rectifier with lamp 250V AC	8	5001734

* (New) EN 175301-803 corresponds to (old) DIN 43650.

Fig. 1

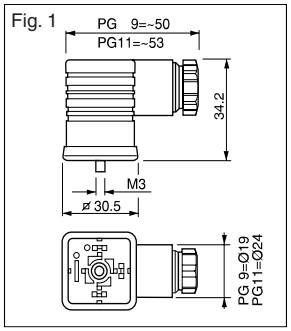


Fig. 2

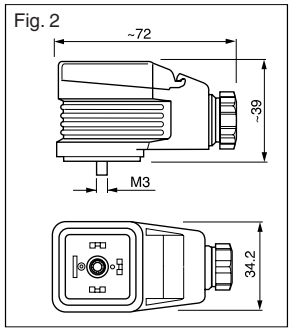


Fig. 3

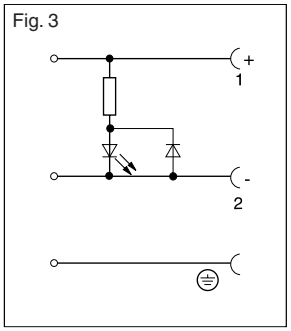


Fig. 4

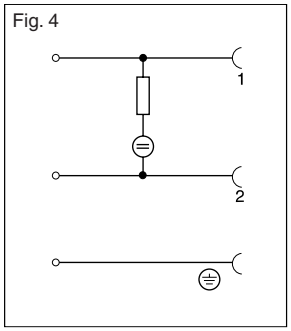


Fig. 5

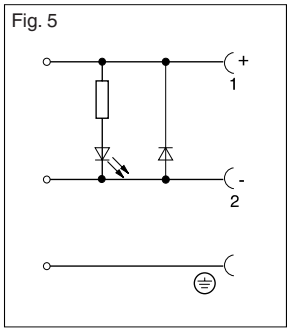


Fig. 6

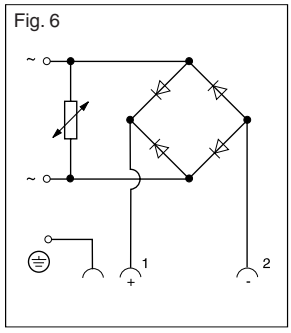


Fig. 7

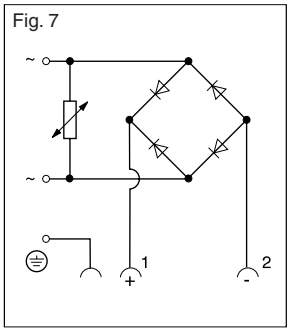
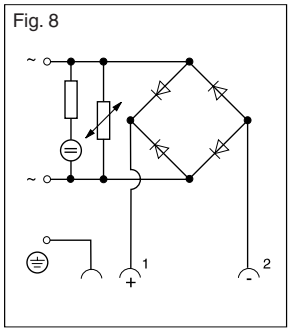
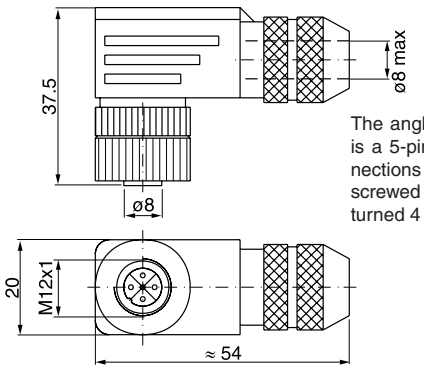


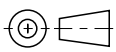
Fig. 8



Plug M12x1, Order No.: 5004109



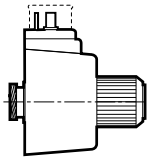
The angled plug for M12x1 is a 5-pin design. The connections in the plug can be screwed in. The plug can be turned 4 x 90°.

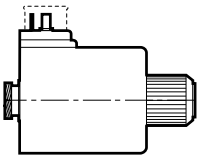


Plug kit 2-pin Junior Timer (AMP)

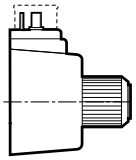
Order no.	Number of plugs in 1 kit
393 000 K822	1
393 000 K825	10
393 000 K826	50
393 000 K827	100

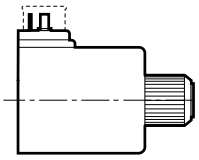
Solenoid kit (displayed: **EN plug**)
A solenoid kit contains tube, coil, retainer and seals for the solenoid.


AC


DC

Coil kit
A coil kit contains coil, retainer and seals for the coil.


AC


DC

For D1VW standard

Solenoid kits: **AK-D1VW-S-...** (Soft shift on request)		(Example: **AK-D1VW-S-JW-91**)	
Voltage Volt/Hertz	Voltage Code	EN plug D1VW	EN plug without manual override (Code „T“) D1VW
12V=	K	**KW-91**	KWT-91
24V=	J	**JW-91**	JWT-91
98V=	U	UW-91	UWT-91
205V=	G	GW-91	GWT-91
110V/50Hz / 120V/60Hz	Y	**YW-91**	–
230V/50Hz / 240V/60Hz	T	**TW-91**	–

Coil kits: **AK-D1VW-C-...**	(Example: **AK-D1VW-C-JW-91**)	
Voltage Volt/Hertz	Voltage Code	EN plug D1VW
12V=	K	**KW-91**
24V=	J	**JW-91**
98V=	U	UW-91
205V=	G	GW-91
110V/50Hz / 120V/60Hz	Y	**YW-91**
230V/50Hz / 240V/60Hz	T	**TW-91**

D1VW 8 Watt

Solenoid kits: **AK-D1VW-S-...**				Coil kits: **AK-D1VW-C-...**	
Voltage Volt/Hertz	Voltage Code	EN plug D1VW	M12x1 „DESINA“ (Code „DLJ5“) D1VW	EN plug D1VW	M12x1 „DESINA“ (Code „DLJ5“) D1VW
24V=	J	JWL-91	JDLJ5-91	**JWL-91**	JDLJ5-91

D3W

Solenoid kits: **AK-D3W-S-...** (Soft shift on request) (Example: **AK-D3W-S-JW-30**)					Coil kits: **AK-D3W-C-...**	
Voltage Volt/Hertz	Voltage Code	EN plug D3W	EN plug without manual override (Code „T“) D3W	EN plug with 210bar tank pressure (Code „H“) D3W	EN plug D3W	EN plug without manual override (Code „T“) D3W
12V=	K	KW-30	KWT-30	KW-30	KW-30	KWT-30
24V=	J	**JW-30**	JWT-30	JW-30	**JW-30**	JWT-30
98V=	U	UW-30	UWT-30	UW-30	UW-30	UWT-30
205V=	G	GW-30	GWT-30	GW-30	GW-30	GWT-30
110V/50Hz 120V/60Hz	Y	**YW-30**	–	YWH-30	**YW-30**	–
230V/50Hz 240V/60Hz	T	**TW-30**	–	TWH-30	**TW-30**	–

Other solenoids, coil kits and tube kits on request.

Bold letters =
Short-term availability

O-rings to seal between valve and mounting surface

Valve size	Valve series	Ports	Dimensions inner Ø x section Ø	Quantity [1]
DIN NG 6	**D1**	P, A, B, T X, Y	9.25 x 1.78 4.47 x 1.78	4 2
DIN NG10	**D3**	P, A, B, T X, Y	12.42 x 1.78 10.82 x 1.78	5 2
DIN NG 16	**D4**	P, A, B, T X, Y	21.89 x 2.62 10.82 x 1.78	4 2
DIN NG 25	**D8**	P, A, B, T X, Y	29.82 x 2.62 20.29 x 2.62	4 2
DIN NG 25	**D9**	P, A, B, T X, Y	34.59 x 2.62 20.29 x 2.62	4 2
DIN NG 32	**D11**	P, A, B, T X, Y	53.57 x 3.53 14.00 x 1.78	4 2

[1] Number per set

Seal kits (connecting surface and inner seals)
Spool valves

Valve series	Material	Order code for valve size						
		D1	**D3**	**D31DW**	**D4**	**D8**	**D9**	**D11**
D**W Solenoid	NBR	SK-D1VW-N-91	SK-D3W-30	SK-D31DW-N-91	SK-D41VW-N-91	SK-D81VW-N-91	SK-D91VW-N-91	SK-D111VW-N-91
	FPM	SK-D1VW-V-91	SK-D3W-V30	SK-D31DW-V-91	SK-D41VW-V-91	SK-D81VW-V-91	SK-D91VW-V-91	SK-D111VW-V-91
D**P Hydr.	NBR	SK-D1VP-70	SK-D3DP-35	–	SK-D41VW-70	–	SK-D91VW-70	SK-D111VW-70
	FPM	SK-D1VP-V70	SK-D3DP-V35	–	SK-D41VW-V70	–	SK-D91VW-V70	SK-D111VW-V70
D*L/LB Hand lever	NBR	SK-D1DL-77	SK-D3DL-35	–	SK-D4L-60	–	SK-D9L-60	–
	FPM	SK-D1DL-V77	SK-D3DL-V35	–	SK-D4L-V60	–	SK-D9L-V60	–

Valve series	Material	4D01-C	4D02-C	4D02V-B	4D03-C	4D06-C
4D0* Solenoid	NBR	SK-D1VW-N-91	SK-D3W-30	SK-4D02V-B1	SK-D41VW-N-91	SK-D81VW-N-91
	FPM	SK-D1VW-V-91	SK-D3W-V30	SK-4D02V-B5	SK-D41VW-V-91	SK-D81VW-V-91

Seated valve

Valve series	Material	D1SE
D1SE Solenoid	NBR	SK-D1SE-70
	FPM	SK-D1SE-V70

2

Slip-in orifice for P, A, B port of directional control valves NG6 and NG10

DK — □ □

Orifice kit | Size | Orifice size

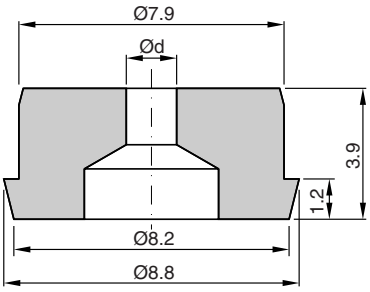
Code	Size
D1VW91	NG6
D3W30	NG10

Code	Orifice Ø	NG6	NG10
00	without orifice	x	x
06	0.6 mm	x	
08	0.8 mm	x	x
09	0.9 mm	x	
10	1.0 mm	x	x
11	1.1 mm	x	
12	1.2 mm	x	x
14	1.4 mm	x	x
15	1.5 mm	x	x
17	1.7 mm		x
18	1.8 mm	x	
20	2.0 mm	x	x
25	2.5 mm	x	x
30	3.0 mm		x
45	4.5 mm		x

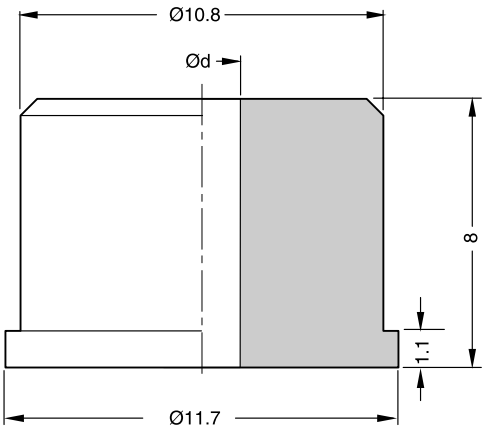
Package size: Each kit contains 10 orifice of the same size.

Dimensions

NG6



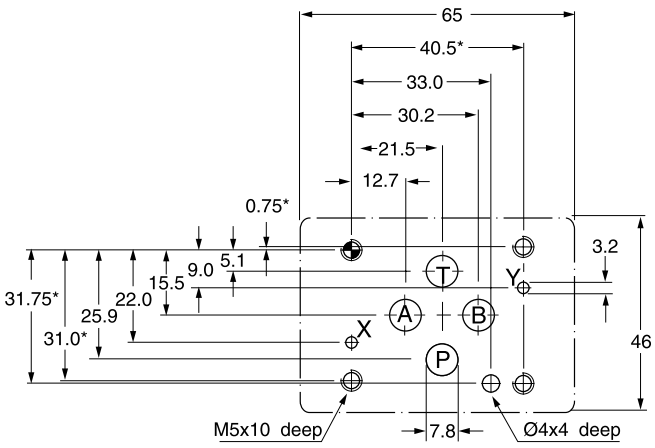
NG10



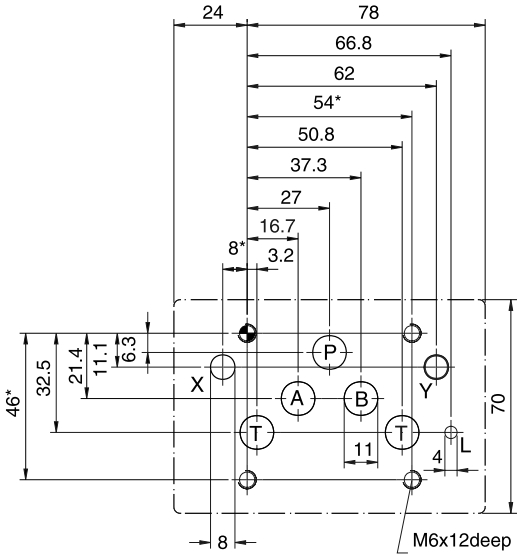
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Kaarst, Germany

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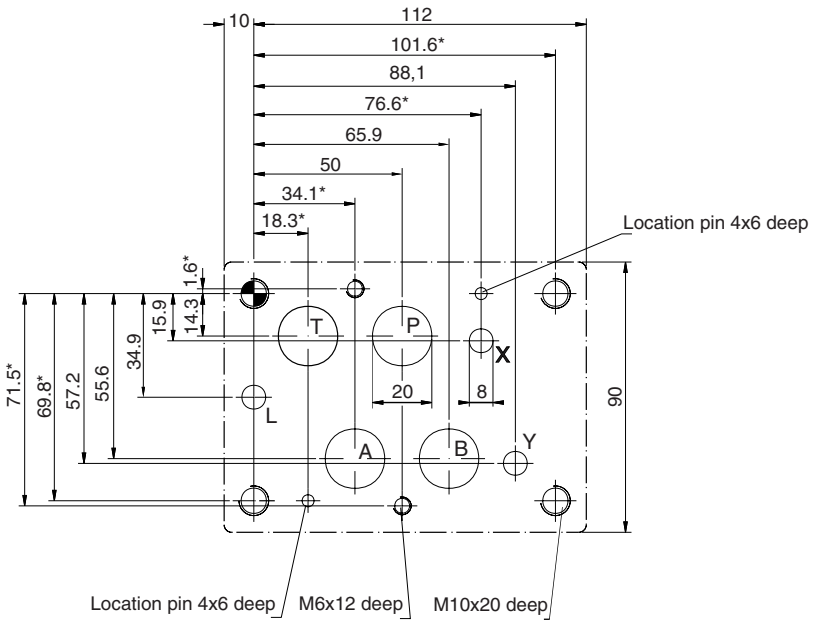
Size 6, mounting pattern to DIN 24340-A6



Size 10, mounting pattern to DIN 24340-A10



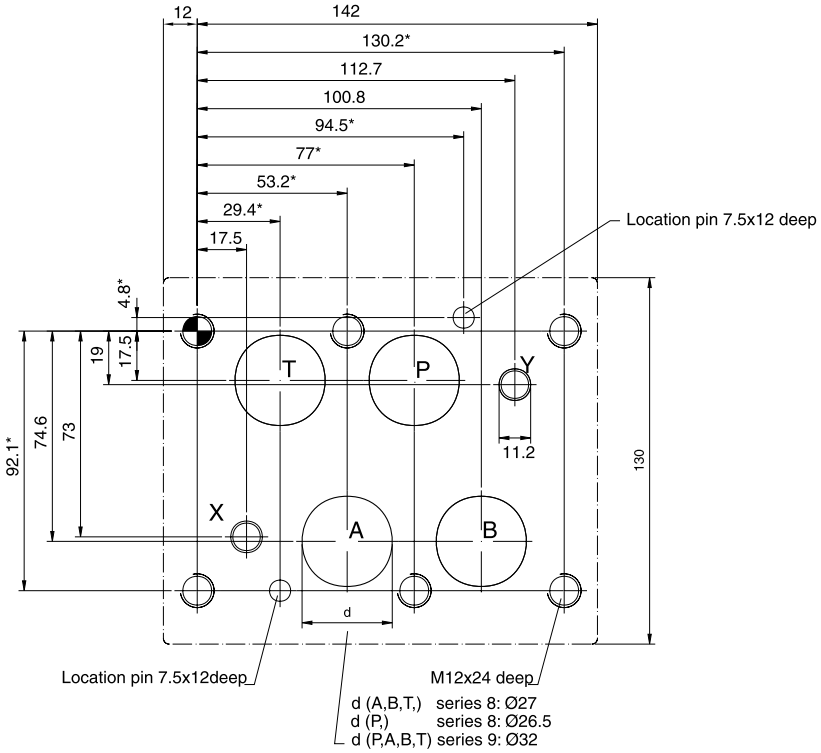
Size 16, mounting pattern to DIN 24340-A16



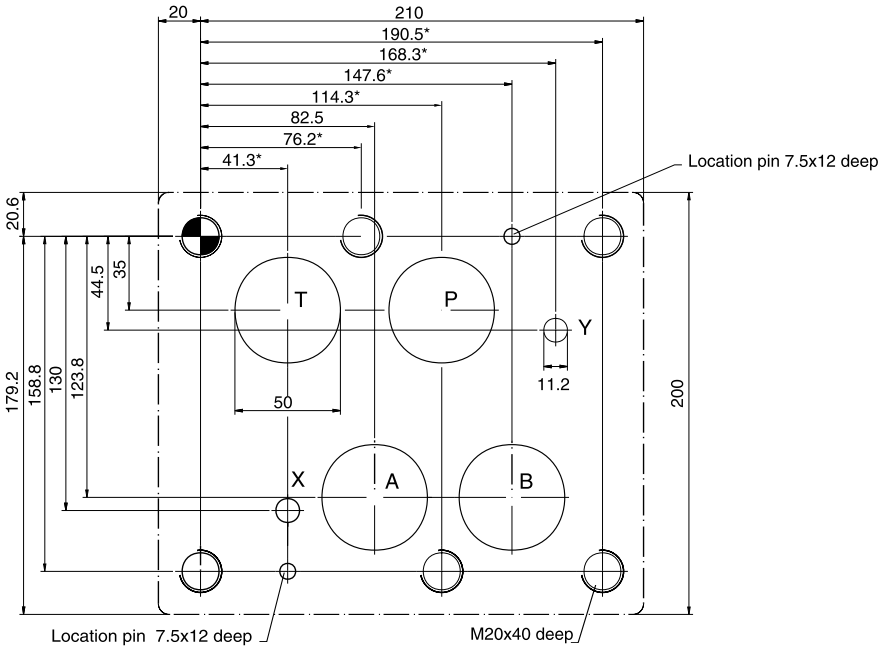
With * marked dimensions ± 0.1mm. All other dimensions ± 0.2mm.

Subplates and manifolds see chapter 12.

Size 25, mounting pattern to DIN 24340-A25



Size 32, mounting pattern to DIN 24340-A32



With * marked dimensions ± 0.1mm. All other dimensions ± 0.2mm.

Subplates and manifolds see chapter 12.

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Series Parker	Series Denison	Description	Direct operated		Pilot operated				Onboard electronics	Spool feedback	Page
		DIN / ISO	06	10	10	16	25	32			
		Standard dynamics, standard repeatability									
D1FB	–		•								3-3
	4DP01		•								3-9
	4DPE01	Economical version	•								
D3FB				•							3-15
	4DP02			•							3-21
D31FW	–				•						3-27
D41FW	–					•					
D91FW	–						•				
–	4DP02 V	High flow capacity			•						3-35
–	4DP03					•					
–	4DP06						•				
D1FT	–		•						•		3-45
D31FT	–				•				•		3-51
D41FT	–					•			•		
D91FT	–						•		•		
		High dynamics, high repeatability									
D31FH	–				•				•	•	3-59
D41FH	–					•			•	•	
D81/91FH	–						•		•	•	
D111FH	–							•	•	•	
		VCD® dynamics*, for closed loop applications									
D1FP	–	Spool / sleeve design	•						•	•	3-69
D1FP*S	–	Size 04 (ISO 10372)							•	•	3-75
D3FP*0	–	Spool / sleeve design		•					•	•	3-81
D3FP*3	–	Spool / body design		•					•	•	3-87
D31FP	–				•						3-93
D41FP	–					•					
D81/91FP	–						•				
D111FP	–							•			
		Accessories									
		Plug-in connectors Mounting patterns									3-101

* VCD® = Voice Coil Drive technology

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Notes

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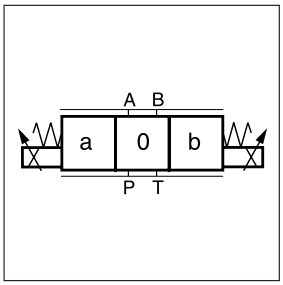
Characteristics

Series D1FB

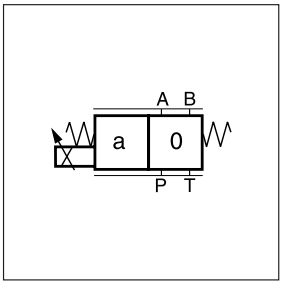
The D1FB directional control valve of the nominal size NG6 (CETOP3) provides variable flow rates.

Due to a spool and sleeve combination with wire EDM window geometry and a special manufacturing adjustment, the valve achieves excellent repeatability from valve to valve and high precision. The D1FB is suited for standard applications particularly with regard to functions on identical machines, which need only to be adjusted once. In combination with the digital power amplifier PWD00A-400, the valve parameters can be saved, changed and duplicated.

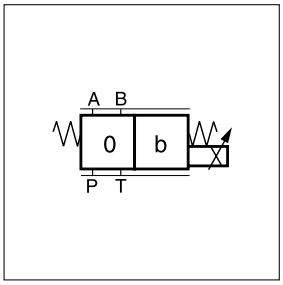




D1FB*C



D1FB*E

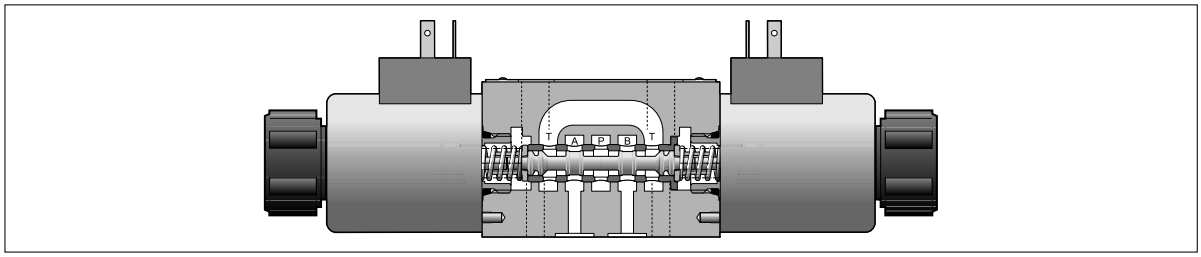


D1FB*K

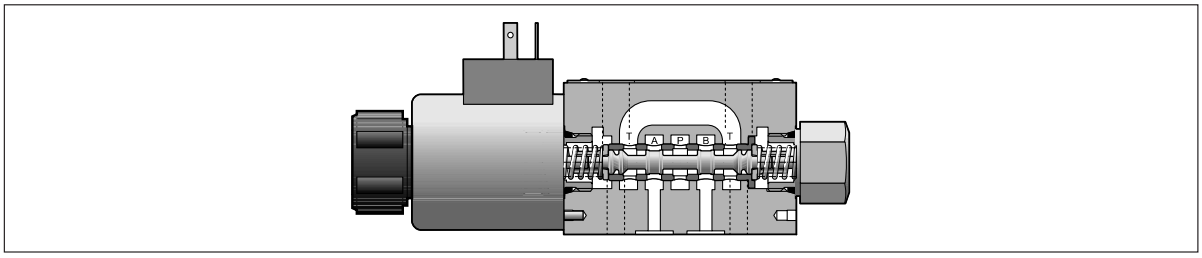
Technical features

- Spool/sleeve design
- High repeatability from valve to valve
- Low hysteresis
- Manual override
- Fail-safe centre position

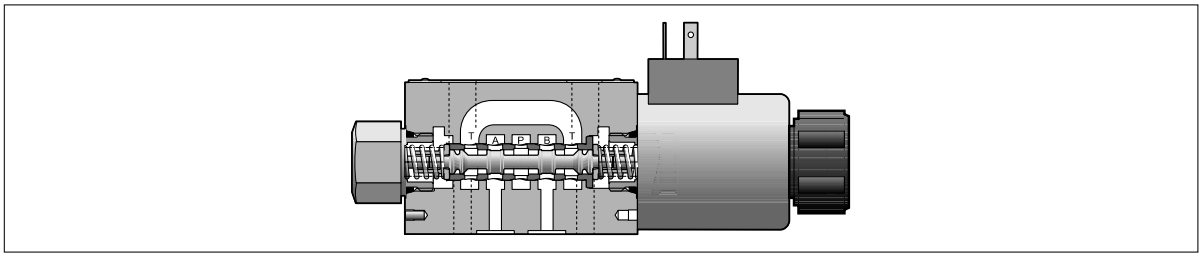
D1FB*C



D1FB*E



D1FB*K



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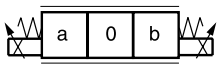
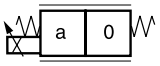
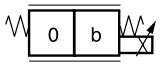
Ordering Code

Series D1FB

D	1	F	B			0	N	M	W	0
Directional control valve	Size DIN NG06 CETOP 03 NFPA D03	Proportional control	Standard dynamics standard repeatability	Spool type	Spool position		Seals NBR (other seal compounds on request)	Solenoid description 9V/2.7A (other voltage on request)	Connector as per EN 175301-803 without plug*	Spool/sleeve design

3

Code	Spool type	Flow [l/min] at Δp 5bar per metering edge
E01H **E01F** **E01C**		**20** **12** **6**
E02H **E02F** **E02C**		**20** **12** **6**
E03H **E03F** **E03C**		**20** **12** **6**
B31H **B31F**	$Q_B = Q_A/2$ 	**20 / 10** **12 / 6**
B32H **B32F**	$Q_B = Q_A/2$ 	**20 / 10** **12 / 6**

Code	Spool position
C	
E	
K	

Bold letters =
Short-term availability

* Please order plugs separately.
See chapter 3 accessories.

General		
Design		Direct operated proportional DC valve
Actuation		Proportional solenoid
Size		NG06/CETOP 03/NFPA D03
Mounting interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
Mounting position		unrestricted
Ambient temperature	[°C]	-20...+60
Weight	[kg]	2.2
Vibration resistance	[g]	25 acc. DIN IEC68, part 2-6
Hydraulic		
Max. operating pressure	[bar] [bar]	Ports P, A, B 350; Port T 210
Fluid		Hydraulic oil as per DIN 51524...535, other on request
Fluid temperature	[°C]	-20...+60
Viscosity		
permitted	[cSt] / [mm²/s]	20...380
recommended	[cSt] / [mm²/s]	30...80
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)
Nominal flow at Δp=5bar per control edge *	[l/min]	6 / 12 / 20
Leakage at 100 bar	[ml/min]	<50
Static / Dynamic		
Hysteresis	[%]	<4
Electrical characteristics		
Duty ratio	[%]	100
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)
Solenoid		Code "M"
Supply voltage	[V]	9
Current consumption	[A]	2.7
Resistance	[Ohm]	2.7
Coil insulation class		F (155 °C)
Solenoid connection		Connector as per EN 175301-803
Wiring min.	[mm²]	3x1.5 (AWG 16) overall braid shield
Wiring lenght max.	[m]	50

* Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

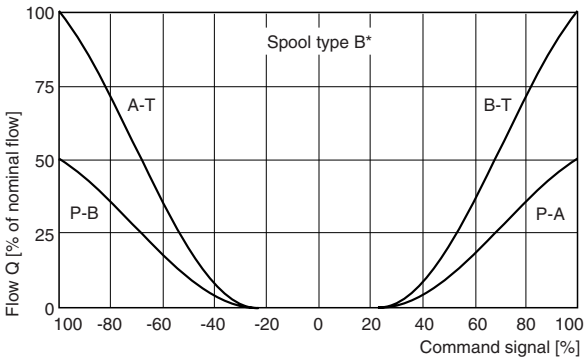
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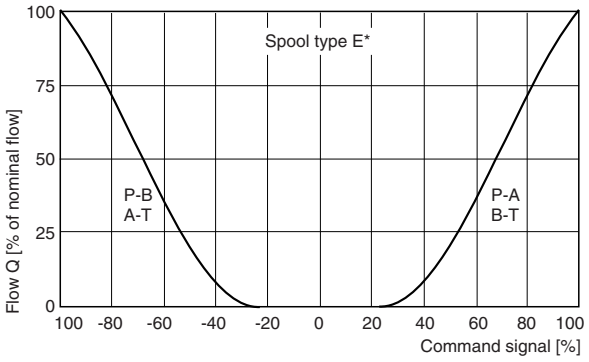
3

Flow characteristics

at Δp = 5 bar per metering edge

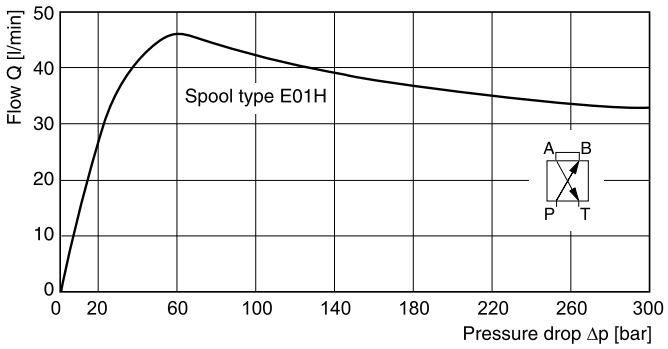
Fluid viscosity 40cSt at 50°C





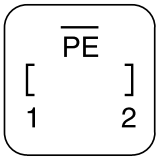
Flow limit

100% command signal



Plug

Solenoid coil

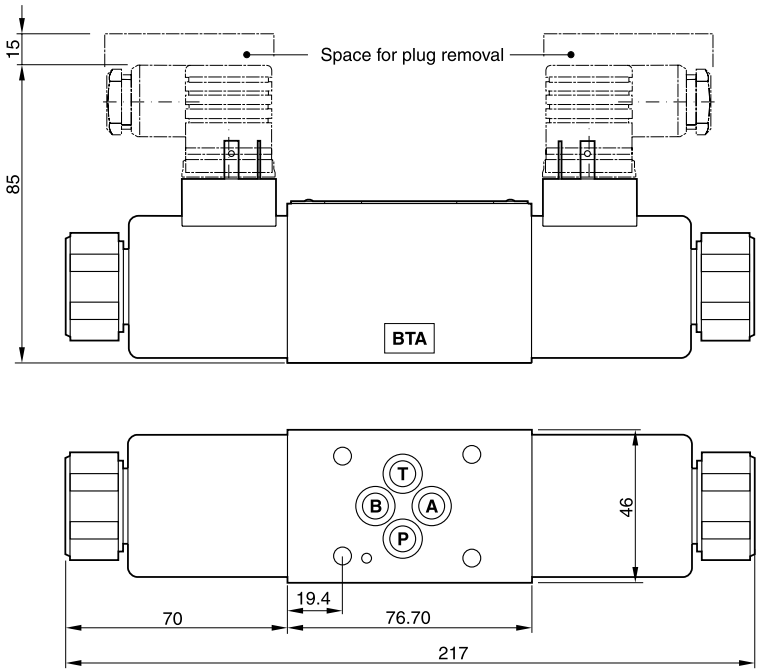


1 = coil connection
2 = coil connection
PE = ground potential

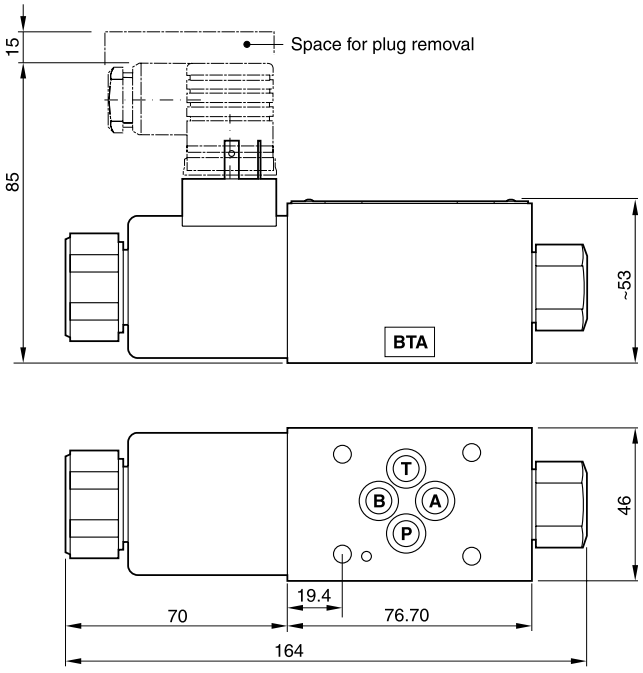
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3

D1FB*C



D1FB*K



Surface finish	Kit			Kit NBR
R_{max}6.3 ⏥ 0.01/100	BK375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	SK-D1FB-N

D1FB_UK.INDD CM_28.01.08.1

Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

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Notes

Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

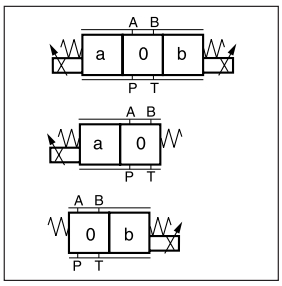
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The proportional directional valves 4DP01 and 4DPE01 (NG06) are offered under Denison brand name.

The spool in body design provides high flow rates at a good level of precision. The 4DPE01 series has a 3-chamber body and is suitable for basic proportional functions such as following a flow profile with acceleration and deceleration ramps.

In combination with the digital power amplifier PWD00A-400, the valve parameters can be saved, changed and duplicated.

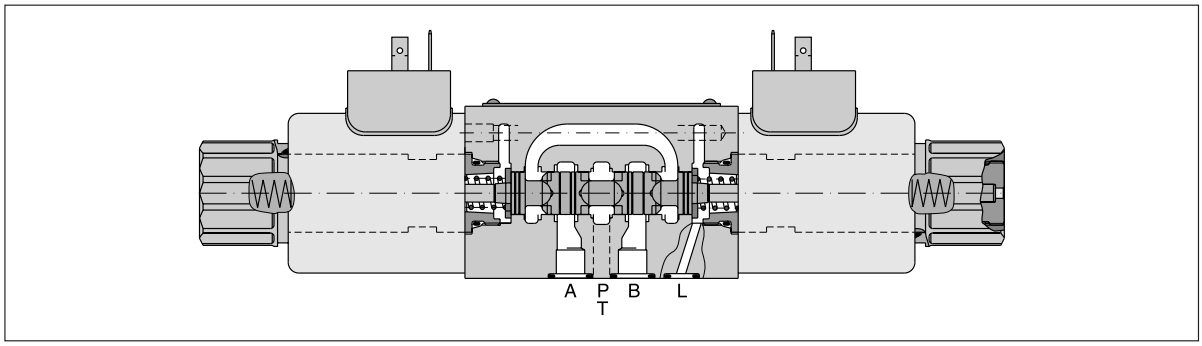




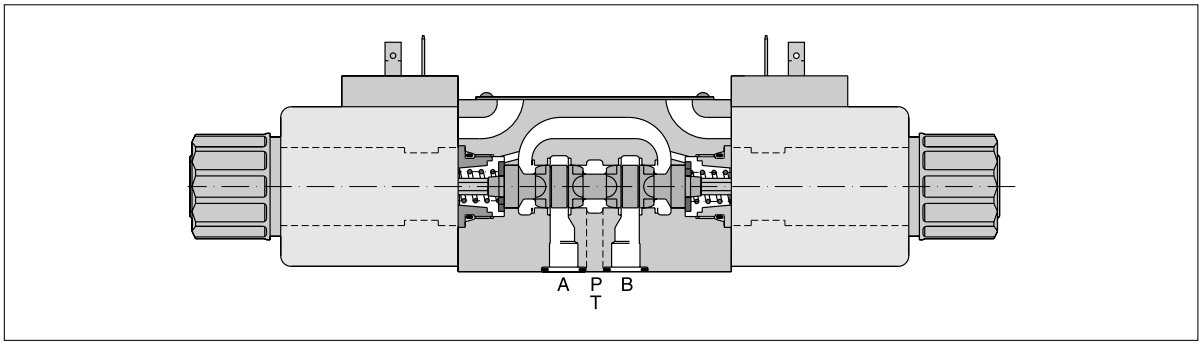
Technical features

- Spool in body design
- High flow rates
- Low hysteresis
- Manual override
- Fail-safe centre position
- Economical series 4DPE01

4DP01



4DPE01



Ordering Code

Series 4DP01, 4DPE01 (Denison)

4DP		01	–		E			–			–	G12	
Directional prop. control valve	Series	Size DIN NG06 CETOP 03 NFPA D03		Body	Control	Spool type	Flow		Spool position	Design series	Seals	Solenoid [1] 12V/2.2A	Connector as per EN 175301-803

3

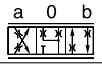
Code	Series
omit	Standard
E	Economic

Code	Body
3	Standard
L	With drain port "L" (only 4DP01: for tank pressure > 160bar)

Code	Connectors
omit	Not supplied
C1	PG11

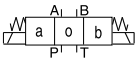
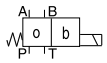
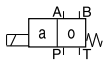
Code	Seals
1	NBR
5	FPM

Code	Design series
B	4DP01
A	4DPE01

3 position spools	
Code	Spool type
Spool position 03	
02	
43	

2 position spools	
Code	Spool type
Spool position 05	
12	
13	
Spool position 06	
12	
13	

Code	Flow
4DP01	
F10	10 l/min
F20	20 l/min
F30	30 l/min
4DPE01	
Q10	10 l/min
Q20	20 l/min
Q30	30 l/min

3 position spools		
Code	Spool position	
03		3 positions. Spring offset in position “0“.
05		2 positions. Spring offset in position “0“. Energized to “b“.
06		2 positions. Spring offset in position “0“. Energized to “a“.

[1] Onboard electronics on request

General		
Design		Direct operated proportional DC valve
Actuation		Proportional solenoid
Size		DIN NG6 / CETOP 03 / NFPA D03
Mounting interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
Mounting position		unrestricted, preferably horizontal
Ambient temperature	[°C]	-20...+50
Weight	[kg]	1.8 (1 solenoid) 2.3 (2 solenoids)
Hydraulic		
Max. operating pressure	[bar] [bar]	Ports P, A, B 350; 4DP01 with port L: T 210, L10; without port L: T 160 4DPE01 port T: 110
Fluid		Hydraulic oil as per DIN 51524/25, other on request
Fluid temperature	[°C]	-20...+80
Viscosity		
permitted	[cSt] / [mm²/s]	10...650
recommended	[cSt] / [mm²/s]	30
Filtration		ISO 4406 (1999) 18/16/13
Nominal flow at Δp=5bar per control edge *	[l/min]	10 / 20 / 30
Leakage at 100 bar	[ml/min]	<50
Static / Dynamic		
Hysteresis	[%]	4DPE01 ≤ 10, 4DP01 ≤ 5
Electrical characteristics		
Duty ratio	[%]	100 ED
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)
Solenoid		Code G12, G24 (only 4DP01)
Supply voltage	[V]	12, 24
Current max.	[A]	2.2
Resistance	[Ohm]	3.7
Coil insulation class		H (180 °C)
Solenoid connection		Connector as per EN 175301-803
Wiring min.	[mm²]	3x1.5 (AWG 16) overall braid shield
Wiring lenght max.	[m]	50

* Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

3

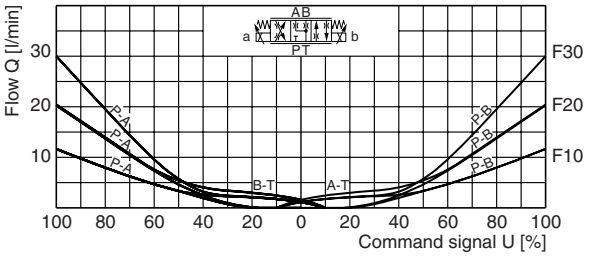
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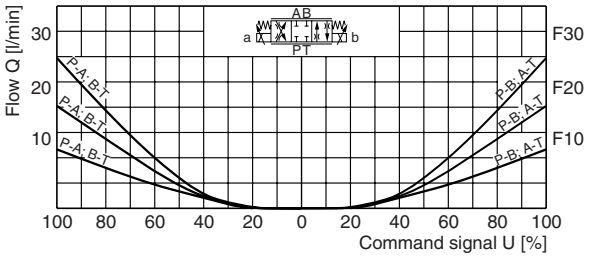
Flow characteristics 4DP01

at Δp = 5 bar per metering edge
Fluid viscosity 40cSt at 50°C

Spool 02

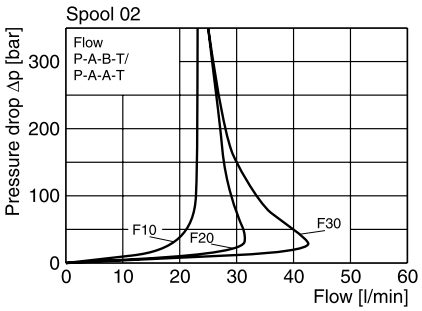


Spool 43

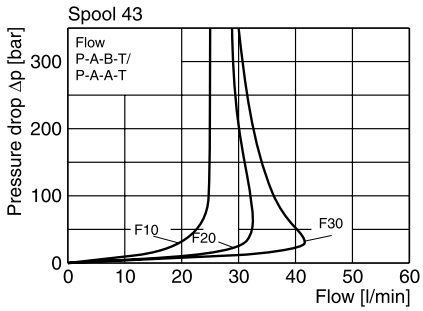


Flow limit

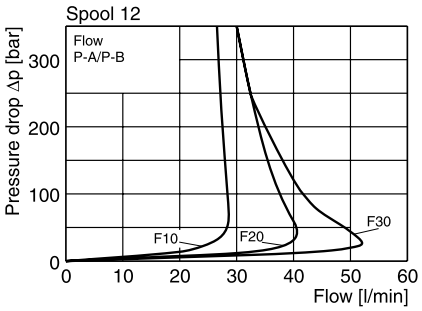
Spool 02



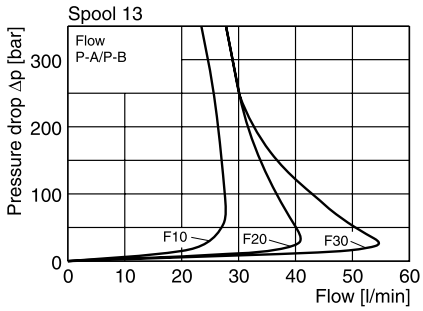
Spool 43



Spool 12



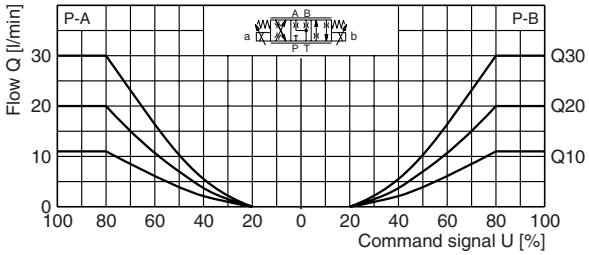
Spool 13



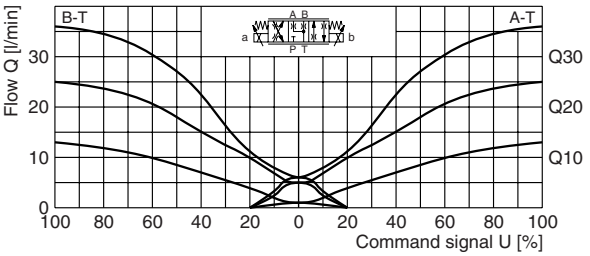
Flow characteristics 4DPE01

at Δp = 5 bar per metering edge
Fluid viscosity 40cSt at 50°C

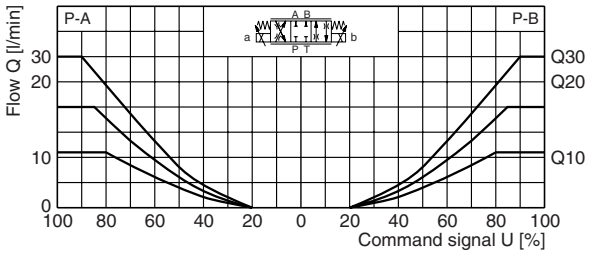
Spool 02



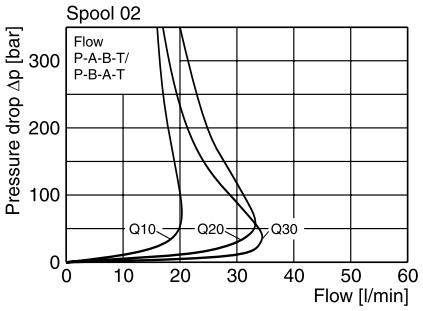
Spool 02

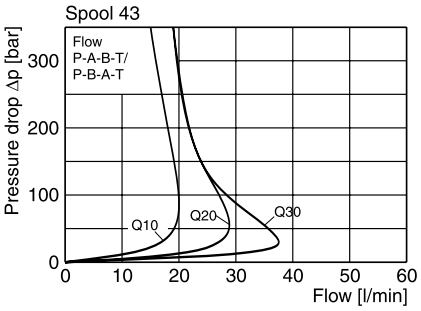


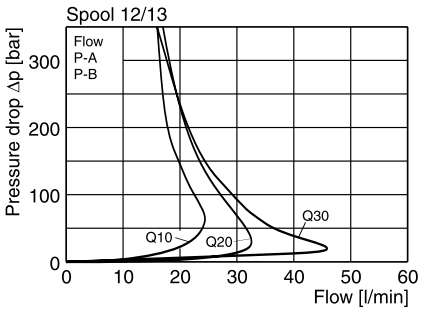
Spool 43



Flow limit



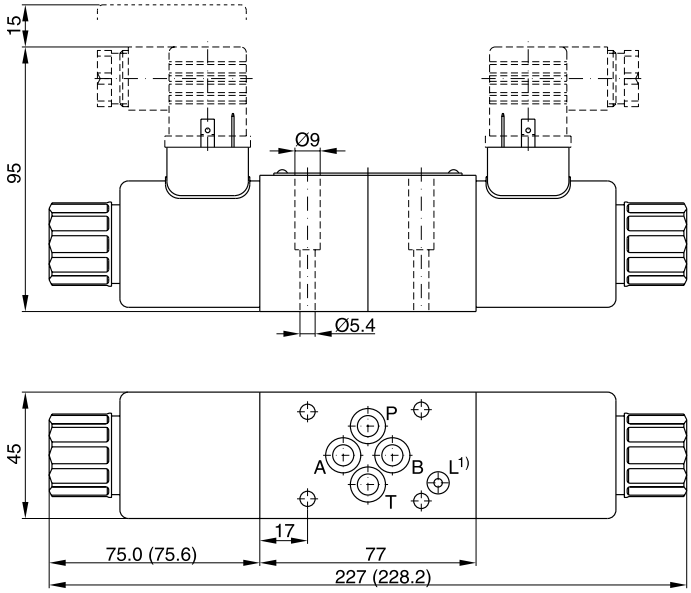




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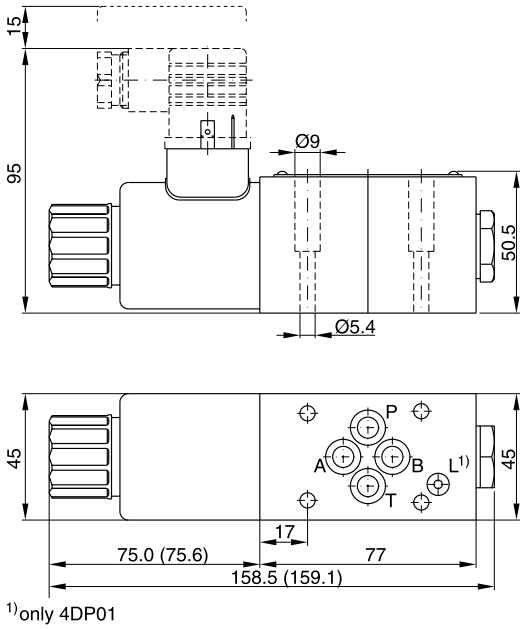
3

4DP01*03
4DPE01*03

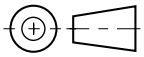


1)only 4DP01

4DP01*06
4DPE01*06



1)only 4DP01



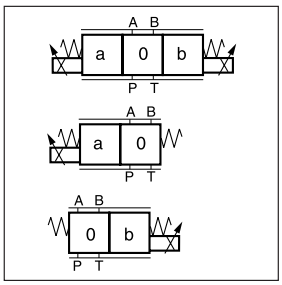
Surface finish	Kit			Kit NBR
R_{max}6.3 ▱ 0.01/100	BK375	4x M5x30 DIN 912 10.4	8.3 Nm	SK-D1FB-N

The D3FB directional control valve of the nominal size NG10 (CETOP 05) provides variable flow rates.

The D3FB is available as spool in sleeve design (code 0) for maximum precision as well as spool in body design (code 3) for high flow rates.

In combination with the digital power amplifier PW-D00A-400, the valve parameters can be saved, changed and duplicated.

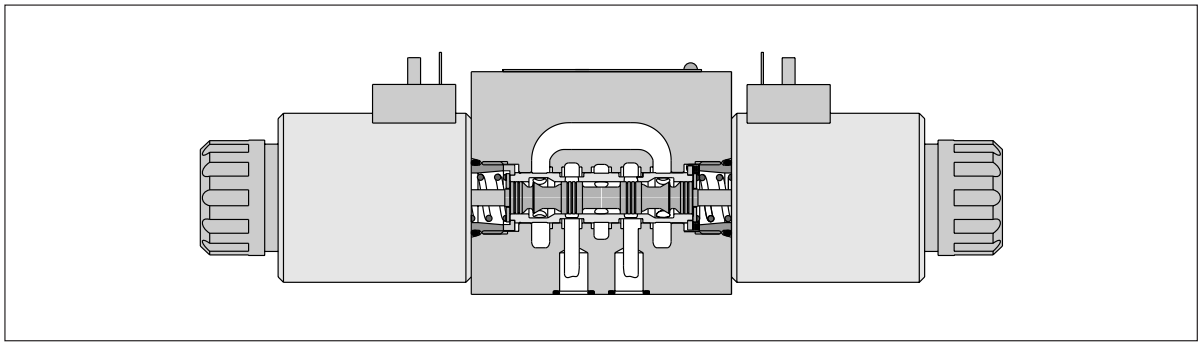




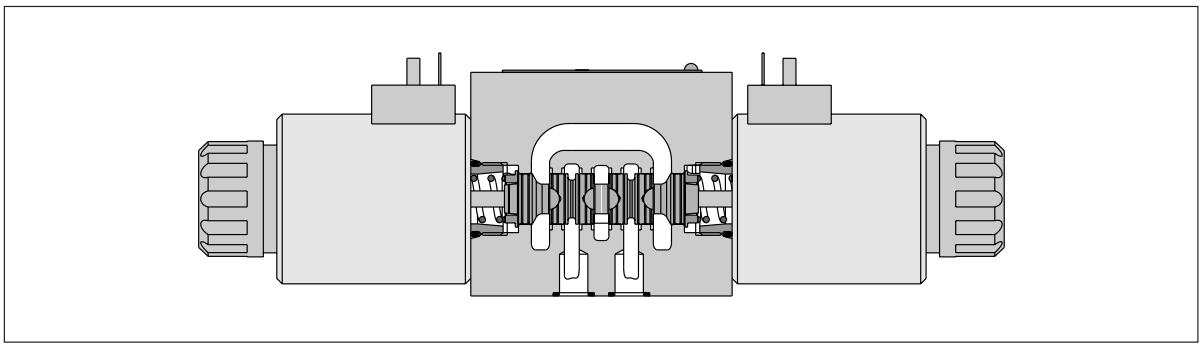
Technical features

- Spool/sleeve design, spool/body design
- High repeatability from valve to valve
- Low hysteresis
- Manual override
- Fail-safe centre position

D3FB*C*0
(Spool in sleeve design)



D3FB*C*3
(Spool in body design)

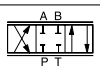
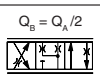


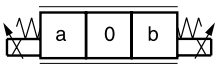
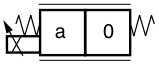
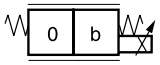
3

D3FB*0

Spool in sleeve design

D	3	F	B			0	N	K	W	0
DC valve	Size DIN NG10 CETOP 05 NFPA D05	Flow control		Spool type	Design		Seal NBR (other seal compounds on request)	Solenoid 12 VDC/2.95A	Connector as per EN 175301-803 without plug*	Spool sleeve design

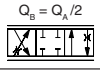
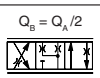
Code	Spool type	Flow [l/min] at Δp 5bar per metering edge
E01M E01S		40 60
E02M E02S		40 60
B31M B31S		40 / 20 60 / 30
B32M B32S		40 / 20 60 / 30

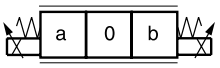
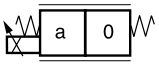
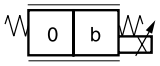
Code	Design
C	
E	
K	

D3FB*3

Spool in body design

D	3	F	B			0	N	K	W	3
DC valve	Size DIN NG10 CETOP 05 NFPA D05	Flow control		Spool type	Design		Seal NBR (other seal compounds on request)	Solenoid 12 VDC/2.95A	Connector as per EN 175301-803 without plug*	Spool body design

Code	Spool type	Flow [l/min] at Δp 5bar per metering edge
E01U		80
E02U		80
E01M E01S		40 60
E02M E02S		40 60

Code	Design
C	
E	
K	

* Please order plugs separately.
See chapter 3 accessories.

General		
Design		Direct operated proportional DC valve
Actuation		Proportional solenoid
Size		NG10 / CETOP 05 / NFPA D05
Mounting interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
Mounting position		unrestricted
Ambient temperature	[°C]	-20...+60
Weight	[kg]	7.6
Vibration resistance	[g]	25 acc. DIN IEC68, part 2-6
Hydraulic		
Max. operating pressure	[bar]	Ports P, A, B 350, T 210
Fluid		Hydraulic oil as per DIN 51524...535, other on request
Fluid temperature	[°C]	-20...+60
Viscosity		
permitted	[cSt] / [mm²/s]	20...380
recommended	[cSt] / [mm²/s]	30...80
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)
Nominal flow at Δp=5bar per control edge *		
D3FB*0	[l/min]	40 and 60
D3FB*3	[l/min]	80
Leakage at 100 bar	[ml/min]	<100
Static		
Hysteresis D3FB*0	[%]	<4
D3FB*3	[%]	<5
Electrical characteristics		
Duty ratio	[%]	100 ED; CAUTION: Coil temperature up to 155°C possible
Protection class		IP 65 in accordance with EN 60529 (plugged and mounted)
Solenoid	Code	K
Supply voltage	[V]	12
Current consumption	[A]	2.95
Power consumption	[W]	35.4
Resistance	[Ohm]	3.84
Solenoid connection		Connector as per EN 175301-803
Wiring min.	[mm²]	3 x 1.5 recommended
Wiring lenght max.	[m]	50 recommended

* Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

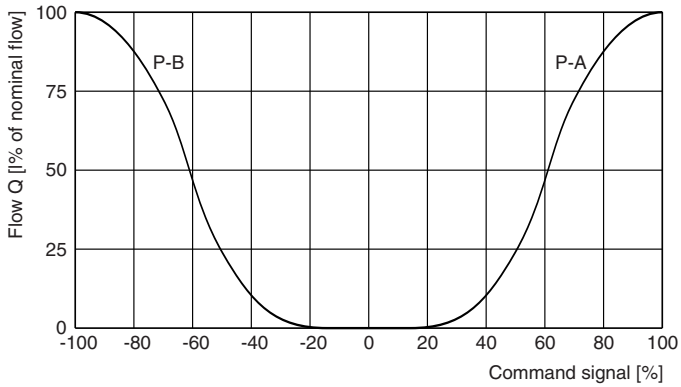
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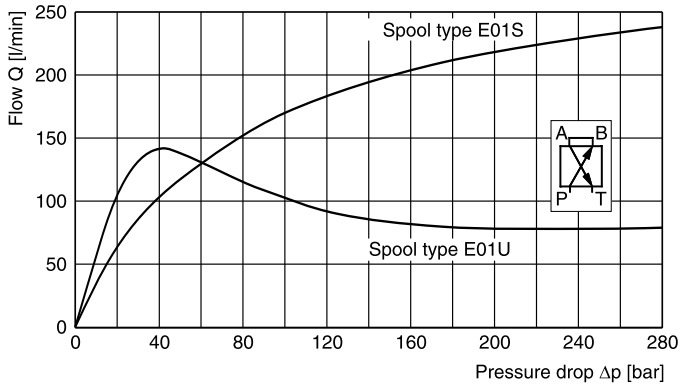
Flow characteristics

at Δp = 5 bar per metering edge
Fluid viscosity 40cSt at 50°C



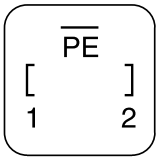
Flow limit

100% command signal



Plug

Solenoid coil

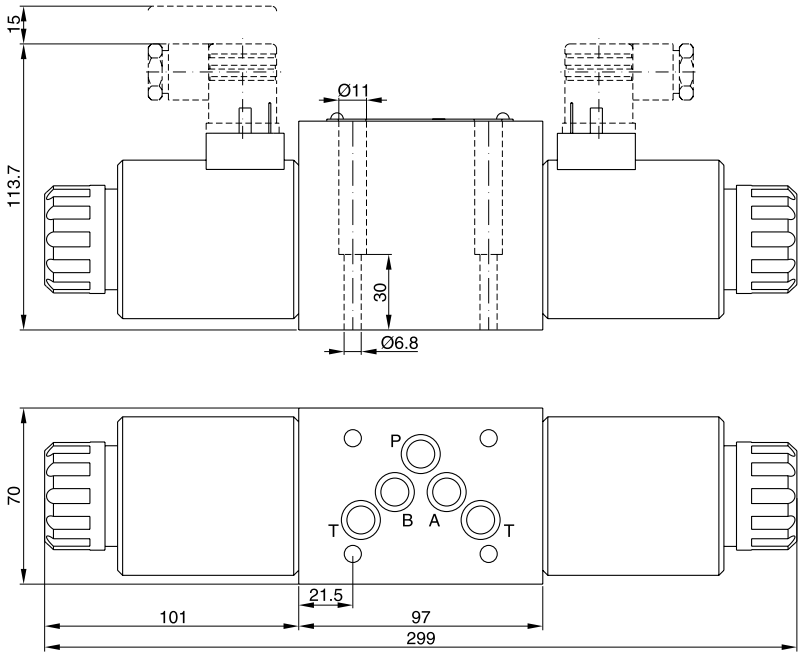


1 = coil connection
2 = coil connection
PE = ground potential

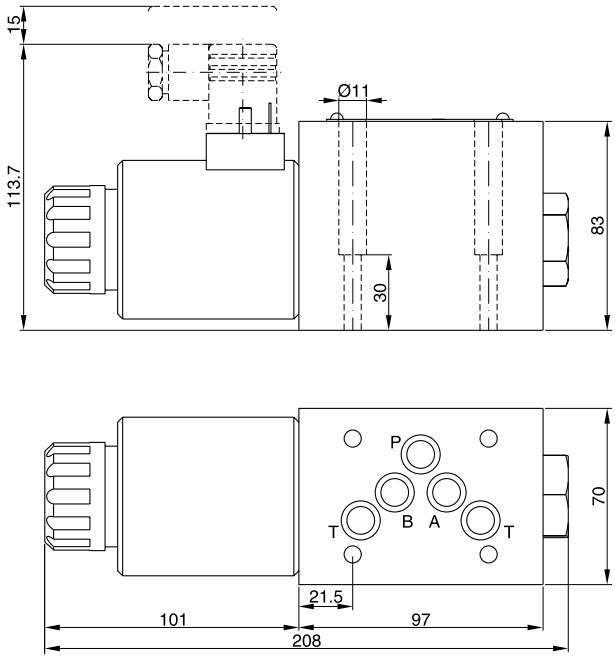
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3

D3FB*C



D3FB*K



Surface finish	Kit			Kit NBR
R_{max}6.3 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm ±15%	SK-D3FB-N

D3FB_UK.INDD CM_28.01.08.1

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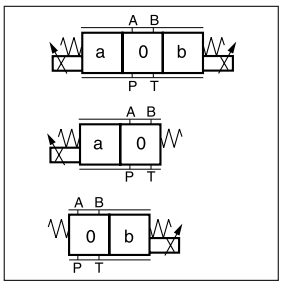
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The proportional directional valves 4DP02 of the nominal size NG10 (CETOP 05) are offered under Denison brand name.

The spool in body design provides high flow rates at a good level of precision.

In combination with the digital power amplifier PWD00A-400, the valve parameters can be saved, changed and duplicated.

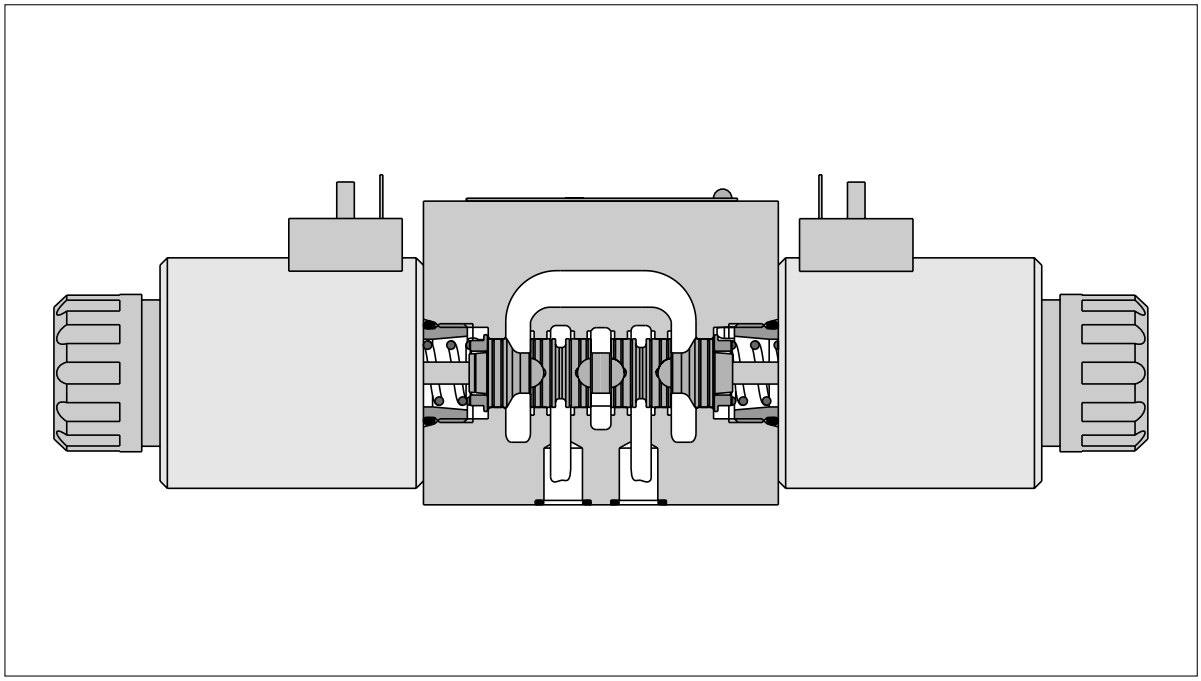




Technical features

- Spool in body design
- High flow rates
- Low hysteresis
- Manual override
- Fail-safe centre position

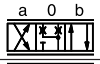
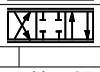
4DP02



3

4DP	02	–	3	E			–		C		G12	
Prop. directional valve	Size DIN NG10 CETOP 05 NFPA D05		Body	Control	Spool type	Flow		Spool position	Design series	Seals	Solenoid 12V/2.95A	Connector as per EN 175301-803

Spool position 03

Code	Spool type
02	
43	

Spool position 05

Code	Spool type
12	
13	

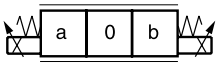
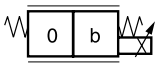
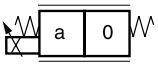
Spool position 06

Code	Spool type
12	
13	

Code	Flow
F40	40 l/min
F60	60 l/min
F80	80 l/min

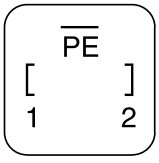
Code	Connector
omit	not supplied
C1	PG11

Code	Seals
1	NBR
5	FPM

Code	Spool position	
03		3 positions spring offset in pos. "0".
05		2 positions spring offset in pos. "0", energized to "a".
06		2 positions spring offset in pos. "0", energized to "b".

Plug

Solenoid coil



1 = coil connection
2 = coil connection
PE = ground potential

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General		
Design		Direct operated proportional DC valve
Actuation		Proportional solenoid
Size		NG10 / CETOP 05 / NFPA D05
Mounting interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
Mounting position		unrestricted
Ambient temperature	[°C]	-20...+60
Weight	[kg]	7.6
Vibration resistance	[g]	25 acc. DIN IEC68, part 2-6
Hydraulic		
Max. operating pressure	[bar]	Ports P, A, B 350, T 210
Fluid		Hydraulic oil as per DIN 51524...535, other on request
Fluid temperature	[°C]	-20...+60
Viscosity permitted recommended	[mm^2/s] [mm^2/s]	20...380 30...80
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)
Flow nominal at Δp=5bar per control edge *	[l/min]	40, 60 and 80
Leakage at 100 bar	[ml/min]	<100
Static / Dynamic		
Hysteresis	[%]	<5
Electrical characteristics		
Duty ratio	[%]	100 ED; CAUTION: Coil temperature up to 155°C possible
Protection class		IP 65 in accordance with EN 60529 (plugged and mounted)
Solenoid	Code	K
Supply voltage	[V]	12
Current consumption	[A]	2.95
Power consumption	[W]	35.4
Resistance	[Ohm]	3.84
Solenoid connection		Connector as per EN 175301-803
Wiring min.	[mm^2]	3 x 1.5 recommended
Wiring lenght max.	[m]	50 recommended

* Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

3

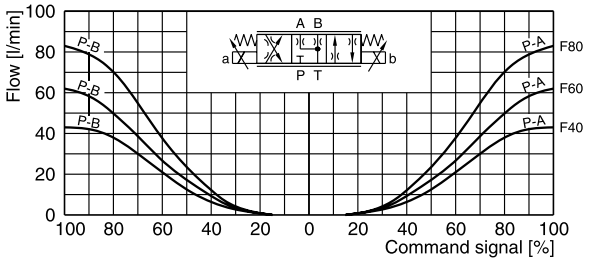
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3

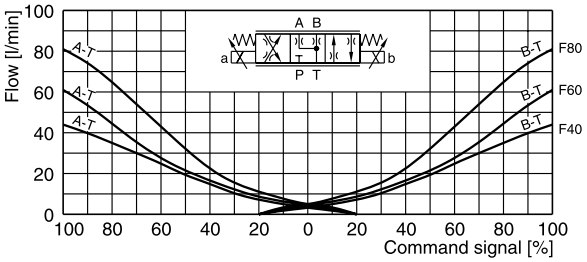
Flow characteristics

at Δp = 5 bar per metering edge
Fluid viscosity 40cSt at 50°C

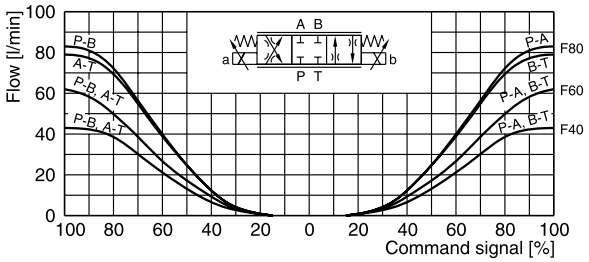
Spool 02 / P-A; P-B



Spool 02 / A-T; B-T

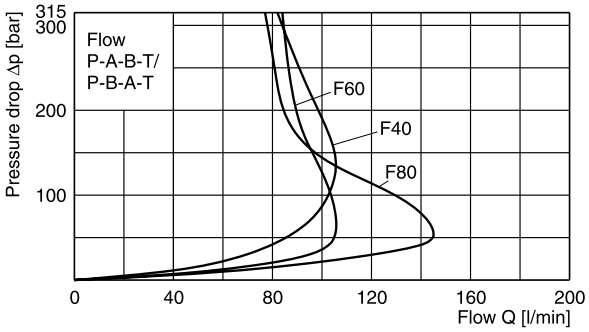


Spool 43

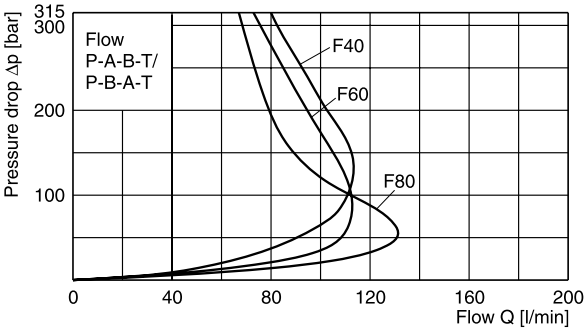


Flow limit

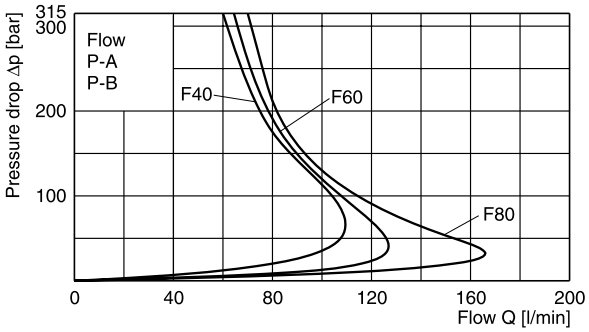
Spool 43



Spool 02



Spool 12/13

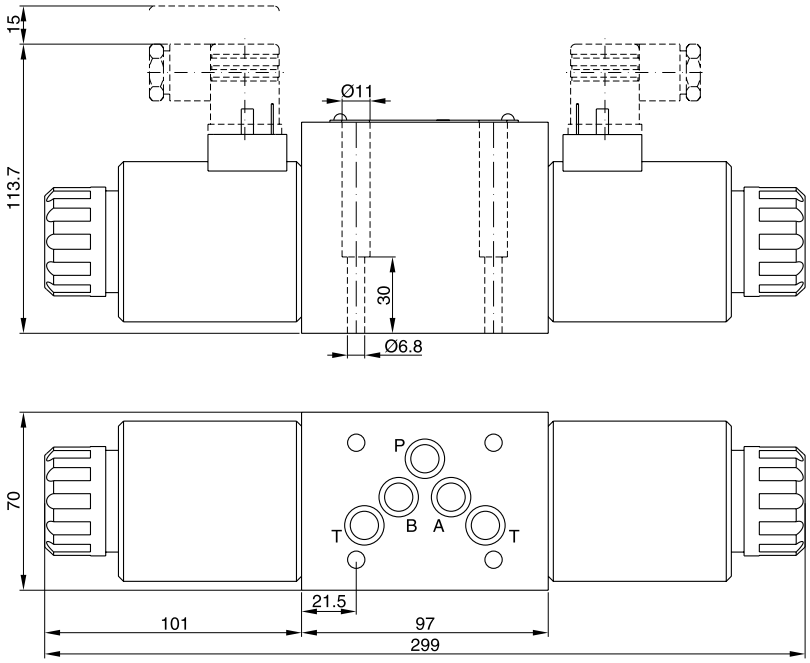


4DP02_UK.INDD CM_10.03.08.1

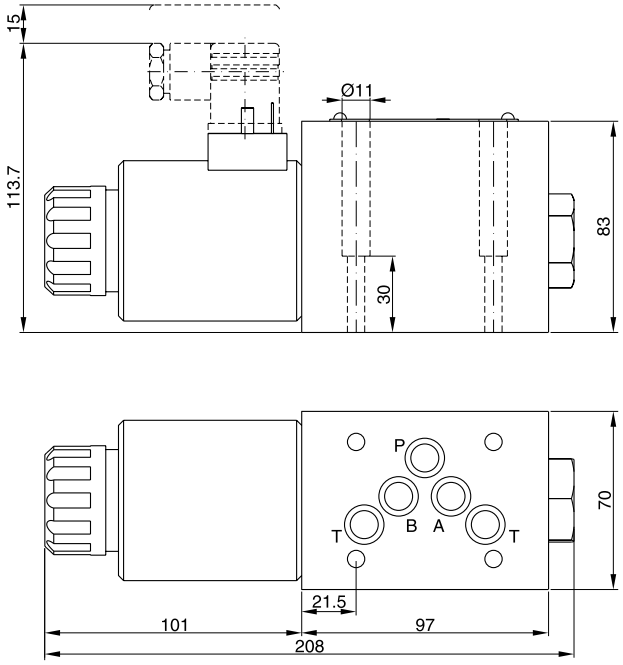
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4DP02*03



4DP02*05



Surface finish	Kit			Kit NBR
R_{max}6.3 0.01/100	BK385	4x M6x40 DIN 912 12.9	11 Nm ±15%	SK-D3FB-N

4DP02_UK.INDD CM_10.03.08.1

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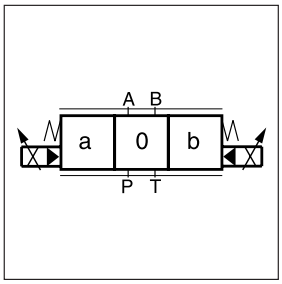
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The D*1FW pilot operated proportional DC valve is available in sizes NG10 (CETOP05), NG16 (CETOP07) and NG25 (CETOP08).

Typical applications include reproducible control of actuator speed in rapid / slow speed profiling and smooth acceleration and deceleration performance.

In combination with the digital power amplifier PWD00A-400, the valve parameters can be saved, changed and duplicated.

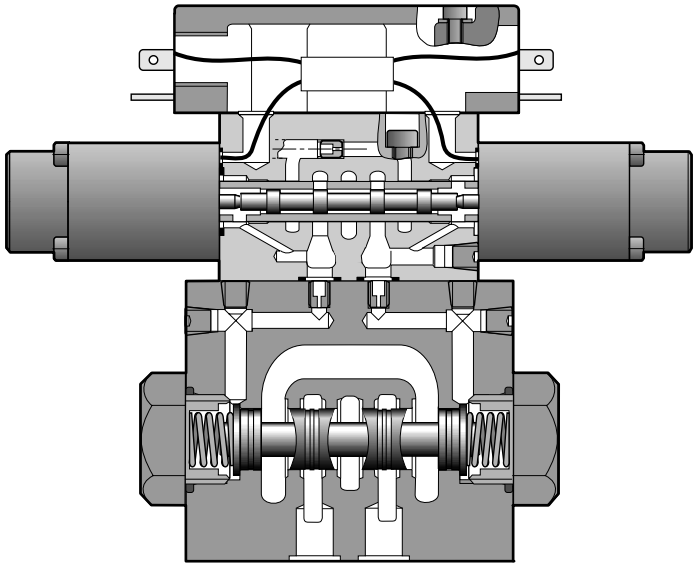




Technical features

- Progressive flow characteristics for sensitive adjustment of flow rate
- Fail-safe centre position
- Centre position monitoring optional
- D31FW - NG10 (CETOP05)
- D41FW - NG16 (CETOP07)
- D91FW - NG25 (CETOP08)

D31FW

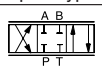


3

D		1	F	W			C		N		W		
Directional control valve	Size	NG06 pilot	Proportional control	Dynamics standard	Spool type	Flow	Spool position	Pilot connection	Seal NBR (other seal compound on request)	Solenoid description (other voltage on request)	Connector as per EN 175301-803 without plug*	Valve accessories	Design series

Code	Nominal size
3	**NG10 / CETOP05**
4	**NG16 / CETOP07**
9 [1]	**NG25 / CETOP08**

[1] with enlarged connections Ø 32 mm

Code	Spool type
E01	
E02	
B31	
B32	

Code	Flow [l/min] at Δp = 5bar per metering edge		
	D31	D41	D91
C	**75**	-	-
D [2]	**90**	-	-
E [2]	**120**	-	-
F	-	**200**	-
H	-	-	**400**

[2] heigh flow version

Code	Valve accessories
0	**Standard**
8 [3]	**Monitor switch**

[3] not available for spool D and E

Code	Solenoid description
L	**6 V/2.5A**
K [4]	**12 V/2.2A**

[4] Flow code D/E (heigh flow)

Code	Inlet	Drain
1	**Internal**	**External**
2	**External**	**External**
4	**Internal**	**Internal**
5	**External**	**Internal**

Bold letters =
Short-term availability

* Please order plugs separately.
See chapter 3 accessories.

General					
Design		Pilot operated DC Valve			
Actuation		Proportional solenoid			
Size		**NG10 (CETOP05)** Standard version	**NG10 (CETOP05)** High flow version	**NG16 (CETOP07)**	**NG25 (CETOP08)**
Mounting interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA			
Mounting position		unrestriced			
Ambient temperature	[°C]	-20...+60			
Weight	[kg]	7.1	8.1	10.8	19
Hydraulic					
Max. operating pressure	[bar]	Pilot drain internal: P, A, B, X 350; T, Y 105 (high flow version: T, Y 15)			
	[bar]	Pilot drain external: P, A, B, T, X 350; Y 105 (high flow version: Y 15)			
Fluid		Hydraulic oil as per DIN 51524...535, other on request			
Fluid temperature	[°C]	-20...+60			
Viscosity					
permitted	[cSt] / [mm²/s]	20...380			
recommended	[cSt] / [mm²/s]	30...80			
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			
Nominal flow at ΔP=5 bar per control edge *	[l/min]	75	90 (code D) 120 (code E)	200	400
Leakage at 100 bar	[ml/min]	100	130	200	600
Pilot supply pressure	[bar]	20-350 (optimal dynamics at 50)			
Pilot flow at 100bar	[l/min]	<1.2	<0.5	<1.2	<1.2
Pilot flow, step response	[l/min]	0.8	3.5	1.7	3.8
Static / Dynamic					
Step response at 100% step	[ms]	60	50	75	100
Hysteresis	[%]	<5			
Electrical characteristics					
Duty ratio	[%]	100			
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)			
Solenoid	Code	L	K	L	L
Supply voltage	[V]	6	12	6	6
Current consumption	[A]	2.5	2.2	2.5	2.5
Resistance	[Ohm]	2.2	3.7	2.2	2.2
Coil insulation class		F (155 °C)			
Electrical connection		Connector as per EN 175301-803			
Wiring min.	[mm²]	3x1.5 (AWG 16) overall braid shield			
Wiring lenght max.	[m]	50			
Electrical monitor switch					
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)			
Ambient temperature	[°C]	0-70			
Supply voltage/ripple	[V]	18...42, ripple <10% eff.			
Current consumption without load	[mA]	<30			
Max. output current per channel, ohmic	[mA]	400			
Min. output load per channel, ohmic	[kOhm]	100			
Max. output drop at 0.2A	[V]	<1.1			
Max. output drop at 0.4A	[V]	<1.6			
EMV		EN 50081-1 / EN50082-2			
Max. tol. ambient field strength	[A/m]	1200			
Min. distance to next AC solenoid	[m]	0.1			
Interface		4+PE acc. IEC 61076-2-101 (M12)			
Wiring min.	[mm²]	5x0.5 (AWG 20) overall braid shield			
Wiring lenght max.	[m]	50			

* Flow rate for different Δp per control edge:

$$Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$$

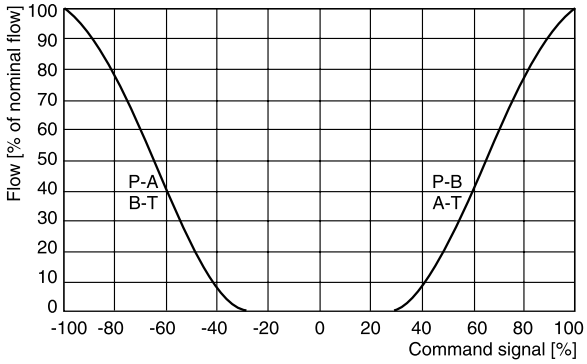
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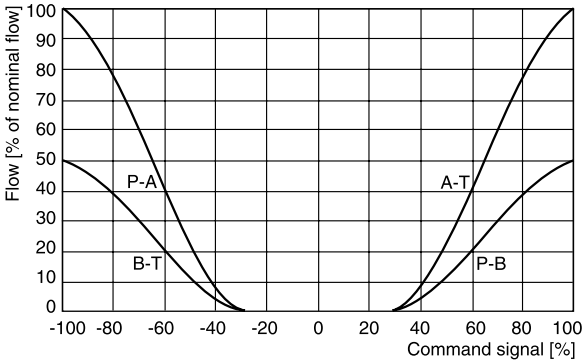
Flow characteristics
at Δp = 5 bar per metering edge

D*1FW

Spool code **E***

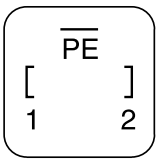


Spool code **B***



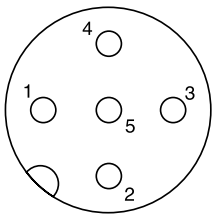
Plug

Solenoid coil

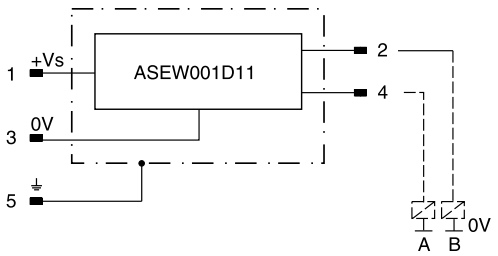


1 = coil connection
2 = coil connection
PE = ground potential

Monitor switch M12x1 pin assignment



1 + Supply 18...42V
2 output B (normally closed)
3 0V
4 output A (normally closed)
5 Earth ground



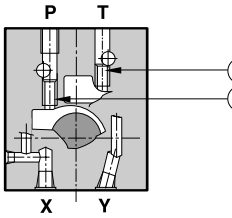
Signal	Output A (pin 4)	Output B (pin 2)
neutral	closed	closed
	open	closed
	closed	open

The neutral position is monitored. The signal changes after less than 10% of the spool stroke.

3

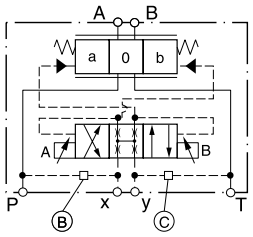
Pilot oil inlet (supply) and outlet (drain)

D31FW (standard version)

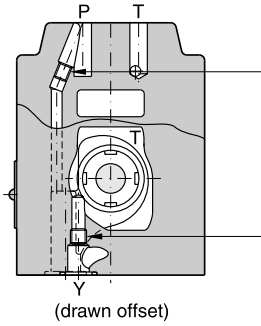


○ open, ● closed

Pilot oil Inlet	Pilot oil Drain	B	C
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○

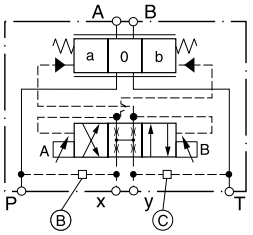


D31FW (high flow version)

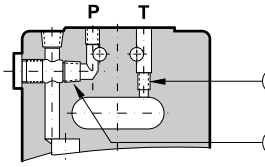


○ open, ● closed

Pilot oil Inlet	Pilot oil Drain	B	C
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○

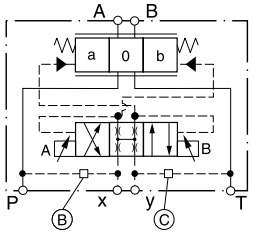


D41FW

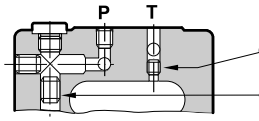


○ open, ● closed

Pilot oil Inlet	Pilot oil Drain	B	C
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○

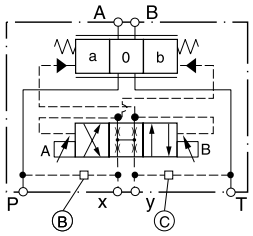


D91FW



○ open, ● closed

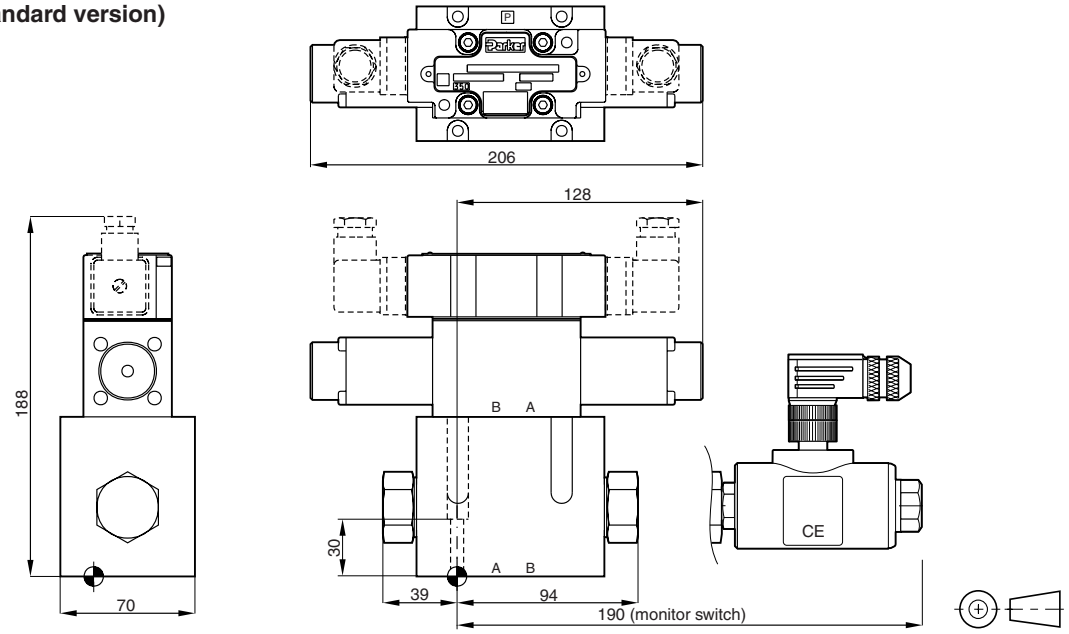
Pilot oil Inlet	Pilot oil Drain	B	C
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○



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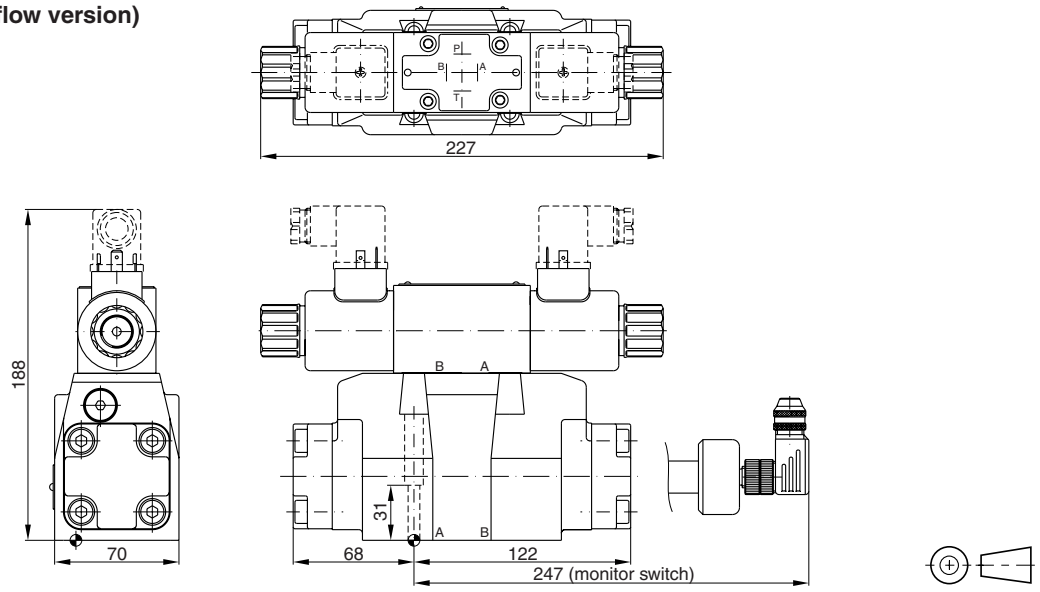
3

D31FW (standard version)



Surface finish	Kit			Kit NBR
R_{max}6.3 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm ±15%	SK-D31FTN

D31FW (high flow version)



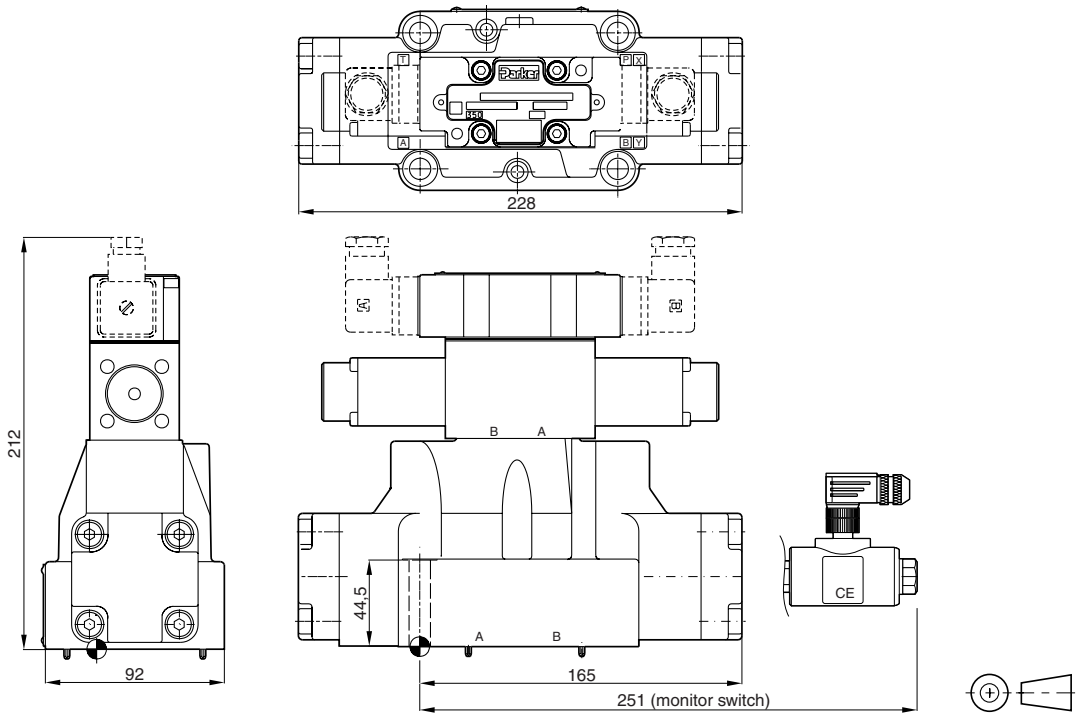
Surface finish	Kit			Kit NBR
R_{max}6.3 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm ±15%	on request

DFW_UK.INDD CM_28.01.08.1

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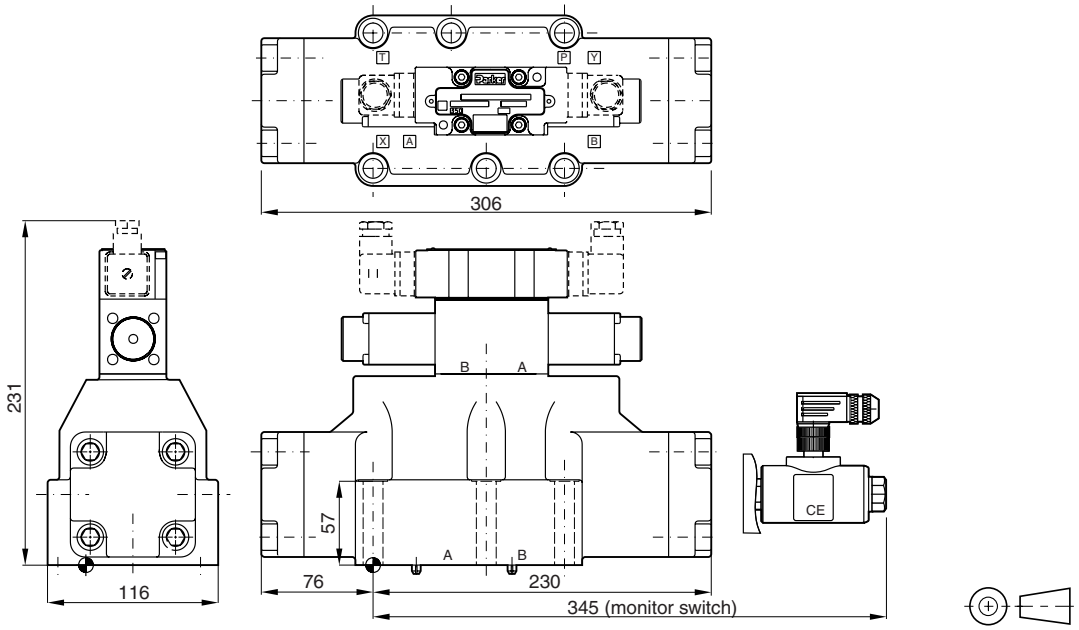
D41FW



Surface finish	Kit			Kit NBR
R_{max}6.3 0.01/100	BK320	2x M6x55 4x M10x60 DIN 912 12.9	13.2 Nm ±15% 63 Nm ±15%	SK-D41FTN

3

D91FW



Surface finish	Kit			Kit NBR
R_{max}6.3 0.01/100	BK360	6x M12x75 DIN 912 12.9	108 Nm ±15%	SK-D91FTN

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The pilot operated proportional DC valves 4DP02V (NG10), 4DP03 (NG16) and 4DP06 (NG25) are offered under Denison brand name.

Typical applications include reproducible control of actuator speed in rapid / slow speed profiling, and smooth acceleration and deceleration performance.

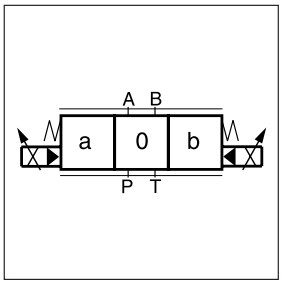
In combination with the digital power amplifier PWD00A-400, the valve parameters can be saved, changed and duplicated.

Technical features

- Progressive flow characteristics for sensitive adjustment of flow rate
- Fail-safe centre position
- Centre position monitoring optional



4DP02V



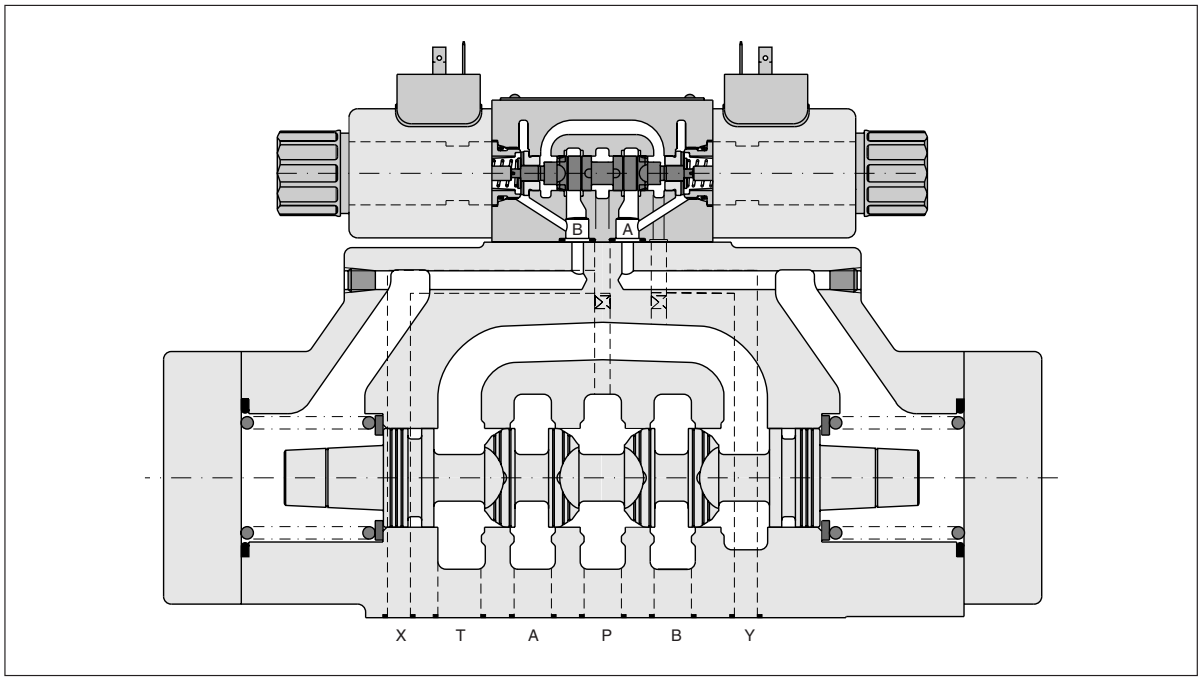


4DP03



4DP06

4DP06



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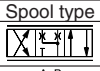
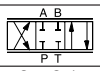
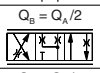
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3

4DP			E					
Directional prop. control valve	Size	Body	Control solenoid operated	Spool type	Flow	Spool position	Design series	Seals

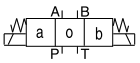
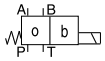
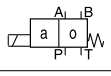
Code	Size
02	NG10
03	NG16
06	NG25

Code	Body
V	for 4DP02V
3	for 4DP03/06

Code	Spool type
02	
43	
B2	
B3	

Code	Flow
4DP02V	
F90[1)]	90 l/min
F120	120 l/min
4DP03	
F100[1)]	100 l/min
F130[1)]	130 l/min
F200	200 l/min
4DP06	
F200[1)]	200 l/min
F250[1)]	250 l/min
F400	400 l/min

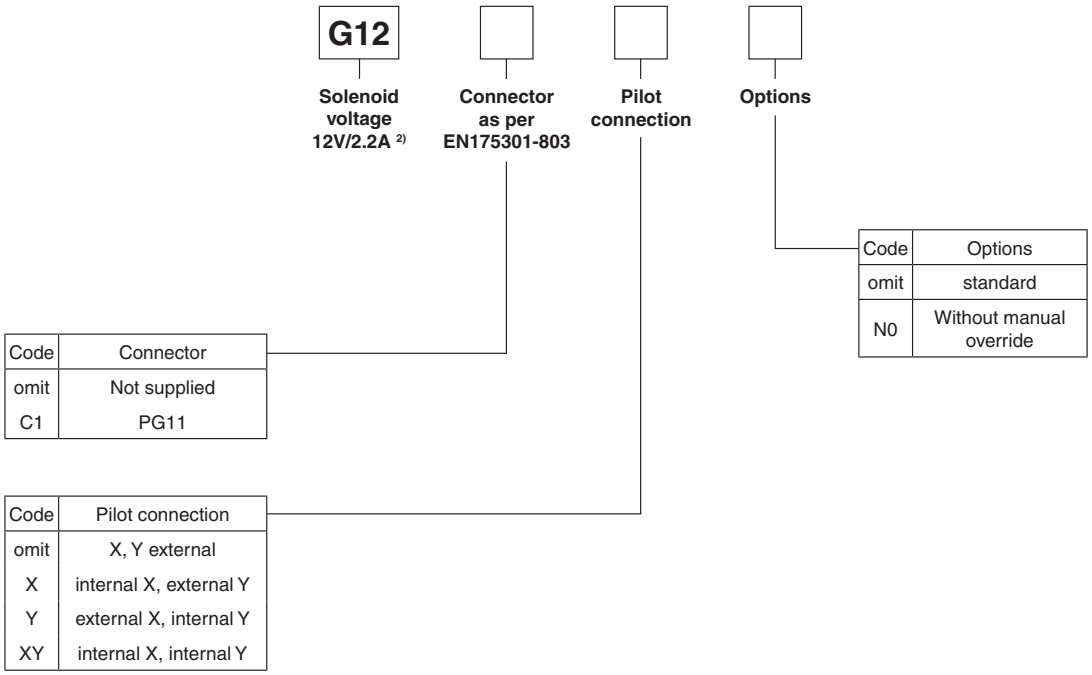
[1)] Not available for spools B2 and B3

3 position spools		
Code	Spool position	
03		3 positions. Spring offset in position “0“.
05		2 positions. Spring offset in position “0“. Energized to “b“.
06		2 positions. Spring offset in position “0“. Energized to “a“.

Code	Seals
1	NBR
5	FPM

Code	Design series
A	4DP02V
B	4DP03
B	4DP06

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Code	Options
omit	standard
N0	Without manual override

Code	Connector
omit	Not supplied
C1	PG11

Code	Pilot connection
omit	X, Y external
X	internal X, external Y
Y	external X, internal Y
XY	internal X, internal Y

2) Onboard electronics on request

3

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General				
Design		Pilot operated DC Valve		
Actuation		Proportional solenoid		
Size		**4DP02V NG10 (CETOP 05)**	**4DP03 NG16 (CETOP 07)**	**4DP06 NG25 (CETOP 08)**
Mounting interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA		
Mounting position		unrestricted, preferably horizontal		
Ambient temperature	[°C]	-20...+50		
Weight	[kg]	7.6 (1 sol.) 8.1 (2 sol.)	10.5 (1 sol.) 10.9 (2 sol.)	18.7 (1 sol.) 19.1 (2 sol.)
Hydraulic				
Max. operating pressure	[bar]	Pilot drain internal: P, A, B, X 350; T, Y 105 (4DP02V: T, Y 15)		
	[bar]	Pilot drain external: P, A, B, T, X 350; Y 105 (4DP02V: Y 15)		
Fluid		Hydraulic oil as per DIN 51524...535, other on request		
Fluid temperature	[°C]	-20...+80		
Viscosity				
permitted	[cSt] / [mm²/s]	10...650		
recommended	[cSt] / [mm²/s]	30		
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)		
Flow nominal at ΔP=5 bar per control edge *	[l/min]	90/120	200	400
Leakage at 100 bar	[ml/min]	100	200	600
Pilot supply pressure	[bar]	20-350 (optimal dynamics at 50)		
Pilot flow at 100bar	[l/min]	<1.2		
Pilot flow, step response	[l/min]	0.8	1.7	3.8
Static / Dynamic				
Step response at 100% step	[ms]	60	75	100
Hysteresis	[%]	<5		
Electrical characteristics				
Duty ratio	[%]	100		
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)		
Solenoid		Code G12		
Supply voltage	[V]	12		
Current max.	[A]	2.2		
Resistance	[Ohm]	3.7		
Coil insulation class		F (155 °C)		
Solenoid connection		Connector as per EN 175301-803		
Wiring min.	[mm²]	3x1.5 (AWG 16) overall braid shield		
Wiring lenght max.	[m]	50		

* Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

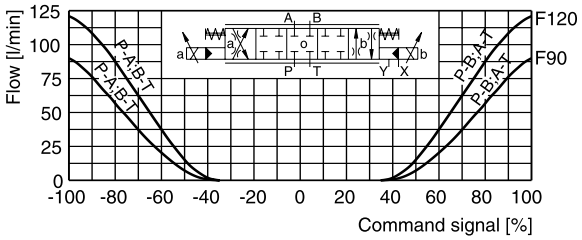
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3

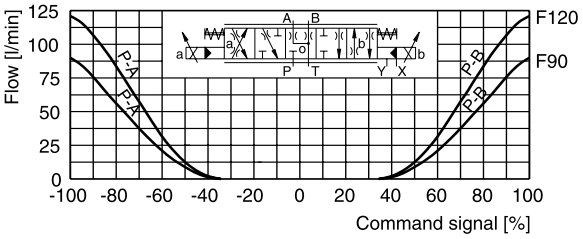
Flow characteristics
at Δp = 5 bar per metering edge
Fluid viscosity 40 cSt at 50°C

4DP02V
Spool code **02, 43**

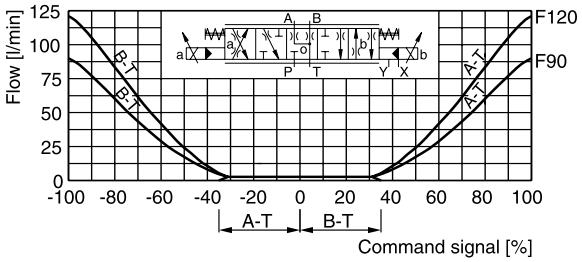
Spool 43



Spool 02 / P-A; P-B

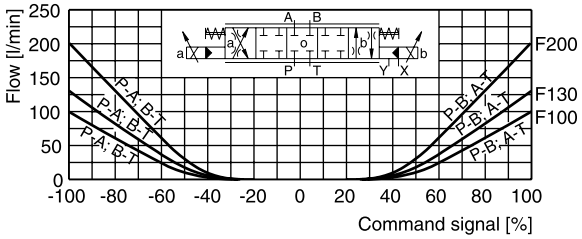


Spool 02 / B-T; A-T

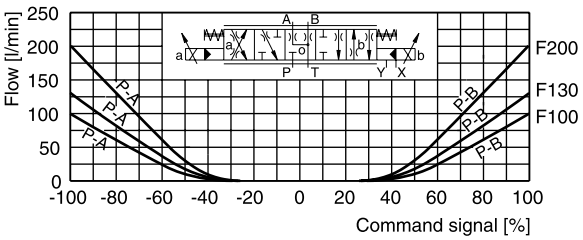


4DP03
Spool code **02, 43**

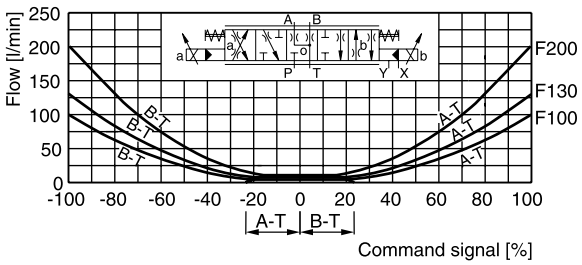
Spool 43



Spool 02 / P-A; P-B



Spool 02 / B-T; A-T

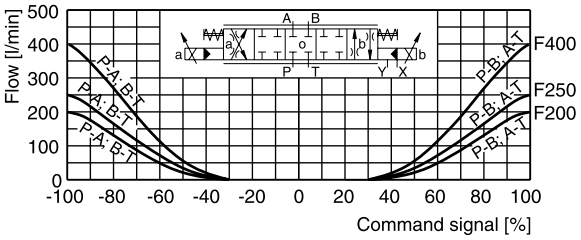


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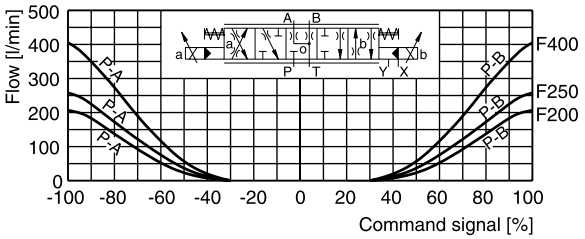
Flow characteristics
at Δp = 5 bar per metering edge
Fluid viscosity 40 cSt at 50°C

4DP06
Spool code **02, 43**

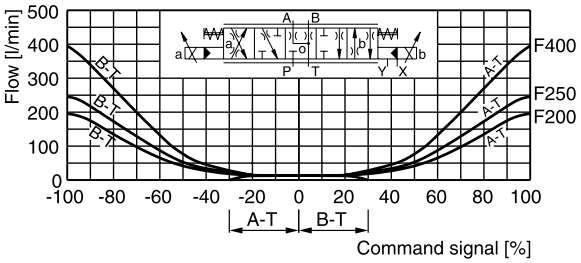
Spool 43



Spool 02 / P-A; P-B

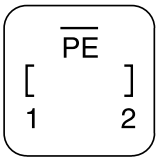


Spool 02 / B-T; A-T



Plug

Solenoid coil

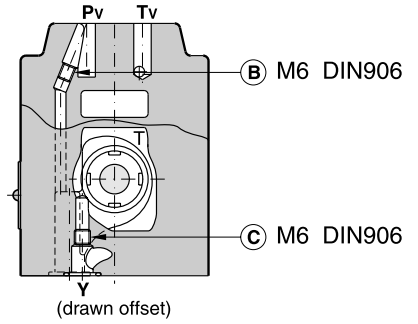


1 = coil connection
2 = coil connection
PE = ground potential

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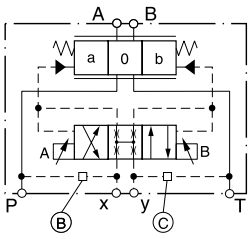
Pilot oil inlet (supply) and outlet (drain)

4DP02V

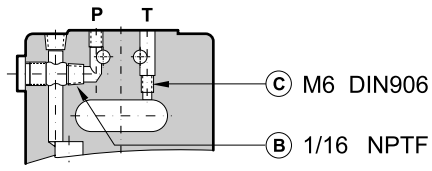


○ open, ● closed

Pilot oil Inlet	Pilot oil Drain	B	C
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○

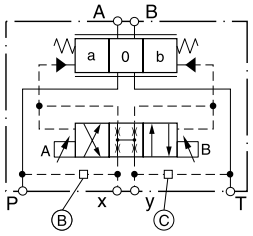


4DP03

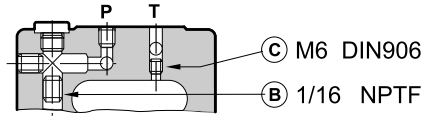


○ open, ● closed

Pilot oil Inlet	Pilot oil Drain	B	C
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○

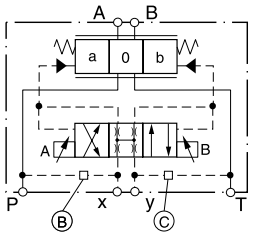


4DP06



○ open, ● closed

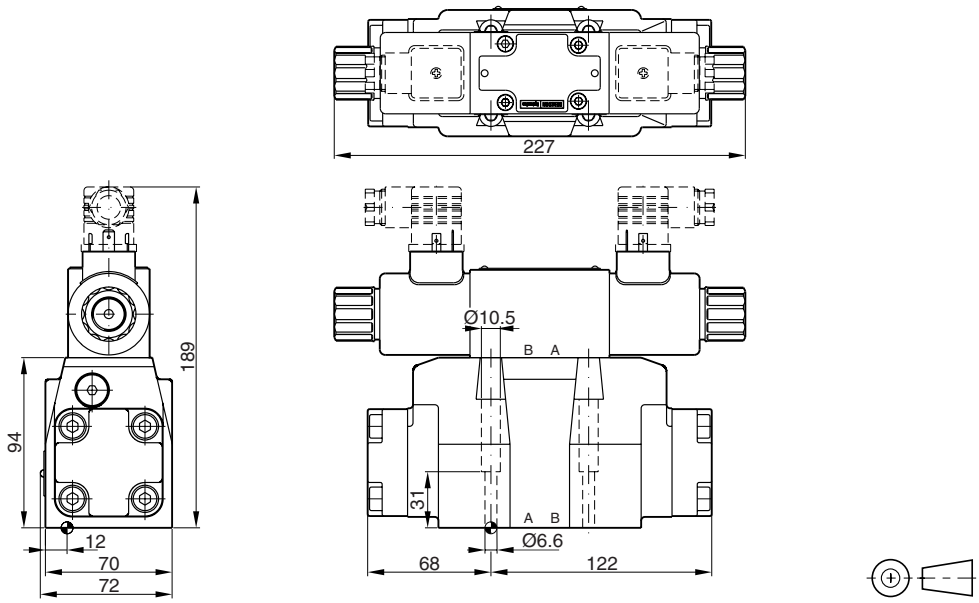
Pilot oil Inlet	Pilot oil Drain	B	C
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○



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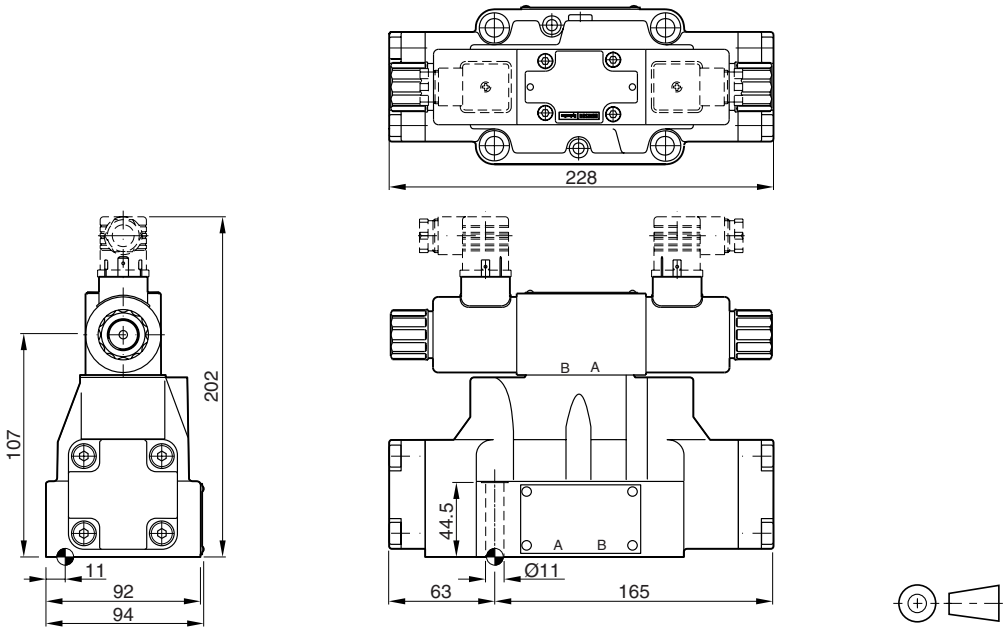
3

4DP02V



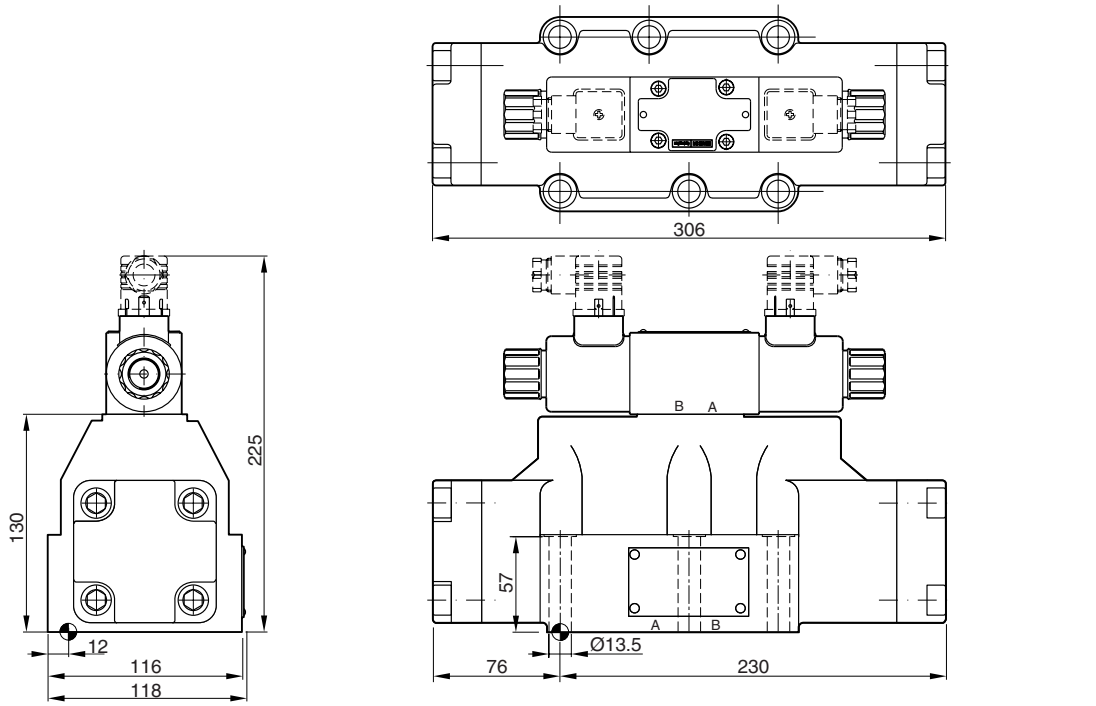
Surface finish	Kit			Kit NBR
R_{max}6.3 ⏥ 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm ±15%	Seal kit on request.

4DP03



Surface finish	Kit			Kit NBR
R_{max}6.3 ⏥ 0.01/100	BK320	2x M6x55 4x M10x60 DIN 912 12.9	13.2 Nm ±15% 63 Nm ±15%	Seal kit on request.

4DP06



Surface finish	Kit			Kit NBR
R_{max}6.3 ▱ 0.01/100	BK360	6x M12x75 DIN 912 12.9	108 Nm ±15%	Seal kit on request.

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Notes

4DP02V-03-06_UK.INDD CM_28.01.08.1

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Hydraulic Controls Division
Kaarst, Germany

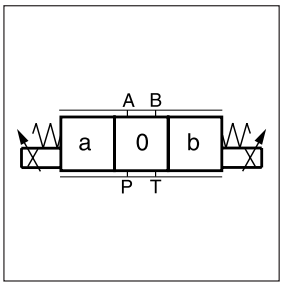
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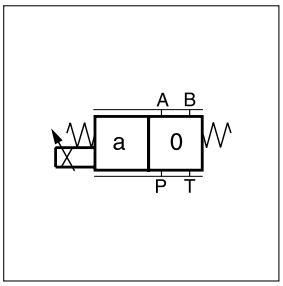
The D1FT directional control valve of the nominal size NG6 (CETOP 3) is a proportional valve providing variable flow rates.

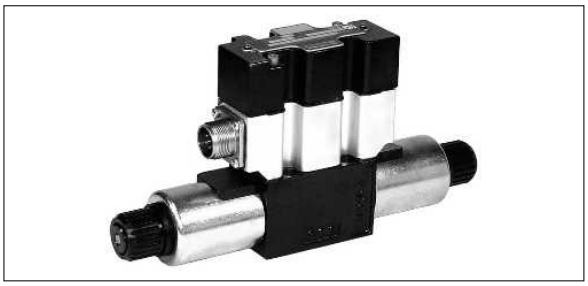
This valve is used with integrated control electronics. Typical applications are soft switching via adjustable ramps for the reduction of hydraulic and mechanical shocks, and electrically adjustable flow rates / speeds for automating machine functions.

Technical features

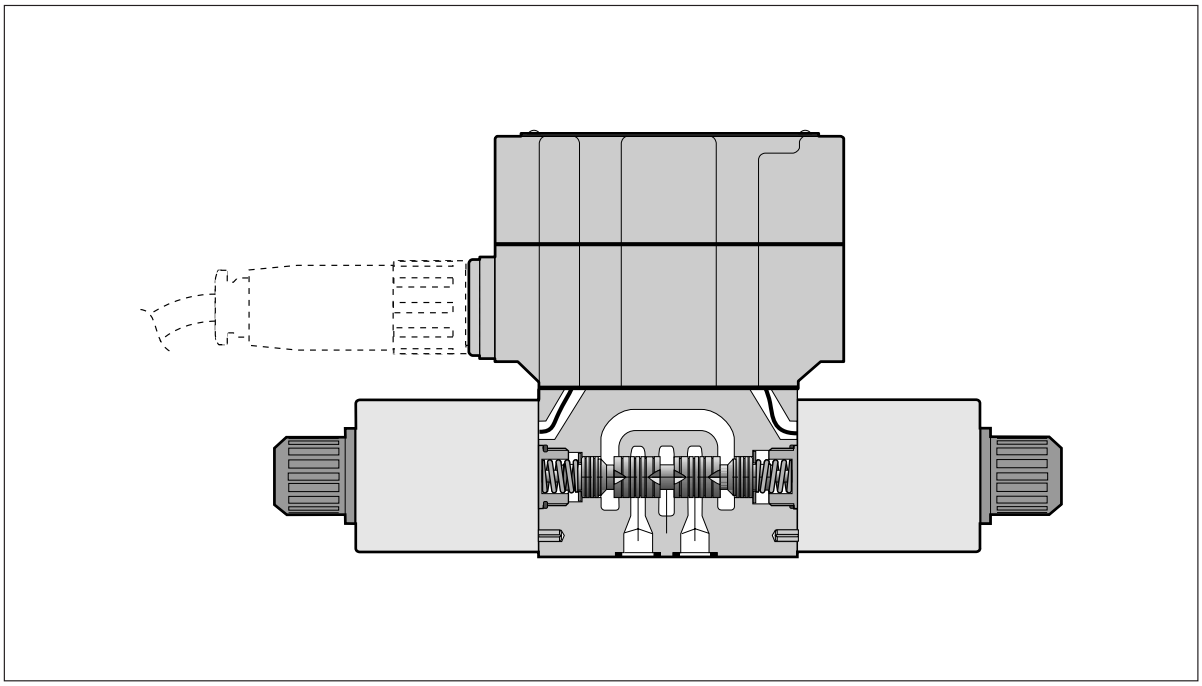
- Integrated control electronics with ramp adjustment
- Progressive flow characteristics for sensitive adjustment of flow rate
- Spring centred spool
- Manual override







D1FT



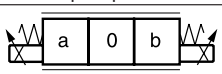
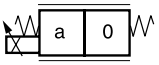
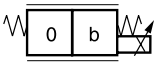
Ordering Code

Series D1FT

D	1	F	T			N		0	0	
Directional control valve	Size NG06/ CETOP03 NFPA D03	Proportional control	DC valve (with integr. electronics)	Spool type	Spool position	Seal NBR (other seal compound on request)	Electronic design	Electronic accessories	Valve acces-sories	Design series

Code	Spool type	Flow [l/min] at Δp 5bar per metering edge
E01C E01F E01H		7.5 15 20
E02C E02F E02H		7.5 15 20
B31F	$Q_B = Q_A/2$ 	15 / 7.5
B32F	$Q_B = Q_A/2$ 	15 / 7.5

Code	Voltage
F	Voltage input 0...±10V with reference output +10V / -10V
G	Current input 0...±20mA

Code	Spool position
C	
E	
K	

Please order plugs separately.
See chapter 3 accessories.

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General		
Design		Direct operated DC Valve with onboard electronics
Actuation		Proportional solenoid
Size		NG06 / (CETOP03) / NFPA D03
Mounting interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
Mounting position		unrestricted
Ambient temperature	[°C]	-20...+60
Weight	[kg]	1.9
Hydraulic		
Max. operating pressure	[bar]	Ports P, A, B 350; Port T 35
Fluid		Hydraulic oil as per DIN 51524...535, other on request
Fluid temperature	[°C]	0...60
Viscosity permitted	[cSt] / [mm²/s]	20...380
recommended	[cSt] / [mm²/s]	30...80
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)
Nominal flow at Δp=5bar per control edge [1]	[l/min]	7.5 / 15 / 20
Leakage at 100 bar	[ml/min]	<200
Static / Dynamic		
Step response at 100% step	[ms]	90
Hysteresis	[%]	< 8
Electrical characteristics		
Duty ratio	[%]	100
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)
Supply voltage/ripple	[V]	14.5 ... 30, ripple <5% eff. surge free, 0...+10V P->A
Current consumption max.	[A]	2.8
Input signal [2]		
Voltage	[V]	10...0...-10, ripple <0.01% eff., surge free, 0...+10V P->A
Impedance	[kOhm]	100
Current	[mA]	20...0...-20, ripple <0.01% eff., surge free, 0...+20mA P->A
Impedance	[Ohm]	500
Differential input max.	[V]	30 for terminal D and E against PE
Ramp	[s]	0...3
Pre-fusing	[A]	6.3 medium lag
EMC		EN 50081-1 / EN50082-2
Coil insulation class		F (155 °C)
Electrical connection		6+PE acc. EN 175201-804
Wiring min.	[mm²]	7x1.0 (AWG 18) overall braid shield
Wiring lenght max.	[m]	50

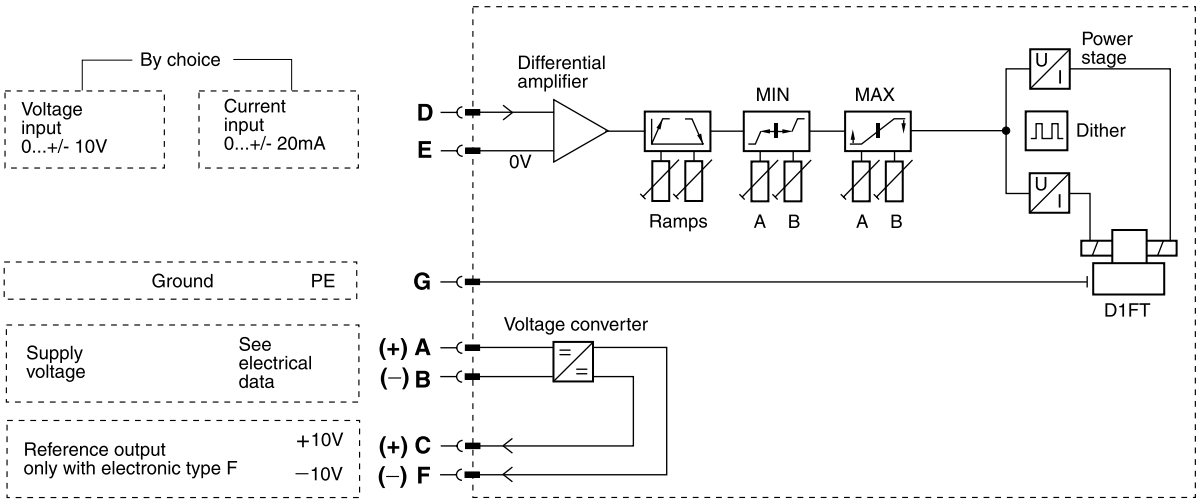
[1] Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

[2] Inverse polarity on request

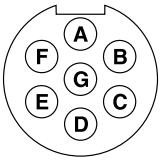
3

3

Block diagram

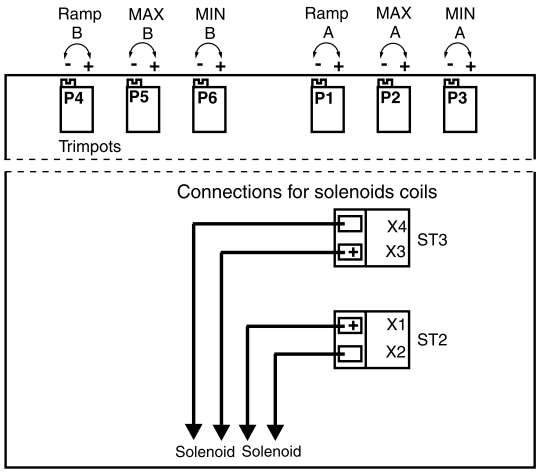


Central connector 6 + PE



A = supply (14.5...30 VDC)
B = GND (0V)
C = ref. +10 VDC
D = input
E = input
(-10...+10 VDC)
(-20...+20 mA)
F = ref. -10 VDC
G = PE (Ground)

Arrangement of the potentiometers



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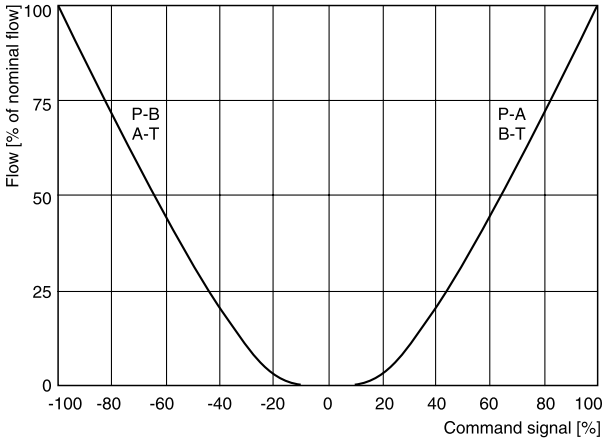
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3

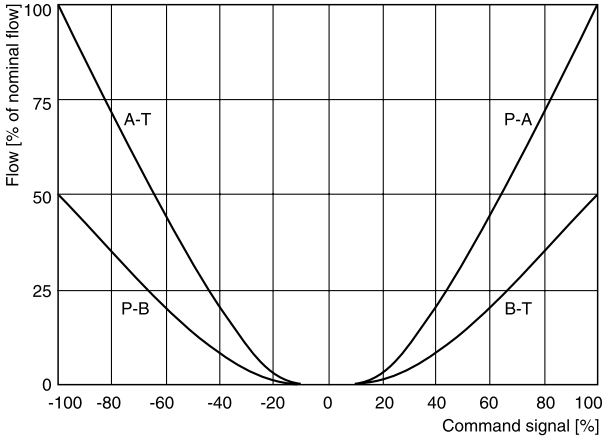
Flow characteristics

Spool code **E***

at Δp 5bar per metering edge

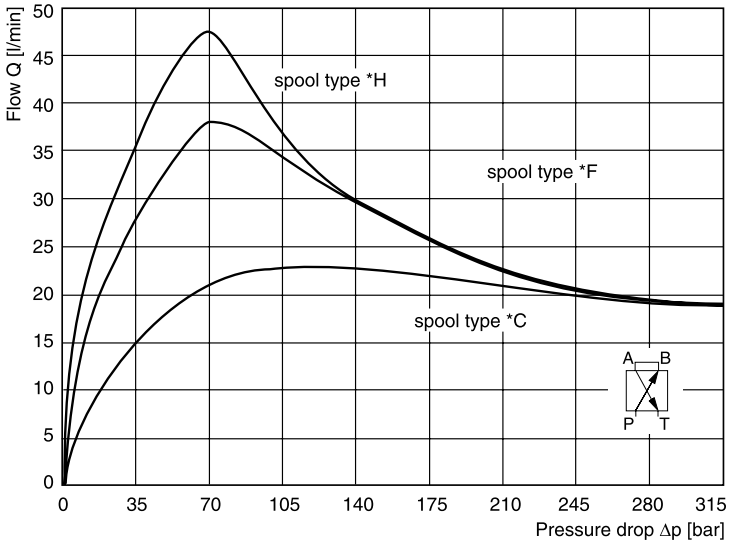


Spool code **B***

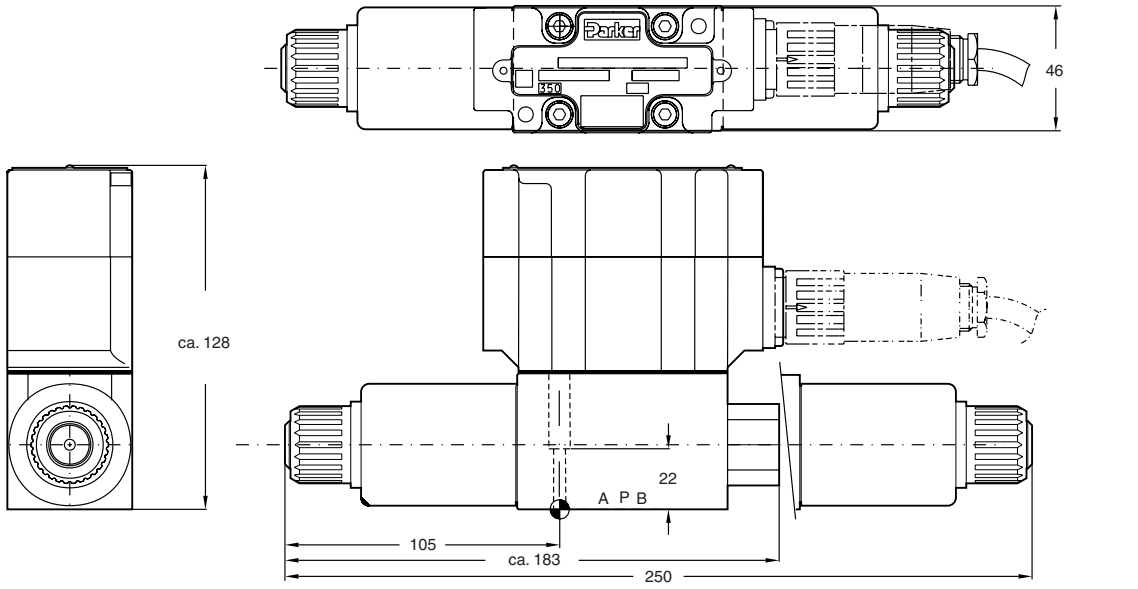


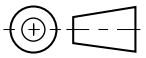
Flow limit

Spool code **E***
(Spool code **B*** on request)
100% command signal



3





Surface finish	Kit			Kit NBR
R_{max}6.3 0.01/100	BK375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	SK-D1FT-N30

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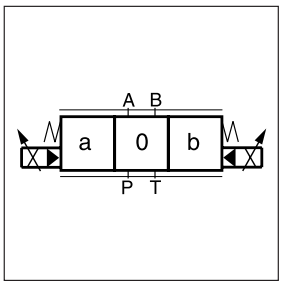
The D*1FT pilot operated proportional DC valves are available in sizes NG10 (CETOP05), NG16 (CETOP07) and NG25 (CETOP08).

The D*1FT onboard electronics offers features as adjustable ramps and overlap compensation.

Typical applications include reproducible control of actuator speed in rapid / slow speed profiling, and smooth acceleration and deceleration performance.



D31FT

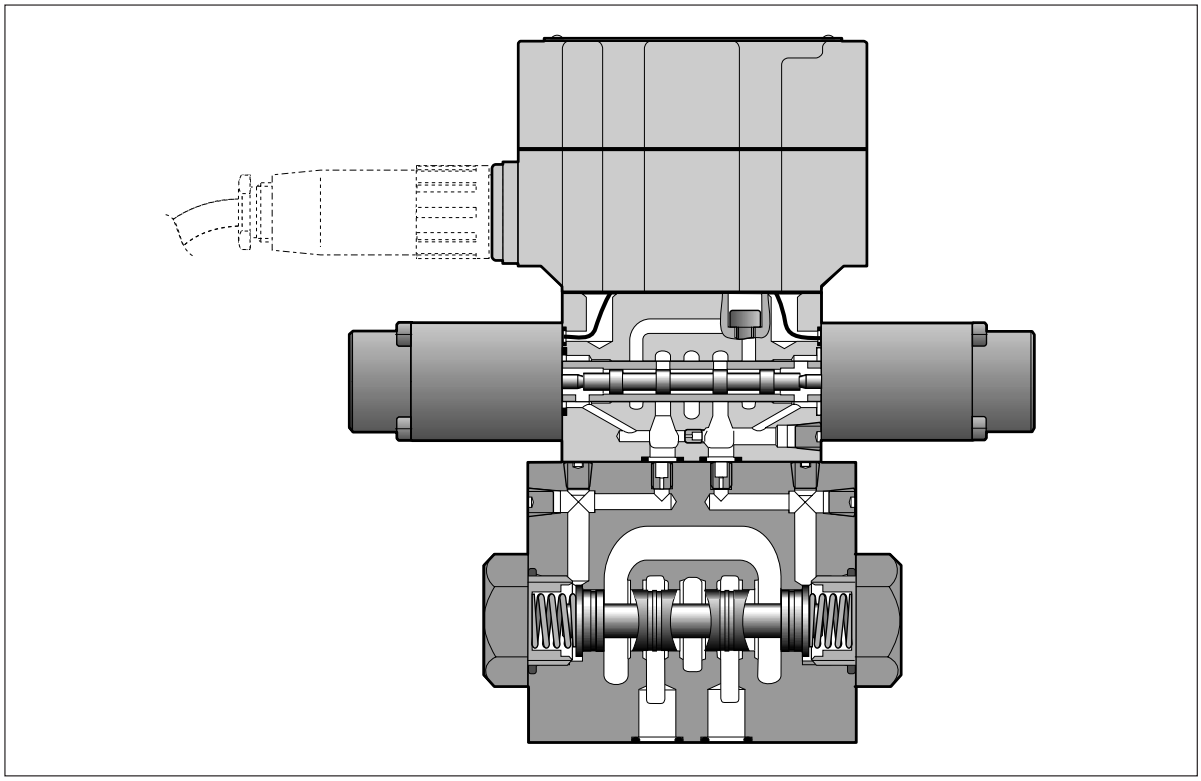


Technical features

- Progressive flow characteristics for sensitive adjustment of flow rate
- Fail-safe centre position
- Center position monitoring optional
- Onboard electronics with adjustable
  – ramps
  – overlap compensation
  – zero offset
- D31FT – NG 10 (CETOP05)
- D41FT – NG 16 (CETOP07)
- D91FT – NG 25 (CETOP08)

CE

D31FT



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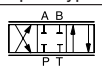
D		1	F	T			C		N		0		
Directional control valve	Size	NG06 pilot	Proportional control	Integrated electronics	Spool type	Flow	Spool position	Pilot connection	Seal NBR (other seal compound on request)	Electronic variation	Electronic accessories	Valve accessories	Design series

Code	Size
3	**NG10 / CETOP05**
4	**NG16 / CETOP07**
9 *	**NG25 / CETOP08**

* with enlarged connections Ø 32 mm

Code	Valve accessories
0	**Standard**
8	**Monitor switch**

Code	Electronic variation
F	**Voltage input 0...±10V, with reference output +10V/-10V**
G	**Current input 0...±20mA**

Code	Spool type
E01	
E02	
B31	$Q_B = Q_A/2$ 
B32	$Q_B = Q_A/2$ 

Code	Inlet	Drain
1	**Internal**	**External**
2	**External**	**External**
4	**Internal**	**Internal**
5	**External**	**Internal**

Code	Flow [l/min] at Δp = 5bar per metering edge		
	D31	D41	D91
C	**75**	-	-
F	-	**200**	-
H	-	-	**400**

Bold letters =
Short-term availability

Please order plugs separately.
See chapter 3 accessories.

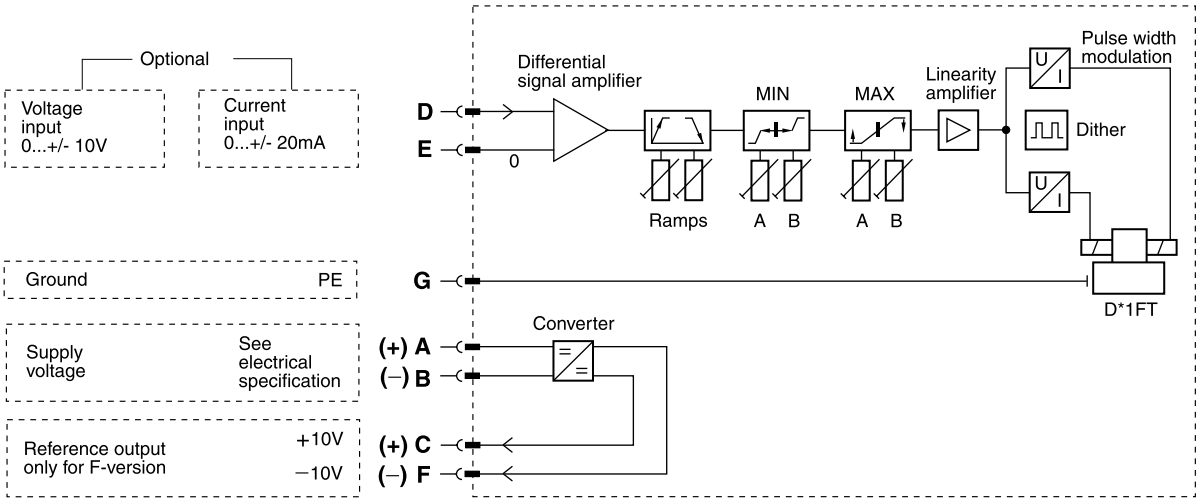
General				
Design		Pilot operated DC Valve		
Actuation		Proportional solenoid		
Size		**NG10 (CETOP05)**	**NG16 (CETOP07)**	**NG25 (CETOP08)**
Mounting interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA		
Mounting position		unrestriced		
Ambient temperature	[°C]	-20...+60		
Weight	[kg]	7.3	11.1	19.3
Hydraulic				
Max. operating pressure	[bar]	Pilot drain internal P, A, B, X 350; T, Y 105		
	[bar]	Pilot drain external P, A, B, T, X 350; Y 105		
Fluid		Hydraulic oil as per DIN 51524...535, other on request		
Fluid temperature	[°C]	-20...+60		
Viscosity permitted	[cSt] / [mm²/s]	20...380		
recommended	[cSt] / [mm²/s]	30...80		
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)		
Nominal flow [1]	[l/min]	75	200	400
Leakage at 100 bar	[ml/min]	100	200	600
Pilot supply pressure	[bar]	20-350 (optimal dynamics at 50)		
Pilot flow at 100bar	[l/min]	< 1.2		
Pilot flow, step response	[l/min]	0.8	1.7	3.8
Static / Dynamic				
Step response at 100% step	[ms]	60	75	100
Hysteresis	[%]	< 5		
Sensitivity	[%]	< 1		
Electrical characteristics				
Duty ratio	[%]	100		
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)		
Supply voltage/ripple	[V]	14.5 ... 30, ripple < 5% eff. surge free		
Current consumption max.	[A]	2.8		
Input signal [2]				
Voltage	[V]	10...0...-10, ripple < 0.01% eff., surge free, 0...+10V P → B		
Impedance	[kOhm]	100		
Current	[mA]	20...0...-20, ripple < 0.01% eff., surge free, 0...+20mA P → B		
Impedance	[Ohm]	500		
Differential input max.	[V]	30 for terminal D and E against PE		
Ramp	[s]	0...3		
Pre-fusing	[A]	6.3 medium lag		
EMC		EN 50081-2 / EN50082-2		
Coil insulation class		F (155 °C)		
Electrical connection		6+PE acc. EN 175201-804		
Wiring min.	[mm²]	6x1.0 (AWG 18) overall braid shield		
Wiring lenght max.	[m]	50		
Electrical monitor switch				
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)		
Ambient temperature	[°C]	0-70		
Supply voltage/ripple	[V]	18...42, ripple < 10% eff.		
Current consumption without load	[mA]	< 30		
Max. output current per channel, ohmic	[mA]	400		
Min. output load per channel, ohmic	[kOhm]	100		
Max. output drop at 0.2A	[V]	< 1.1		
Max. output drop at 0.4A	[V]	< 1.6		
EMC		EN 50081-1 / EN50082-2		
Max. tol. ambient field strength	[A/m]	1200		
Min. distance to next AC solenoid	[m]	0.1		
Interface		4+PE acc. IEC 61076-2-101 (M12)		
Wiring min.	[mm²]	5x0.5 (AWG 20) overall braid shield		
Wiring lenght max.	[m]	50		

[1] Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

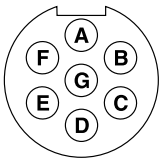
[2] Inverse polarity on request

3

Block diagram

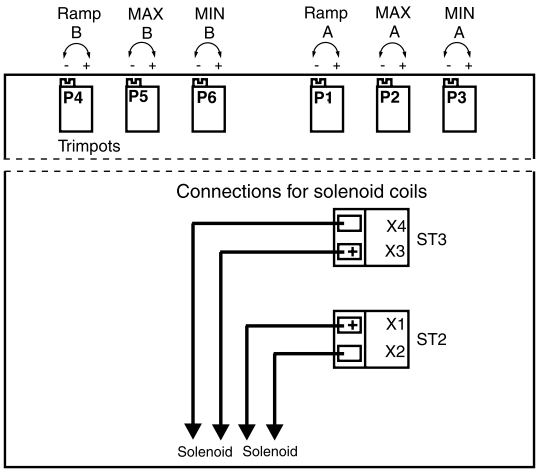


Central connector 6 + PE



A = supply (14.5...30 VDC)
B = GND (0V)
C = ref. +10 VDC
D = input
E = input
(-10...+10 VDC)
(-20...+20 mA)
F = ref. -10 VDC
G = PE (Ground)

Mechanical arrangement of the potentiometers



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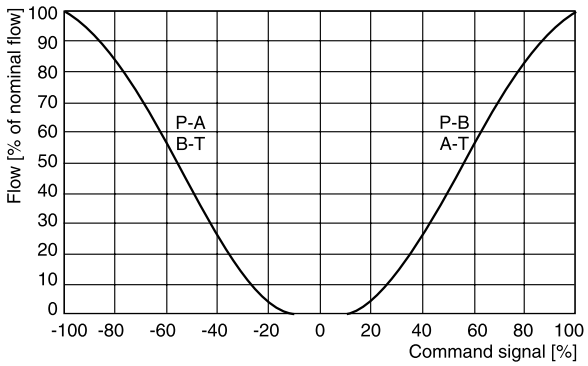
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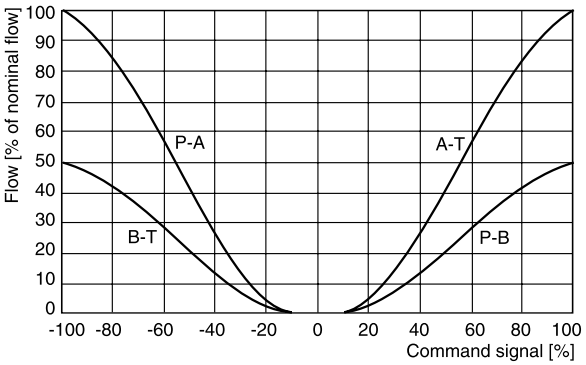
Flow characteristics
at Δp = 5bar per metering edge

D*1FT

Spool code **E***

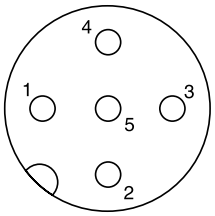


Spool code **B***

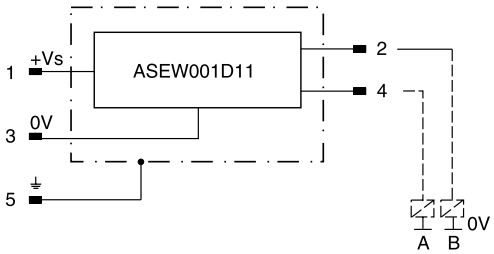


3

Monitor switch M12x1 pin assignment



1 + Supply 18...42V
2 output B (normally closed)
3 0V
4 output A (normally closed)
5 Earth ground



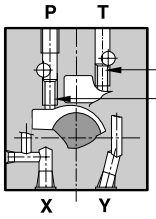
Signal	Output A (pin 4)	Output B (pin 2)
neutral	closed	closed
	open	closed
	closed	open

The neutral position is monitored. The signal changes after less than 10% of the spool stroke.

3

Pilot oil inlet (supply) and outlet (drain)

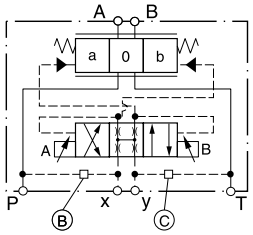
D31FT



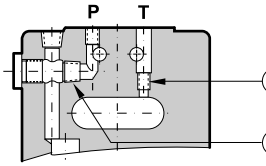
C M6 DIN906
B M5 DIN906

○ open, ● closed

Pilot oil Inlet	Pilot oil Drain	B	C
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○



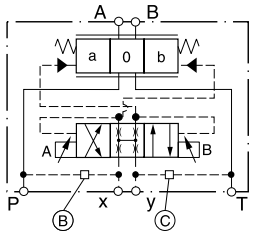
D41FT



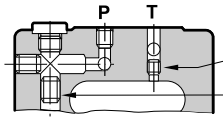
C M6 DIN906
B 1/16 NPTF

○ open, ● closed

Pilot oil Inlet	Pilot oil Drain	B	C
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○



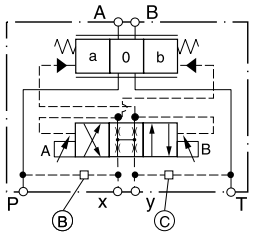
D91FT



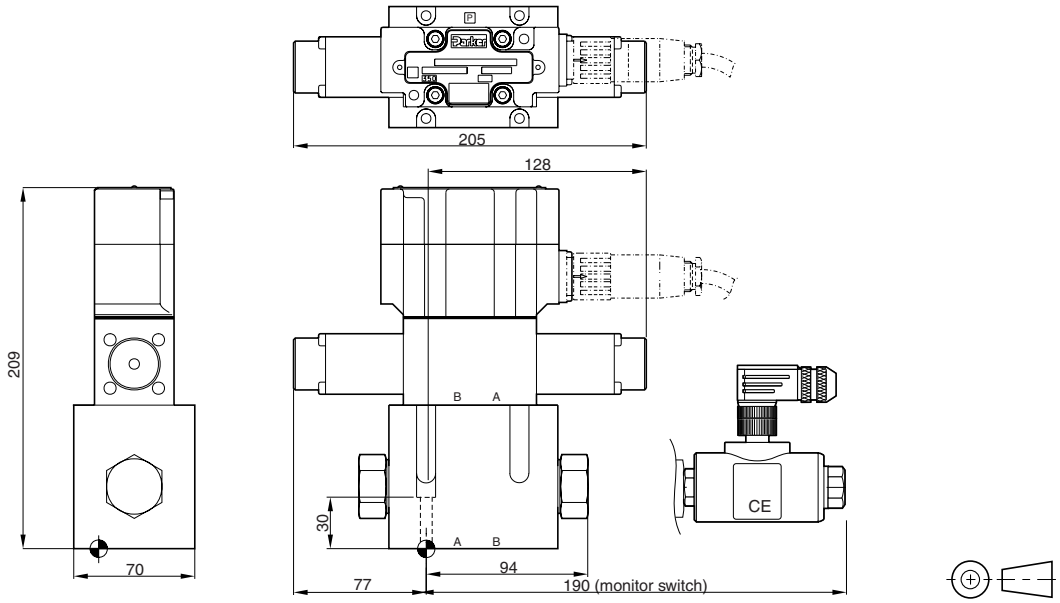
C M6 DIN906
B 1/16 NPTF

○ open, ● closed

Pilot oil Inlet	Pilot oil Drain	B	C
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○

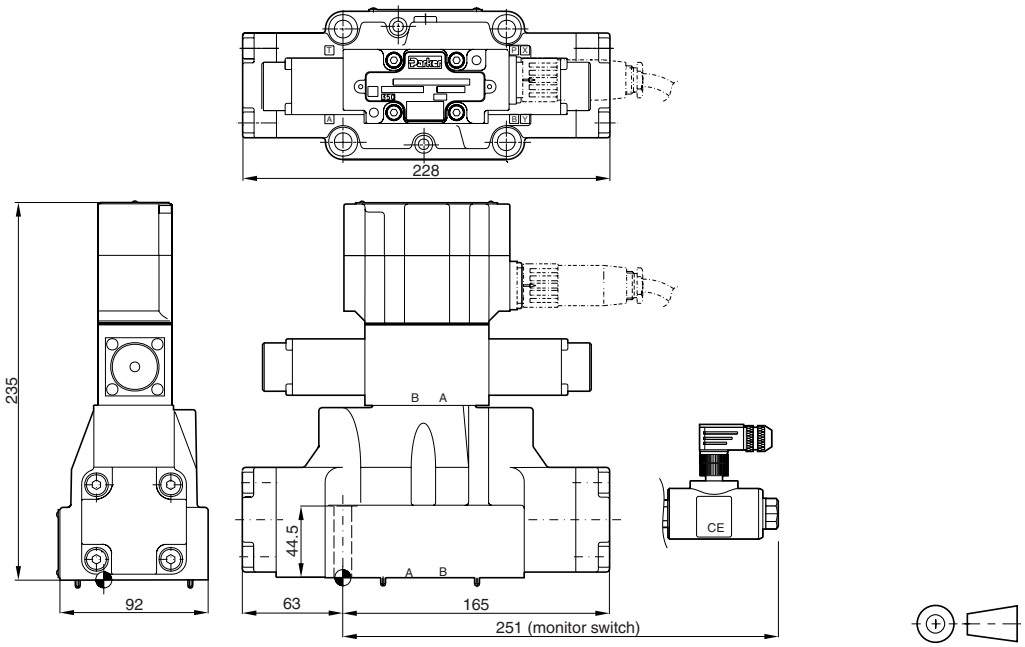


D31FT



Surface finish	Kit			Kit NBR
R_{max}6.3 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm ±15%	SK-D31FTN

D41FT



Surface finish	Kit			Kit NBR
R_{max}6.3 0.01/100	BK320	2x M6x55 4x M10x60 DIN 912 12.9	13.2 Nm ±15% 63 Nm ±15%	SK-D41FTN

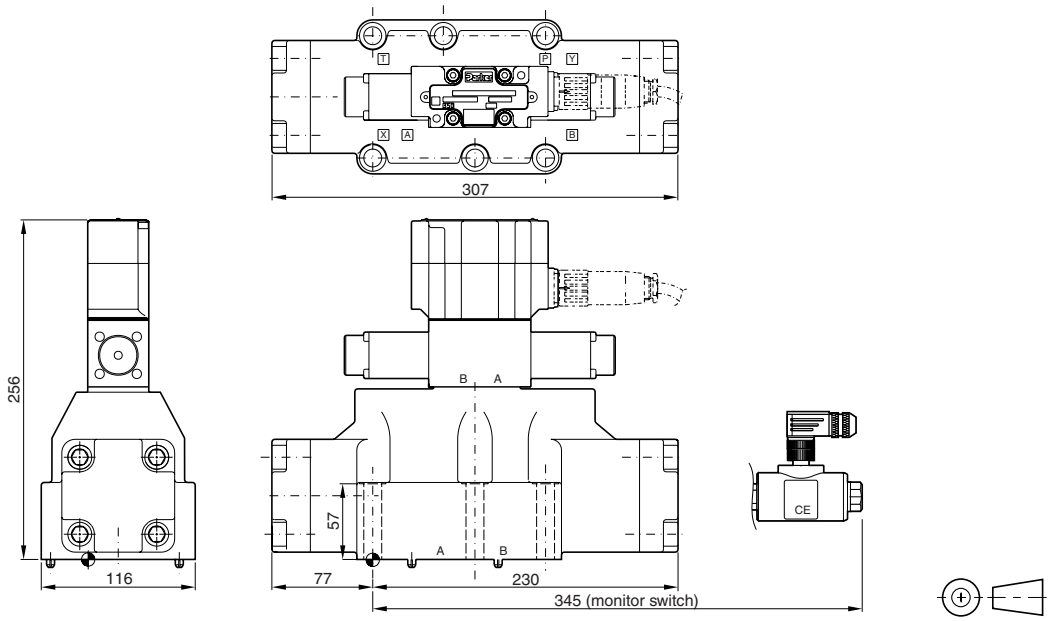
DFT_UK.INDD CM_28.01.08.1

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3

D91FT



Surface finish	Kit			Kit NBR
R_{max}6.3 0.01/100	BK360	6x M12x75 DIN 912 12.9	108 Nm ±15%	SK-D91FTN

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Characteristics

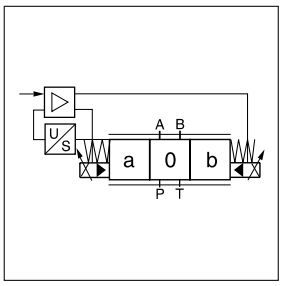
Series D*1FH

The pilot operated proportional DC valves series of the D*1FH series are high-performance valves with electronic spool position feedback. These valves are available in sizes NG10 to NG32 (CETOP05 to CETOP10).

Typical applications are:

High precision and reproducible adjustment of flow rates, applications in rapid / creep speed with spool position monitoring for presses and dynamic position and p/Q closed loop systems.





D91FH

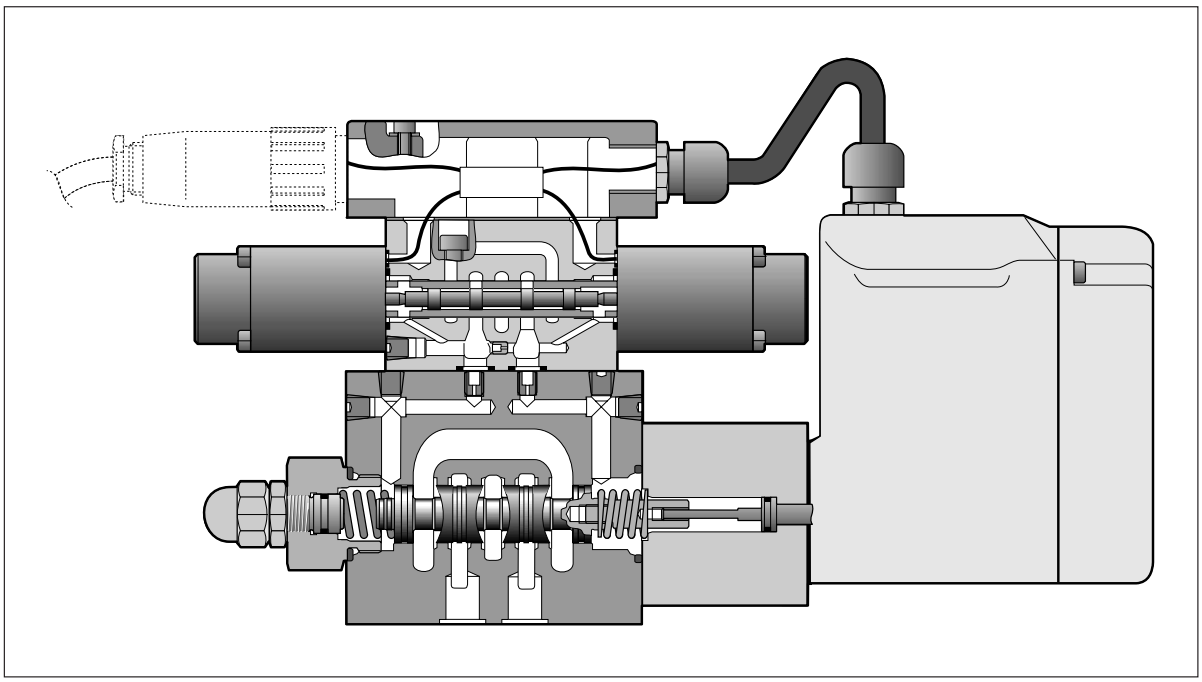
3

Technical features

- Very low hysteresis
- Zero lap and overlap spool design available
- High dynamics
- Spool position feedback
- Center position monitoring optional
- D31FH – NG 10 (CETOP05)
- D41FH – NG 16 (CETOP07)
- D81/91FH – NG 25 (CETOP08)
- D111FH – NG 32 (CETOP10)

CE

D*1FH

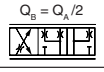


3

D		1	F	H				N		0		
Directional control valve	Size	NG06 pilot	Proportional control	High response	Spool type	Flow	Pilot connection	Seal NBR (other seal compound on request)	Electronic variation	Electronic accessories	Valve accessories	Design series

Code	Size
3	**NG10 / CETOP05**
4	**NG16 / CETOP07**
8	**NG25 / CETOP08**
9 [1]	**NG25 / CETOP08**
11	**NG32 / CETOP10**

[1] with enlarged connections Ø 32 mm

Code	Spool type
	overlap
E01	
E02	
B31	$Q_B = Q_A/2$ 
B32	$Q_B = Q_A/2$ 
B11 [2]	$Q_B = Q_A/2$ 
B12 [2]	$Q_B = Q_A/2$ 

[2] only Flow code for
D31FH* = Code C
D41FH* = Code F
D81/91 FH* = Code H
D111FH* = Code L

Code	Valve accessories
0	**Standard**
8 [3]	**Monitor switch**

[3] not for spool B11 and B12 at NG10

Code	Electronic variation
B	**Voltage input 0...±10V standard**
E	**Current input 0...±20mA**
S	**Current input 4...20mA**

Code	Inlet	Drain
1	**Internal**	**External**
2	**External**	**External**
4	**Internal**	**Internal**
5	**External**	**Internal**

Code	Flow [l/min] at Δp = 5bar per metering edge				
	D31	D41	D81	D91	D111
A	55	—	—	—	—
B	—	**105**	—	—	—
C	**80 (65)**	**140**	—	—	—
E	—	**190**	**250**	**250**	—
F	—	**240 (190)**	**310**	**310**	—
H	—	—	**400 (360)**	**400 (360)**	**500**
L	—	—	—	—	**1000 (850)**

( ) flow for spool B11/B12

Please order plugs separately.
See chapter 3 accessories.

Bold letters =
Short-term availability

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General					
Design		Pilot operated DC Valve with onboard electronic			
Actuation		Proportional solenoid			
Size		**NG10 (CETOP05)**	**NG16 (CETOP07)**	**NG25 (CETOP08)**	**NG32 (CETOP10)**
Mounting interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA			
Mounting position		unrestricted			
Ambient temperature	[°C]	-20...+60			
Weight	[kg]	8.1	11.6	20.7	62
Vibration resistance	[g]	25 acc. DIN IEC68, part 2-6			
Hydraulic					
Max. operating pressure	[bar]	Ports P, A, B, T, X 350; Port Y 10			
Fluid		Hydraulic oil as per DIN 51524...535, other on request			
Fluid temperature	[°C]	-20...+60			
Viscosity					
permitted	[cSt] / [mm²/s]	20...380			
recommended	[cSt] / [mm²/s]	30...80			
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			
Nominal flow at Δp=5bar					
per control edge [1]	[l/min]	80	240	400	1000
Leakage at 100 bar	[ml/min]	100	200	600	1000
Pilot supply pressure	[bar]	20-350 (optimal dynamics at 50)			
Pilot flow	[l/min]	<1.2			
Pilot flow, step response	[l/min]	2.0	4.1	9.0	18.0
Static / Dynamic					
Step response at 100% step	[ms]	25	45	65	150
Hysteresis	[%]	<0.1			
Sensitivity	[%]	<0.05			
Electrical characteristics					
Duty ratio	[%]	100			
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)			
Supply voltage/ripple	[V]	18 ... 30, ripple <5% eff., surge free			
Current consumption max.	[A]	2.0			
Input signal [2]					
Voltage	[V]	10...0...-10, ripple <0.01% eff., surge free, 0...+10V P—>B			
Impedance	[kOhm]	100			
Current	[mA]	20...0...-20, ripple <0.01% eff., surge free, 0...+20mA P—>B			
Impedance	[Ohm]	500			
Current	[mA]	4...12...20, ripple <0.01% eff., surge free, 12...20mA P—>A			
Impedance	[Ohm]	500			
Differential input max.	[V]	30 for terminal D and E against PE			
Pre-fusing	[A]	2.5 medium lag			
EMC		EN 50081-2 / EN50082-2			
Coil insulation class		F (155 °C)			
Electrical connection		6+PE acc. EN 175201-804			
Wiring min.	[mm²]	7x1.0 (AWG 18) overall braid shield			
Wiring lenght max.	[m]	50			
Electrical monitor switch					
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)			
Ambient temperature	[°C]	0-70			
Supply voltage/ripple	[V]	18...42, ripple <10% eff.			
Current consumption without load	[mA]	<30			
Max. output current					
per channel, ohmic	[mA]	400			
Min. output load					
per channel, ohmic	[kOhm]	100			
Max. output drop at 0.2A	[V]	<1.1			
Max. output drop at 0.4A	[V]	<1.6			
EMC		EN 50081-1 / EN50082-2			
Max. tol. ambient field strength	[A/m]	1200			
Min. distance to next AC solenoid	[m]	0.1			
Interface		4+PE acc. IEC 61076-2-101 (M12)			
Wiring min.	[mm²]	4x0.5 (AWG 20) overall braid shield			
Wiring lenght max.	[m]	50			

[1] Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

[2] Inverse polarity on request

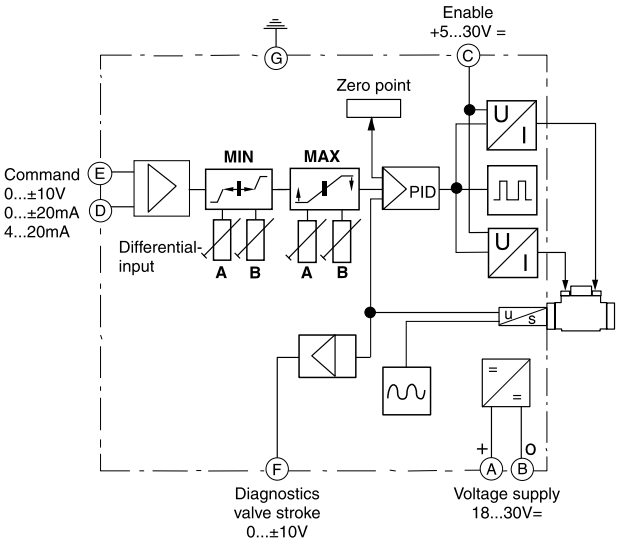
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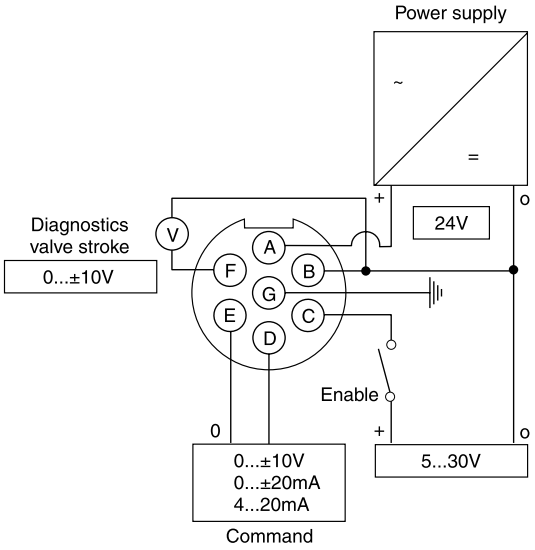
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3

Control system flow chart, valve electronics



Wiring



Enable input

The power stage is activated via pin C (enable input).

Supply voltage monitoring

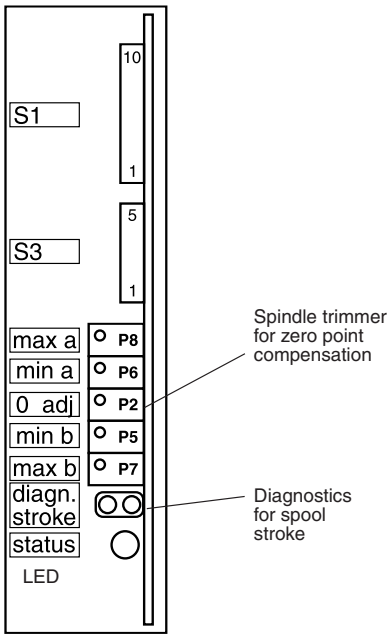
If the minimal supply voltage drops below, it is internally monitored and displayed via the status LED.

Control monitoring

A control error is indicated if there is an error in the control circuit of the valve.

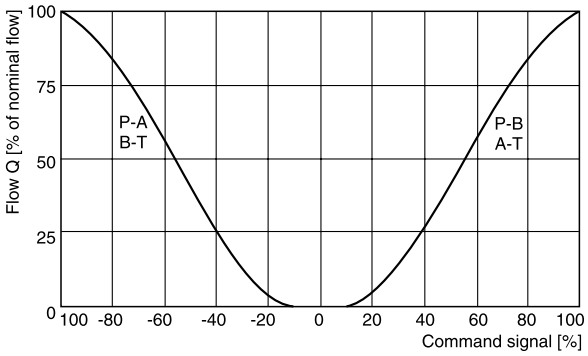
Display is green	Normal operation
Display off	Supply voltage is outside the permissible range of 18 ... 30V
Display is red	Control error

Arrangement of the potentiometers

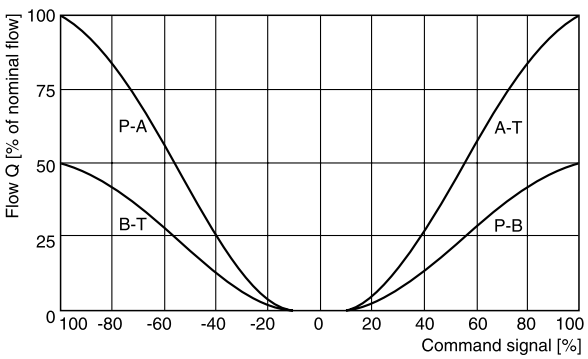


Flow characteristics
at Δp = 5bar per metering edge

Spool types **E01, E02**

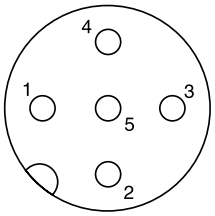


Spool types **B31, B32**

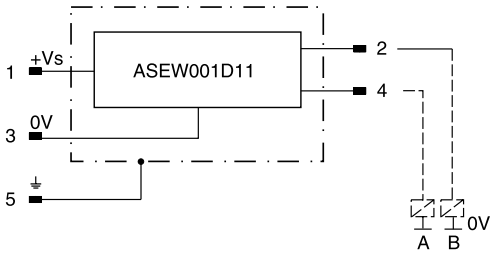


3

Monitor switch M12x1 pin assignment



1 + Supply 18...42V
2 output B (normally closed)
3 0V
4 output A (normally closed)
5 Earth ground



Signal	Output A (pin 4)	Output B (pin 2)
neutral	closed	closed
	open	closed
	closed	open

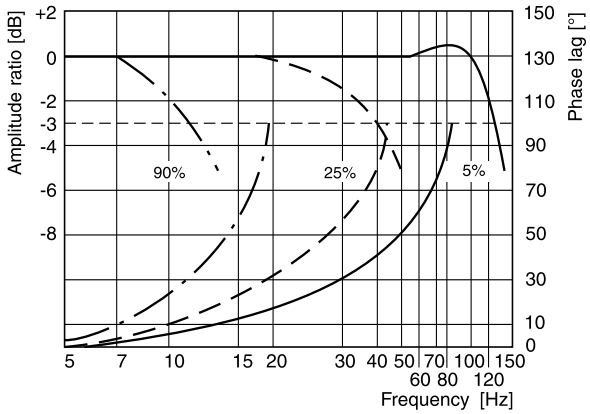
The neutral position is monitored. The signal changes after less than 10% of the spool stroke.

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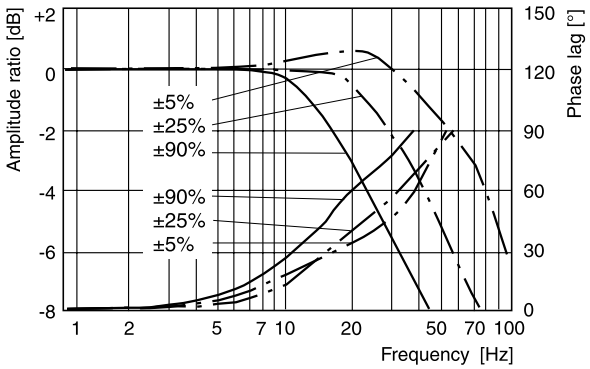
3

Frequency response

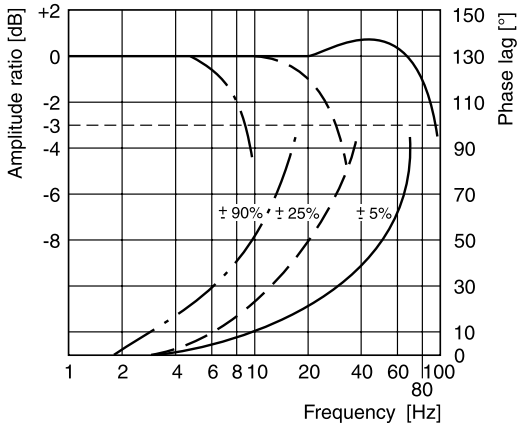
D31FH



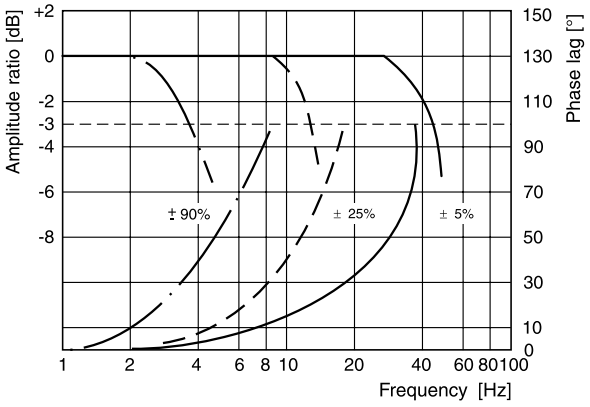
D81/91FH



D41FH



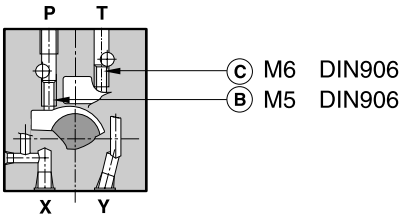
D111FH



3

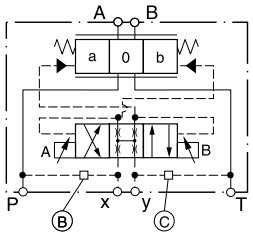
Pilot oil inlet (supply) and outlet (drain)

D31FH

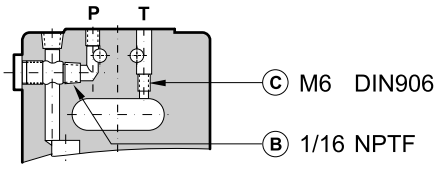


○ open, ● closed

Pilot oil Inlet	Pilot oil Drain	B	C
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○

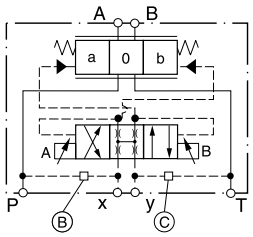


D41FH

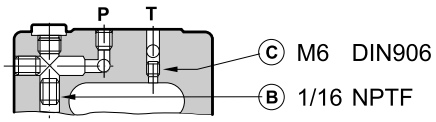


○ open, ● closed

Pilot oil Inlet	Pilot oil Drain	B	C
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○

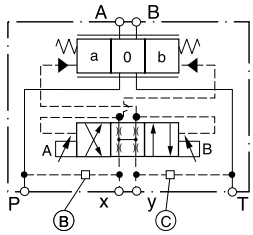


D81/91FH

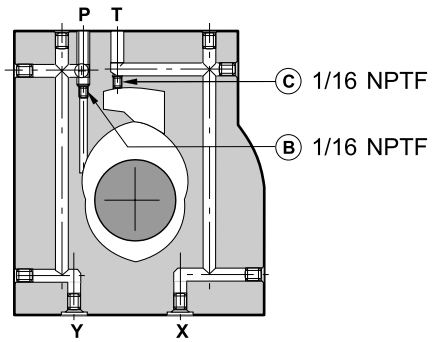


○ open, ● closed

Pilot oil Inlet	Pilot oil Drain	B	C
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○

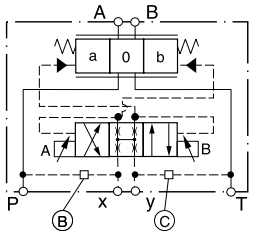


D111FH



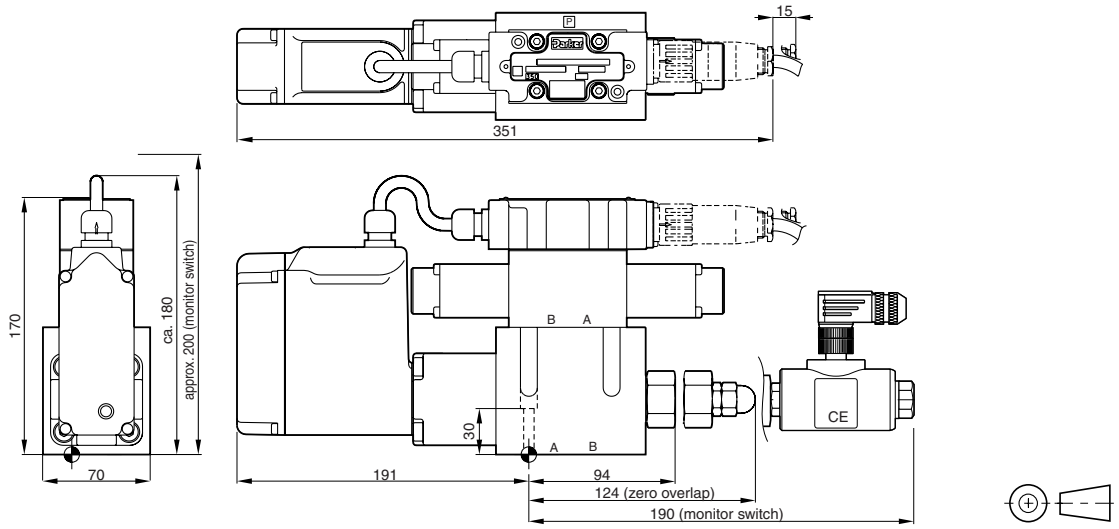
○ open, ● closed

Pilot oil Inlet	Pilot oil Drain	B	C
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○



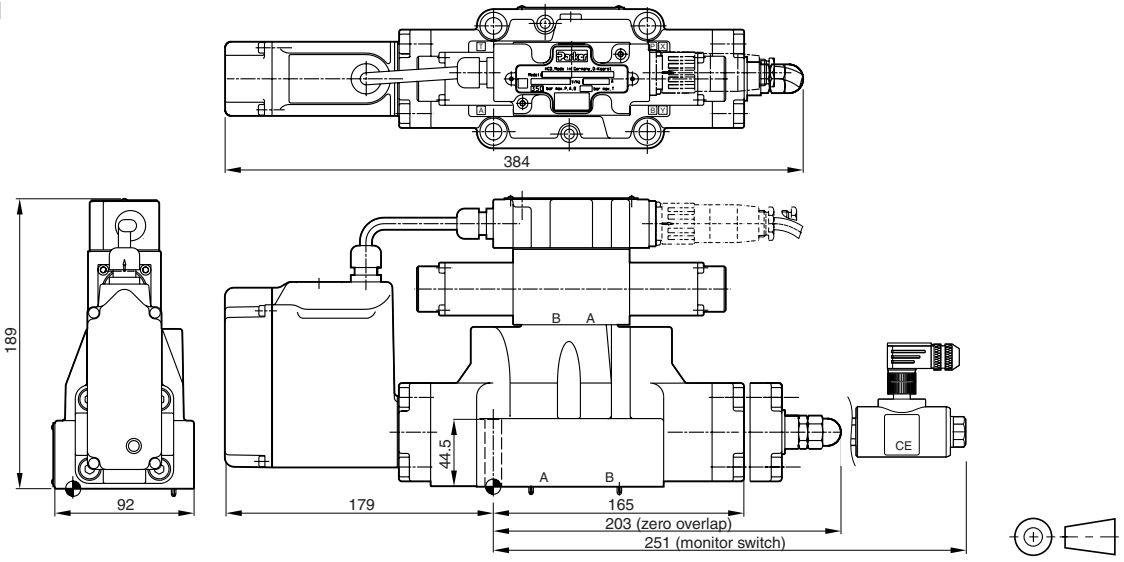
3

D31FH



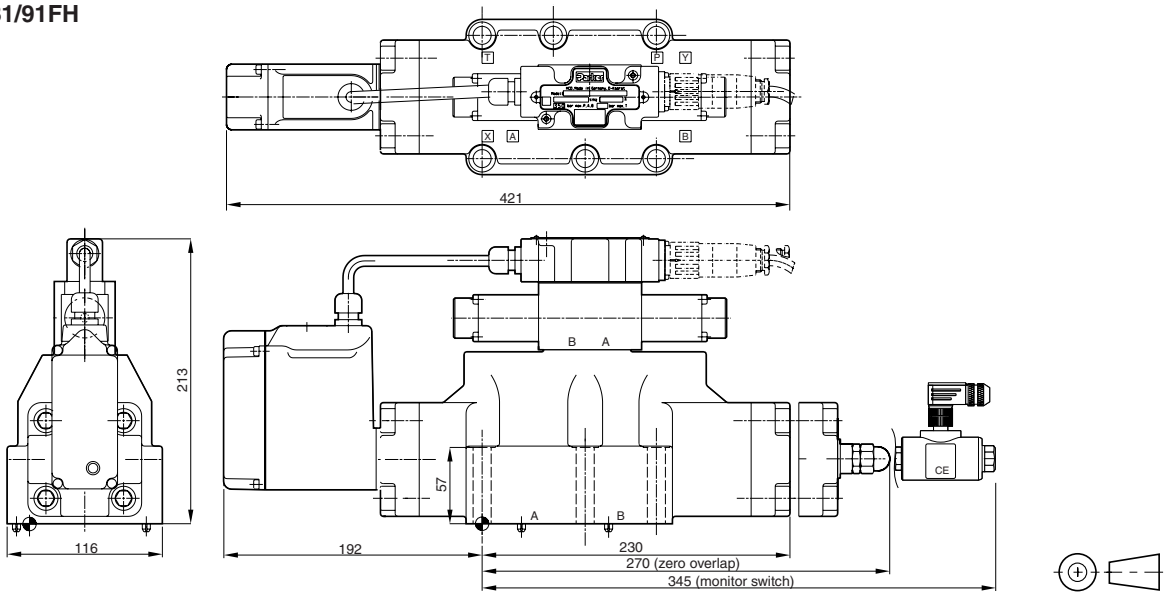
Surface finish	Kit			Kit NBR
R_{max}6.3 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm ±15%	SK-D31FHN

D41FH



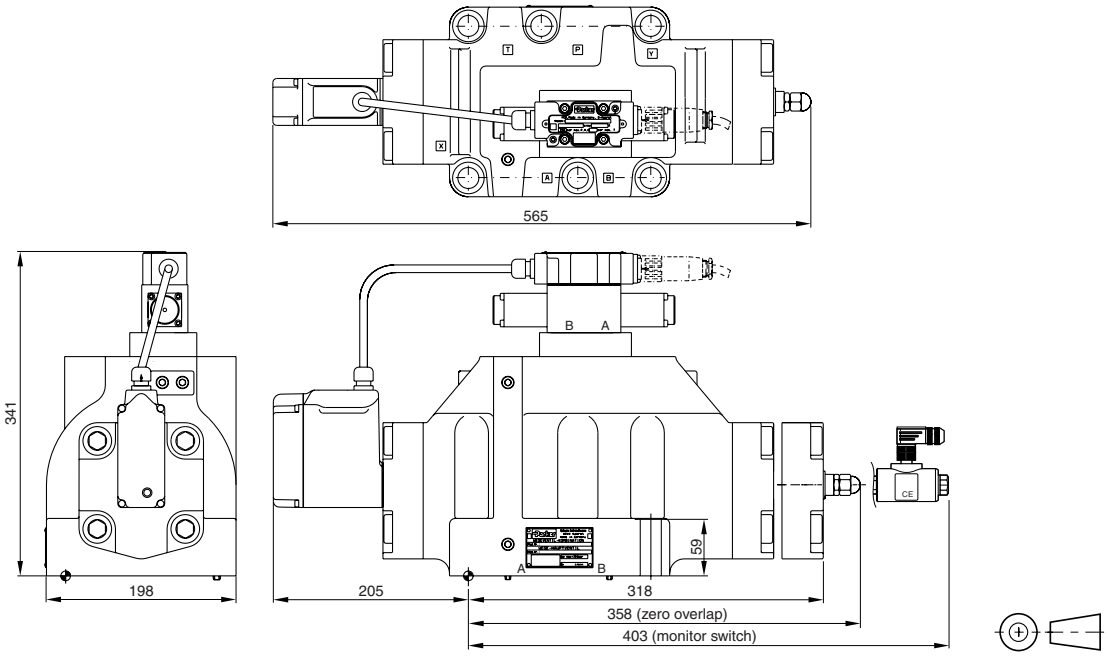
Surface finish	Kit			Kit NBR
R_{max}6.3 0.01/100	BK320	2x M6x55 4x M10x60 DIN 912 12.9	13.2 Nm ±15% 63 Nm ±15%	SK-D41FHN

D81/91FH



Surface finish	Kit			Kit NBR
R_{max}6.3 0.01/100	BK360	6x M12x75 DIN 912 12.9	108 Nm ±15%	SK-D91FHN

D111FH



Surface finish	Kit			Kit NBR
R_{max}6.3 0.01/100	BK386	6x M20x90 DIN 912 12.9	517 Nm ±15%	SK-D111FHN

Notes

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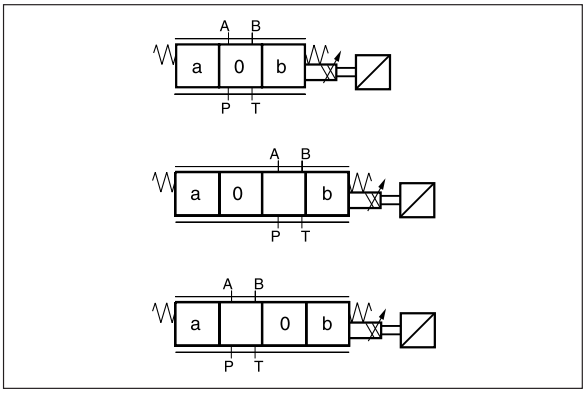
Characteristics

Series D1FP

The direct operated control valve D1FP of the nominal size NG06 (CETOP03) shows extremly high dynamics combined with maximum flow. First of all it is used for highest accuracy in positioning of hydraulic axis and controlling of pressure and velocity.

Driven by the new patented VCD® actuator the D1FP reaches the frequency response of real servovalves. Compared with solenoid driven valves the D1FP can also be used in applications with pressure drops up to 350bar across the valve. Because of the high flow capability the D1FP can be a substitute for NG10 valves in some cases.

A loss of the power supply lets the spool move in a defined position. All common input signals are available.



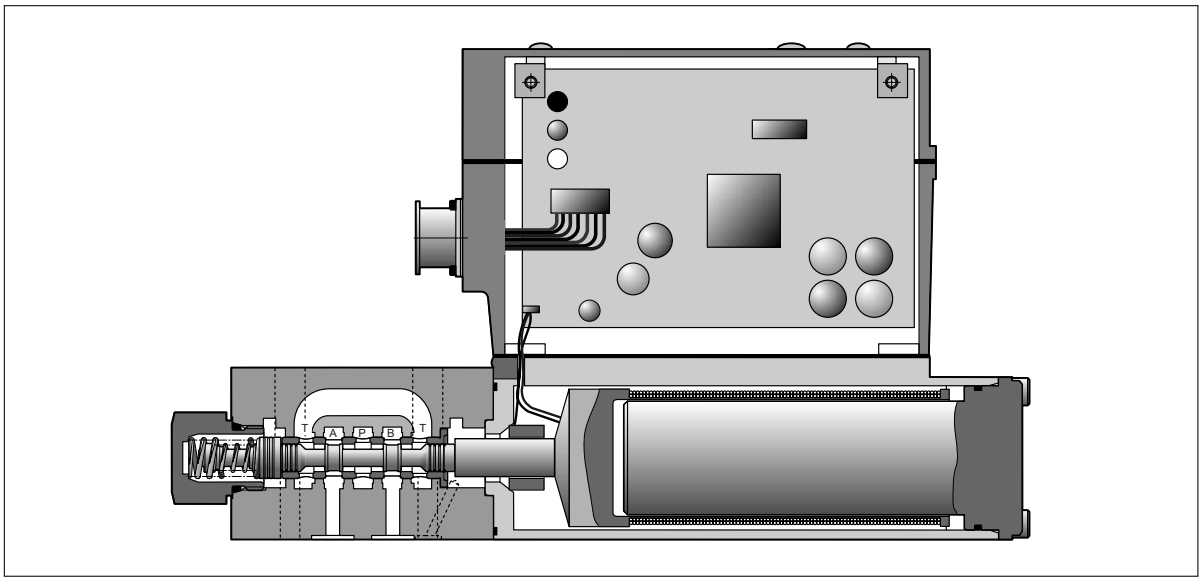


Technical features

- Real servovalve dynamics (-3dB/350Hz at ±5% input signal)
- No flow limit up to 350 bar pressure drop through the valve
- Max. tank pressure 350 bar (with external drain port y)
- High flow
- Defined spool positioning in case of power supply breakdown
- Onboard electronics

CE

D1FP



D1FP_UK.INDD CM_28.01.08.1

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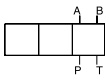
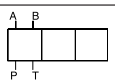
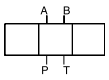
D	1	F	P			9				0	
Directional control valve	Size DIN NG06 CETOP03 NFPA D03	Proportional control	VCD	Spool type	Spool position on power down [1]	Y-port (plugged) [4]	Seals	Command-signal	Acces-sories	Spool/ sleeve design	Design series

Code	Spool type	Flow [l/min] at Δp 35bar per metering edge
Zerolap		
E50M **E50H** **E50F** **E50C** **E50B**		**40** **25** **12** **6** **3**
B60M	$Q_B = Q_A/2$ 	**40 / 20**
Underlap approx. -0.5%		
E55M **E55H**		**40** **25**
Overlap 25%		
E01M **E01H** **E01F** **E01C** **E01B**		**40** **25** **12** **6** **3**
B31M	$Q_B = Q_A/2$ 	**40 / 20**
E02M **E02H** **E02F** **E02C** **E02B**		**40** **25** **12** **6** **3**
B32M	$Q_B = Q_A/2$ 	**40 / 20**

Code	Connection type
0	**6 + PE acc. EN175201-804**
5	**11 + PE acc. EN175201-804**

Code	Signal	Flow direction
B	**+/- 10V**	**0...+10V -> P-A**
E	**+/- 20mA**	**0...+20mA -> P-A**
S	**4...20mA**	**12...20mA -> P-A**

Code	Seals
N	NBR
V	FPM
H	for HFC fluid

Code	Spool pos. on power down
A [2]	
B [2]	
C [3]	

Bold letters =
Short-term availability

[1] On power down the spool moves in a defined position. This cannot be guaranteed in case of single flow path on the control edge A – T resp. B – T with pressure drops above 120 bar or contamination in the hydraulic fluid.

[2] approx. 10% opening, only zero lapped spools and underlap spools

[3] only for overlapped spools

[4] needs to be removed at tank pressure >35 bar

Please order plugs separately.
See chapter 3 accessories.

General		
Design		Direct operated proportional DC valve
Actuation		VCD® actuator
Size		NG06/CETOP03/NFPA D03
Mounting interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
Mounting position		unrestricted
Ambient temperature	[°C]	-20...+50
Weight	[kg]	4.5
Vibration resistance	[g]	25 acc. DIN IEC68, part 2-6
Hydraulic		
Max. operating pressure	[bar]	Ports P, A, B 350
	[bar]	Port T max. 35, port Y max. 35 [1]
Fluid		Hydraulic oil as per DIN 51524...535, other on request
Fluid temperature	[°C]	-20...+60
Viscosity		
permitted	[cSt] / [mm²/s]	20...380
recommended	[cSt] / [mm²/s]	30...80
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)
Nominal flow at Δp=35bar per control edge [2]	[l/min]	3 / 6 / 12 / 25 / 40
Flow maximum	[l/min]	90 (at Δp=350bar over two control edges)
Leakage at 100 bar	[ml/min]	<400 (zero lapped spool); <50 (over lapped spool)
Static / Dynamic		
Step response at 100% step [3]	[ms]	<3.5
Frequency response (±5% signal) [3]	[Hz]	350 (amplitude ratio -3dB), 350 (phase lag -90°)
Hysteresis	[%]	<0.05
Sensitivity	[%]	<0.03
Temperature drift	[%/°K]	<0.025
Electrical characteristics		
Duty ratio	[%]	100
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)
Supply voltage/ripple	[V]	DC 22 ... 30, ripple <5% eff., surge free
Current consumption max.	[A]	3.5
Switch-on current typical	[A]	22 for 0.2 ms
Input signal		
Voltage	[V]	10...0...-10, ripple <0.01% eff., surge free, 0...+10V P->A
Impedance	[kOhm]	100
Current	[mA]	20...0...-20, ripple <0.01% eff., surge free, 0...+20mA P->A
Impedance	[Ohm]	250
Current	[mA]	4...12...20, ripple <0.01% eff., surge free, 12...20mA P->A <3.6 mA = disable, <3.8 mA = according to NAMUR NE43
Impedance	[Ohm]	250
Differential input max.		
Code 0	[V]	30 for terminal D and E against PE (terminal G)
Code 5	[V]	30 for terminal 4 and 5 against PE (terminal ⏚)
Enable signal (only code 5)	[V]	5...30, Ri = 9 kOhm
Diagnostic signal	[V]	+10...0...-10 / +Ub, rated max. 5mA
Pre-fusing	[A]	4.0 medium lag
EMC		EN 50081-2 / EN50082-2
Electrical connection	Code 0	6 + PE acc. EN 175201-804
	Code 5	11 + PE acc. EN 175201-804
Wiring min.		
Code 0	[mm²]	7x1.0 (AWG 18) overall braid shield
Code 5	[mm²]	12x1.0 (AWG 18) overall braid shield
Wiring lenght max.	[m]	50

[1] For applications with p_T>35 bar the Y-port has to be connected and the plug in the Y-port has to be removed.

[2] Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

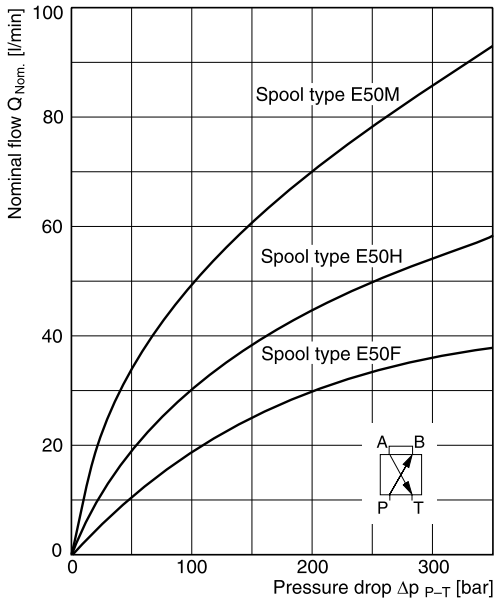
[3] Measured with load (100 bar pressure drop/two control edges)

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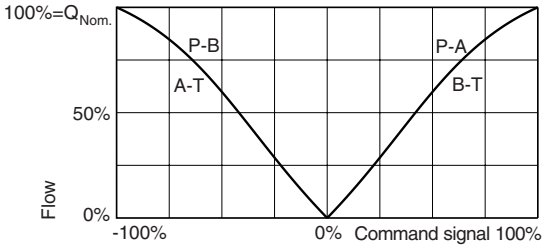
Functional limit (at 100% command signal)



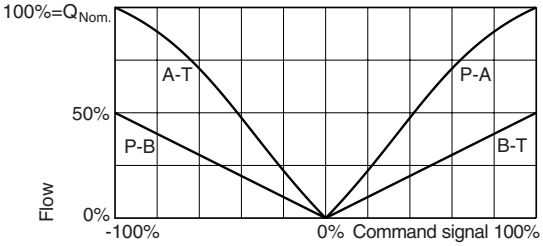
Flow curves

at Δp = 35 bar per metering edge

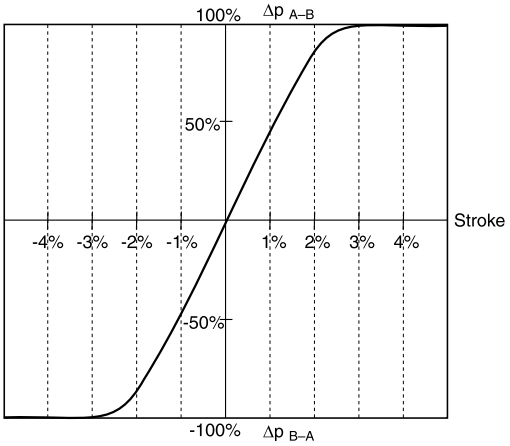
Spool type **E50**



Spool type **B60**

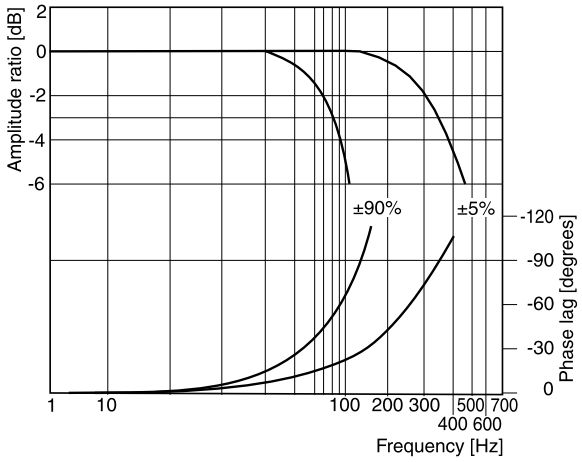


Pressure gain



Frequency response

±5% command signal
±90% command signal

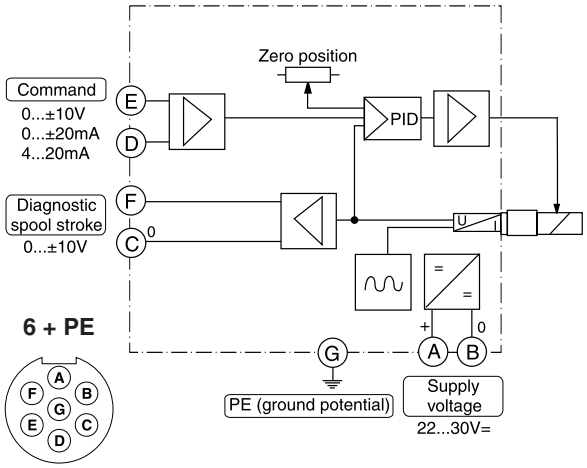


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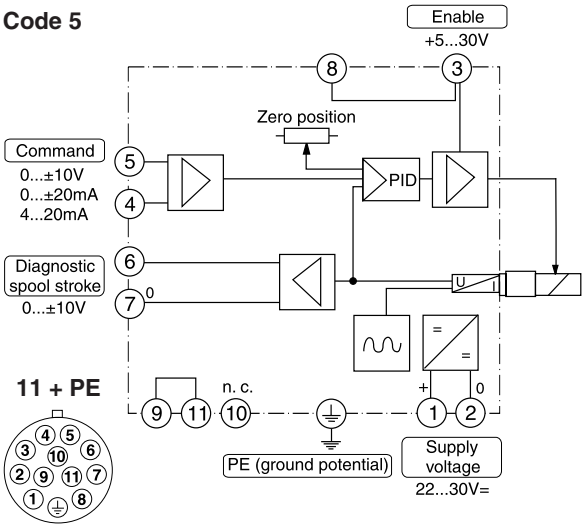
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Block diagrams

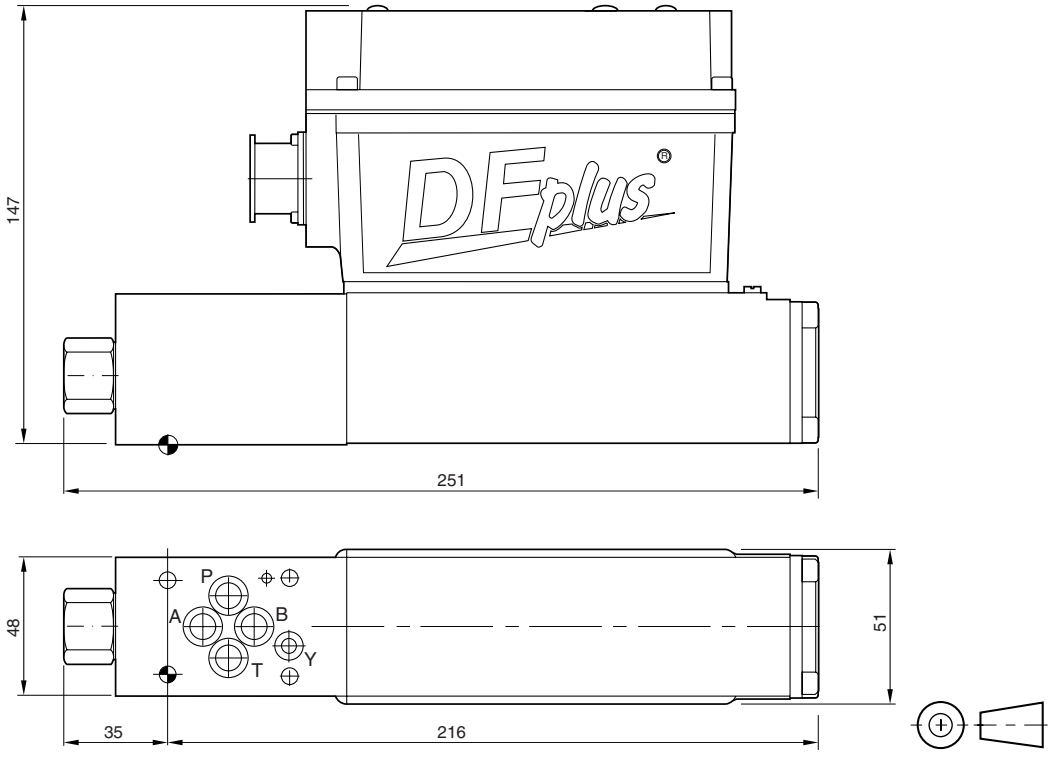
Code 0



Code 5



Dimensions



Surface finish	Kit		
R_{max}6.3 ⏥ 0.01/100	BK375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%

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Notes

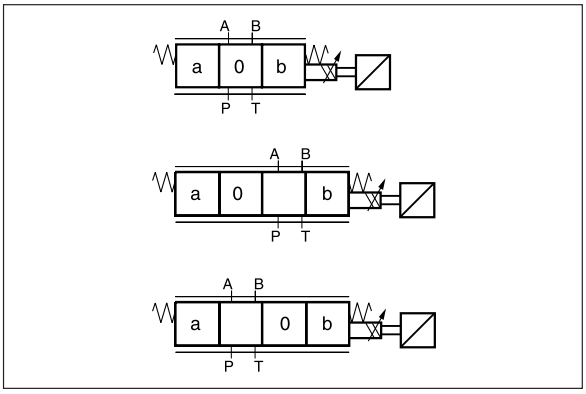
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The direct operated control valve D1FP*S of the nominal size 04 (ISO 10372) shows extremly high dynamics combined with maximum flow. The valve mounting pattern is designed to replace servovalves of size 04 (ISO 10372) with the D1FP*S.

Driven by the new patented VCD® technology the D1FP*S shows all advantages of the DFplus® series as robustness, high dynamics and no flow limit up to 350 bar. Additional features are low leakage and a defined spool position in case of power supply breakdown.

Maintenance and contamination restrictions correspond to common solenoid driven valves and pilot supply is not required. All common input signals are available.



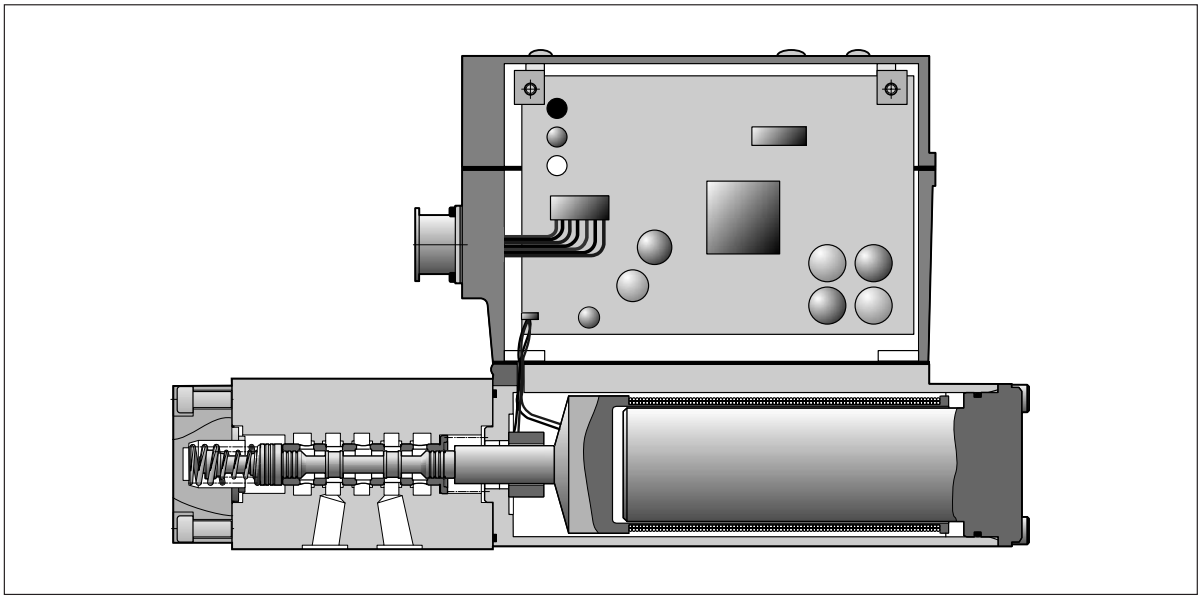


Technical features

- Servovalve size 04 (ISO 10372) mounting pattern
- Real servovalve dynamics
  (-3db/350Hz with ± 5% input signal)
- Low leakage
- No flow limit up to 350 bar pressure drop through the valve
- Max. tank pressure 350 bar
  (with external drain port y)
- High flow
- Defined spool positioning in case of power supply breakdown
- Onboard electronics

CE

D1FP*S



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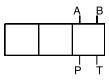
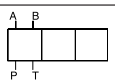
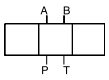
D	1	F	P			9				S	
Directional control valve	ISO 10372 size 04	Proportional control	VCD	Spool type	Spool position on power down [1]	Y-port (plugged) [4]	Seals	Command-signal	Acces-sories	Mounting interface ISO 10372	Design series

Code	Spool type	Flow [l/min] at Δp 35bar per metering edge
	Zerolap	
E50M **E50H** **E50F** **E50C** **E50B**		**40** **25** **12** **6** **3**
B60M	$Q_B = Q_A/2$ 	**40 / 20**
	Underlap approx. -0.5%	
E55M **E55H**		**40** **25**
	Overlap 25%	
E01M **E01H** **E01F** **E01C** **E01B**		**40** **25** **12** **6** **3**
B31M	$Q_B = Q_A/2$ 	**40 / 20**
E02M **E02H** **E02F** **E02C** **E02B**		**40** **25** **12** **6** **3**
B32M	$Q_B = Q_A/2$ 	**40 / 20**

Code	Connection type
0	**6 + PE acc. EN175201-804**
5	**11 + PE acc. EN175201-804**

Code	Signal	Flow direction
B	**+/- 10V**	**0...+10V -> P-A**
E	**+/- 20mA**	**0...+20mA -> P-A**
S	**4...20mA**	**12...20mA -> P-A**

Code	Seals
N	NBR
V	FPM
H	for HFC fluid

Code	Spool pos. on power down
A [2]	
B [2]	
C [3]	

Bold letters =
Short-term availability

[1] On power down the spool moves in a defined position. This cannot be guaranteed in case of single flow path on the control edge A – T resp. B – T with pressure drops above 120 bar or contamination in the hydraulic fluid.

[2] approx. 10% opening, only zero lapped spools and underlap spools

[3] only for overlapped spools

[4] needs to be removed at tank pressure >35 bar

Please order plugs separately.
See chapter 3 accessories.

General		
Design		Direct operated proportional DC valve
Actuation		VCD® actuator
Size		ISO 10372 size 04
Mounting interface [1]		Acc. ISO 10372-04-04-0-92 (x port used as y unpressurized tank)
Mounting position		unrestricted
Ambient temperature	[°C]	-20...+50
Weight	[kg]	4.5
Vibration resistance	[g]	25 acc. DIN IEC68, part 2-6
Hydraulic		
Max. operating pressure	[bar]	Ports P, A, B 350 Port T 35, port Y max. 35 [1]
Fluid		Hydraulic oil as per DIN 51524...535, other on request
Fluid temperature	[°C]	-20...+60
Viscosity		
permitted	[cSt] / [mm²/s]	20...380
recommended	[cSt] / [mm²/s]	30...80
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)
Nominal flow at Δp=35bar per control edge [2]	[l/min]	3 / 6 / 12 / 25 / 40
Flow maximum	[l/min]	90 (at Δp=350bar over two control edges)
Leakage at 100 bar	[ml/min]	<400 (zero lapped spool); <50 (over lapped spool)
Static / Dynamic		
Step response at 100% step [3]	[ms]	<3.5
Frequency response (±5% signal) [3]	[Hz]	350 (amplitude ratio -3dB), 350 (phase lag -90°)
Hysteresis	[%]	<0.05
Sensitivity	[%]	<0.03
Temperature drift	[%/°K]	<0.025
Electrical characteristics		
Duty ratio	[%]	100
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)
Supply voltage/ripple	[V]	22 ... 30, ripple <5% eff.
Current consumption max.	[A]	3.5
Switch-on current typical	[A]	22 for 0.2 ms
Input signal	[V]	10...0...-10, ripple <0.01% eff., surge free, 0...+10V P->A
Voltage	[kOhm]	100
Impedance	[mA]	20...0...-20, ripple <0.01% eff., surge free, 0...+20mA P->A
Current	[Ohm]	250
Impedance	[mA]	4...12...20, ripple <0.01% eff., surge free, 12...20mA P->A
Current		<3.6 mA = disable, <3.8 mA = according to NAMUR NE43
Impedance	[Ohm]	250
Differential input max.		
Code 0	[V]	30 for terminal D and E against PE (terminal G)
Code 5	[V]	30 for terminal 4 and 5 against PE (terminal ⏚)
Enable signal (only code 5)	[V]	5...30, Ri = 9 kOhm
Diagnostic signal	[V]	+10...0...-10 / +Ub, rated max. 5mA
Pre-fusing	[A]	4.0 medium lag
EMC		EN 50081-2 / EN50082-2
Electrical connection	Code 0	6 + PE acc. EN 175201-804
	Code 5	11 + PE acc. EN 175201-804
Wiring min.		
Code 0	[mm²]	7x1.0 (AWG 18) overall braid shield
Code 5	[mm²]	12x1.0 (AWG 18) overall braid shield
Wiring lenght max.	[m]	50

[1] For applications with p_T>35 bar the Y-port has to be connected and the plug in the Y-port has to be removed.

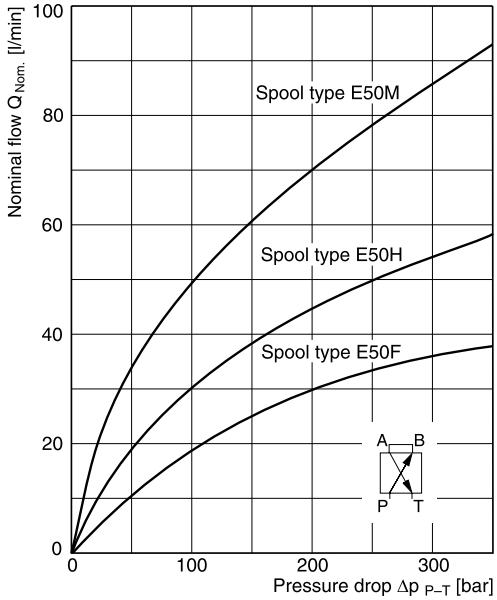
[2] Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

[3] Measured with load (100 bar pressure drop/two control edges)

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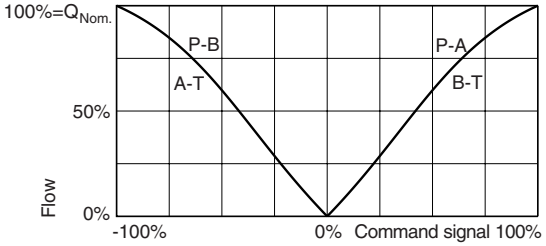
Functional limit (at 100% command signal)



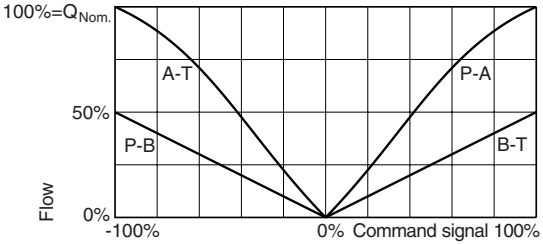
Flow curves

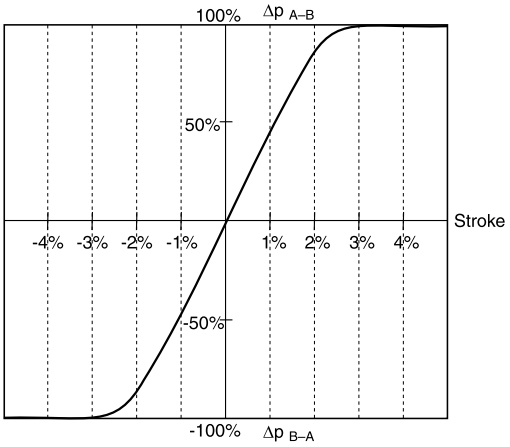
at Δp = 35 bar per metering edge

Spool type **E50**



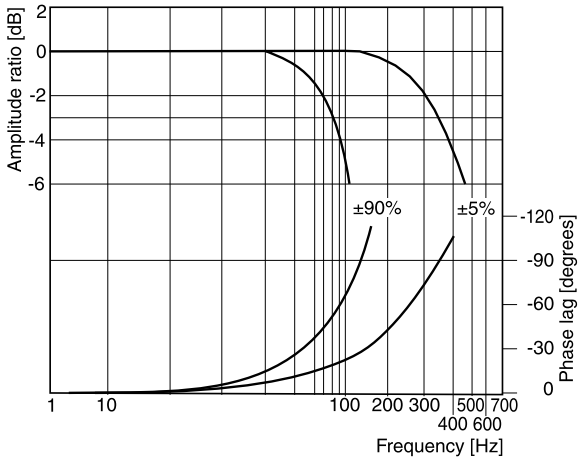
Spool type **B60**





Frequency response

±5% command signal
±90% command signal



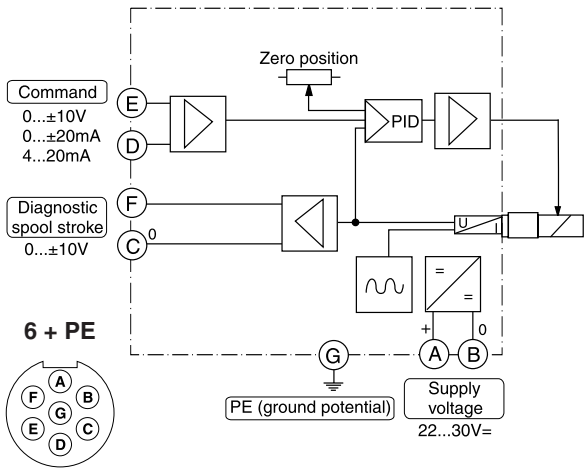
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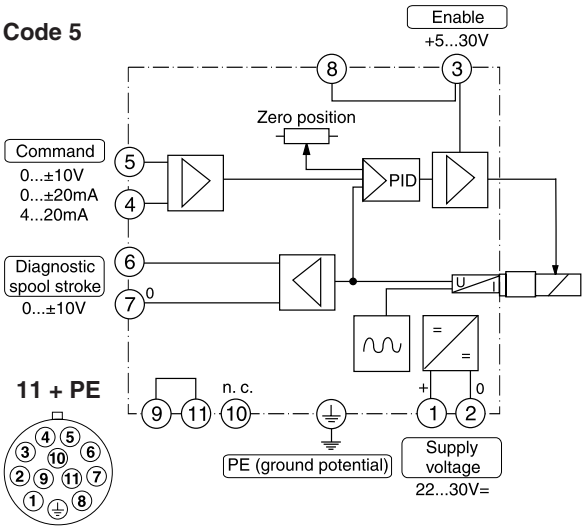
3

Block diagrams

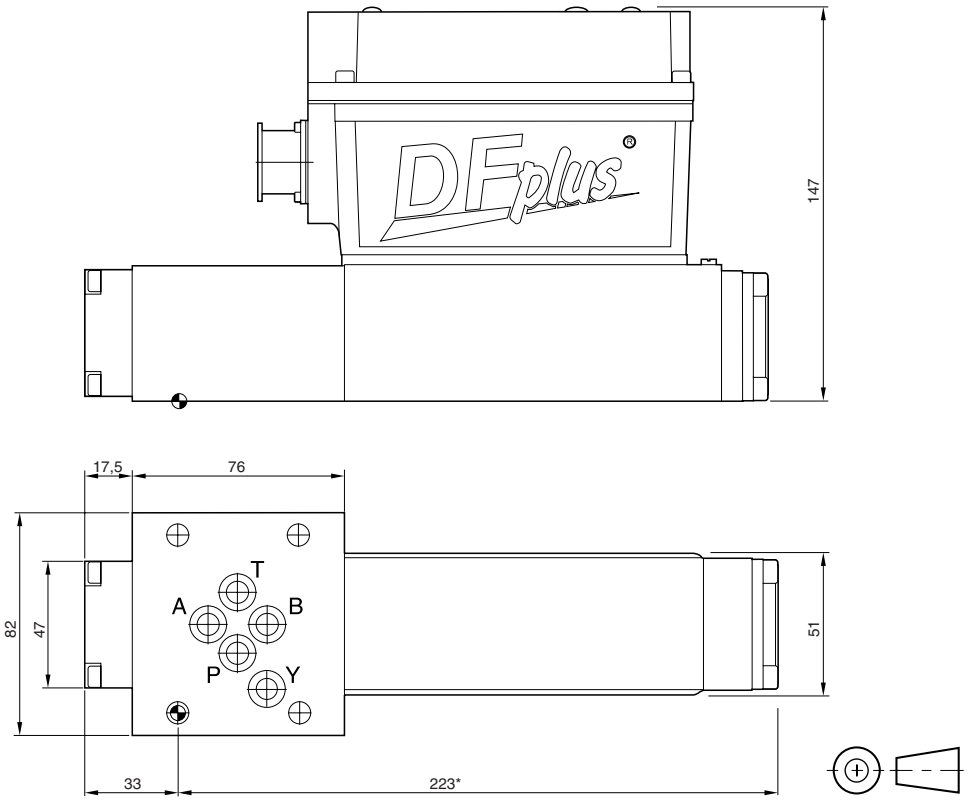
Code 0



Code 5



Dimensions



* valve drive on opposite side on request

Surface finish	Kit		
R_{max}6.3 0.01/100	BK414	4x M8x40 DIN 912 12.9	31.8 Nm ±15%

D1FPS_UK.INDD CM_28.01.08.1

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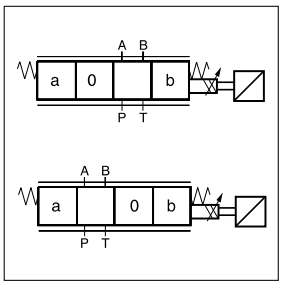
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The direct operated control valve D3FP of the nominal size NG10 (CETOP05) shows extremly high dynamics combined with high flow. First of all it is used for highest accuracy in positioning of hydraulic axis and controlling of pressure and velocity.

Driven by the new patented VCD® actuator the D3FP reaches the frequency response of real servovalves.

A loss of power supply lets the spool move in a defined position. All common input signals are available.



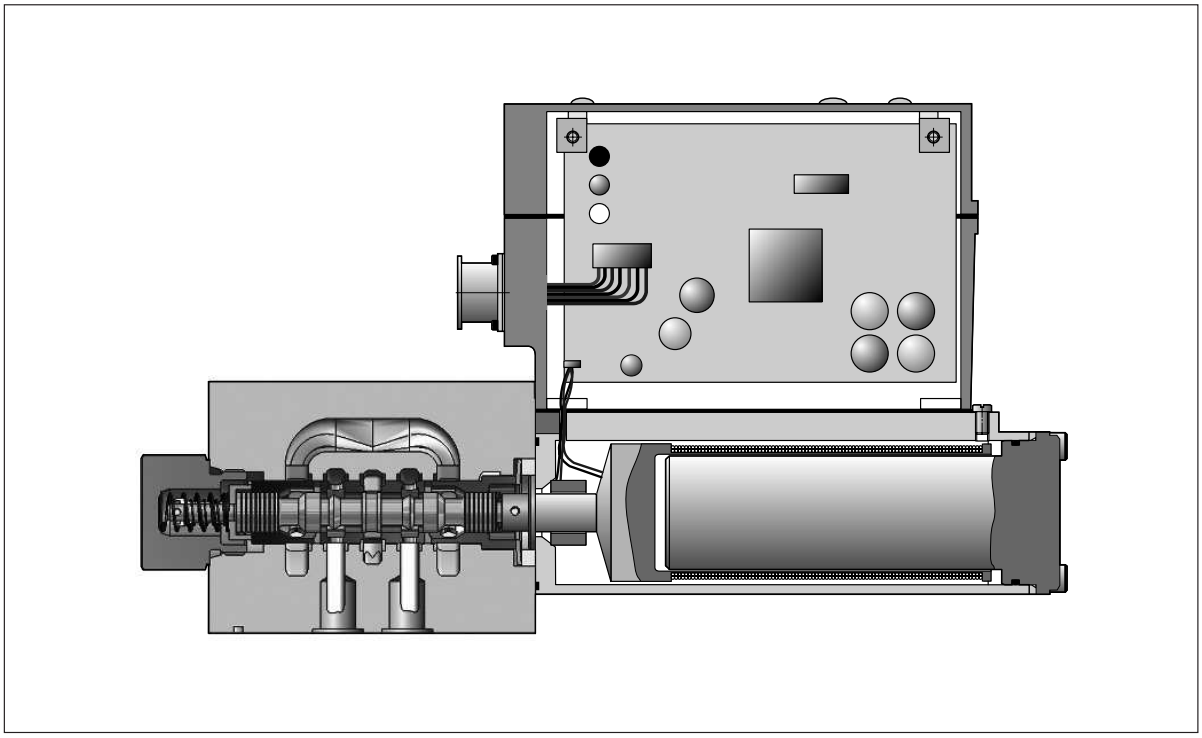


Technical features

- Extremely high dynamics
- Max. tank pressure 350 bar (with external drain port Y)
- Defined spool positioning in case of power supply breakdown
- Onboard electronics
- Spool / sleeve design

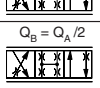
CE

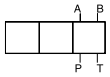
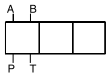
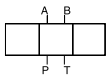
D3FP



D	3	F	P			9				0	
Direct. control valve	Size DIN NG10 CETOP05 NFPA D05	Proportional control	VCD	Spool type	Spool position on power down [1]	Y-port (plugged) [4]	Seals	Command-signal	Acces-sories	Spool/ sleeve design	Design series

3

Code	Spool type	Flow [l/min] at Δp 35bar per metering edge
	Zerolap	
E50Y		**100**
E50P		**50**
B60Y	$Q_B = Q_A/2$ 	**100**
B60P	$Q_B = Q_A/2$ 	**50**
	Underlap approx. -0.5%	
E55Y		**100**
E55P		**50**
	Overlap 18%	
E01Y		**100**
E02Y		**100**

Code	Spool pos. on power down
A [2]	
B [2]	
C [3]	

Code	Connection type
0	**6 + PE acc. EN175201-804**
5	**11 + PE acc. EN175201-804**

Code	Signal	Flow direction
B	**+/- 10V**	**0...+10V -> P-A**
E	**+/- 20mA**	**0...+20mA -> P-A**
S	**4...20mA**	**12...20mA -> P-A**

Code	Seals
N	NBR
V	FPM
H	for HFC fluid

Bold letters =
Short-term availability

[1] On power down the spool moves in the middle position. This cannot be guaranteed in case of contamination in the hydraulic fluid.

[2] approx. 10% opening

[3] only for overlapped spools

[4] needs to be removed at tank pressure >35 bar

Please order plugs separately.
See chapter 3 accessories.

D3FP0_UK.INDD CM_28.01.08.1

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General			
Design			Direct operated proportional DC valve
Actuation			VCD® actuator
Size			NG10/CETOP05/NFPA D05
Mounting interface			DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
Mounting position			unrestricted
Ambient temperature		[°C]	-20...+50
Weight		[kg]	6.5
Vibration resistance		[g]	25 acc. DIN IEC68, part 2-6
Hydraulic			
Max. operating pressure		[bar]	Ports P, A, B 350
		[bar]	Port T max. 35, port Y max. 35 [1]
Fluid			Hydraulic oil as per DIN 51524...535, other on request
Fluid temperature		[°C]	-20...+60
Viscosity	permitted	[cSt] / [mm²/s]	20...380
	recommended	[cSt] / [mm²/s]	30...80
Filtration			ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)
Flow nominal at Δp=35bar per control edge [2]		[l/min]	50 / 100
Flow maximum		[l/min]	150
Leakage at 100 bar		[ml/min]	<400
Static / Dynamic			
Step response at 100% step [3]		[ms]	<6
Frequency response (±5% signal) [3]		[Hz]	200 (amplitude ratio -3dB), 200 (phase lag -90°)
Hysteresis		[%]	<0.05
Sensitivity		[%]	<0.03
Temperature drift		[%/°K]	<0.025
Electrical characteristics			
Duty ratio		[%]	100
Protection class			IP65 in accordance with EN 60529 (plugged and mounted)
Supply voltage/ripple		[V]	22 ... 30, ripple <5% eff.
Current consumption max.		[A]	3.5
Switch-on current typical		[A]	22 for 0.2 ms
Input signal			
	Voltage	[V]	10...0...-10, ripple <0.01% eff., surge free, 0...+10V P->A
	Impedance	[kOhm]	100
	Current	[mA]	20...0...-20, ripple <0.01% eff., surge free, 0...+20mA P->A
	Impedance	[Ohm]	250
	Current	[mA]	4...12...20, ripple <0.01% eff., surge free, 12...20mA P->A <3.6 mA = disable, <3.8 mA = according to NAMUR NE43
	Impedance	[Ohm]	250
Differential input max.		[V]	30 for terminal D and E against PE (terminal G) 30 for terminal 4 and 5 against PE (terminal ⏚)
Enable signal (only code 5)		[V]	5...30, Ri = 9 kOhm
Diagnostic signal		[V]	+10...0...-10 / +Ub, rated max. 5mA
Pre-fusing		[A]	4.0 medium lag
EMC			EN 50081-2 / EN50082-2
Electrical connection		Code 0	6 + PE acc. EN 175201-804
		Code 5	11 + PE acc. EN 175201-804
Wiring min.			
Code 0		[mm²]	7 x 1.0 (AWG 18) overall braid shield
Code 5		[mm²]	12 x 1.0 (AWG 18) overall braid shield
Wiring lenght max.		[m]	50

[1] For applications with p_T>35 bar the Y-port has to be connected and the plug in the Y-port has to be removed.

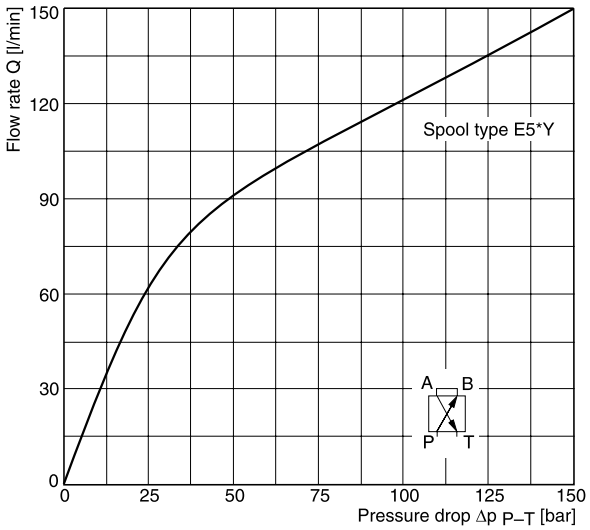
[2] Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

[3] Measured with load (100 bar pressure drop/two control edges)

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3

Functional limit* (at 100% command signal)

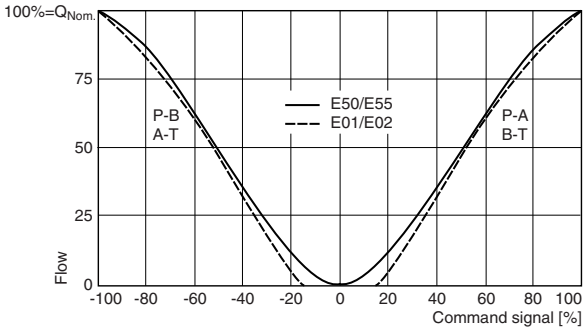


*** When exceeding the functional limits, for a period of time the valve will go into fail safe and power supply needs to be switched off/on to re-enable the valve.**

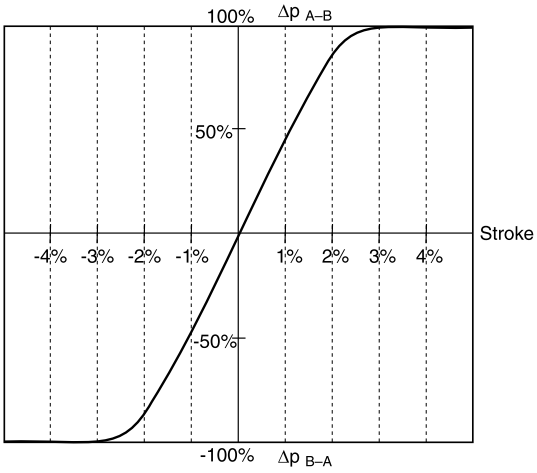
Flow curves

at Δp = 35 bar per metering edge

Spool type **E50/E55, E01/E02**



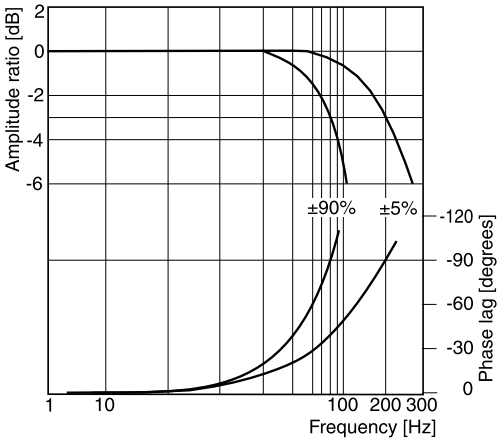
Pressure gain



Frequency response

±5% command signal

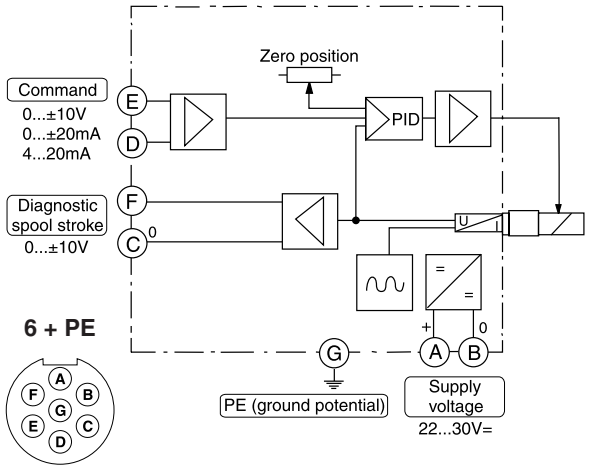
±90% command signal



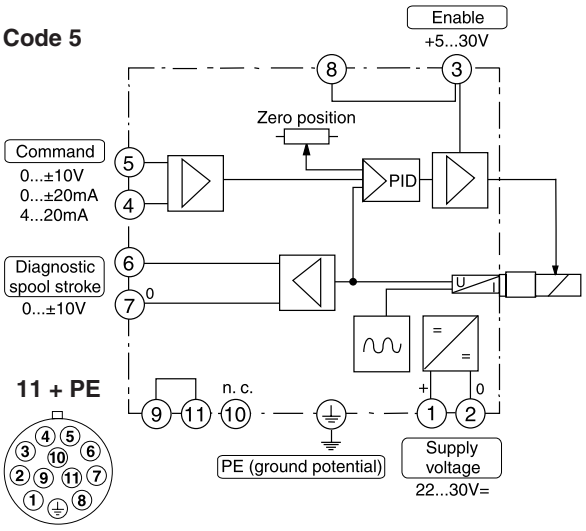
3

Block diagrams

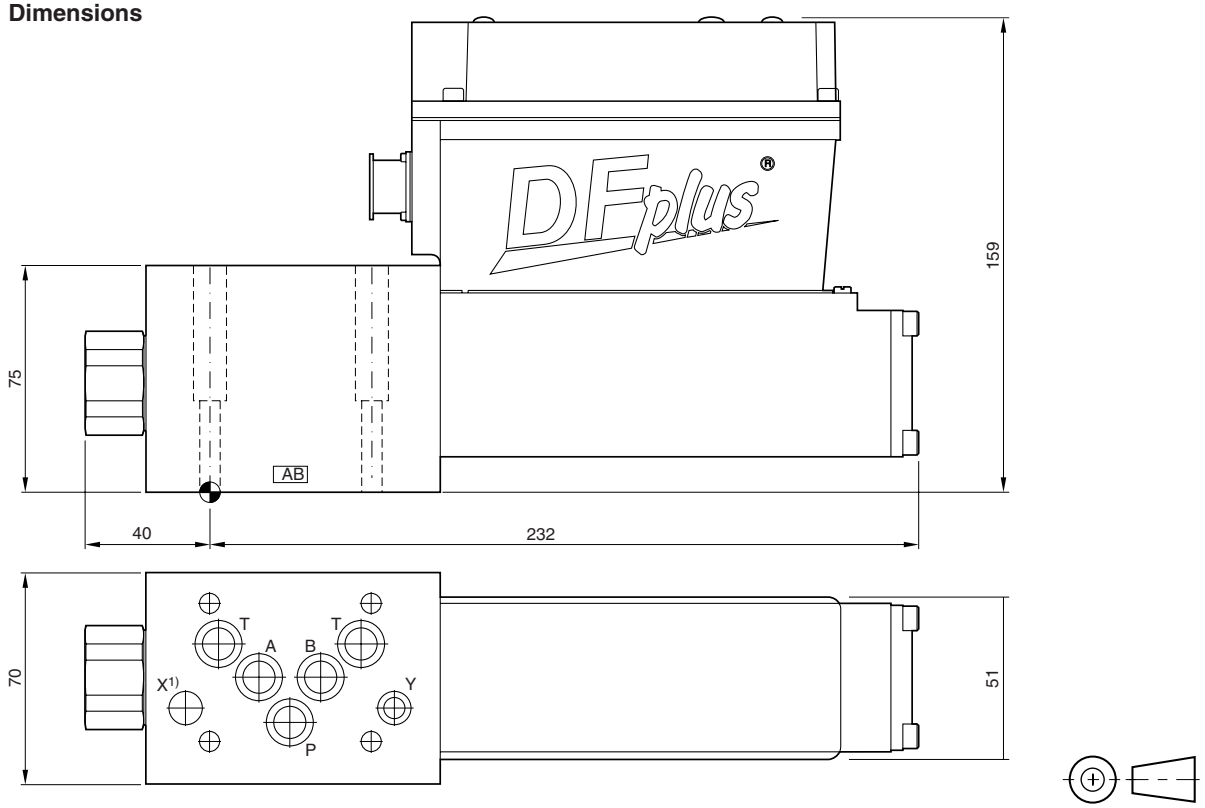
Code 0



Code 5



Dimensions



1) O-ring recess diameter on valve body.

Surface finish	Kit		
$\sqrt{R_{max}6.3}$ 0.01/100	BK385	4xM6x40 DIN 912 12.9	13.2 Nm ±15%

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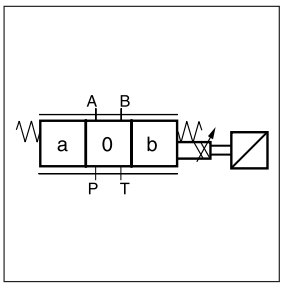
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Notes

The direct operated control valve D3FP of the nominal size NG10 (CETOP05) shows extremly high dynamics combined with high flow. First of all it is used for highest accuracy in positioning of hydraulic axis and controlling of pressure and velocity. Driven by the new patented VCD® actuator the D3FP reaches the frequency response of real servovalves.

A loss of power supply lets the spool move in a defined position. All common input signals are available.



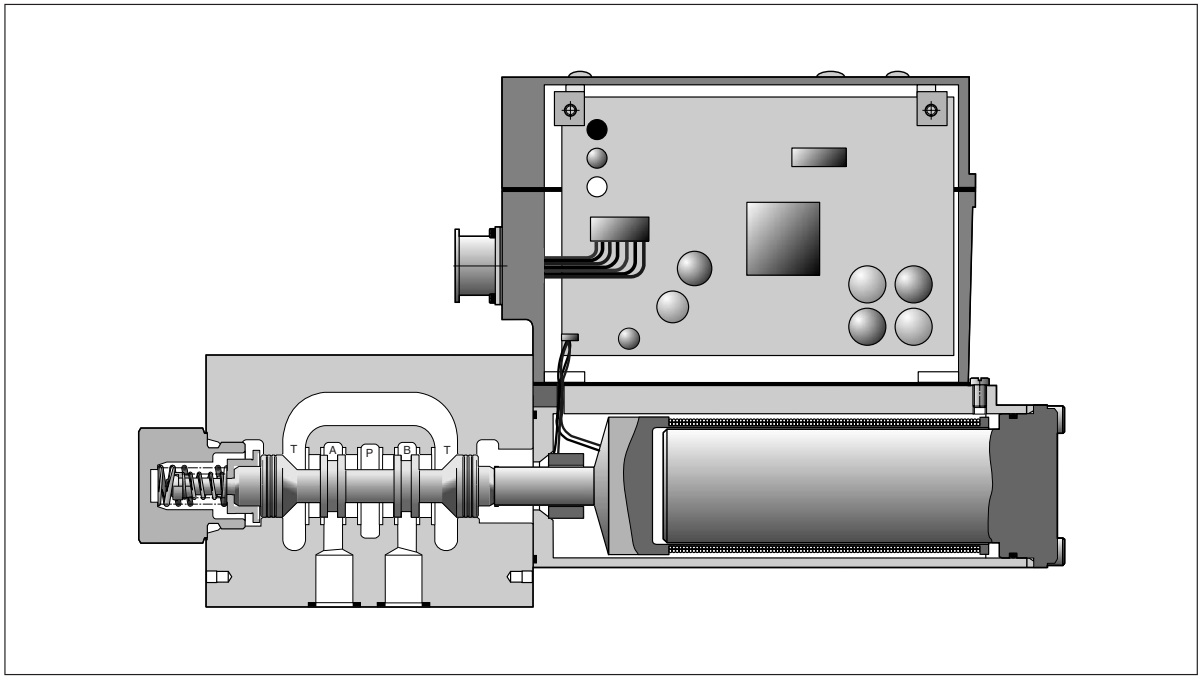


Technical features

- Extremly high dynamics
- Max. tank pressure 350 bar (with external drain port Y)
- Defined spool positioning
- Onboard electronics
- Spool / body design

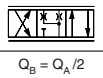
CE

D3FP



3

D	3	F	P		C	9				3	
Directional control valve	Size DIN NG06 CETOP03 NFPA D03	Proportional control	VCD	Spool type	Spool position on power down [1]	Y-port (plugged) [2]	Seals	Command signal	Acces-sories	Spool in body design	Design series

Code	Spool type	Flow [l/min] at Δp 35bar per metering edge
Overlap 20%		
E01Y **E01P**		**100** **50**
E02Y **E02P**		**100** **50**
B31Y **B31P**	$Q_B = Q_A/2$ 	**100 / 50** **50 / 25**
B32Y **B32P**	$Q_B = Q_A/2$ 	**100 / 50** **50 / 25**

Bold letters =
Short-term availability

Code	Connection type
0	**6 + PE acc. EN175201-804**
5	**11 + PE acc. EN175201-804**

Code	Signal	Flow direction
B	**+/- 10V**	**0...+10V -> P-A**
E	**+/- 20mA**	**0...+20mA -> P-A**
S	**4...20mA**	**12...+20mA -> P-A**

Code	Seals
N	NBR
V	FPM
H	for HFC fluid

[1] On power down the spool moves in the middle position. This cannot be guaranteed in case of contamination in the hydraulic fluid.

[2] needs to be removed at tank pressure >35 bar

Please order plugs separately.
See chapter 3 accessories.

General			
Design			Direct operated proportional DC valve
Actuation			VCD® actuator
Size			NG10/CETOP05/NFPA D05
Mounting interface			DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
Mounting position			unrestricted
Ambient temperature		[°C]	-20...+50
Weight		[kg]	6.5
Vibration resistance		[g]	25 acc. DIN IEC68, part 2-6
Hydraulic			
Max. operating pressure		[bar]	Ports P, A, B 350
		[bar]	Port T max. 35, port Y max. 35 [1]
Fluid			Hydraulic oil as per DIN 51524...535, other on request
Fluid temperature		[°C]	-20...+60
Viscosity	permitted	[cSt] / [mm²/s]	20...380
	recommended	[cSt] / [mm²/s]	30...80
Filtration			ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)
Flow nominal at Δp=35bar per control edge [2]		[l/min]	50 / 100
Flow maximum		[l/min]	150
Leakage at 100 bar		[ml/min]	<150
Static / Dynamic			
Step response at 100% step [3]		[ms]	<6
Frequency response (±5% signal) [3]		[Hz]	200 at -3dB, 200 at -90°
Hysteresis		[%]	<0.05
Sensitivity		[%]	<0.03
Temperature drift		[%/°K]	<0.025
Electrical characteristics			
Duty ratio		[%]	100
Protection class			IP65 in accordance with EN 60529 (plugged and mounted)
Supply voltage/ripple		[V]	22 ... 30, ripple <5% eff.
Current consumption max.		[A]	3.5
Switch-on current typical		[A]	22 for 0.2 ms
Input signal			
	Voltage	[V]	10...0...-10, ripple <0.01% eff., surge free, 0...+10V P->A
	Impedance	[kOhm]	100
	Current	[mA]	20...0...-20, ripple <0.01% eff., surge free, 0...+20mA P->A
	Impedance	[Ohm]	250
	Current	[mA]	4...12...20, ripple <0.01% eff., surge free, 12...20mA P->A <3.6 mA = disable, <3.8 mA = according to NAMUR NE43
	Impedance	[Ohm]	250
Differential input max.		[V]	30 for terminal D and E against PE (terminal G) 30 for terminal 4 and 5 against PE (terminal ⏚)
Enable signal (only code 5)		[V]	5...30, Ri = 9 kOhm
Diagnostic signal		[V]	+10...0...-10 / +Ub, rated max. 5mA
Pre-fusing		[A]	4.0 medium lag
EMC			EN 50081-2 / EN50082-2
Electrical connection		Code 0	6 + PE acc. EN 175201-804
		Code 5	11 + PE acc. EN 175201-804
Wiring min.			
Code 0		[mm²]	7 x 1.0 (AWG 18) overall braid shield
Code 5		[mm²]	12 x 1.0 (AWG 18) overall braid shield
Wiring lenght max.		[m]	50

[1] For applications with p_T>35 bar the Y-port has to be connected and the plug in the Y-port has to be removed.

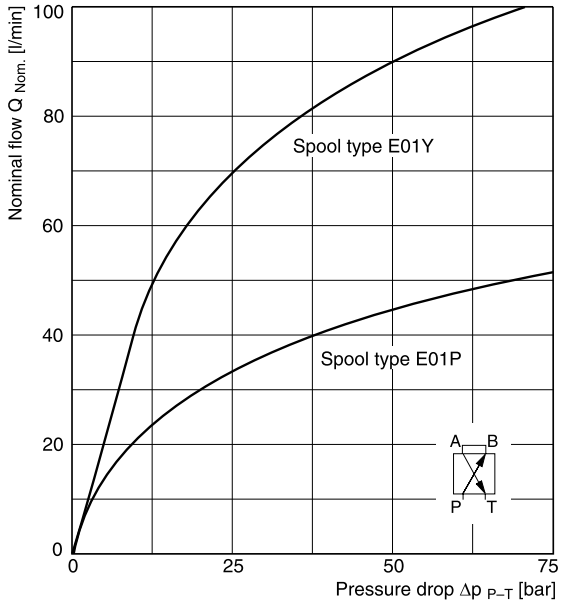
[2] Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

[3] Measured with load (100 bar pressure drop/two control edges)

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3

Functional limit* (at 100% command signal)

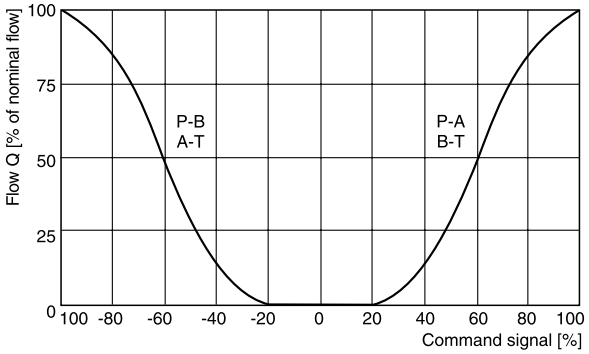


*** When exceeding the functional limits, for a period of time the valve will go into fail safe and power supply needs to be switched off/on to re-enable the valve.**

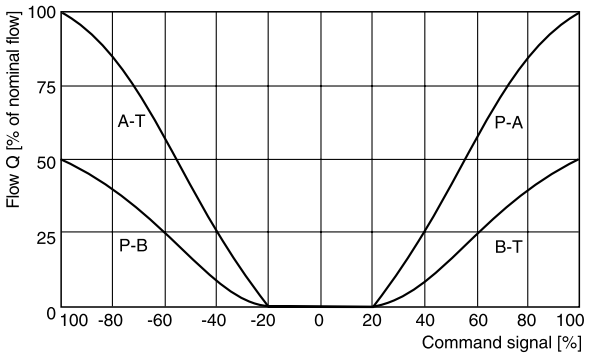
Flow curves

at Δp = 35 bar per metering edge

Spool type **E01**

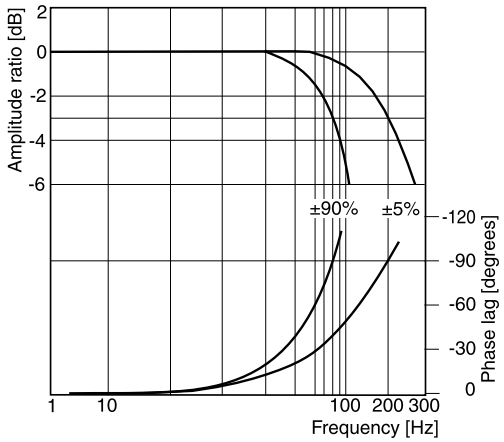


Spool type **B31**



Frequency response

±5% command signal
±90% command signal



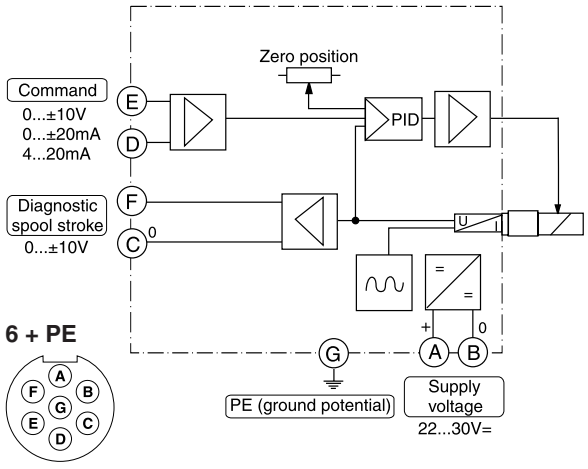
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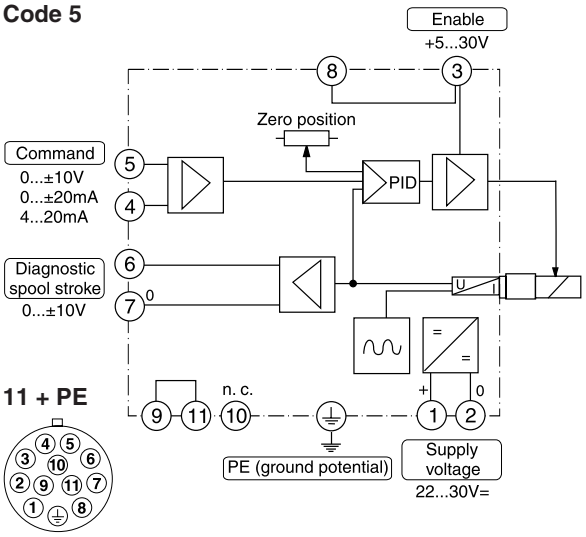
3

Block diagrams

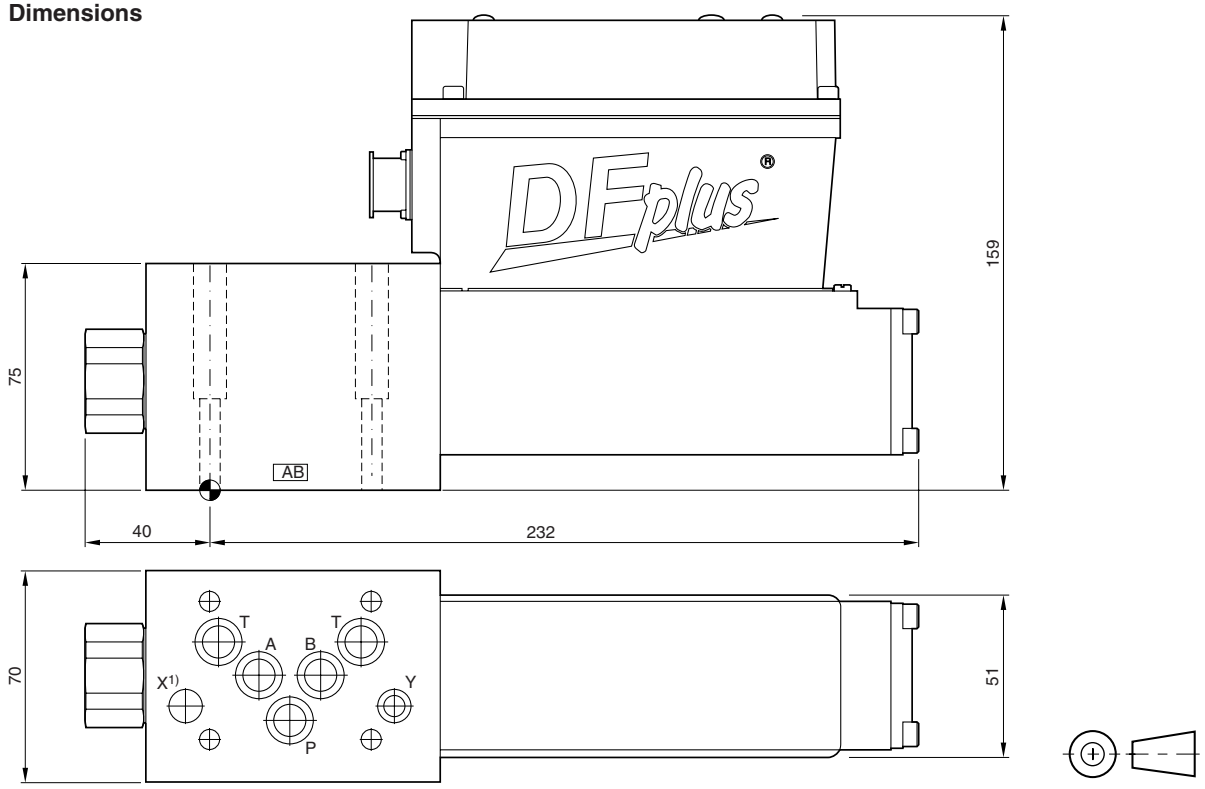
Code 0



Code 5



Dimensions



1) O-ring recess diameter on valve body.

Surface finish	Kit		
R_{max}6.3 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm ±15%

D3FP3_UK.INDD CM_28.01.08.1

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The new series of pilot operated servo proportional valves D*1FP transfers the advantages of the Parker patented Voice Coil Drive (VCD®) to larger frame sizes and thus high flow rates. The high dynamic / high precision drive of the pilot valve allows the optimum control of the main spool and results in servo class performance of the complete valves.

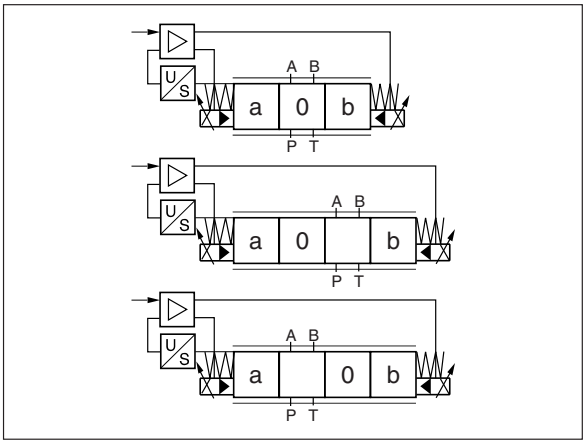
The D*1FP series is available in 5 sizes:

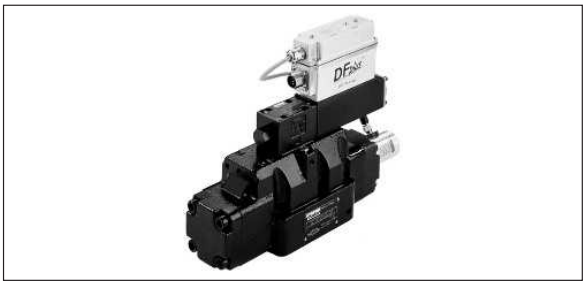
D31FP NG10 (CETOP05)
D41FP NG16 (CETOP07)
D81FP NG25 (CETOP08) for port diam. up to 26 mm
D91FP NG25 (CETOP08) for port diam. up to 32 mm
D111FP NG32 (CETOP10)

The new safety concept works with a safe 4th position of the D1FP pilot valve. This ensures that the main stage is hydraulically balanced at power down and allows to have the main spool spring centred (for overlapped spools) or approximately 10% spring offset to spool position A or B (for zerolap spools).

Technical features

- High dynamics
- High flow
- Defined spool positioning in case of power supply breakdown
- Onboard electronics
- Closed loop position – controlled pilot valve and main stage

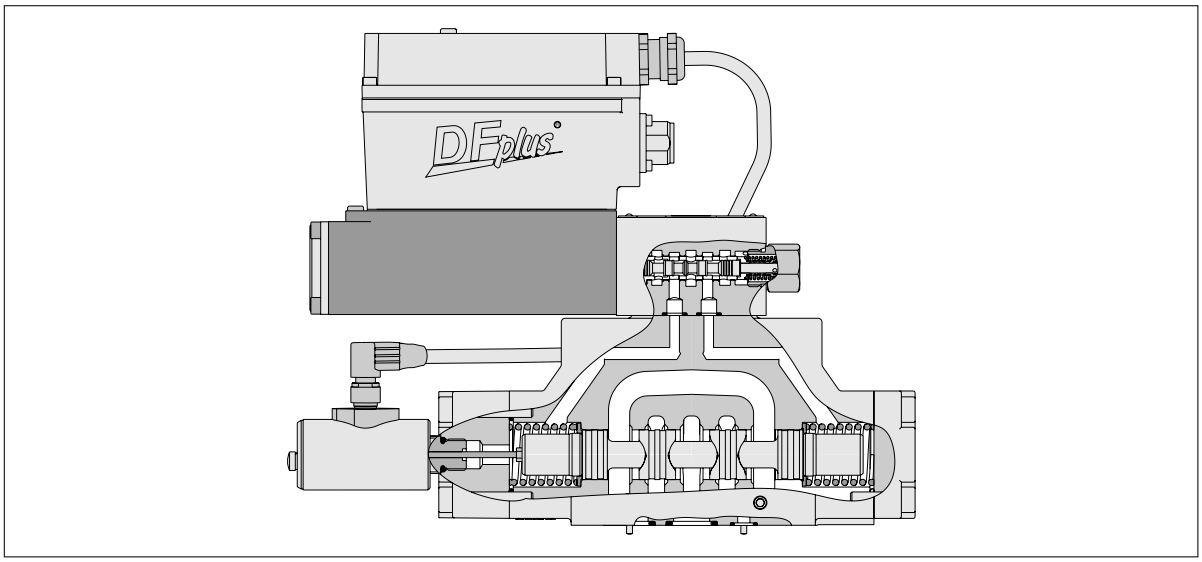




D41FP

CE

D41FP



3

D		1	F	P								0	
Directional control valve	Size	NG06 pilot	Proportional control	High response	Spool type	Flow	Spool position on power down [1]	Pilot connections	Seals	Electronic options	Valve options		Design series

Code	Size
3	NG10 / CETOP05
4	NG16 / CETOP07
8	NG25 / CETOP08
9 [2]	NG25 / CETOP08
11	NG32 / CETOP10

[2] for enlarged connections Ø 32 mm

Code	Valve options
0	6+PE acc. EN175201-804
5	11+PE acc. EN175201-804
7	6+PE + Enable

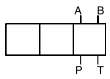
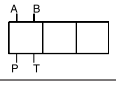
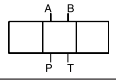
Code	Electronic options
K	Voltage input 0...±10V
S	Current input 4...20mA

Code	Seals
N	NBR
V	FPM
H	for HFC fluid

Code	Inlet	Drain
1	internal	external
2	external	external
4	internal	internal
5	external	internal

Code	Spool type
overlap	
E01	
E02	
B31	$Q_B = Q_A/2$ 
B32	$Q_B = Q_A/2$ 
zerolap	
E52 [3]	
B61 [3]	$Q_B = Q_A/2$ 

Code	Flow [l/min] at Δp = 5bar per metering edge			
	D31	D41	D81/91	D111
E	120	—	—	—
F	—	200	—	—
H	—	—	400	—
L	—	—	—	1000

Code	Spool pos. on power down
A [4]	
B [4]	
C [5]	

[1] On power down the spool moves into a defined position.
[3] not for D111FP
[4] approx. 10% opening, only zero lapped spools
[5] only for overlapped spools

Please order plugs separately.
See chapter 3 accessories.

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General						
Design			Servo Proportional directional control valve, pilot operated			
Actuation			VCD®-actuator			
Size			**NG10 (CETOP 05)**	**NG16 (CETOP 07)**	**NG25 (CETOP 08)**	**NG32 (CETOP 10)**
Mounting Interface			DIN 24340 / ISO 4401 / CETOP RP121 / NFPA			
Mounting position			unrestricted			
Ambient temperature		[°C]	-20...+50			
Weight		[kg]	11.3	14.2	23.5	64.5
Hydraulic						
Max. operating pressure		[bar]	Internal Pilot Drain P, A, B, X 350; T, Y 35 External Pilot Drain P, A, B, T, X 350; Y 35			
Fluid			Hydraulic oil acc. DIN 51524...535, other on request			
Fluid temperature		[°C]	-20...+60			
Viscosity	permitted	[cSt] / [mm2/s]	20...380			
	recommended	[cSt] / [mm2/s]	30...80			
Filtration			ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			
Nominal flow at Δp = 5 bar per control edge [1]		[l/min]	120	200	400	1000
Max. recommended Flow		[l/min]	250	600	1000	3000
Leakage at 100 bar						
	Overlapped spool	[ml/min]	200	200	600	1000
	Zerolapped spool	[ml/min]	900	900	1000	-
	Pilot	[ml/min]	< 1000			
Pilot supply pressure		[bar]	20...350			
Pilot flow, step response at 210 bar		[l/min]	10	12	24	40
Static / Dynamic						
Step response at 100% stroke [2]		[ms]	10	13	19	45
Frequency response						
	Amplitude ±5 % at 210 bar	[Hz]	128	95	95	40
	Phase ±5 % at 210 bar	[Hz]	118	95	90	75
Hysteresis		[%]	< 0.1			
Sensitivity		[%]	< 0.05			
Temperature drift of Center Position		[%/°K]	< 0.025			
Electrical						
Duty ratio		[%]	100			
Protection class			IP65 in accordance with EN 60529 (plugged and mounted)			
Supply voltage / ripple		[V]	22...30, ripple < 5% eff., surge free			
Current consumption max.		[A]	3.5			
Switch-on current typical		[A]	22 for 0.2 ms			
Input signal	voltage	[V]	+10...0...-10, ripple < 0.01 % eff., surge free, 0...+10 V P–>A			
	Impedance	[kOhm]	100			
	current	[mA]	4...12...20, ripple < 0.01 % eff., surge free, 12...20 mA P–>A < 3.6 mA = enable off, > 3.8 mA = enable on acc. NAMUR NE43			
	Impedance	[Ohm]	250			
	Input Capacitance typ.	[nF]	1			
Differential input max.	Code 0	[V]	30 for terminal D and E against PE (terminal G) 11 for terminal D and E against 0V (terminal B)			
	Code 5	[V]	30 for terminal 4 and 5 against PE (terminal ⏚) 11 for terminal 4 and 5 against 0V (terminal 2)			
	Code 7	[V]	30 for terminal D and E against PE (terminal G)			
Enable signal	Code 5/7	[V]	5...30, Ri = 9 kOhm			
Diagnostic signal		[V]	+10...0...-10 / +Ub, rated max. 5 mA			
Pre-fusing		[A]	4.0 A medium lag			
EMC			EN 61000-6-2, EN 61000-6-4			
Electrical connection		Code 0/7	6 + PE acc. EN 175201-804			
		Code 5	11 + PE acc. EN 175201-804			
Wiring min.		Code 0/7	7 x AWG16 overall braid shield			
		Code 5	8 x AWG16 overall braid shield			
Wiring lenght max.		[m]	50			

[1] Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

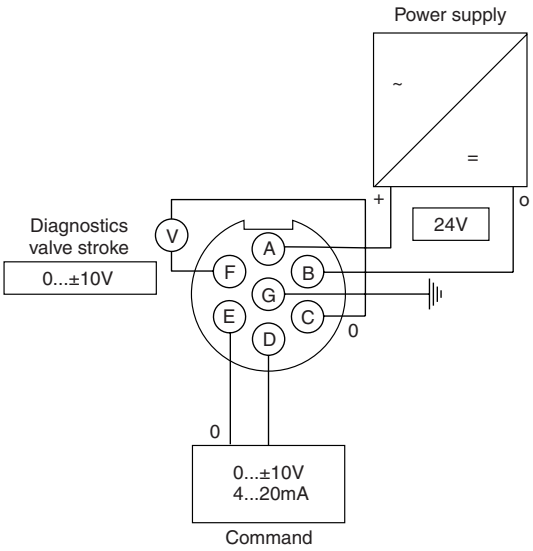
[2] Measured with load (210 bar pressure drop/two control edges)

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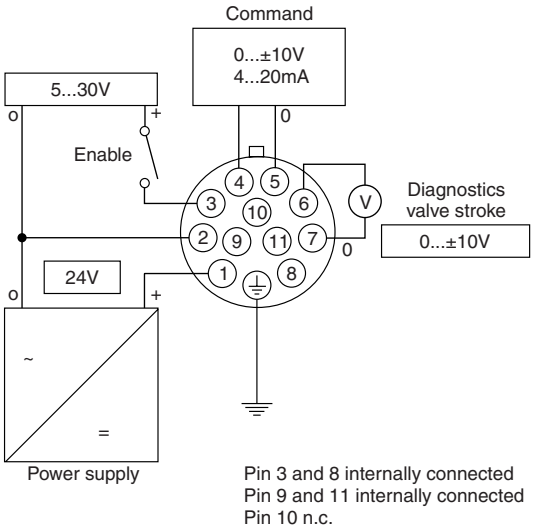
3

Wiring

Code 0
6 + PE acc. EN 175201-804

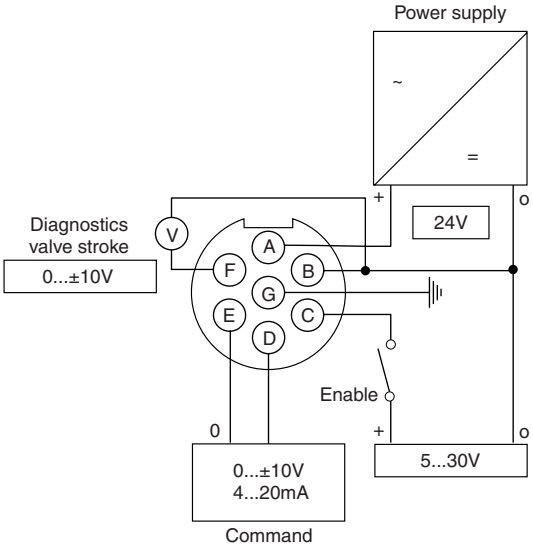


Code 5
11 + PE acc. EN 175201-804



Pin 3 and 8 internally connected
Pin 9 and 11 internally connected
Pin 10 n.c.

Code 7
6 + PE acc. EN 175201-804 + enable



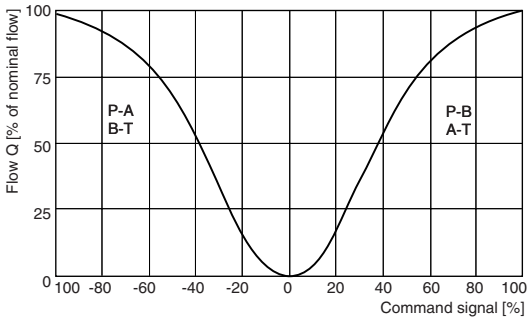
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3

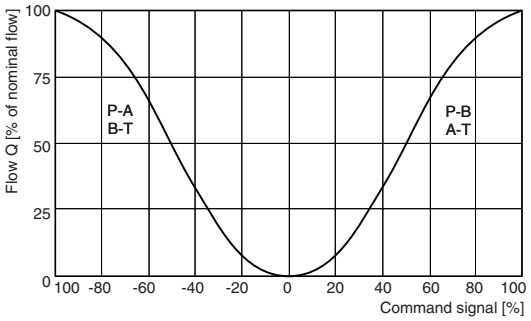
Flow curves

at Δp = 5 bar per metering edge

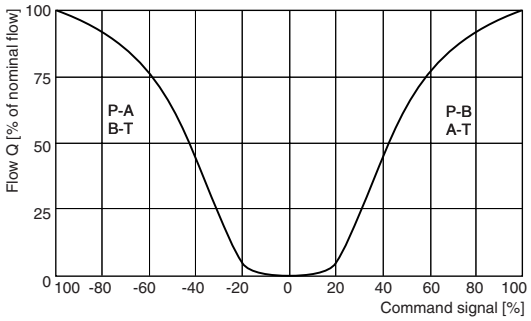
D31FP — Spool type E52



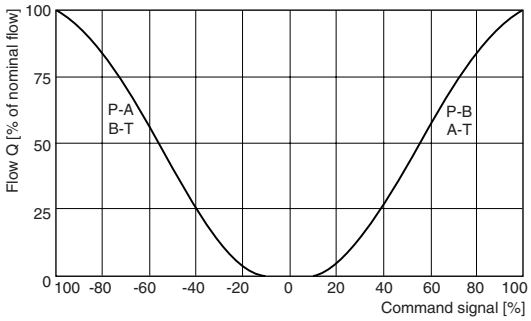
D41FP — Spool type E52



D81FP/D91FP — Spool type E52



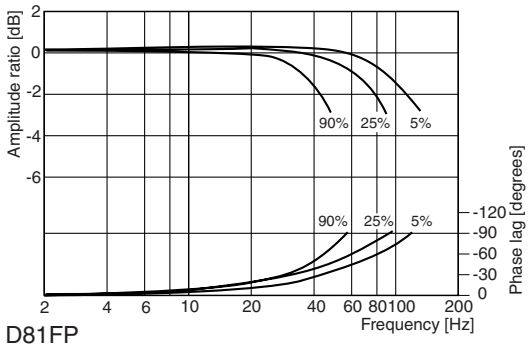
D111FP — Spool type E01



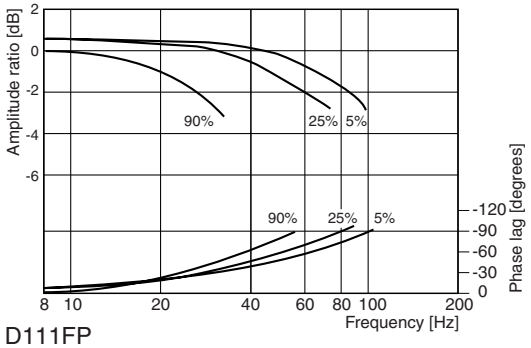
Frequency response

±5 % / ±25 % / ±90 % command signal
Dynamics at 210 bar pilot supply pressure

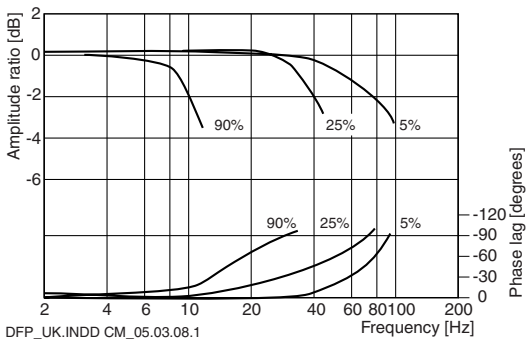
D31FP



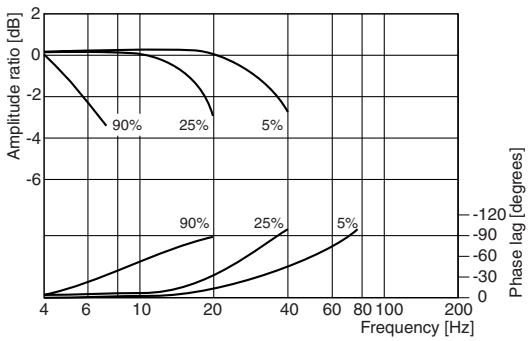
D41FP



D81FP



D111FP

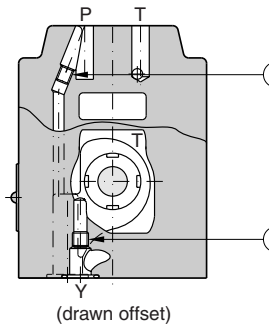


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3

Pilot oil inlet (supply) and outlet (drain)

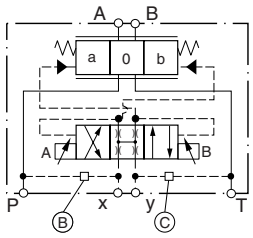
D31FP



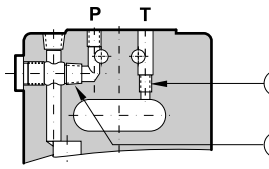
(drawn offset)

○ open, ● closed

Pilot oil Inlet	Pilot oil Drain	B	C
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○

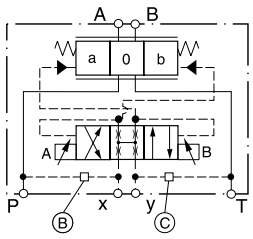


D41FP

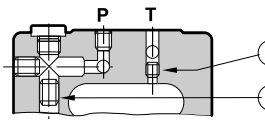


○ open, ● closed

Pilot oil Inlet	Pilot oil Drain	B	C
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○

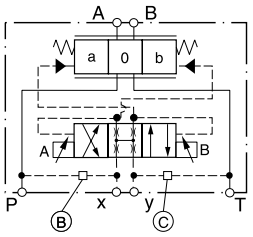


D81/91FP

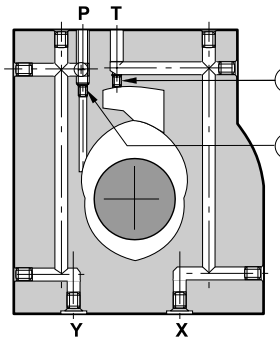


○ open, ● closed

Pilot oil Inlet	Pilot oil Drain	B	C
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○

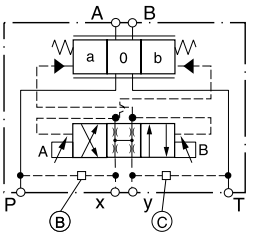


D111FP



○ open, ● closed

Pilot oil Inlet	Pilot oil Drain	B	C
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○

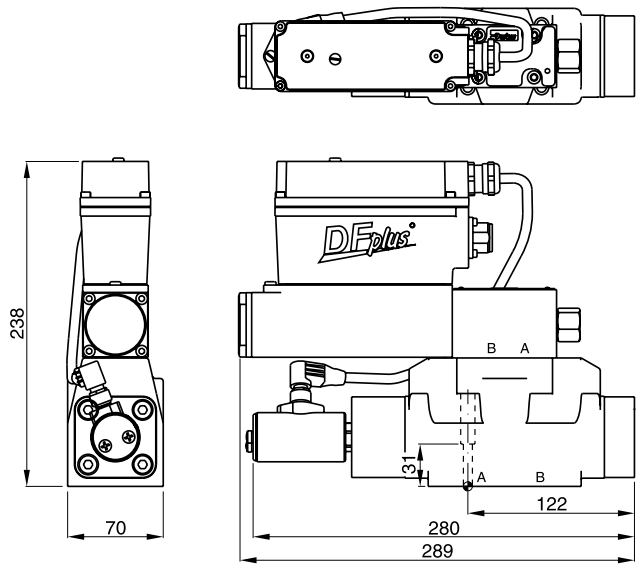


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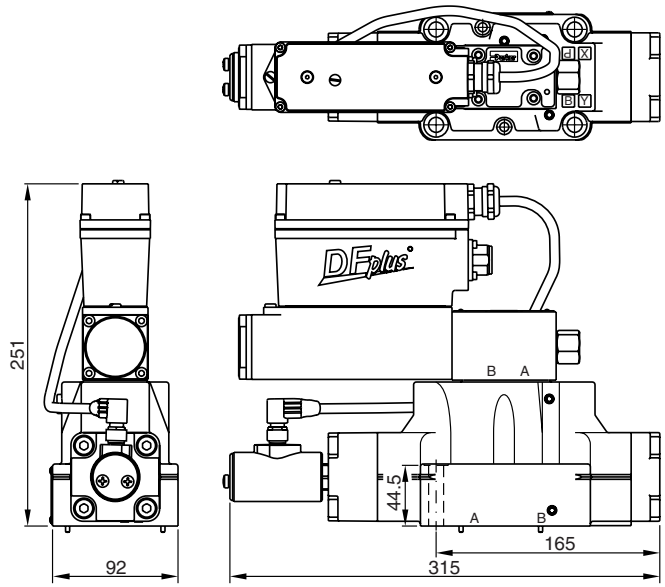
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D31FP



Surface finish	Kit			Kit NBR
R_{max}6.3 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm ±15%	SK-D31FP

D41FP

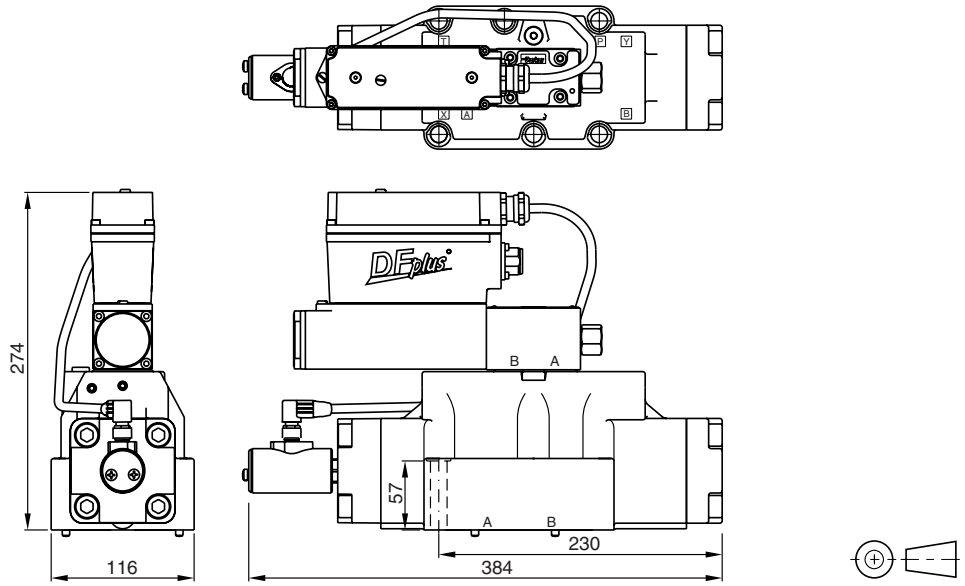


Surface finish	Kit			Kit NBR
R_{max}6.3 0.01/100	BK320	2x M6x55 4x M10x60 DIN 912 12.9	13.2 Nm ±15% 63 NM ±15%	SK-D41FP

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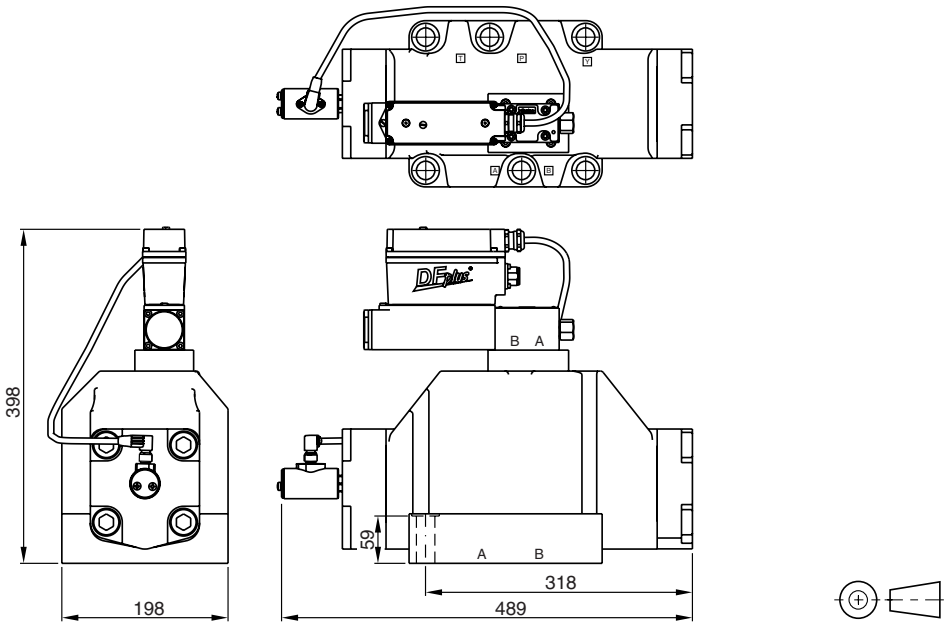
3

D81/91FP



Surface finish	Kit			Kit NBR
R_{max}6.3 0.01/100	BK360	6x M12x75 DIN 912 12.9	108 Nm ±15%	SK-D81FP SK-D91FP

D111FP



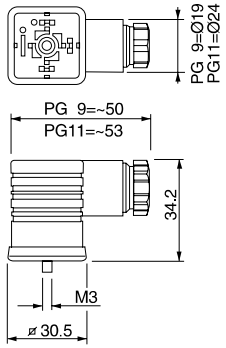
Surface finish	Kit			Kit NBR
R_{max}6.3 0.01/100	BK386	6x M20x90 DIN 912 12.9	517 Nm ±15%	SK-D111FP

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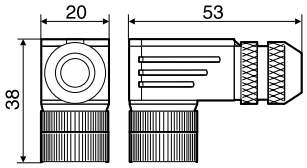
3

Solenoid connector
D*FB, D*1FW



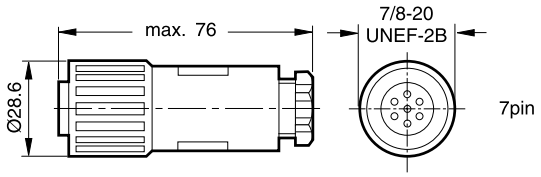
Description	Variation	Order No.
EN 175301-803 2+PE	PG 9 black B	5001710
EN 175301-803 2+PE	PG 9 grey A	5001711
EN 175301-803 2+PE	PG 11 black B	5001716
EN 175301-803 2+PE	PG 11 grey A	5001717

Monitor switch connector
D*1FW / D*1FT / D*1FH



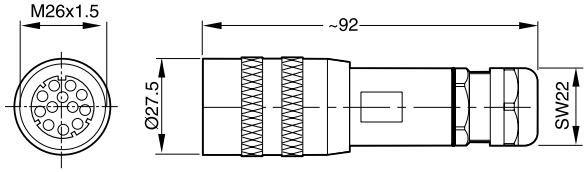
Description	Order No.
IEC 61076-2-101 M12 / 4 + PE	5004109

Central connector
D1FT / D*1FT / D*1FH / D*FP*0 / D*1FP*0 / D*1FP*7



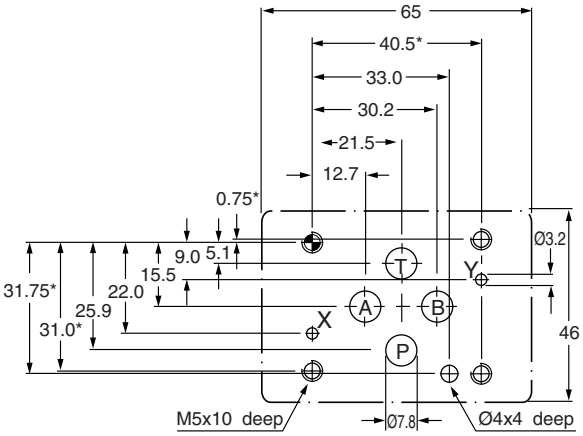
Description	Order No.
EN 175201-804 6 + PE	5004072

Central connector
D*FP*5 / D*1FP*5

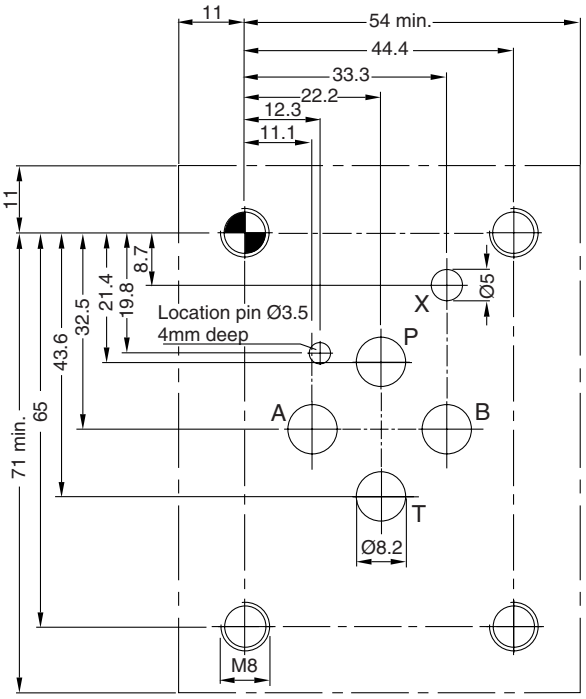


Description	Order No.
EN 175201-804 11 + PE	5004711

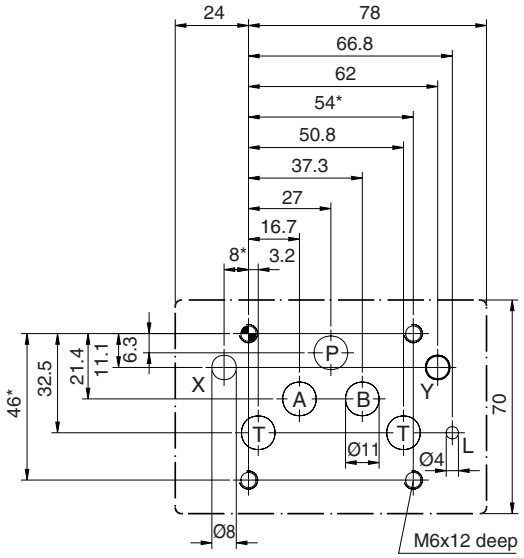
to DIN 24340-A6, size NG06/CETOP03



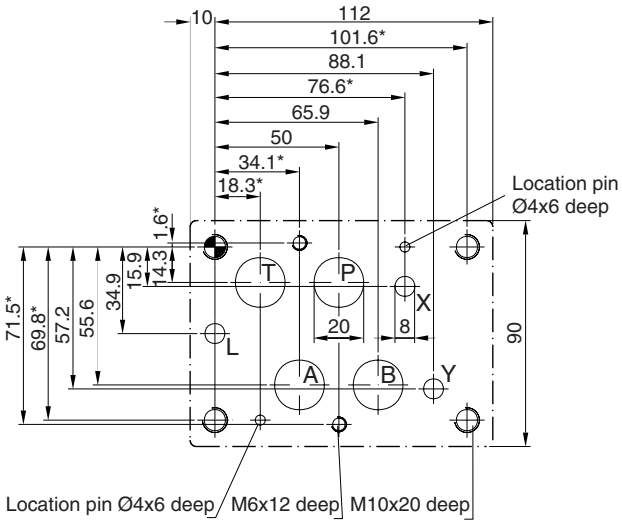
to ISO 10372-04-04-0-92, size 04



to DIN 24340-A10, size NG10/CETOP05



to DIN 24340-A16, size NG16/CETOP07



With * marked dimensions ± 0.1mm.
All other dimensions ± 0.2mm.

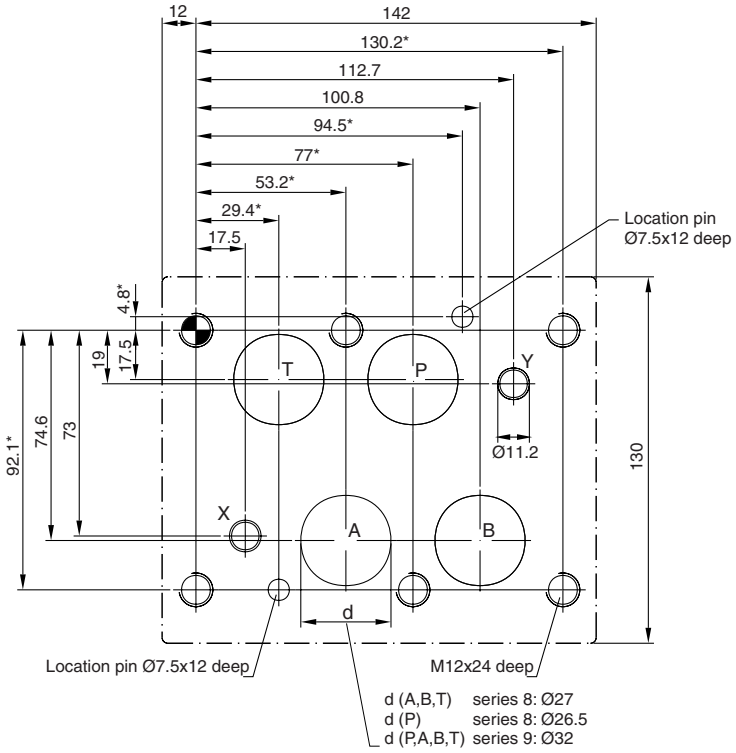
access03_UK.INDD CM_28.01.08.1

Subplates and manifolds see chapter 12.

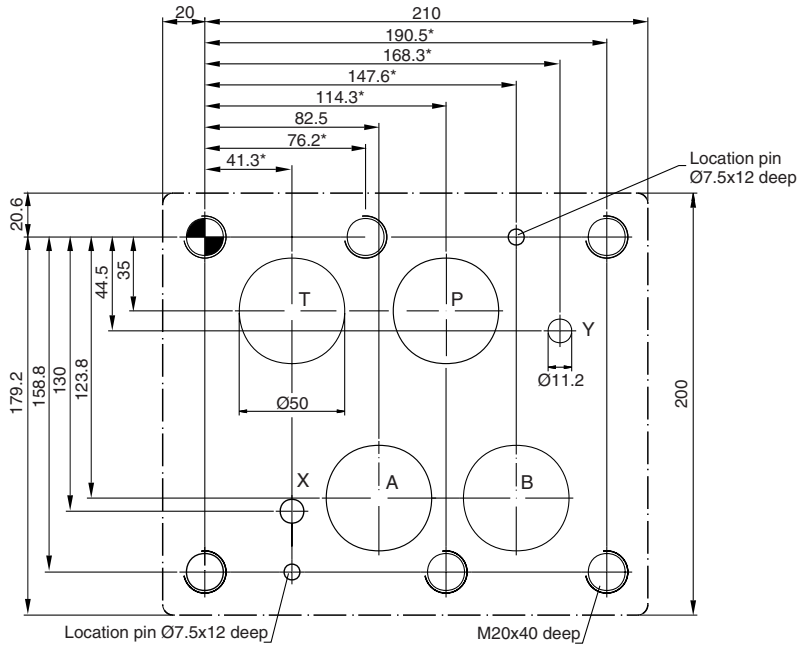
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to DIN 24340-A25, size NG25/CETOP08



to DIN 24340-A32, size NG32/CETOP10



With * marked dimensions ± 0.1mm.
All other dimensions ± 0.2mm.

Subplates and manifolds see chapter 12.

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Series Parker	Series Denison	Description	Size						Mounting			Operation		Page
		Parker Standard DIN / ISO	06	10	06	10	25	32	Subplate	Panel	Screw-in	Direct	Pilot	
		Pressure relief valves, manual operation												
VS	–				•				•			•		4-3
VB	–	For high secondary pressure			•	•			•			•		4-7
VBY	–	For high secondary pressure			•	•			•				•	4-13
EVSA	–		•	•							•	•		4-19
–	R1E02	Remote control valve	•						•	•		•		4-23
R/RS	R4V/R6V					•	•	•	•				•	4-27
DSDU	–	With German certificate (TÜV)				•	•	•	•				•	4-39
		Pressure relief valves, proportional operation												
RE06M*W	4VP01				•				•			•		4-43
RE06M*T	–				•				•			•		4-47
RE*W	R4V/R6V					•	•	•	•				•	4-53
RE*T	R4V/R6V					•	•	•	•				•	4-61
VBY*K	–	For high secondary pressure			•	•			•				•	4-71
		Unloading and sequence valves, manual operation												
UR/US	R4U					•	•	•	•				•	4-77
S	R4S					•	•	•	•				•	4-87
		Pressure reducing valves, manual operation												
VM	–				•				•			•		4-91
PR	R4R					•	•	•	•				•	4-97
		Pressure reducing valves, proportional operation												
VMY	–				•				•				•	4-101
PE*W	R4R					•	•	•	•				•	4-109
		Accessories												
		Plug-in connectors Mounting patterns												4-115

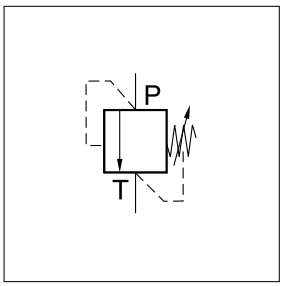
More pressure valves are presented in the following chapters:
Chapter 7: Sandwich Valves
Chapter 8: Slip-In Cartridge Valves
Chapter 9: SAE Flange Valves
Chapter 10: Valves for Pipe Mounting

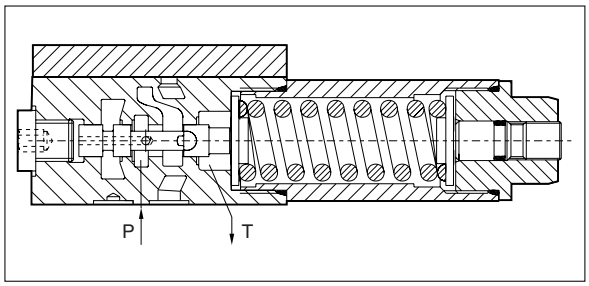
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Notes

The pressure relief valve VS*06 is a direct operated spool valve for subplate mounting with internal drain to port T. The connection and function is according to ISO 6264.







4

Function

- Spool type valve
- Subplate mounting according to ISO 6264
- 5 pressure stages
- 2 adjustment modes
- Gauge port

Ordering code

VS		A	06	V	G		
Pressure relief valve	Pressure stages	Adjustment screw with hexagon socket	Nominal size	FPM Seals	Gauge port G1/4“	Lock	Design series (not required for ordering)

Code	Pressure stages
025	up to 25 bar
064	**up to 64 bar**
160	**up to 160 bar**
210	**up to 210 bar**
350	up to 350 bar

Code	Lock
omit	**Normal**
Z *	DIN lock

* not pictured

Bold letters =
Short-term availability

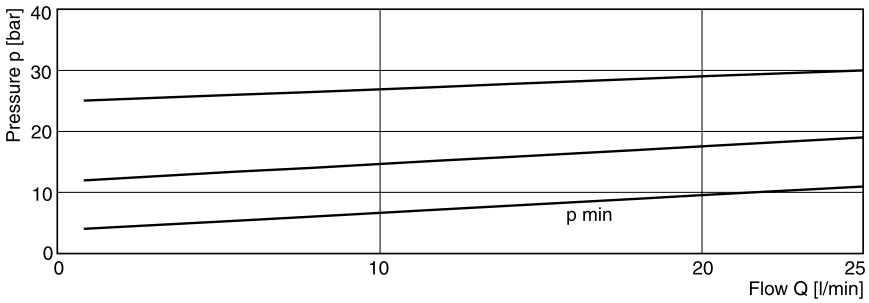
Technical data

General		
Design		Direct operated relief valves spool type
Nominal size		DIN NG06 / CETOP03 / NFPA D03
Interface		Subplate mounting according to ISO 6264
Mounting position		unrestricted
Ambient temperature	[°C]	-20...+80
Weight	[kg]	1.3
Hydraulics		
Max. operating pressure	[bar]	Port P 350, Port T depressurized
Pressure stages	[bar]	25, 64, 160, 210, 350
Nominal flow	[l/min]	25
Fluid		Hydraulic oil according to DIN 51524...525
Fluid temperature	[°C]	Recommended +30...+50, permitted -20...+70
Viscosity permitted	[cSt] / [mm²/s]	20...380
recommended	[cSt] / [mm²/s]	30...50
Filtration		ISO 4406 (1999); 18/16/13

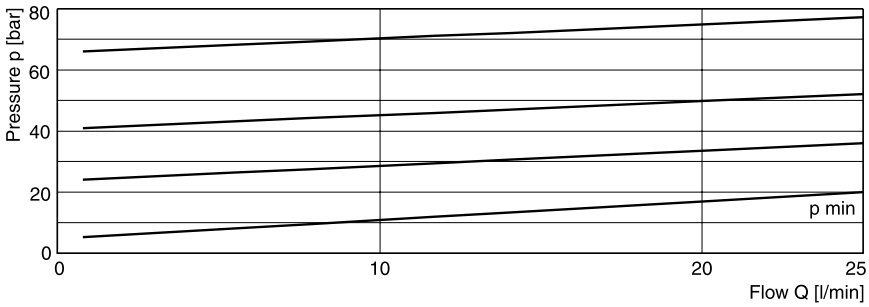
4

p/Q performance curves

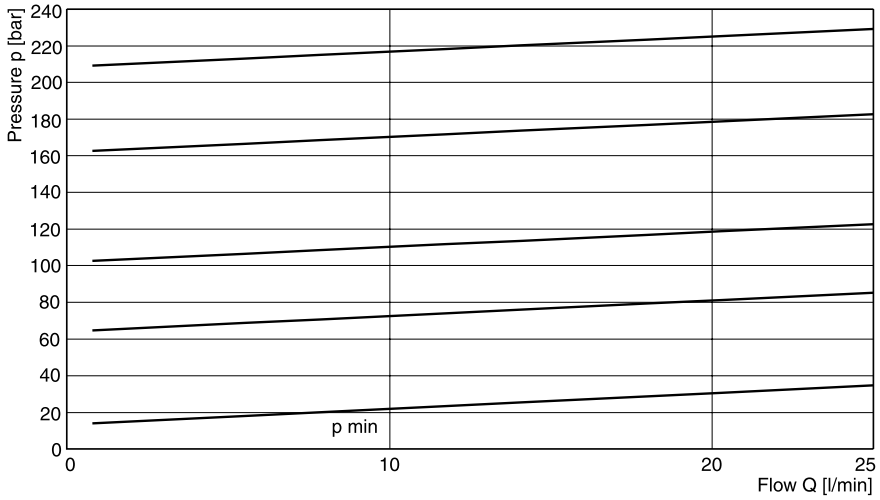
Pressure stage 25 bar



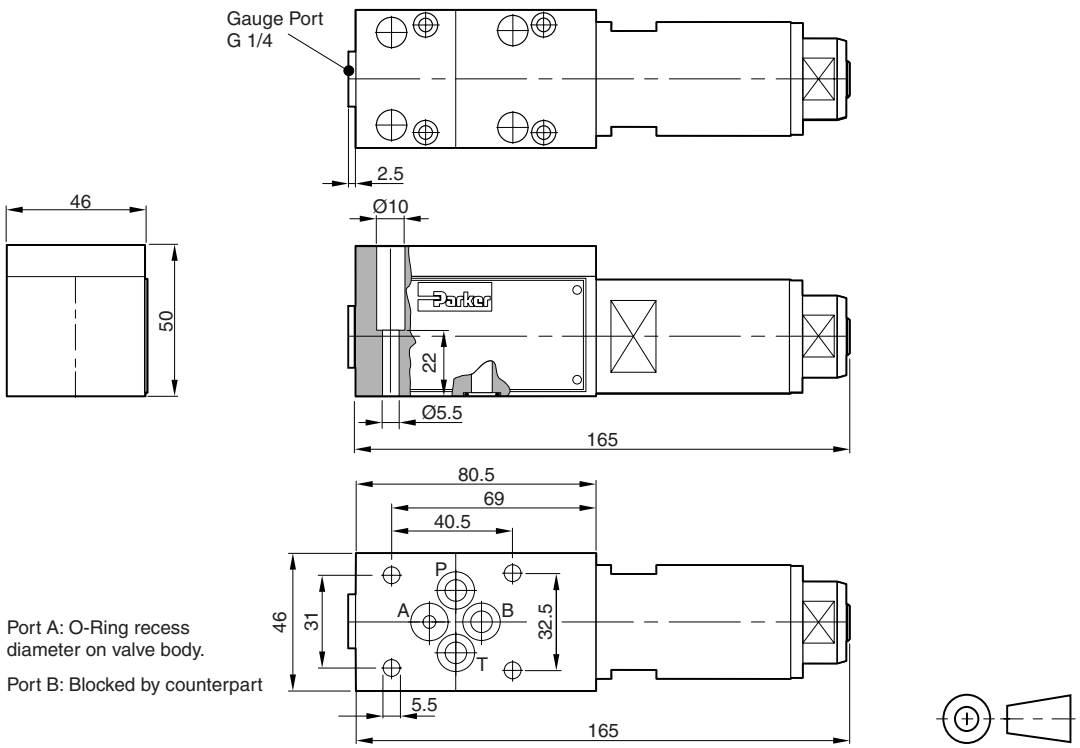
Pressure stage 64 bar



Pressure stage 160, 210 and 350 bar

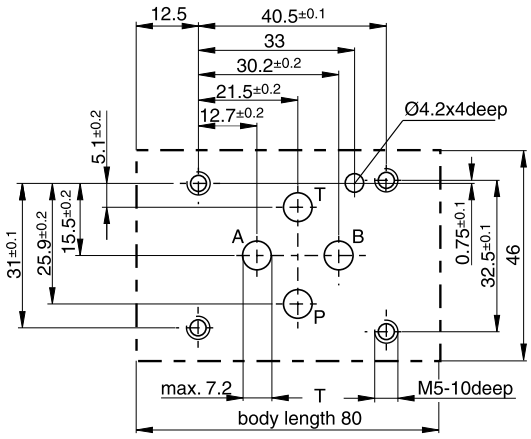


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Surface finish	Bolt kit DIN 912 12.9		Kit FPM
R_{max}6.3 0.01/100	SK-M5x30-4pcs	7.6 Nm ±15%	SK-VB/VM/VS-A06V

Mounting pattern ISO 6264, code 6264-03-04-*-97



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4

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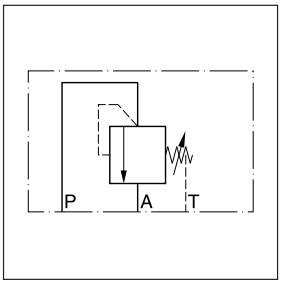
Direct operated pressure relief valve with manual adjustment. The series VB can also be used as a pressure sequence valve, because of the high pressure capability in the outlet port and the external drain port.

Features

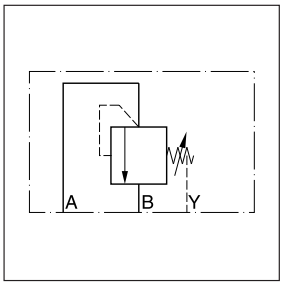
- Spool type valve
- Subplate mounting according to ISO 5781
- 5 pressure stages at NG06
- 3 pressure stages at NG10
- 2 adjustment modes



VB*A10



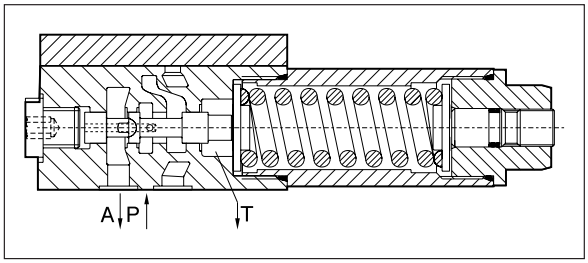
VB*A06



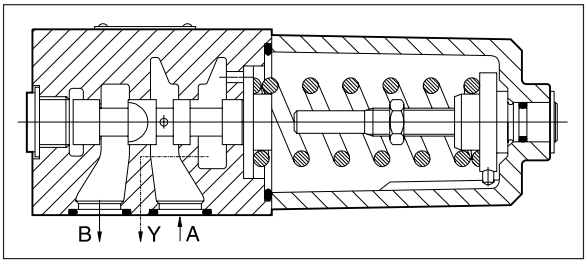
VB*A10

4

VB*A06



VB*A10



Ordering code

VB		A		V			
Pressure relief valve	Pressure stages	Adjustment screw with hexagon socket	Nominal size	FPM Seals	Gauge port	Lock	Design series (not required for ordering)

Code	Pressure stages
025 [1]	up to 25 bar
064	**up to 64 bar**
125 [2]	**up to 125 bar**
160 [1]	**up to 160 bar**
210	**up to 210 bar**
350 [1]	up to 350 bar

[1] only NG 06
[2] only NG 10

Code	Nominal size
06	**NG 06**
10	**NG 10**

Code	Lock
omit	**Normal**
Z	Key lock

Code	Gauge port
G [1]	G 1/4"
M [2]	M18x1.5

Bold letters =
Short-term availability

VB_UK.INDD CM_29.01.2008.1

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Technical data

General			
Design		Direct operated pressure relief valve, spool type	
Nominal size		**NG 06 (CETOP 03 / NFPA D03)**	**NG 10 (CETOP 05 / NFPA D05)**
Interface		Subplate mounting according to ISO 5781	
Mounting position		unrestricted	
Ambient temperature	[°C]	-20...+80	
Weight	[kg]	1.3	3.7
Hydraulic			
Max. operating pressure	[bar]	Port P and A 350 Port T depressurized	Port A and B 315 Port Y depressurized
Pressure stages	[bar]	25, 64, 160, 210, 350	64, 125, 210
Nominal flow	[l/min]	25	60
Fluid		Hydraulic oil according to DIN 51524...525	
Fluid temperature	[°C]	-20...+70	
Viscosity recommended	[cSt] / [mm²/s]	30...50	
permitted	[cSt] / [mm²/s]	20...380	
Filtration		ISO 4406 (1999) 18/16/13	

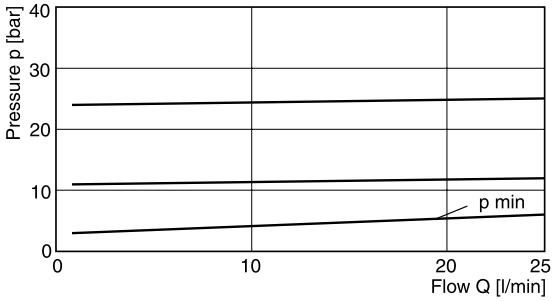
4

p/Q performance curves

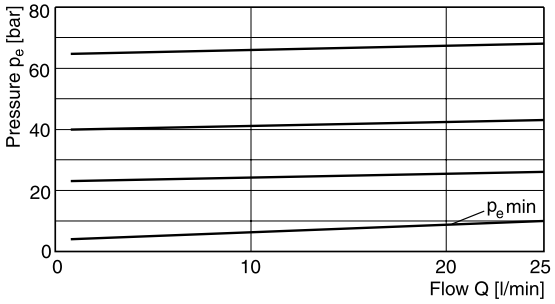
measured at t = 50°C and ν = 36 mm²/s

VB*06

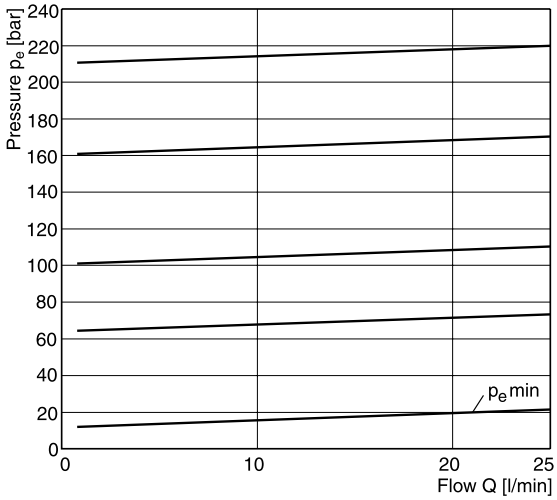
Setting pressure max. 25 bar



Setting pressure max. 64 bar

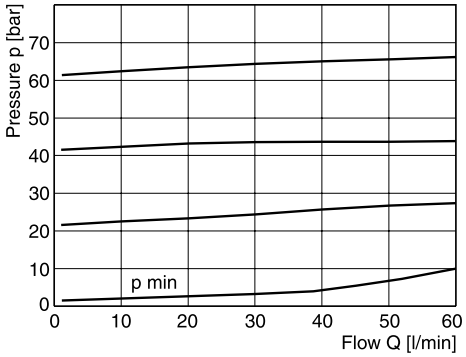


Setting pressure max. 160 or 210 bar

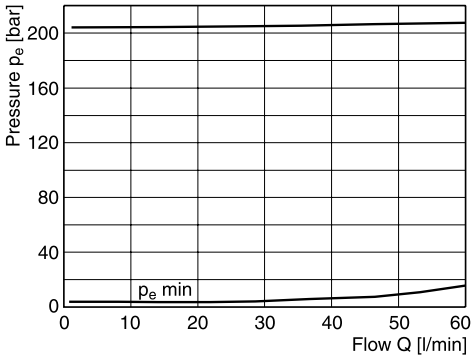


VB*10

Setting pressure max. 64 bar

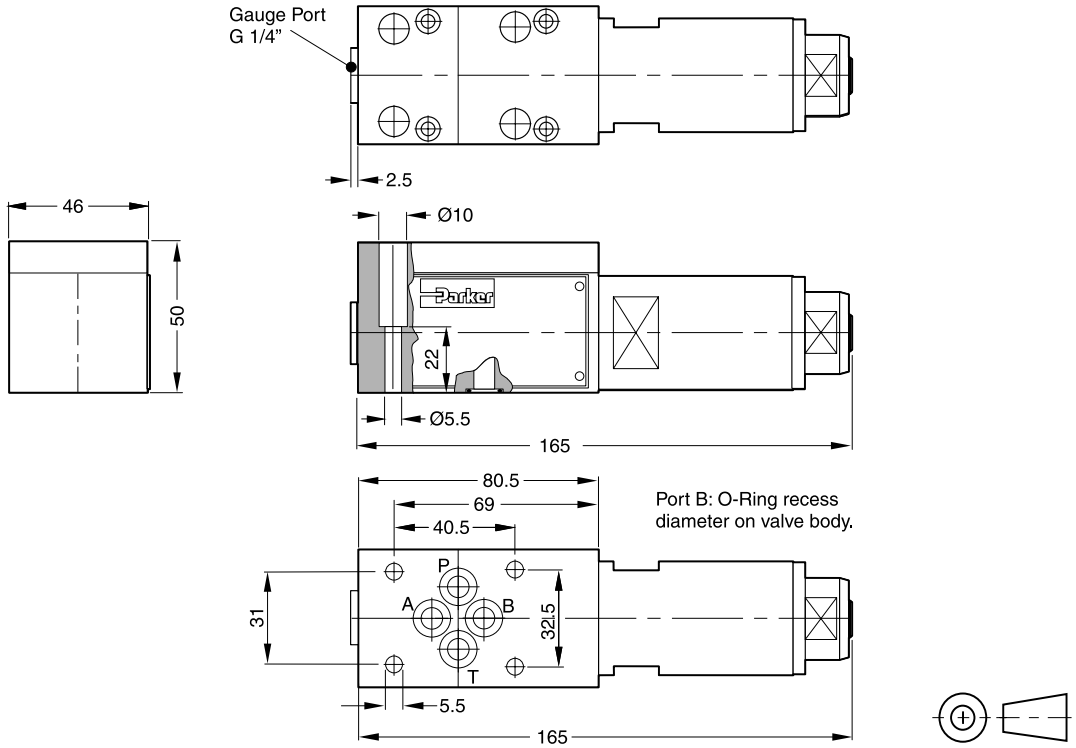


Setting pressure max. 210 bar



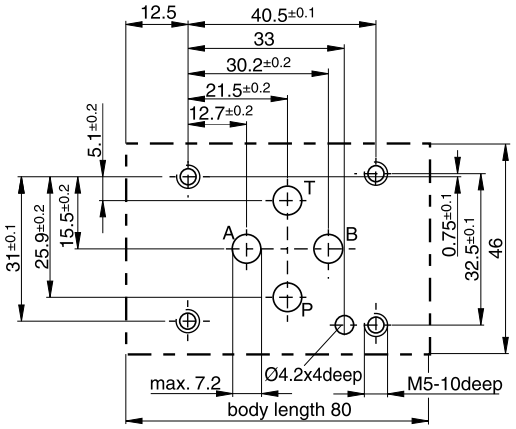
4

NG06

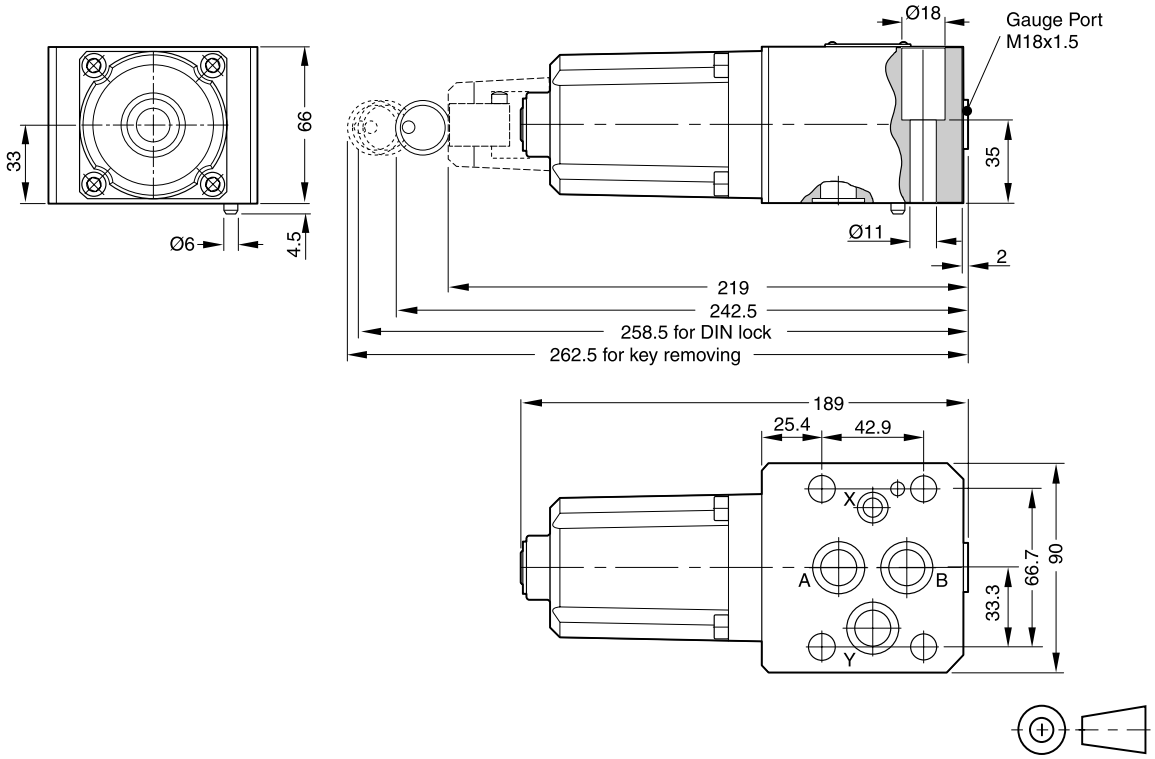


Surface finish	Bolt kit			Kit FPM
R_{max}6.3 0.01/100	BK375	4xM5x30 DIN 912 12.9	7.6 Nm ±15%	SK-VB/VM/VS-A06V

Mounting pattern ISO 5781-03-04-0-00

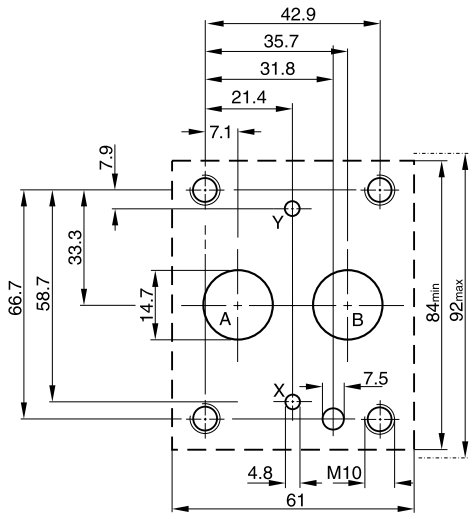


NG10



Surface finish	Bolt kit			Kit FPM
R_{max}6.3 0.01/100	BK389	4xM10x50 DIN 912 12.9	63 Nm ±15%	SK-VB/VM-A10V

Mounting pattern ISO 5781-06-07-0-00



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Pilot operated relief valves of the series VBY consist of a pilot with manual adjustment and a spool type main stage. The valves need to be externally drained.

The series VBY can also be used as pressure sequence valve, because of the high pressure capability in the outlet port and the external drain port.

Features

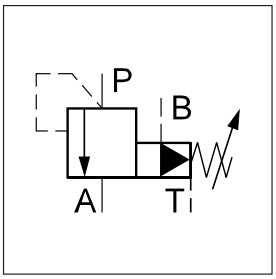
- Subplate mounting acc. to ISO 5781
- Main stage spool type
- Pilot stage seated type
- 4 pressure stages
- 2 adjustment modes
  - screw with hexagon socket
  - Key lock



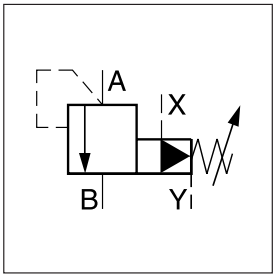
VBY*A06



VBY*A10



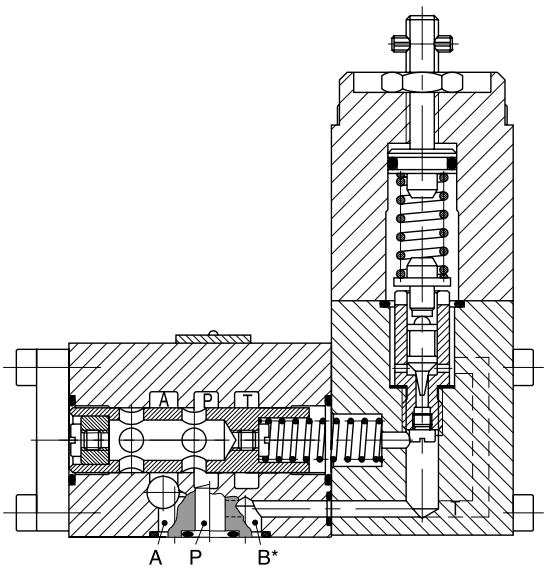
VBY*A06



VBY*A10

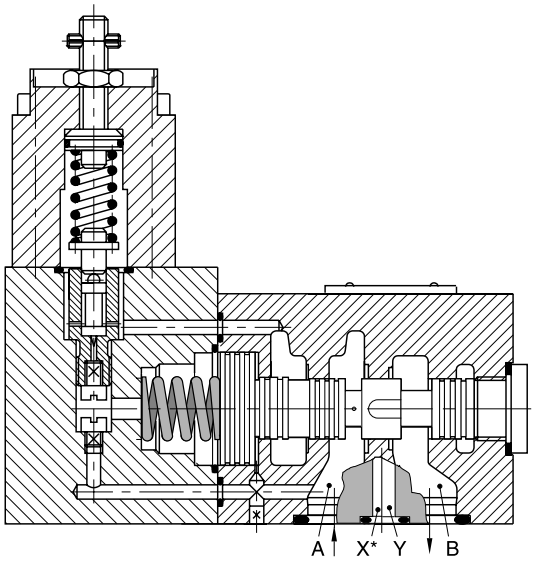
4

VBY*A06



* Port B for remote control, otherwise to be blocked

VBY*A10

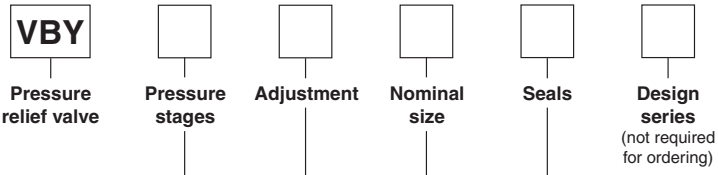


* Port X for remote control, otherwise to be blocked

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4

Ordering code



Code	Pressure stages
064	**up to 64 bar**
160	**up to 160 bar**
210	**up to 210 bar**
315	up to 315 bar

Code	Adjustment
A	**Screw with hexagon socket**
H	Turning knob with key lock

Code	Seals
N	**NBR**
V	FPM

Code	Nominal size
06	**NG06**
10	**NG10**

Bold letters =
Short-term availability

Technical data

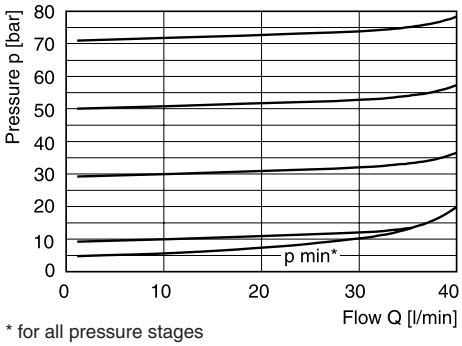
Nominal size		**NG06**	**NG10**
Design		Pilot operated pressure relief valve, spool type	
Interface		Subplate mounting according to ISO 5781	
Mounting position		unrestricted	
Ambient temperature	[°C]	-20...+80	
Max. operating pressure	[bar]	P, A, B 315	A, B, X 315
External drain port pressure	[bar]	T 100	Y 100
Pressure stages	[bar]	64, 160, 210, 315	
Fluid temperature	[°C]	-20...+70	
Viscosity, recommended	[cSt] / [mm²/s]	30...50	
permitted	[cSt] / [mm²/s]	20...380	
Filtration		ISO 4406 (1999) 18/16/13	
Nominal flow	[l/min]	See p/Q curves	
Pilot oil flow	[cm³/min]	approx. 500	approx. 1000
Weight	[kg]	2.4	4.5

p/Q performance curves VBY

measured at t = 50°C and ν = 36 mm²/s

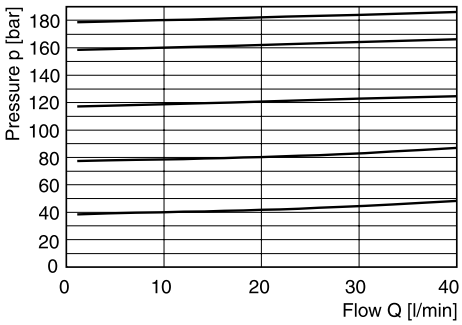
NG06

Max. 64 bar NG06

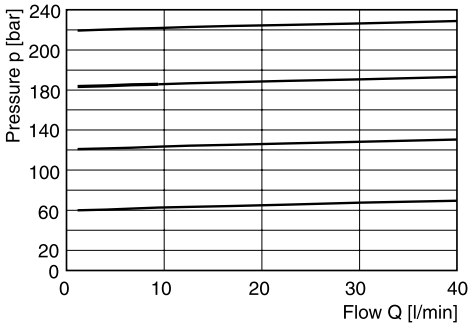


* for all pressure stages

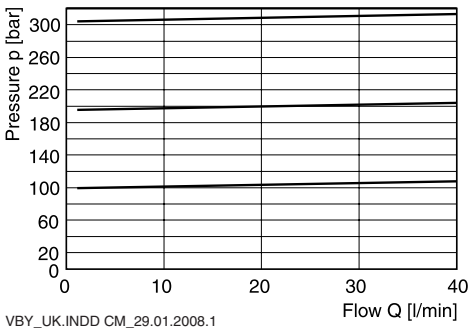
Max. 160 bar NG06



Max. 210 bar NG06



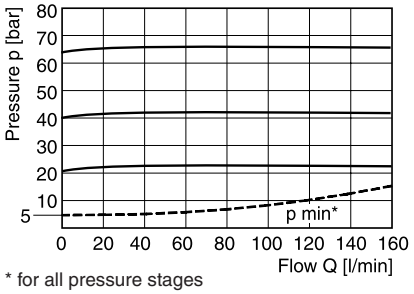
Max. 315 bar NG06



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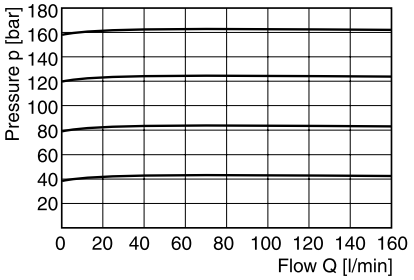
NG10

Max. 64 bar NG10

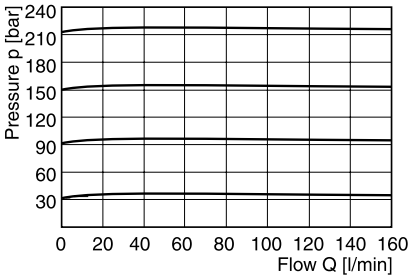


* for all pressure stages

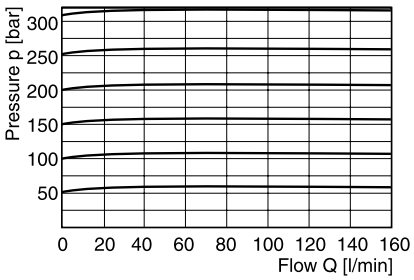
Max. 160 bar NG10



Max. 210 bar NG10



Max. 315 bar NG10



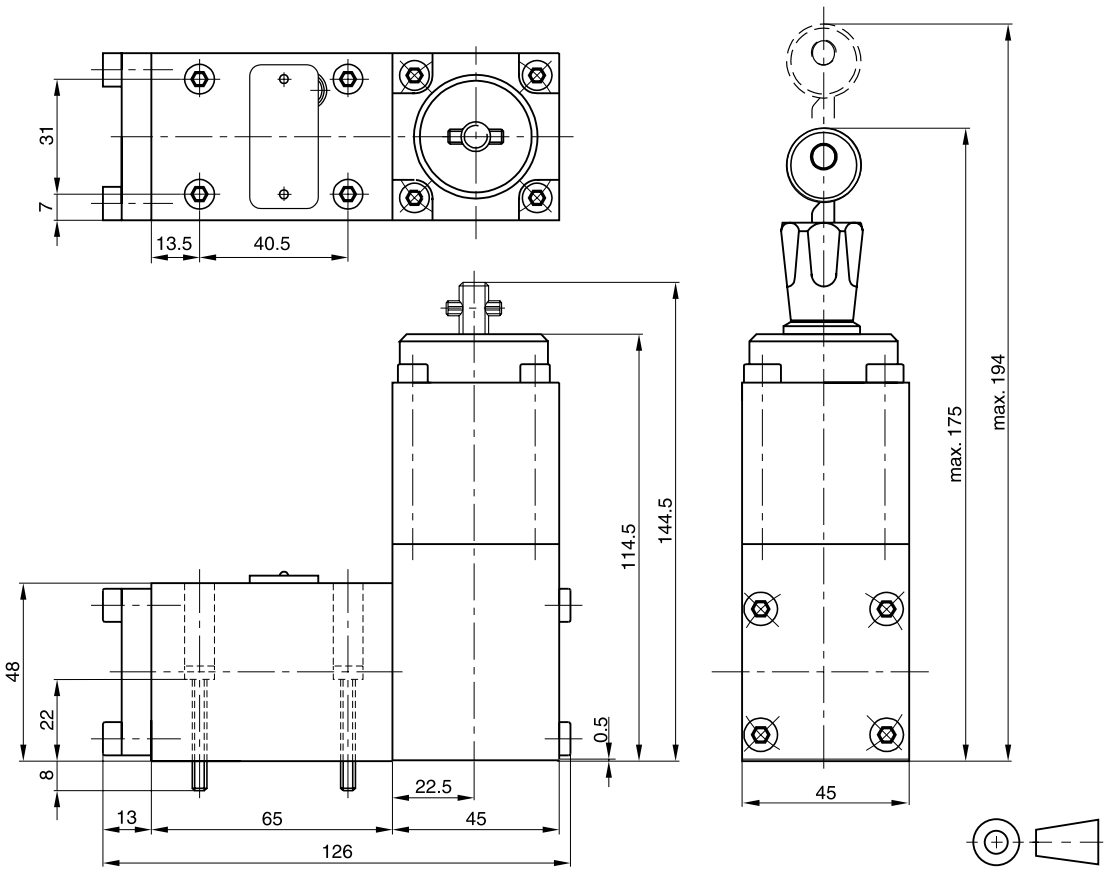
4

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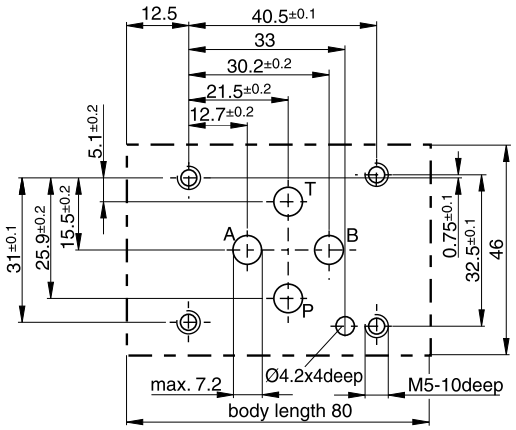
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NG06



Surface finish	Bolt kit			Kit FPM
R_{max}6.3 0.01/100	BK375	4xM5x30 DIN 912 12.9	7.6 Nm ±15%	SK-VBY-A06V

Mounting pattern ISO 5781-03-04-0-00

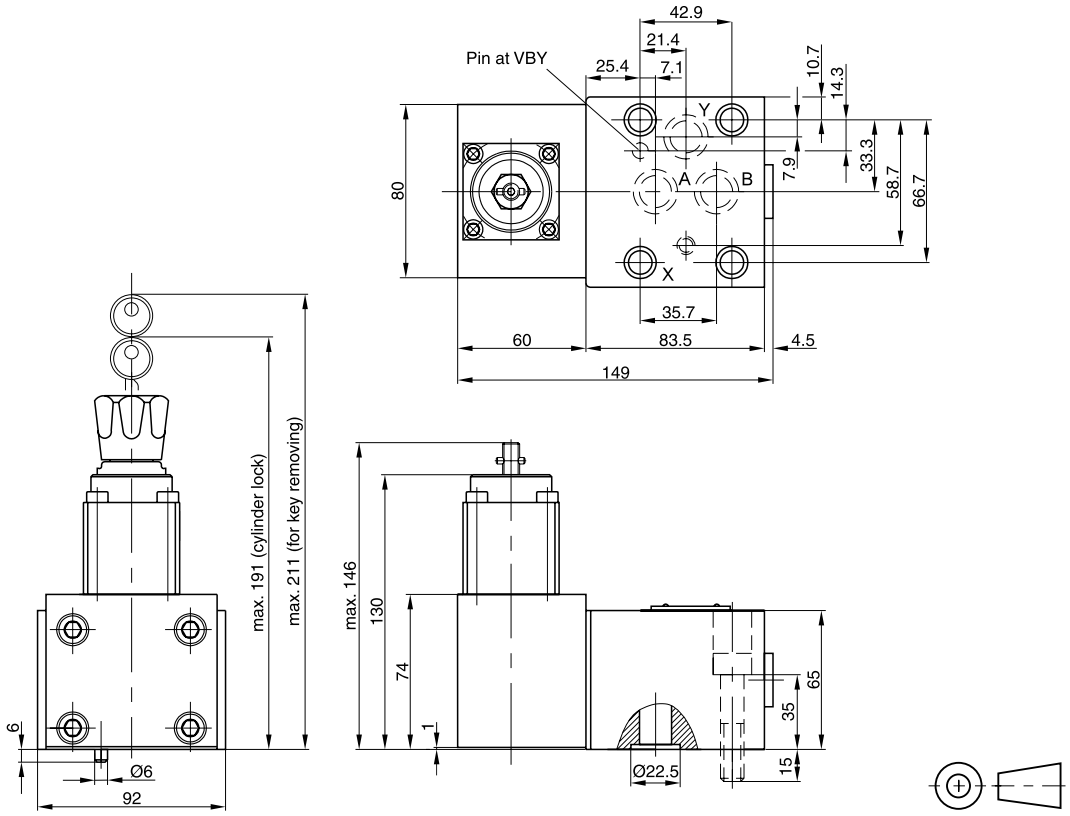


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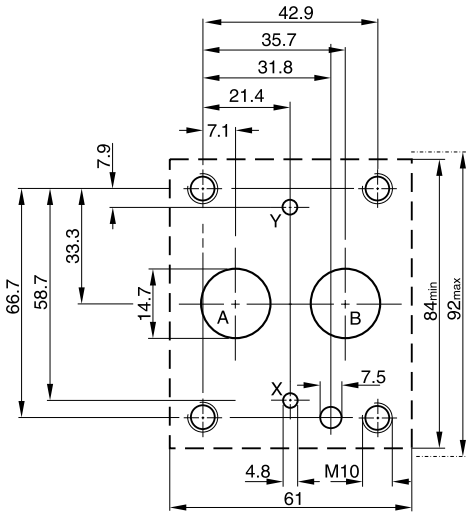
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NG10



Surface finish	Bolt kit			Kit FPM
R_{max}6.3 ⏥ 0.01/100	BK389	4xM10x50 DIN 912 12.9	63 Nm ±15%	SK-VB/VM-A10V

Mounting pattern ISO 5781-06-07-0-00



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The direct operated pressure relief valve series EVSA is a seated type valve for screw-in mounting. It is available in two sizes and three pressure stages.

Function

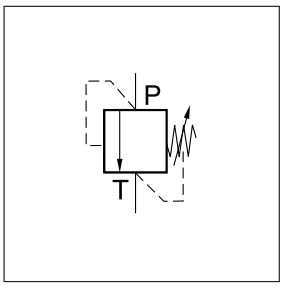
When the pressure in port P exceeds the setting pressure the cone opens to port T and thus limits the pressure in port P to the adjusted level.

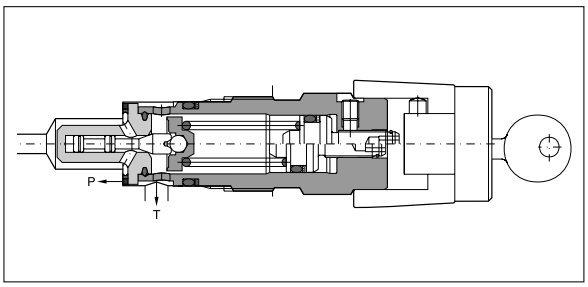
The integrated damping spool prevents pressure fluctuations in the transition region. The pressure is set by the adjusting screw, which is locked by the clamping screw. The setting can optionally be secured by a cylinder lock (key lock).

Features

- Seated type valve
- Screw-in mounting
- 3 pressure stages
- 2 adjustment modes
  - screw with lock nut
  - key lock







Note

The spring must be unloaded when the EVSA is screwed out of the manifold.

Technical data

General			
Design		Direct operated relief valve, seated type	
Nominal size		**NG06**	**NG10**
Interface		Screw-in mounting	
Mounting position		unrestricted	
Ambient temperature	[°C]	-20...+80	
Weight	[kg]	0.3	0.45
Hydraulics			
Max. operating pressure	[bar]	Port P 315, Port T depressurized	
Pressure stages	[bar]	64, 160, 315	
Nominal flow	[l/min]	40 (NG06), 80 (NG10)	
Fluid		Hydraulic oil according to DIN 51524...525	
Fluid temperature	[°C]	Recommended +30...+50, permitted -20...+70	
Viscosity permitted	[cSt] / [mm²/s]	20...380	
recommended	[cSt] / [mm²/s]	30...50	
Filtration		ISO 4406 (1999); 18/16/13	

Ordering code

EVSA		A		1		
Pressure relief valve	**Pressure stages**	**Adjustment screw with hex. socket**	**Nominal size / thread type**	**FPM Seals**	**Design series** (not required for ordering)	**Lock**

Code	Pressure stages
064	**up to 64 bar**
160	**up to 160 bar**
315	**up to 315 bar**

Code	Lock
omit	**Normal**
Z	Key lock

Code	Nominal size
06	**NG06, M28x1.5**
10	**NG10, M35x1.5**

Bold letters =
Short-term availability

EVSA_UK.INDD CM_29.01.2008.1

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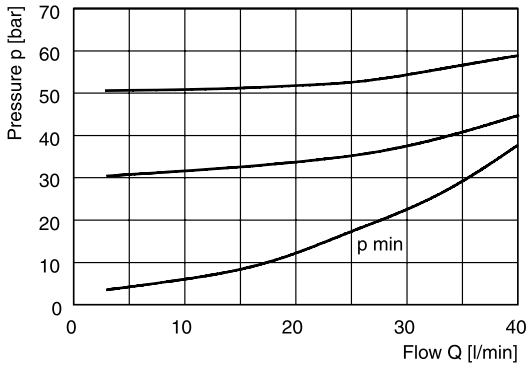
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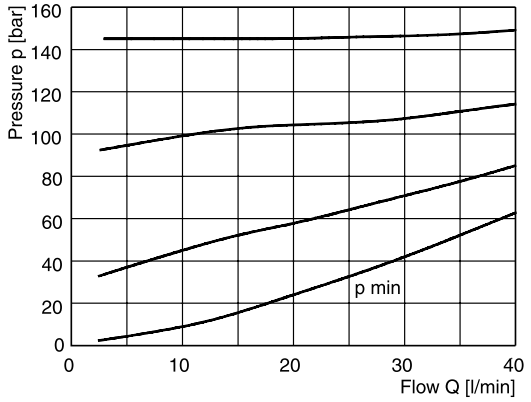
Δp/Q performance curves
measured at t = 50°C and υ = 36 mm²/s

NG06

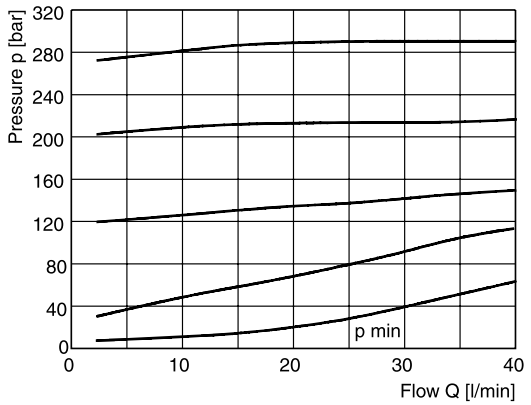
Pressure stage 64 bar



Pressure stage 160 bar

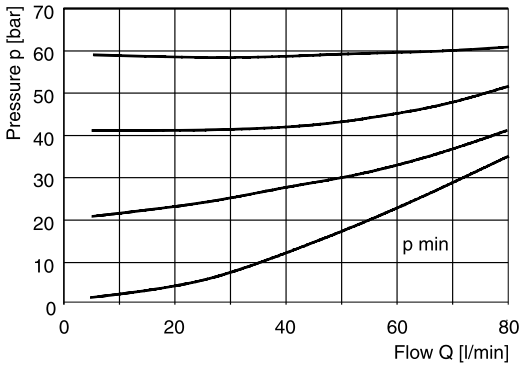


Pressure stage 315 bar

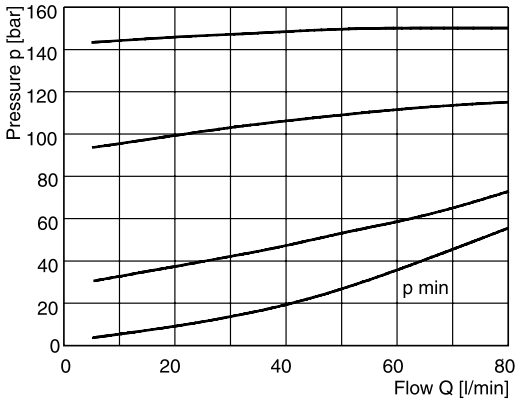


NG10

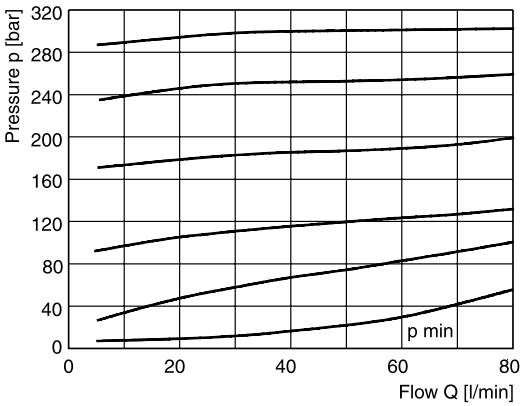
Pressure stage 64 bar



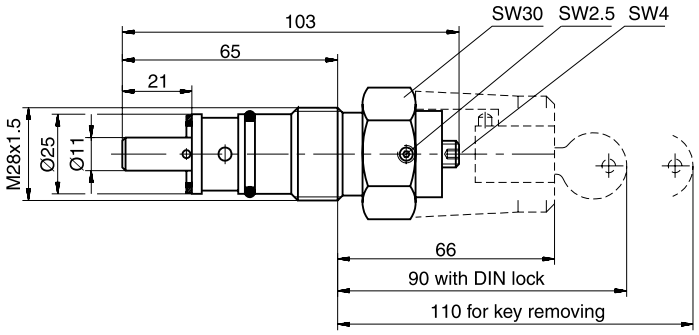
Pressure stage 160 bar



Pressure stage 315 bar

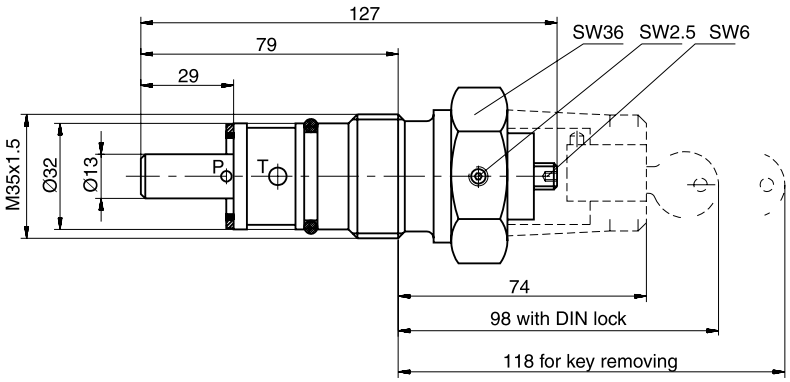


EVSA NG06



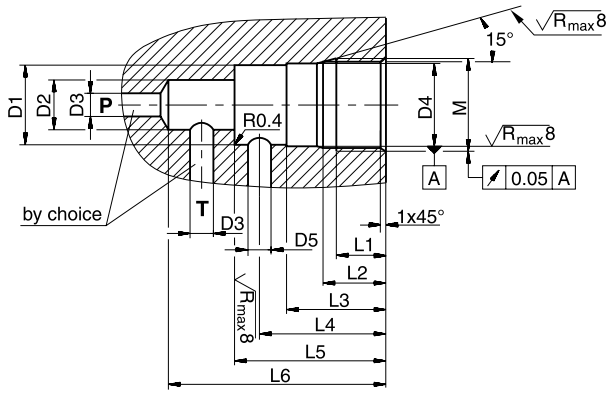
Kit
SK-EVSAA0613

EVSA NG10



Kit
SK-EVSAA1013

Installation dimensions



Size	M	D_1	D_2	D_3	D_4	D_5	L_1	L_2	L_3	L_4	L_5	L_6
NG06	M28 x 1.5	Ø24.8	Ø15	Ø6.8	$Ø25^{H9}$	Ø6.8	15	19	30	35	45	65
NG10	M35 x 1.5	Ø31.8	Ø18.5	Ø10	$Ø32^{H9}$	Ø10	18	23	35	41 - 46	52	80

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Direct operated pressure relief valves series R1E02 are seated type valves typically used for remote pressure controls. In applications where the reliability and simplicity of a hydraulic remote control are preferred to an electro-hydraulic system the R1E02 series is an ideal solution.

Typically pilot operated pressure valves or compensators of variable pumps are controlled.

Features

- Seated type valve
- 3 body variants:
  - foot mounting
  - front panel mounting
  - subplate mounting
- 3 pressure stages
- 3 adjustment modes
  - hand knob
  - acorn nut with lead seal
  - adjusting with lock



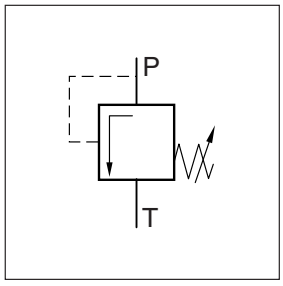
Foot mounting



Front panel mounting

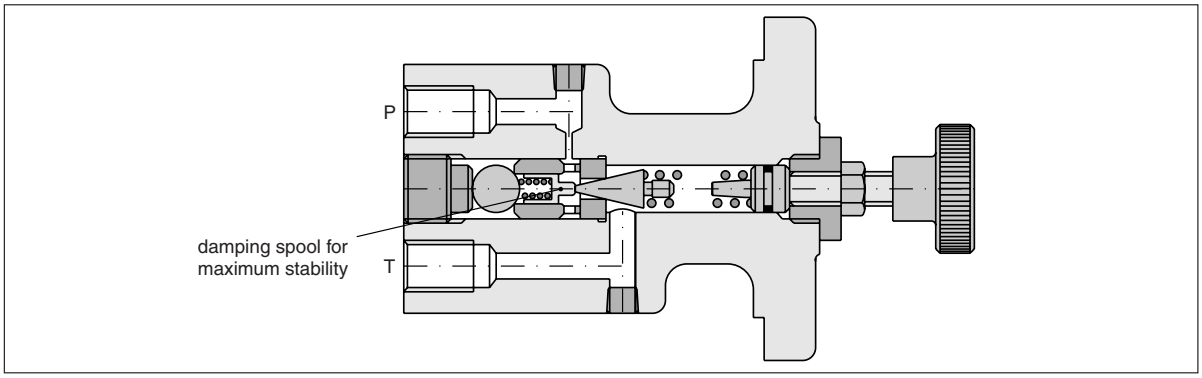


Subplate mounting

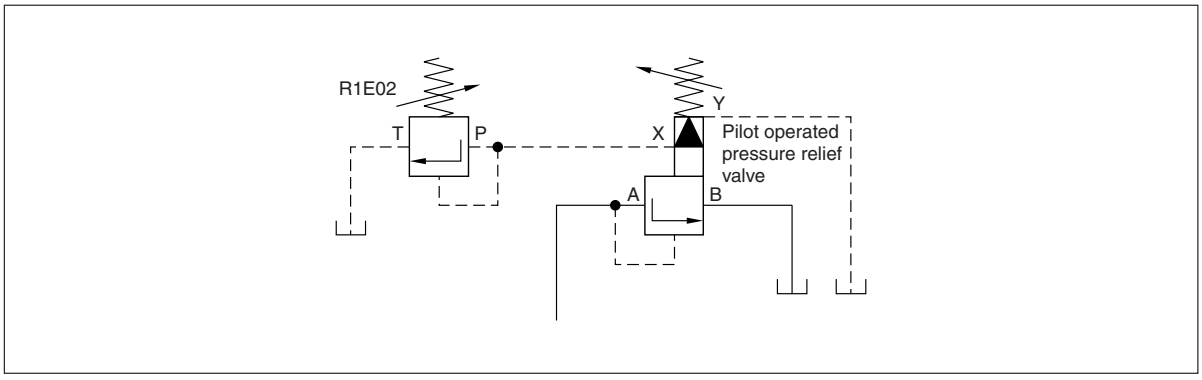


4

R1E02, front panel mounting



Typical configuration as remote pilot valve



4

Ordering code

R1E02	–	☐	☐	☐	☐	–	A	–	1	–	☐
Pressure relief valve		Interface	Pressure stages	Connections G1/4“	Adjustment		Design series		Seals NBR		Options

Code	Interface
1	foot mounting
2	front panel mounting
3	subplate mounting

Code	Pressure stages
1	up to 105 bar
3	up to 210 bar
5	up to 350 bar

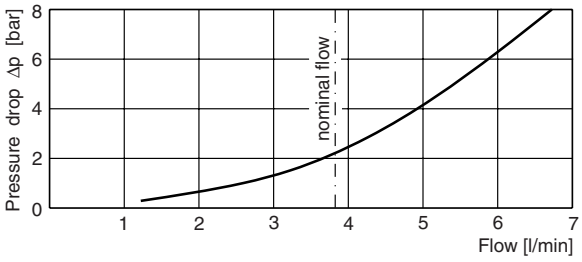
Code	Adjustment
1	Hand knob Ø 32 mm
3	Acorn nut with lead seal
4 [1)]	Adjusting device with lock (key order no. 700-70619)

[1)] on bodies for subplate mounting use plate S16-64188.

Technical data

General				
Design		Direct operated relief valve, seated type		
Nominal size		1/4”		
Interface		foot mounting	front panel mounting	subplate mounting
Mounting position		unrestricted		
Ambient temperature	[°C]	-20...+60		
Weight	[kg]	2.1	2.1	1.0
Hydraulics				
Max. operating pressure	[bar]	Port P 350, Port T depressurized		
Pressure stages	[bar]	105, 210, 350		
Fluid temperature	[°C]	-20...+70		
Nominal flow	[l/min]	3.8		
Fluid		Hydraulic oil according to DIN 51524...525		
Minimum setting pressure	[bar]	7		
Viscosity permitted	[cSt] / [mm²/s]	10...650		
recommended	[cSt] / [mm²/s]	30		
Filtration		ISO 4406 (1999); 18/16/13		

Characteristic curves

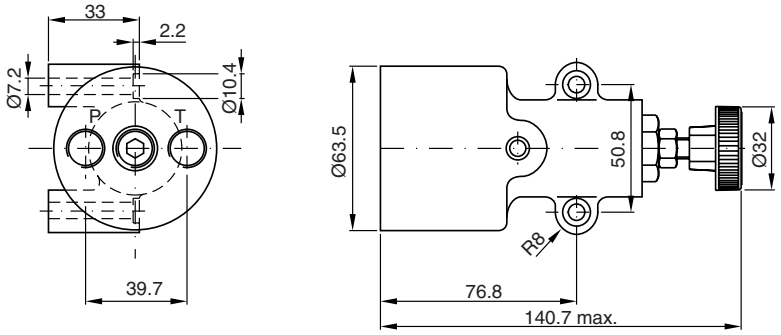


Fluid viscosity 35 cSt at 50°C ± 5°C

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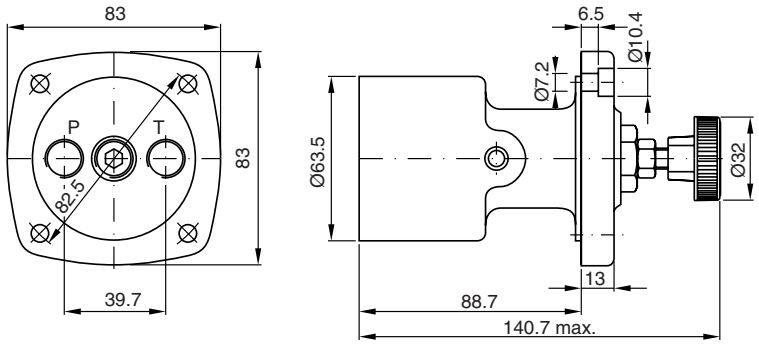
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Foot mounting



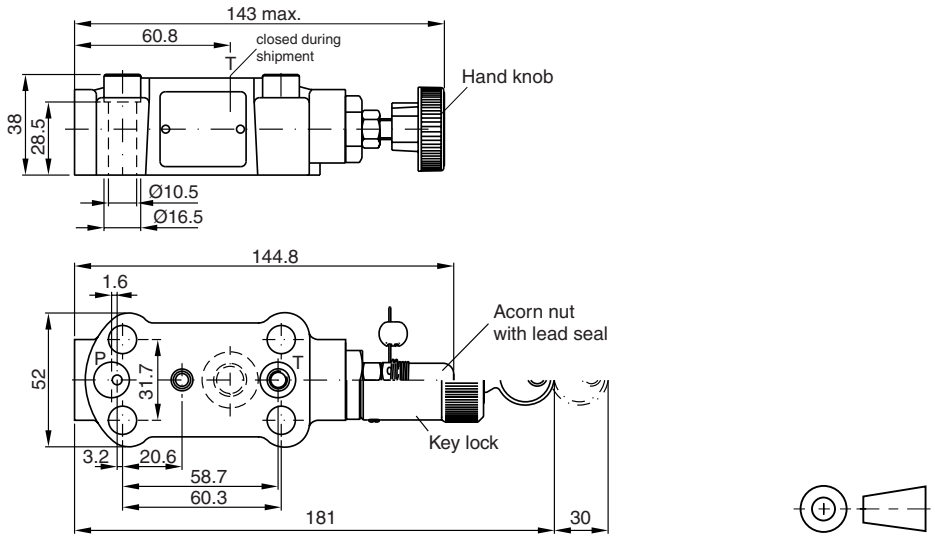
Ports P and T: G1/4”

Front panel mounting



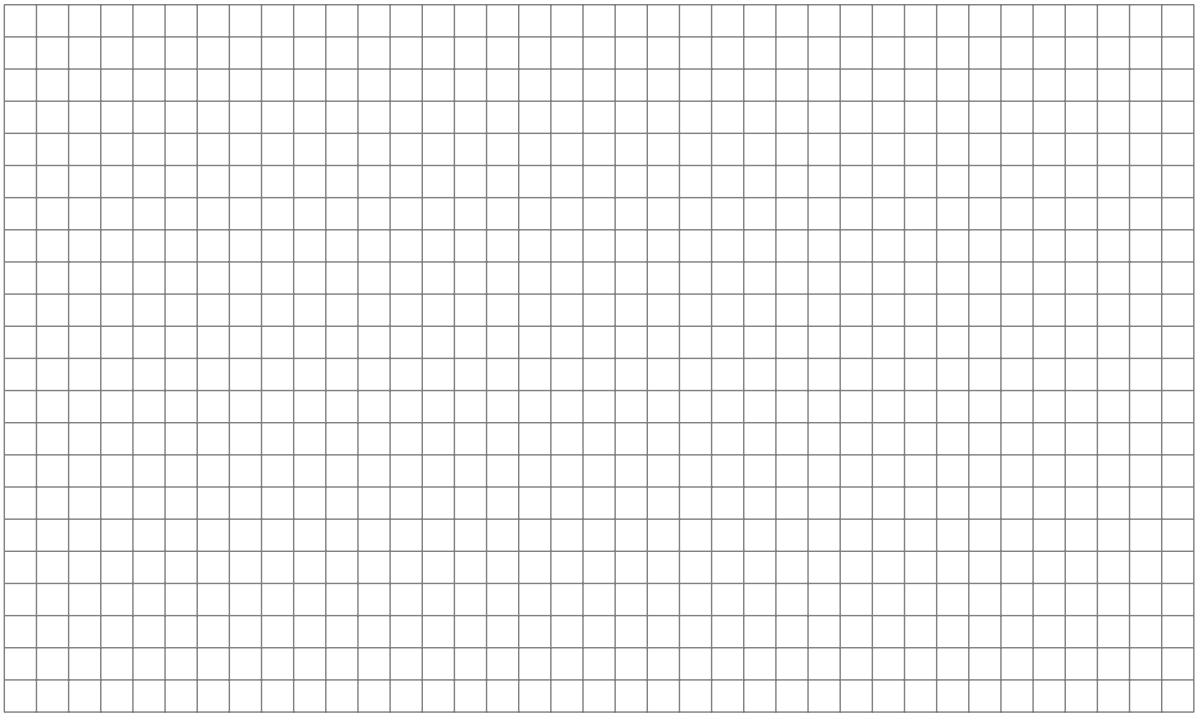
Ports P and T: G1/4”

Subplate mounting



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Pilot operated pressure relief valves are available with both Parker (series R/RS) and Denison (series R4V/R6V) model codes.

A manually adjusted pilot stage controls a seated type main stage.

A vent function with a solenoid operated directional valve is available for circulation at minimum pressure.

Features

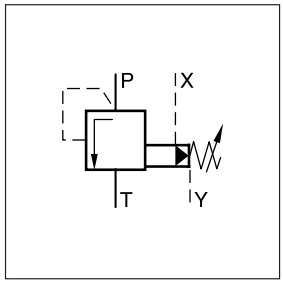
- Pilot operated with manual adjustment
- 2 interfaces
  - Subplate ISO 6264 (DIN 24340 Form D) with VV01 vent valve
  - Subplate ISO 6264 (DIN 24340 Form E) with Cetop 03 vent valve
- 4 pressure stages
- 3 adjustment modes
  - hand knob
  - acorn nut with lead seal
  - Key lock
- Remote control via port X



R25R



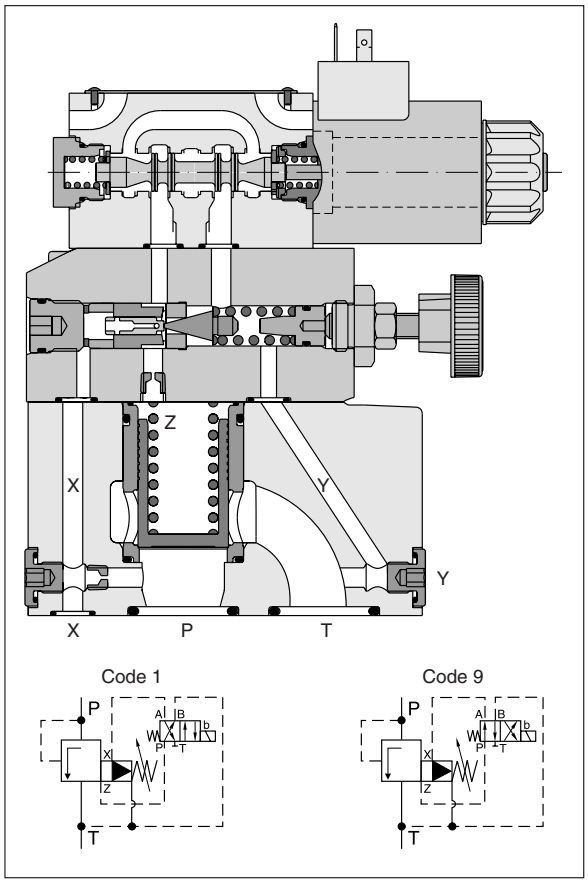
RS25R





RS25M

RS25R



Function:

Series R

System pressure in port P is applied via the X gallery to the spring loaded cone in the pilot head. The pilot head controls the pressure in the Z area on top of the main cartridge which is additionally kept close by the main spring.

If the pilot pressure exceeds the setting pressure the pilot cone opens and thus limits the pilot pressure.

When the system pressure exceeds the pilot pressure plus the spring force, the main cartridge opens to port T and limits the pressure in port P to the adjusted level.

Series RS

Additionally to the relief function of series R, a solenoid operated vent valve connects the Z area to tank. This allows oil circulation from P to T at minimum pressure drop. The vent valve can either be a standard Cetop 03 valves (mounting form E) or a sandwich unit (mounting form D). For both types the vent position can be either at the energized or de-energized solenoid.

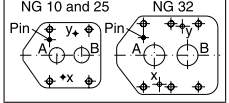
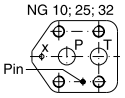
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R						S		
Pressure relief valve	Nominal size	Interface	Pressure stages	Adjust-ment	Pilot oil	Poppet spring	Seals	Design series (not required for ordering)

Code	Nominal size
10	NG10
25	NG25
32	NG32

Code	Seals
N	NBR
V	FPM

Code	Interface	
M	Subplate mounting ISO 6264	NG 10 and 25 / NG 32 
R [1]		NG 10; 25; 32 

[1] drain line with pipe only

Pilot oil		
Code	Pilot	Drain
1	Internal	External
4	Internal	Internal

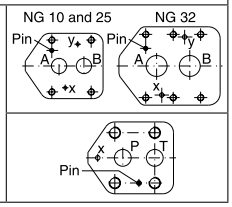
Code	Adjustment
S	Hand knob (Standard)
L	Key lock
A	Acorn nut with lead seal

Code	Pressure stages
07	up to 70 bar
17	up to 175 bar
25	up to 250 bar
35	up to 350 bar

The Parker model code should be used for all new applications. Otherwise also refer to Denison model code.

R [ ] V [ ] - 5 [ ] [ ] - [ ] [ ] [ ] - [ ]

- R: Pressure valve
- [ ]: Interface
- V: Relief function
- [ ]: Nominal size
- 5: Max. pressure (350 bar)
- [ ]: Drain port
- [ ]: Pressure setting range
- [ ]: Adjust-ment
- [ ]: Pilot oil
- [ ]: Design series
- [ ]: Seals
- [ ]: Modifi-cations

Code	Interface
4	Subplate mounting ISO 6264 
6	

Code	Seals
1	NBR
5	FPM

Code	Design
A	R4V
B	R6V

Code	Nominal size
03	NG10
06	NG25
10	NG32

Pilot oil	
Code	Drain line
0	internal
1 [1]	external from subplate
2 [2]	external from valve body (Y-port)

[1] R4V only
[2] R6V only

Code	Interface	Drain port
3	R4V	Y port in mounting pattern
9	R6V	Y-port = G 1/8“

Code	Adjustment
1	Hand knob 32mm dia. (Standard)
3	Acorn nut with lead seal
4	Key lock

Code	Pressure stages
1	up to 105 bar
3	up to 210 bar
5	up to 350 bar

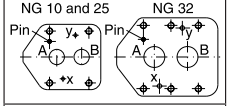
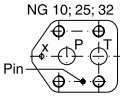
DENISON Hydraulics

The Denison model code is available for existing applications. Otherwise also refer to Parker model code.

4

RS						S				W		
Pressure relief valve with elec. unloading	Nominal size	Interface	Pressure stages	Adjustment	Pilot oil	Poppet spring	Seals	Switching type	Solenoid voltage	Without plug	Options	Design series (not required for ordering)

Code	Nominal size / Mounting	
10	NG10	Subplate mounting
25	NG25	
32	NG32	

Code	Interface	
M	Subplate mounting ISO 6264	NG 10 and 25 / NG 32 
R [1]		NG 10; 25; 32 

[1] external drain with pipe only

Code	Pressure stages
07	up to 70 bar
17	up to 175 bar
25	up to 250 bar
35	up to 350 bar

Code	Adjustment
S	Hand knob (Standard)
L	Key lock
A	Acorn nut with lead seal

Code	Options
omit	Standard
S	with slow unloading

Code	Solenoid
K	12V =
J	24V =
U	98V =
G	205V =
Y	110V / 50Hz 120V / 60Hz
T	230V / 50Hz 240V / 60Hz

Code	Switching type
1 [2]	Solenoid not activ. unpress. circulation
9 [2]	Solenoid activated unpress. circulation

[2] detailed symbols see characteristics.

Code	Seals
N	NBR
V	FPM

Pilot oil		
Code	Pilot	Drain
1	Internal	External
4	Internal	Internal

Other solenoid voltages on request.

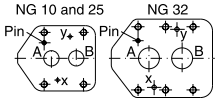
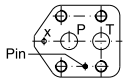
The Parker model code should be used for all new applications. Otherwise also refer to Denison model code.

R-RS-R4V-R6V_UK.INDD CM_29.01.2008.1

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R		V		-	5			-			-		-		-		-	
Pressure valve	Interface	Relief function	Nominal size		Max. Pressure (350 bar)	Drain port	Pressure setting range		Adjust-ment	Pilot oil		Vent valve function		Solenoid voltage		Design series		Seals		Modifi-cations

Code	Interface	
4	Subplate mounting ISO 6264	NG 10 and 25 / NG 32 
6		

Code	Seals
1	NBR
5	FPM

Code	Design
A	R4V
B	R6V

Code	Nominal size
03	NG10
06	NG25
10	NG32

Code	Voltage
G0R	12V =
G0Q	24V =
GAR	98V =
GAG	205V =
W30	110V / 50Hz 120V / 60Hz
W31	230V / 50Hz 240V / 60Hz

Code	Interface	Drain port
3	R4V	Y port in mounting pattern
9	R6V	Y-port = G 1/8“

Code	Vent valve
09	Solenoid not activ. unpress. circulation
11	Solenoid activated unpress. circulation

Code	Pressure stages
1	up to 105 bar
3	up to 210 bar
5	up to 350 bar

Code	Adjustment
1	Hand knob (Standard)
3	Acorn nut with lead seal
4	Key lock

Pilot oil	
Code	Drain line
0	internal
1 [1)]	external from subplate
2 [2)]	external from valve body (Y-port)

[1)] R4V only
[2)] R6V only

DENISON Hydraulics

The Denison model code is available for existing applications. Otherwise also refer to Parker model code.

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R / R*V

General					
Nominal size			**10**	**25**	**32**
Interface			Subplate mounting acc. ISO 6264		
Mounting position			as desired, horizontal mounting prefered		
Ambient temperature		[°C]	-20...+80		
Weight	Series R*R / R6V	[kg]	4.5	5.8	7.8
	Series R*M / R4V	[kg]	2.7	4.5	6.0
Hydraulic					
Max. operating pressure		[bar]	Ports P (or A) and X up to 350, Port T (or B) and Y depressurized		
Pressure stages		[bar]	75, 175, 250, 350 (series R) : 105, 210, 350 (series R*V)		
Nominal flow	Series R*R / R6V	[l/min]	250	500	650
	Series R*M / R4V	[l/min]	150	350	650
Fluid			Hydraulic oil according to DIN 51524 ... 525		
Viscosity, recommended		[cSt] / [mm²/s]	30 ... 50		
permitted		[cSt] / [mm²/s]	20 ... 380		
Fluid temperature		[°C]	-20 ... +70		
Filtration			ISO 4406 - (1999) ; 18/16/13		

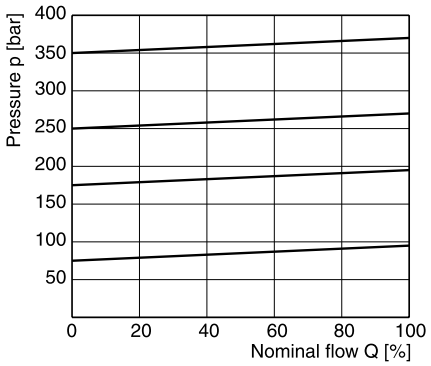
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RS / R*V with vent function

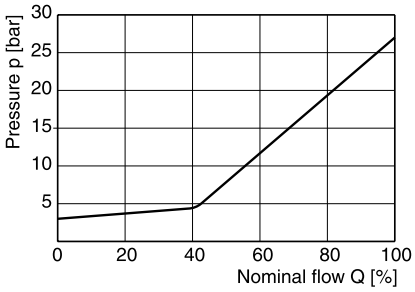
General								
Nominal size			**10**		**25**		**32**	
Interface			Subplate mounting acc. ISO 6264					
Mounting position			as desired, horizontal mounting prefered					
Ambient temperature		[°C]	-20...+80					
Weight	Series RS*R / R6V	[kg]	5.9		7.2		9.2	
	Series RS*M / R4V	[kg]	4.4		6.2		7.7	
Hydraulic								
Max. operating pressure		[bar]	Ports P (or A) and X 350, port T (or B) and Y depressurized					
Pressure stages		[bar]	75, 175, 250, 350 (series R) : 105, 210, 350 (series R*V)					
Nominal flow	Series RS*R / R6V	[l/min]	250		500		650	
	Series RS*M / R4V	[l/min]	150		350		650	
Fluid			Hydraulic oil according to DIN 51524 ... 525					
Viscosity, recommended		[cSt] / [mm²/s]	30 ... 50					
permitted		[cSt] / [mm²/s]	20 ... 380					
Fluid temperature		[°C]	-20 ... +70					
Filtration			ISO 4406 - (1999) ; 18/16/13					
Electrical								
Duty ratio		[%]	100 ED; CAUTION: coil temperature up to 180 °C possible					
Max. switching frequency		[1/h]	16000 (DC), 7200 (AC)					
Protection class			IP 65 in according with EN 60529 (plugged and mounted)					
Code Denison / Code Parker			G0R / K	G0Q / J	GAR / U	GAG / G	W30 / Y	W31 / T
Supply voltage		[V]	12V =	24V =	98V =	205V =	110V/50Hz 120V/60Hz	230V/50Hz 240V/60Hz
Tolerance supply voltage		[%]	+5...-10	+5...-10	+5...-10	+5...-10	+5...-10	+5...-10
Power consumption	hold	[W]	31	31	31	31	78	78
	in rush	[W]	31	31	31	31	264	264
Solenoid connection			Connector as per EN 175301-803					
Wiring min.		[mm²]	3 x 1.5 recommended					
Wiring length max.		[m]	50 recommended					

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p/Q performance curve
Series R/RS*M / R4V [1)]

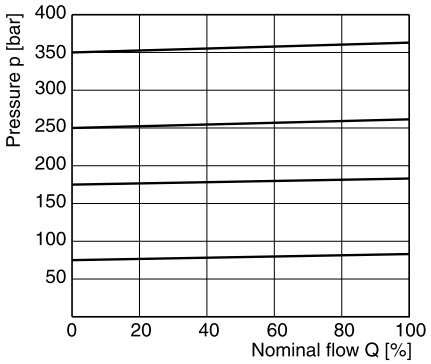


Minimum pressure curve

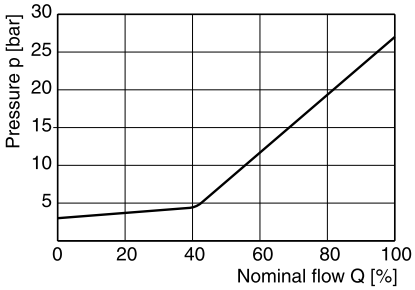


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p/Q performance curve
Series R/RS*R/R6V [1)]

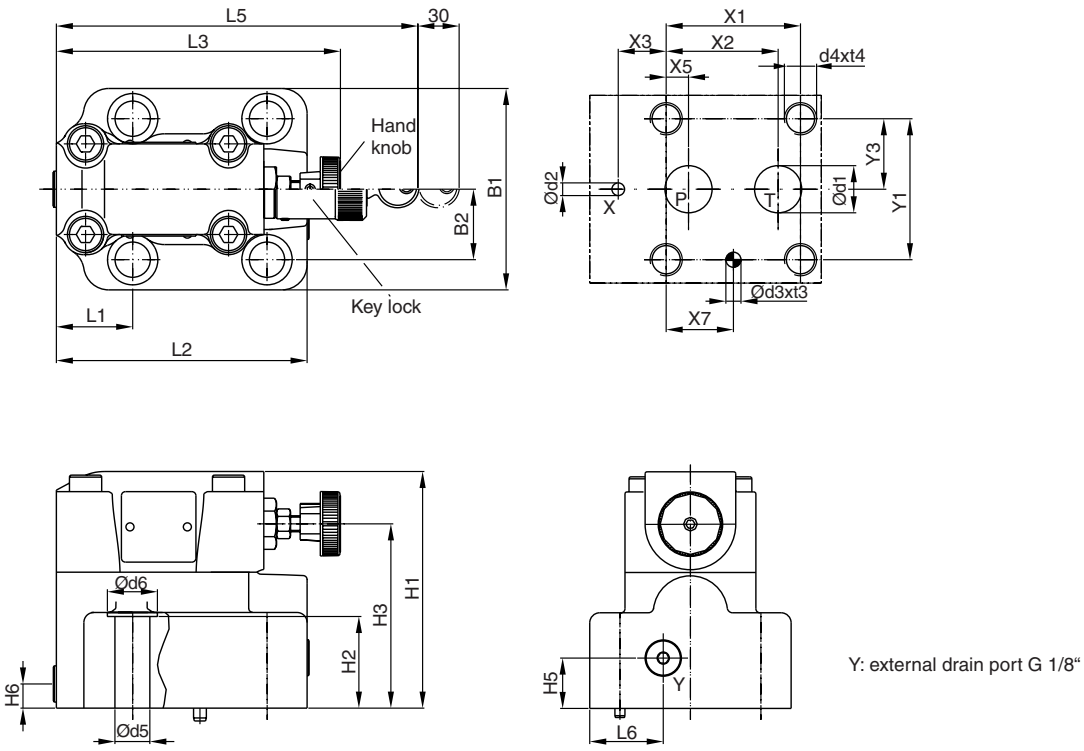


Minimum pressure curve



1) The performance curves are measured with external drain.
For internal drain the tank pressure has to be added to curve.

R*R / R6V



Y: external drain port G 1/8"

NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	6264-06-09-*-97	53.8	47.5	0	–	22.1	–	22.1	53.8	–	26.9	–	–	–
25	6264-08-13-*-97	66.7	55.6	23.8	–	11.1	–	33.4	70	–	35	–	–	–
32	6264-10-17-*-97	88.9	76.2	31.8	–	12.7	–	44.5	82.6	–	41.3	–	–	–

Tolerance at X and Y pin holes and screw holes ±0.1, at port holes ±0.2.

NG	ISO-code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6
10	6264-06-09-*-97	80	26.9	114	27	88		20.5	25	52.5	118.5	141		180	29.5
25	6264-08-13-*-97	100	35	117.5	45.5	91.5	–	25	12	37.9	124.5	141	–	180	36.5
32	6264-10-17-*-97	120	41.3	123	52	97		26.5	13.5	45	153	141		180	46.5

NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	6264-06-09-*-97	14.7	4.8	7.5	10	M12	20	13.5	20
25	6264-08-13-*-97	23.4	6.3	7.5	10	M16	27	17.5	25
32	6264-10-17-*-97	32	6.3	7.5	10	M18	28	20	30

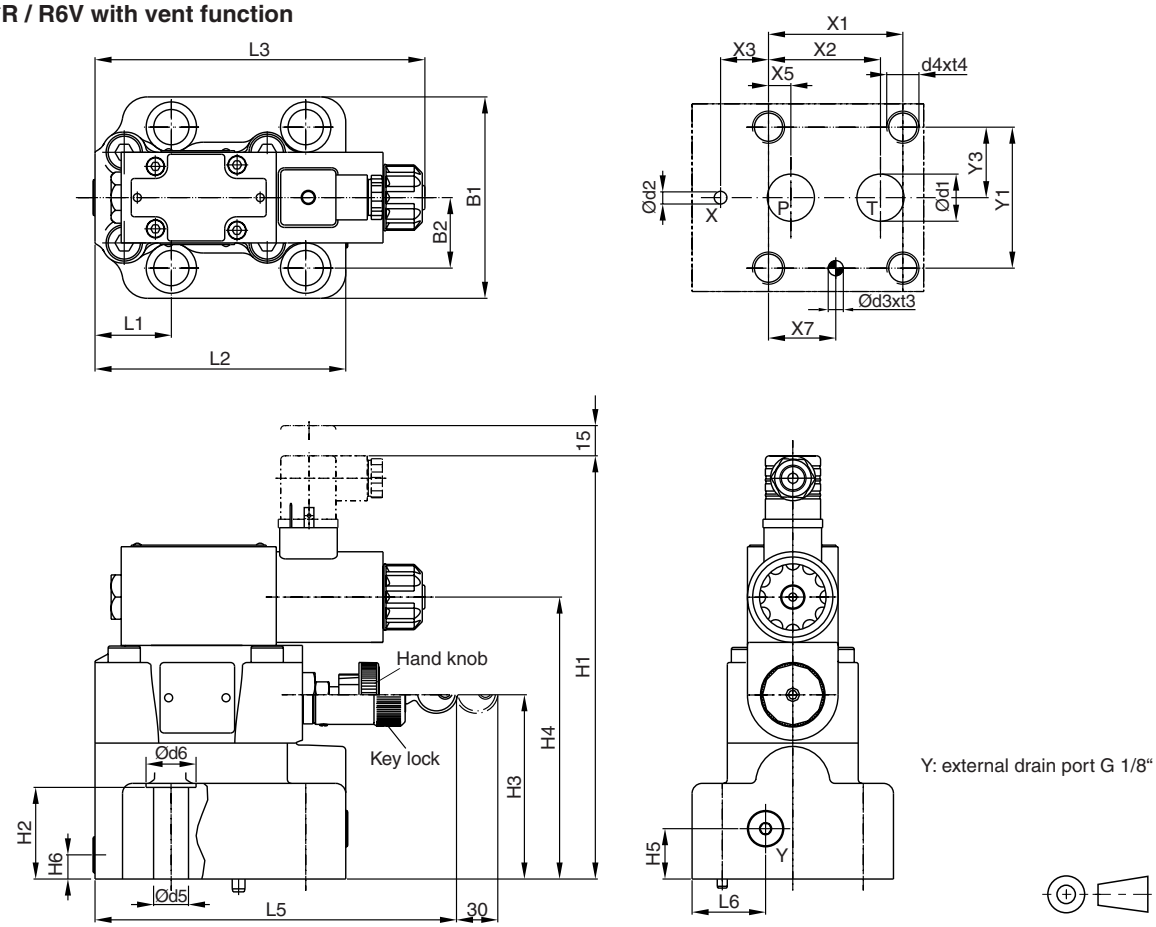
NG	ISO-code	Bolt kit			Kit		Surface finish
					NBR	FPM	
10	6264-06-09-*-97	BK 494	4xM12 x 45 DIN 912 12.9	108 Nm ±15%	SK-R10RN40	SK-R10RV40	
25	6264-08-13-*-97	BK 366	4xM16 x 70 DIN 912 12.9	264 Nm ±15%	SK-R25RN40	SK-R25RV40	
32	6264-10-17-*-97	BK 507	4xM18 x 75 DIN 912 12.9	398 Nm ±15%	SK-R32RN40	SK-R32RV40	

R-RS-R4V-R6V_UK.INDD CM_29.01.2008.1

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RS*R / R6V with vent function



NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	6264-06-09-*-97	53.8	47.5	0	–	22.1	–	22.1	53.8	–	26.9	–	–	–
25	6264-08-13-*-97	66.7	55.6	23.8	–	11.1	–	33.4	70	–	35	–	–	–
32	6264-10-17-*-97	88.9	76.2	31.8	–	12.7	–	44.5	82.6	–	41.3	–	–	–

Tolerance at X and Y pin holes and screw holes ±0.1, at port holes ±0.2.

NG	ISO-code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6
10	6264-06-09-*-97	80	26.9	206	27	88	136.5	25	12	52.5	118.5	163.8		180	36.5
25	6264-08-13-*-97	100	35	210	45.5	91.5	140	25	12	37.9	124.5	163.8	–	180	36.5
32	6264-10-17-*-97	120	41.3	215.5	52	97	145.5	25	12	45	153	163.8		180	36.5

NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	6264-06-09-*-97	14.7	4.8	7.5	10	M12	20	13.5	20
25	6264-08-13-*-97	23.4	6.3	7.5	10	M16	27	17.5	25
32	6264-10-17-*-97	32	6.3	7.5	10	M18	28	20	30

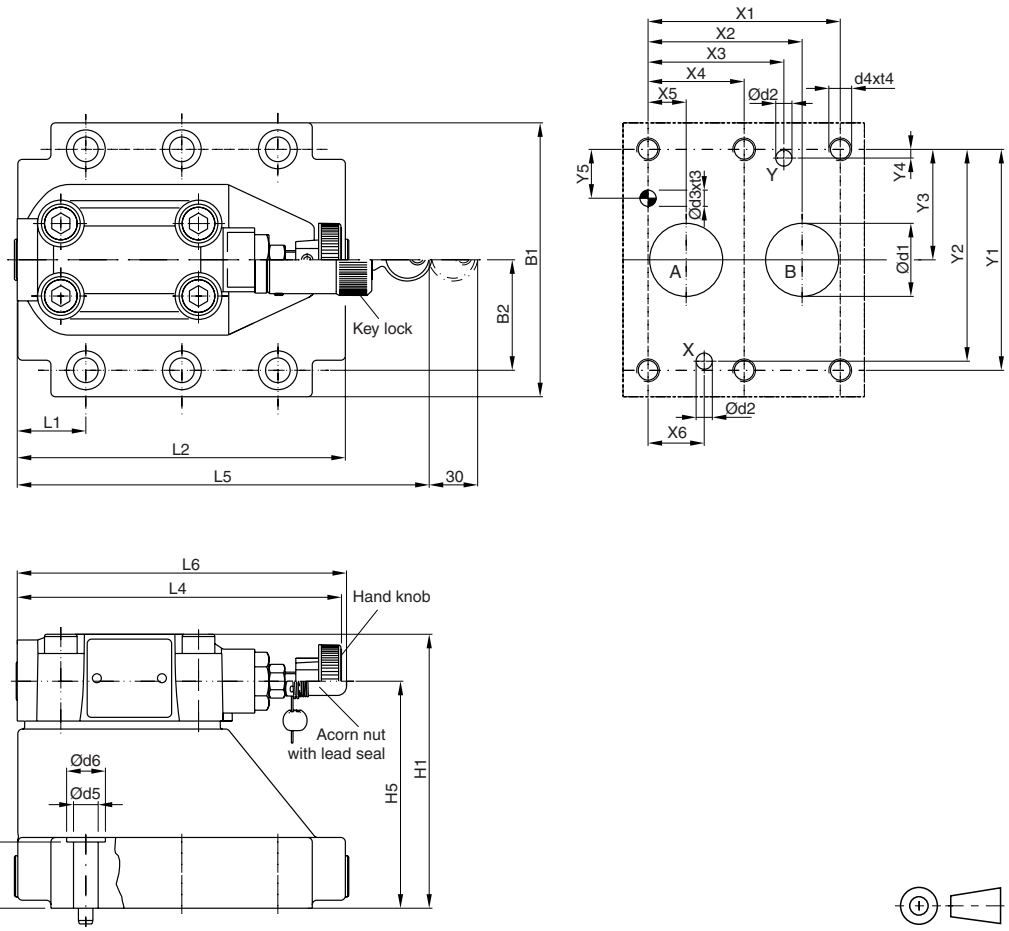
NG	ISO-code	Bolt kit			Kit		Surface finish
					NBR	FPM	
10	6264-06-09-*-97	BK 494	4xM12 x 45 DIN 912 12.9	108 Nm ±15%	SK-RS10RN40	SK-RS10RV40	
25	6264-08-13-*-97	BK 366	4xM16 x 70 DIN 912 12.9	264 Nm ±15%	SK-RS25RN40	SK-RS25RV40	
32	6264-10-17-*-97	BK 507	4xM18 x 75 DIN 912 12.9	398 Nm ±15%	SK-RS32RN40	SK-RS32RV40	

R-RS-R4V-R6V_UK.INDD CM_29.01.2008.1

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R*M / R4V



NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	6264-06-07-*-97	42.9	35.8	21.5	–	7.2	21.5	0	66.7	58.8	33.4	7.9	14.3	–
25	6264-08-11-*-97	60.3	49.2	39.7	–	11.1	20.6	0	79.4	73	39.7	6.4	15.9	–
32	6264-10-15-*-97	84.2	67.5	59.5	42.1	16.7	24.6	0	96.8	92.8	48.4	3.8	21.4	–

Tolerance at X and Y pin holes and screw holes ±0.1, at port holes ±0.2.

NG	ISO-code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6
10	6264-06-07-*-97	87.3	33.35	83	21	–	–	62.5	–	29	94.8	–	143	181	144.8
25	6264-08-11-*-97	105	39.7	109.5	29	–	–	89	–	34.7	126.8	–	143	181	144.8
32	6264-10-15-*-97	120	48.4	120	29	–	–	99.5	–	30.6	144.3	–	143	181	144.8

NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	6264-06-07-*-97	15	7	7.1	8	M10	16	10.8	17
25	6264-08-11-*-97	23.4	7.1	7.1	8	M10	18	10.8	17
32	6264-10-15-*-97	32	7.1	7.1	8	M10	20	10.8	17

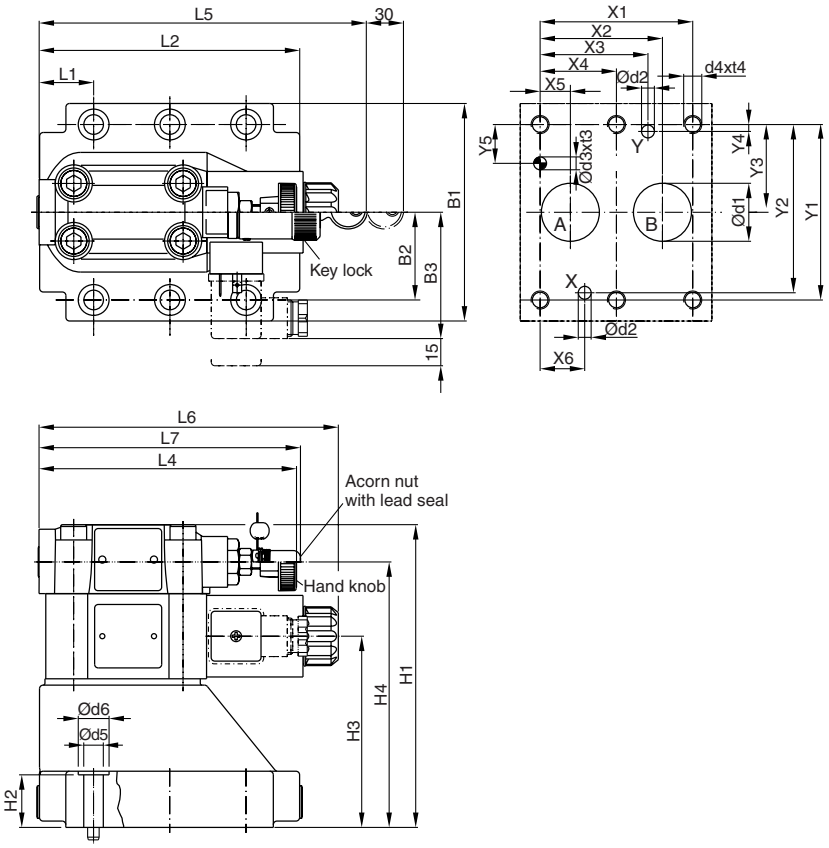
NG	ISO-code	Bolt kit			Kit		Surface finish
					NBR	FPM	
10	6264-06-07-*-97	BK 505	4x M10 x 35	DIN 912 12.9	63 Nm ±15%	SK-R10MN40	SK-R10MV40	R_{max}6.3 0.01/100
25	6264-08-11-*-97	BK 485	4x M10 x 45	DIN 912 12.9	63 Nm ±15%	SK-R25MN40	SK-R25MV40	
32	6264-10-15-*-97	BK 506	6x M10 x 45	DIN 912 12.9	63 Nm ±15%	SK-R32MN40	SK-R32MV40	

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RS*M / R4V with vent function



NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	6264-0-07-*-97	42.9	35.8	21.5	–	7.2	21.5	0	66.7	58.8	33.4	7.9	14.3	–
25	6264-08-11-*-97	60.3	49.2	39.7	–	11.1	20.6	0	79.4	73	39.7	6.4	15.9	–
32	6264-10-15-*-97	84.2	67.5	59.5	42.1	16.7	24.6	0	96.8	92.8	48.4	3.8	21.4	–

Tolerance at X and Y pin holes and screw holes ±0.1, at port holes ±0.2.

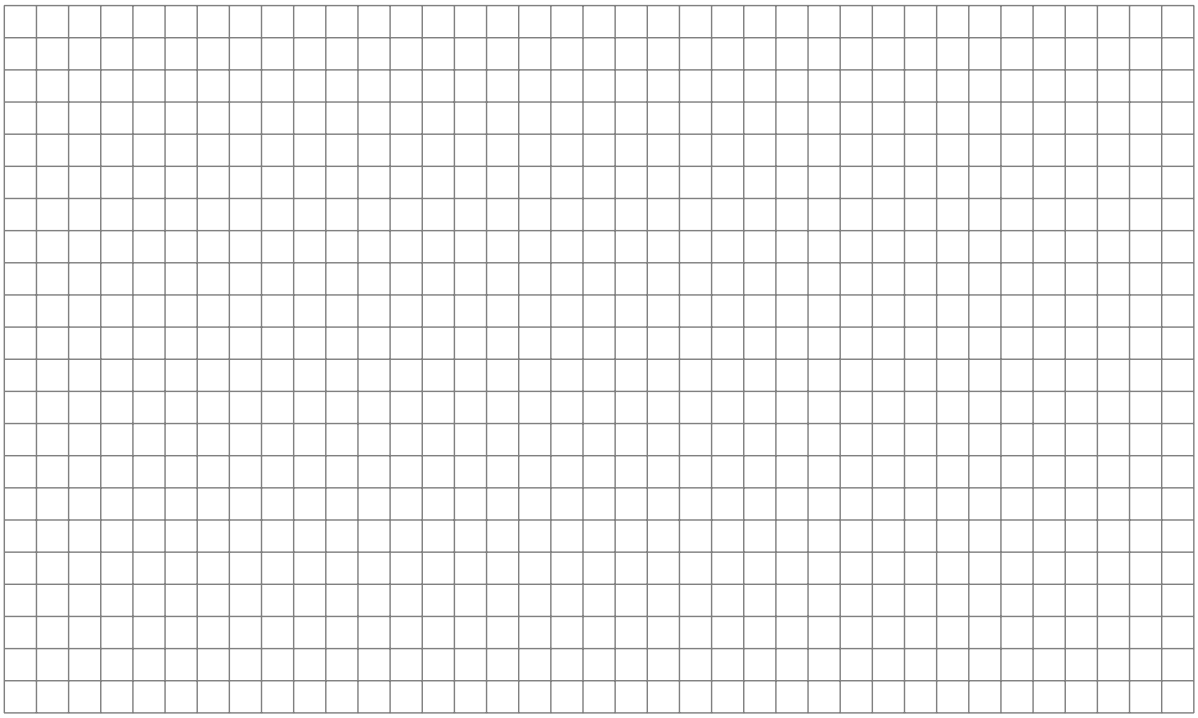
NG	ISO-code	B1	B2	B3	H1	H2	H3	H4	H6	L1	L2	L3	L4	L5	L6	L7
10	6264-06-07-*-97	87.3	33.35	70	130	21	68.5	109.5	–	29	94.8	–	143	181	165.6	144.8
25	6264-08-11-*-97	105	39.7	70	156.5	29	95	136	–	34.7	126.8	–	143	181	165.6	144.8
32	6264-10-15-*-97	120	48.4	70	167	29	105.5	146.5	–	30.6	144.3	–	143	181	165.6	144.8

NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	6264-06-07-*-97	15	7	7.1	8	M10	16	10.8	17
25	6264-08-11-*-97	23.4	7.1	7.1	8	M10	18	10.8	17
32	6264-10-15-*-97	32	7.1	7.1	8	M10	20	10.8	17

NG	ISO-code	Bolt kit			Kit		Surface finish
					NBR	FPM	
10	6264-06-07-*-97	BK 505	4x M10 x 35 DIN 912 12.9	63 Nm ±15%	SK-RS10MN40	SK-RS10MV40	
25	6264-08-11-*-97	BK 485	4x M10 x 45 DIN 912 12.9	63 Nm ±15%	SK-RS25MN40	SK-RS25MV40	
32	6264-10-15-*-97	BK 506	6x M10 x 45 DIN 912 12.9	63 Nm ±15%	SK-RS32MN40	SK-RS32MV40	

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Notes



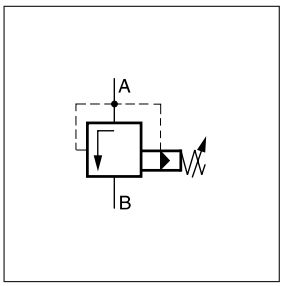
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The pilot operated pressure relief valves series DSDU limit the system pressure by opening the pressure port to the tank. They are mostly used for accumulator pressure relief. The valve is set and sealed by the German technical monitoring association TÜV. The valve delivery includes a copy of the TÜV certificate.





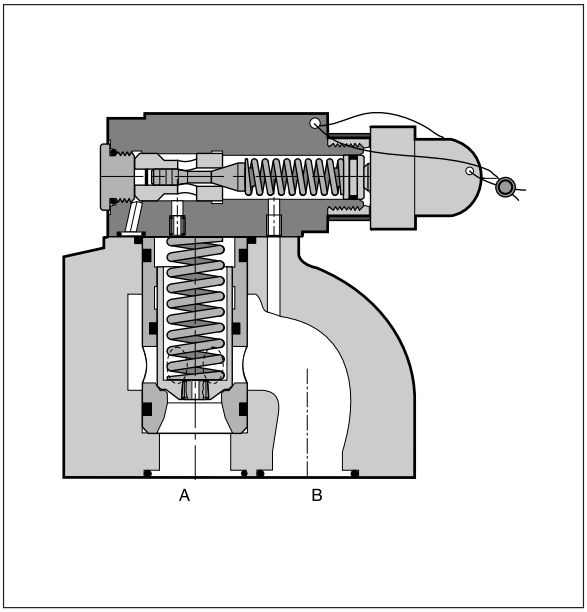
Features

- TÜV certificate



- Subplate mounting acc. to ISO 6264
- Nominal size 25
- Remote control via port X

Other TÜV approved pressure relief valves on request.



DSDU*P20

4

Technical data

General		
Size		25
Interface		Subplate mounting according to ISO 6264
Mounting position		as desired, horizontal mounting prefered
Ambient temperature	[°C]	-20...+80
Weight	[kg]	4.5
Hydraulic		
Max. operating pressure	[bar]	Ports A and X 350, B and Y depressurized
Pilot		Internal / internal
Adjustment pressure	[bar]	See ordering code
Nominal flow	[l/min]	See ordering code
Fluid		Hydraulic oil according to DIN 51524 ... 525
Viscosity, recommended	[cSt] / [mm²/s]	30 ... 50
permitted	[cSt] / [mm²/s]	12 ... 230
Fluid temperature	[°C]	-5 ... +70
Filtration		ISO 4406 (1999), 18/16/13

Ordering code

	DSDU			TÜV	
Seals	Pressure relief valve	Type code	Pressure stage		Desired opening pressure in bar (please specify)

Code	Seals
omit	**NBR**
V	FPM

Type Code 578 P20 Q_{max} [l/min] depending. on opening pressure	Pressure stage	Opening pressure ranges [bar]
220	B	50 - 75
240 265	E	76 - 125 126 - 175
300 320	G	176 - 200 201 - 250
345 370	K	251 - 300 301 - 350

Bold letters =
Short-term availability

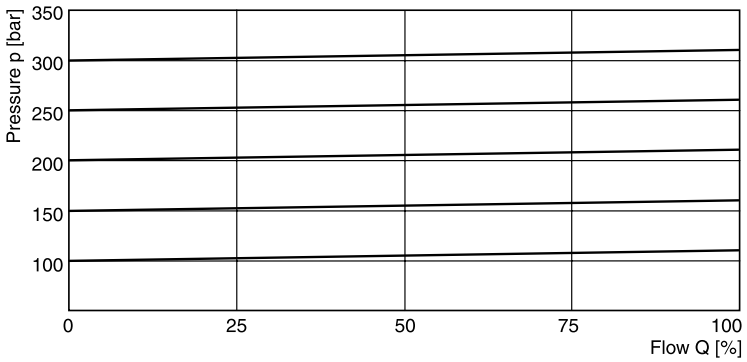
4

Ordering Examples

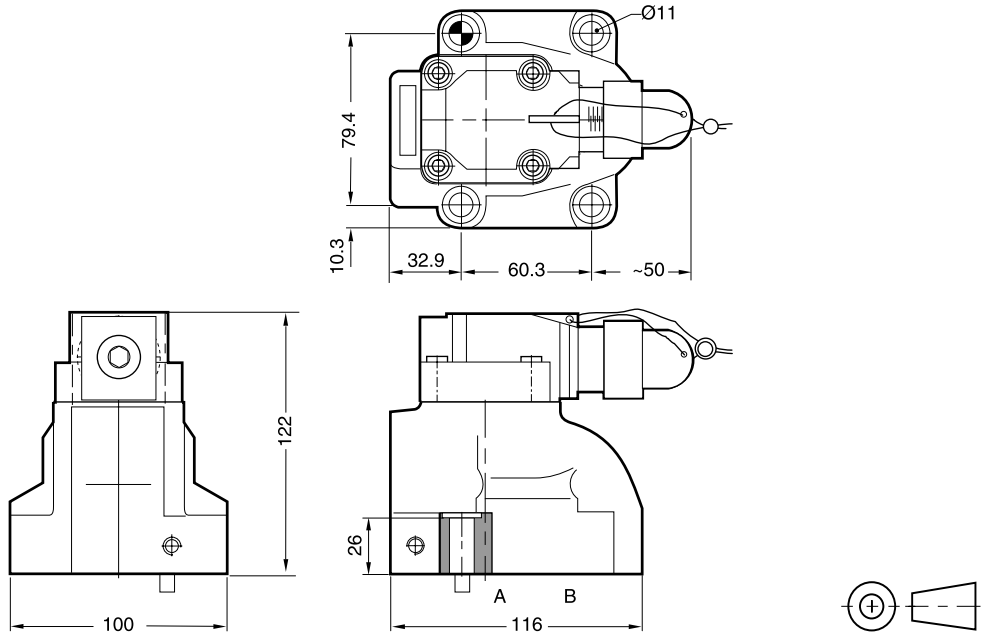
DSDU 578 P20 - 120bar matches Q_{max} 240 l/min, opening pressure 120bar

DSDU P578 P20 - 150bar matches Q_{max} 265 l/min, opening pressure 150bar

p/Q curve

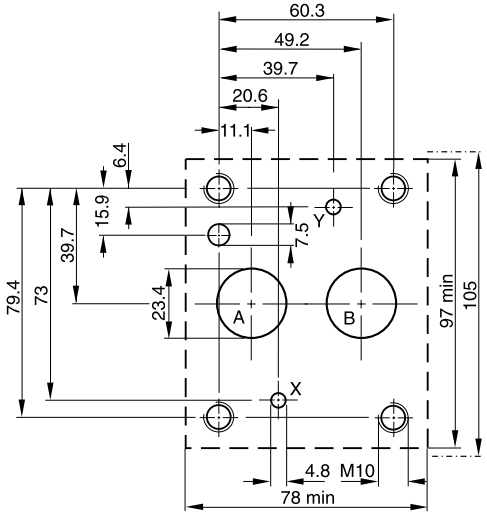


DSDU*P20



Size	Bolt kit			Kit NBR	Kit FPM
P20	BK 388	4x M10 x 40 DIN 912 12.9	63 Nm ±15%	SK-DSDU5P20	SK-DSDU5P20V

Mounting pattern ISO 6264-08-11-*-97



Tolerance at pin holes and screw holes ±0.1, at port holes ±0.2.

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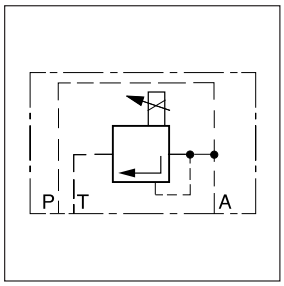
Direct operated proportional pressure relief valves are available with both Parker (series RE06M*W) and Denison (series 4VP01) model codes.

Function

When the pressure in port P (or A for RE06*M) exeeds the pressure setting at the solenoid, the cone opens to port T and limits the pressure in port P to the adjusted level. The optimum performance can be achieved in combination with the digital amplifier module PCD00A-400.



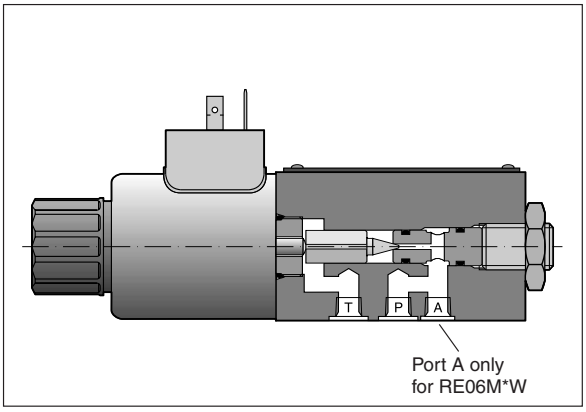
RE06M*W



RE06M*W

Features

- Direct operated by proportional solenoid
- Very low pressure adjustment of p_{min}
- 2 pressure ports, A and P for RE06M*W
- 1 pressure port for 4VP01
- Subplate mounting according to ISO 6264
- 4 pressure stages



Note

The RE06M*W series is equipped with two pressure ports (port P and A). The solenoid is located on the B port side of the mounting pattern.

The 4VP01 series is equipped with one pressure port (port P). The solenoid is located on the A port side of the mounting pattern.

Technical data

General		
Nominal size		DIN NG06 / CETOP03 / NFPA D03
Interface		Subplate mounting according to ISO 6264
Mounting position		as desired, horizontale mounting prefered
Ambient temperature	[°C]	-20 ... +70
Weight	[kg]	1.8
Hydraulic		
Max. operating pressure	[bar]	Ports P (and A) up to 350; port T depressurized
Pressure stages	[bar]	105, 175, 250, 350
Nominal flow	[l/min]	See p/Q curves
Fluid		Hydraulic oil as per DIN 51524 ... 525
Viscosity, recommended	[cSt] / [mm²/s]	30 ... 80
permitted	[cSt] / [mm²/s]	12 ... 380
Fluid temperature	[°C]	-20 ... +60
Filtration		ISO 4406 (1999), 18/16/13
Linearity	[%]	±2.8
Repeatability	[%]	<±1
Hysteresis	[%]	±1.5 of p_{max}
Electrical		
Duty ratio	[%]	100 ED
Protection class		IP 65 in accordance with EN 60529 (plugged and mounted)
Nominal voltage	[V]	12 (2.3 A max. current), 16 (1.3 A max. current)
Coil resistance	[Ohm]	4 at 20°C
Solenoid connection		Connector as per EN 175301-803
Power amplifier, recommended		PCD00A-400

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4

Parker

RE	06	M		W	2	V	1		W	
Proportional pressure relief valve	**NG06**	**Interface ISO 6264**	**Pressure stage**	**External electronics**		**FPM seals**	**Normaly open**	**Solenoid voltage**	**Plug connection EN 175301-803**	**Design series** (not required for ordering)

Code	Pressure stage
10	up to 105 bar
17	**up to 175 bar**
25	up to 250 bar
35	**up to 350 bar**

Code	Solenoid voltage
K	**12 V, 2.3 A**
X	16 V, 1.3 A

Bold letters =
Short-term availability

The Parker model code should be used for all new applications. Otherwise also refer to Denison model code.

Denison

4VP01			G12	B		
Proportional pressure relief valve	**Pressure stage**	**Orifice in port P**	**Solenoid voltage 12V/2.3 A**	**Design series**	**Seals**	**Modifications**

Code	Pressure stage
1	up to 50 bar
2	up to 105 bar
3	up to 210 bar
5	up to 350 bar

Code	Seals
1	NBR
5	FPM

Code	Orifice in port P
0	without (Standard)
1	Ø 0.6 mm
2	Ø 0.8 mm
3	Ø 1.0 mm
4	Ø 1.2 mm

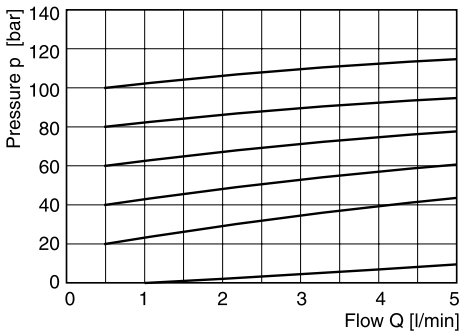
The Denison model code is available for existing applications. Otherwise also refer to Parker model code.

RE06MW-4VP01_UK.INDD CM_29.01.2008.1

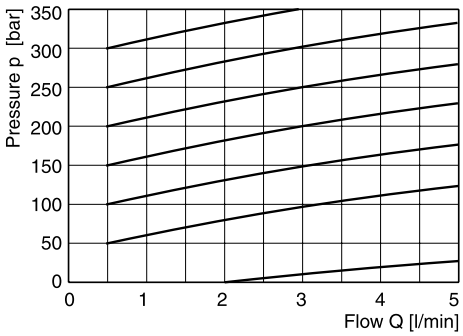
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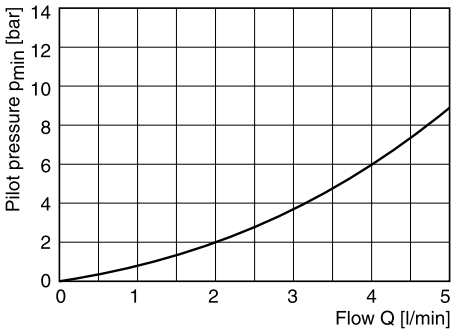
p/Q curves
Pressure stage 105bar



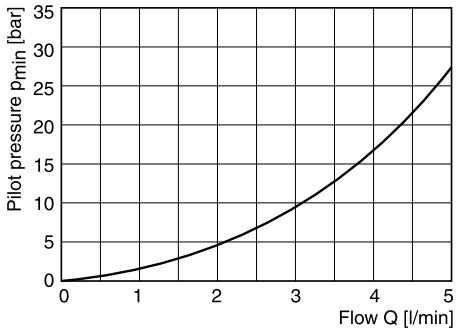
Pressure stage 350bar



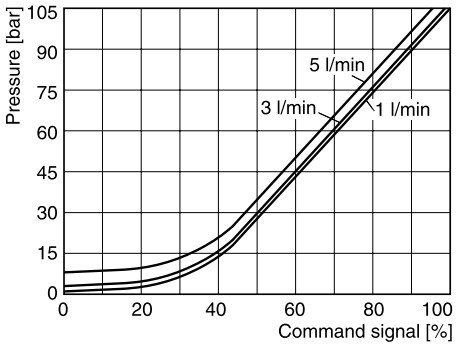
Min. adjusted pressure
Pressure stage 105bar



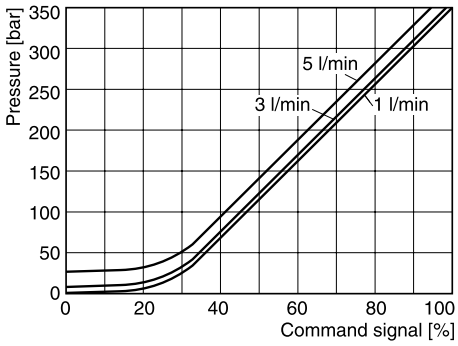
Pressure stage 350bar



Pressure/signal curve
Pressure stage 105bar



Pressure stage 350bar

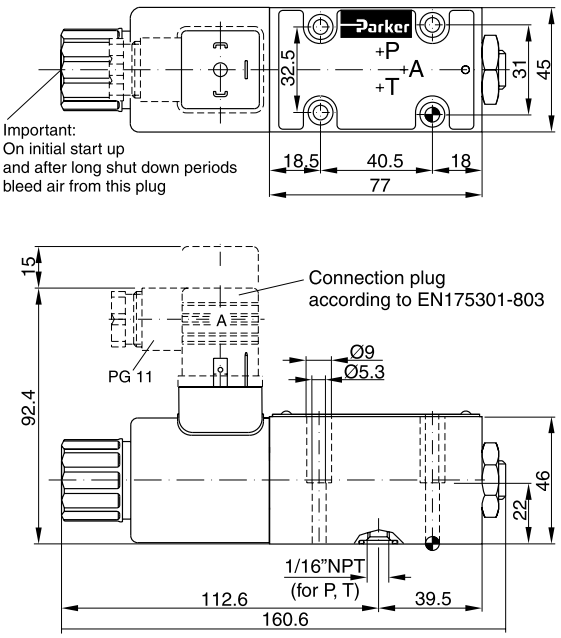


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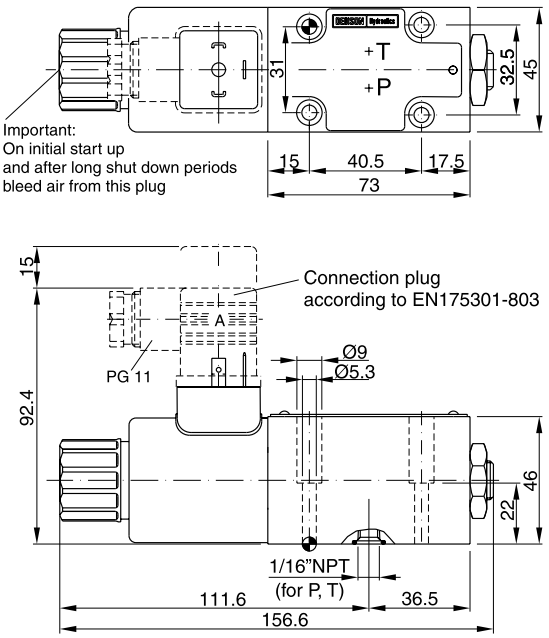
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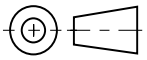
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RE06M*W



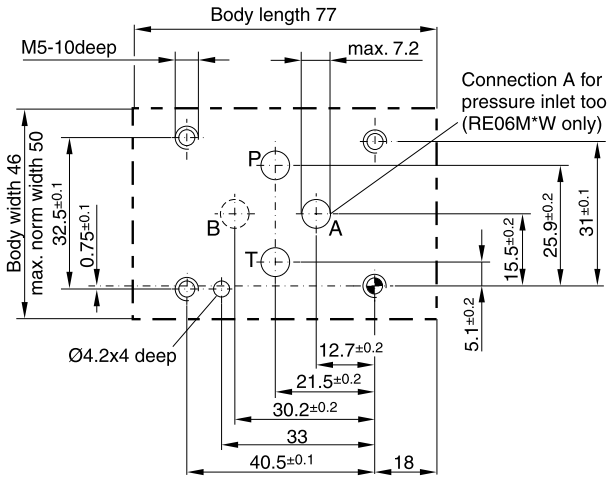
4VP01





Surface finish	Bolt kit			Kit NBR	Kit FPM
R_{max}6.3 0.01/100	BK 375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	SK-RE06MNW	SK-RE06MVW

Mounting pattern ISO 6264-03-04-*-97



RE06M*W:
Port B: O-ring recess diameter on valve body.

4VP01:
Without ports A and B

RE06MW-4VP01_UK.INDD CM_29.01.2008.1

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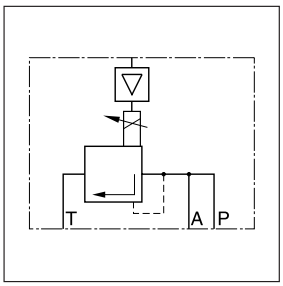
The proportional pressure relief valve series RE06M*T is direct operated seated type valve for subplate mounting with on-board electronics.

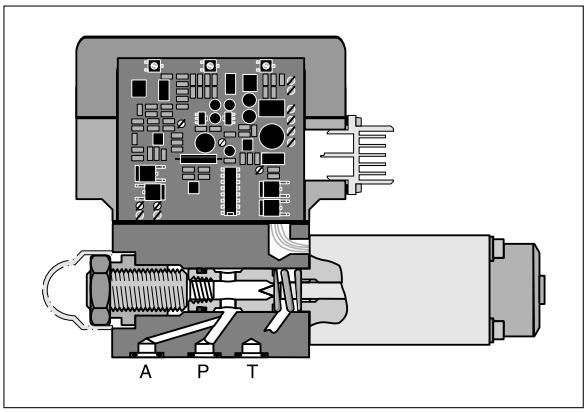
Function

When the pressure in port P or A exeeds the pressure setting at the solenoid, the cone opens to port T and limits the inlet pressure to the adjusted level.

The pressure adjustment is effected by applying current to the solenoid. The control signal is modulated to the solenoid current by the electronics.







Features

- Direct operated pressure relief valve
- Onboard electronics
- Ramp line adjustment
- Characteristics linearized
- Very low pressure adjustment of p_{min}
- Subplate mounting acc. to ISO 6264
- 4 pressure stages
- 2 pressure inlet ports A and P

4

Ordering code

RE	06	M		T	2	V	1		0	
Proportional pressure relief valve	NG06	Interface ISO 6264	Pressure stages	Onboard electronics		FPM seals	Normaly open	Command signal	Electronic attachment	Design series (not required for ordering)

Code	Pressure stages
10	105bar
17	**175bar**
25	250bar
35	**350bar**

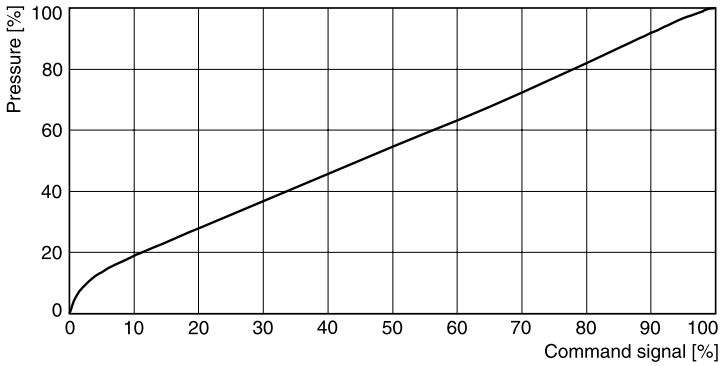
Code	Command signal
F	**Voltage input 0...+10V with reference output +10V**
G	Current input 0...20mA

Bold letters =
Short-term availability

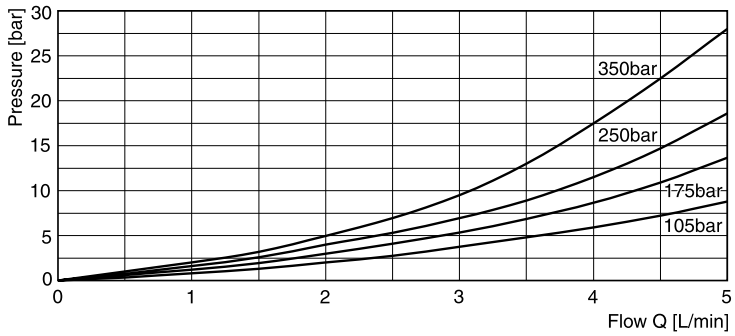
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General		
Nominal size		DIN NG06 / CETOP03 / NFPA D03
Interface		Subplate mounting according to ISO 6264
Mounting position		as desired, horizontal mounting prefered
Ambient temperature	[°C]	-20...+80
Weight	[kg]	2.2
Hydraulic		
Max. operating pressure	[bar]	Ports A and P 350, connection T depressurized
Pressure stages	[bar]	105, 175, 250, 350
Nominal flow	[l/min]	See p/Q curves
Fluid		Hydraulic oil according to DIN 51524 ... 525
Viscosity,		
recommended	[cSt] / [mm²/s]	30 ... 80
permitted	[cSt] / [mm²/s]	12 ... 380
Fluid temperature	[°C]	-20 ... +60
Filtration		ISO 4406 (1999), 18/16/13
Linearity	[%]	See curve
Repeatability	[%]	<±1
Hysteresis	[%]	±1.5 of p_{max}
Electrical		
Duty ratio	[%]	100 ED
Protection class		IP65 according to EN 60529 (plugged and mounted)
Supply voltage	[V]	14.5...30
Ripple in supply voltage	[%]	max. 5
Current consumption	[A]	2.8
Input range		
voltage input	[V]	0...+10 max. / 10kOhm
current input	[mA]	0...+20 / 500Ohm
Adjustment range of ramp time	[s]	0...5
Installation cross-section		Min. 1mm² shielded
Cable length	[m]	Max. 50
Electrical connection		No. 5004072; 6pole + PE / connector EN 175201-804 / cableØ 8...10mm

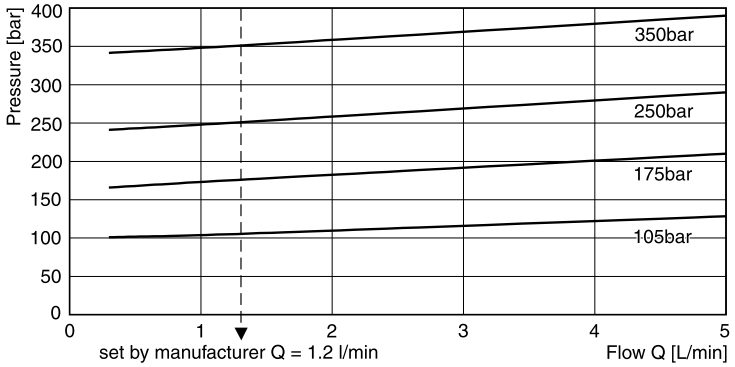
Signal/pressure curve



Min. adjusted pressure



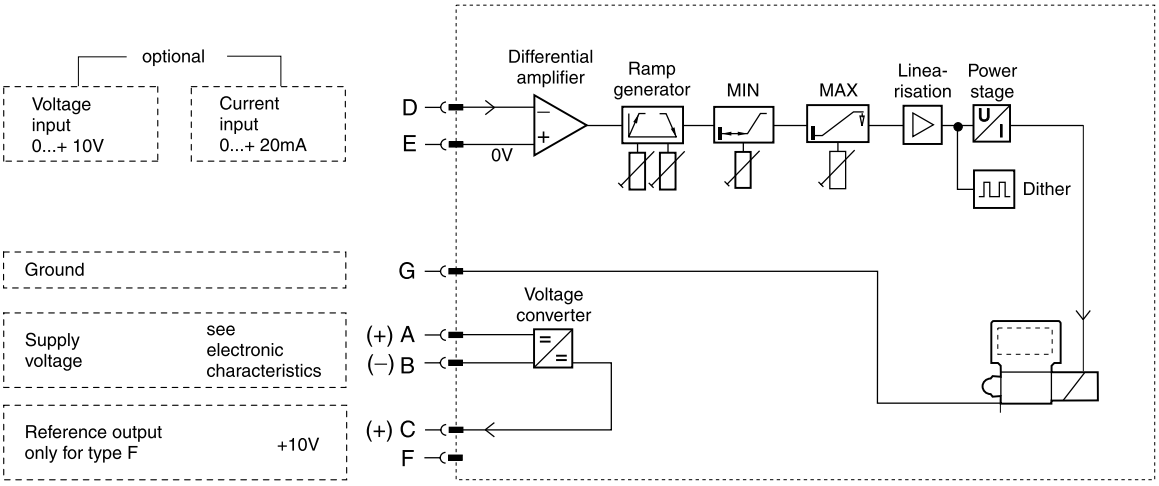
p/Q curve



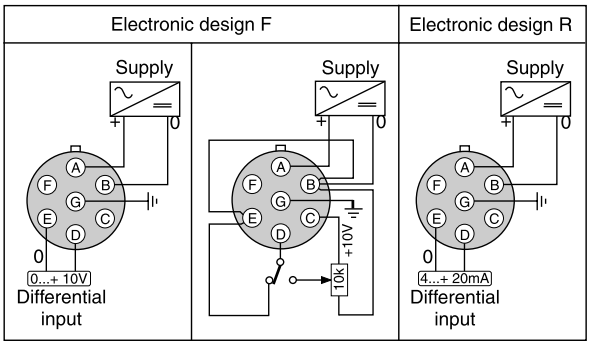
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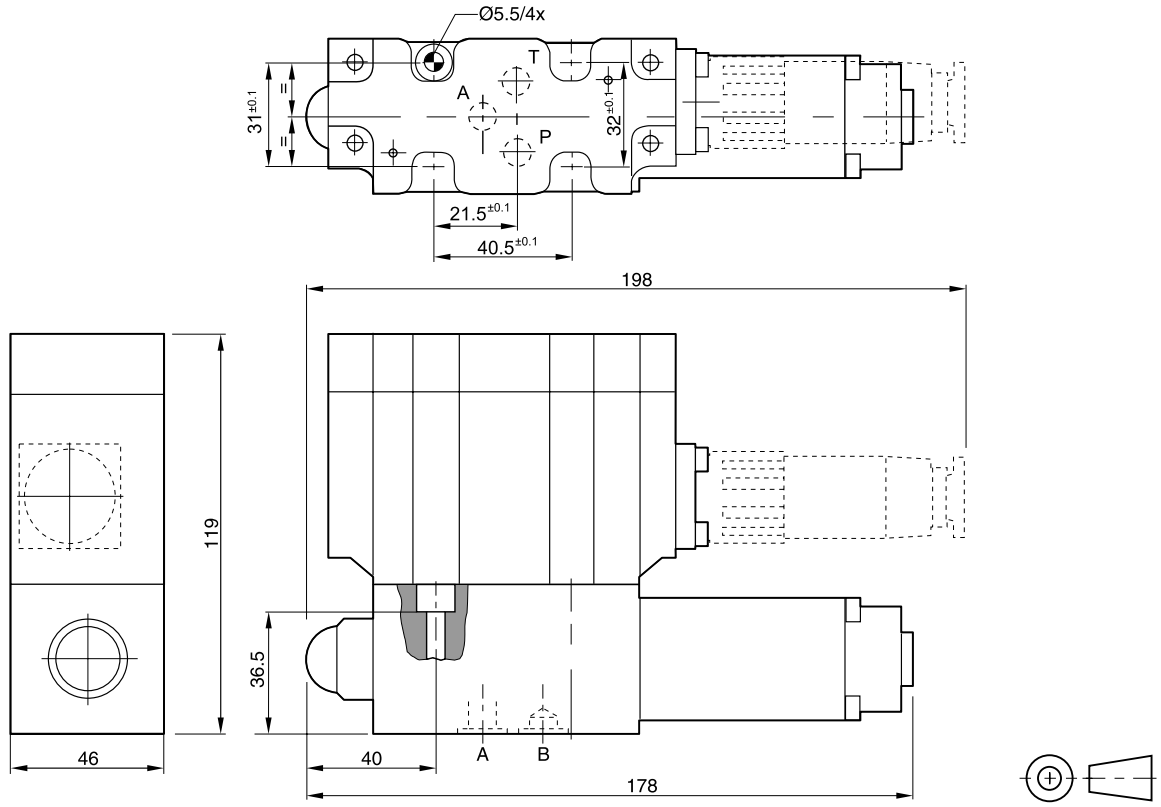
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Block diagram



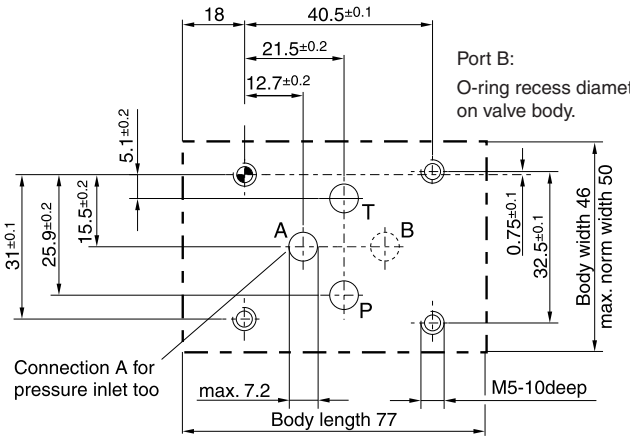
Connector wiring diagram





Surface finish	Bolt kit			Kit NBR	Kit FPM
R_{max}6.3 0.01/100	BK 443	4x M5x45 DIN 912 12.9	7.6 Nm ±15%	SK-RE06MNT	SK-RE06MVT

Mounting pattern ISO 6264-03-04-*-97



RE06MT_UK.INDD CM_29.01.2008.1

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Proportional pressure relief valves for external electronics are available with both Parker (series RE*W) and Denison (series R*V) model codes.

A proportionally adjusted pilot stage controls a seated type main stage. The valves are equipped with a mechanical maximum pressure stage (optional for RE*R*W and R6V).

The optimum performance can be achieved in combination with the digital amplifier module PCD00A-400.

Features

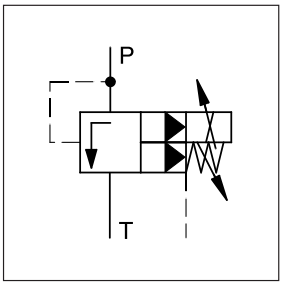
- Pilot operated with proportional solenoid
- Continuous adjustment by proportional solenoid
- 2 interfaces: subplate, ISO 6264 (DIN 24340 Form D + Form E)
- 4 pressure stages
- Optional mechanical maximum pressure adjustment (for RE*R*W and R6V)

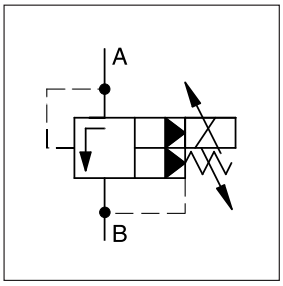


RE*R*W



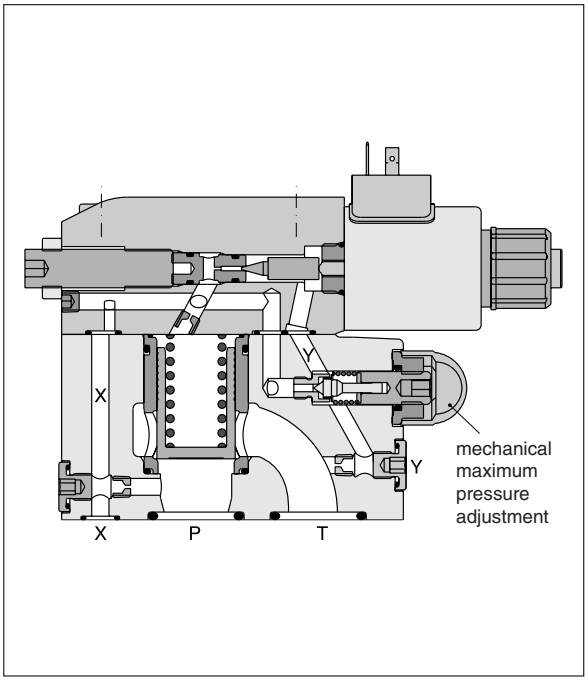
RE*M*W



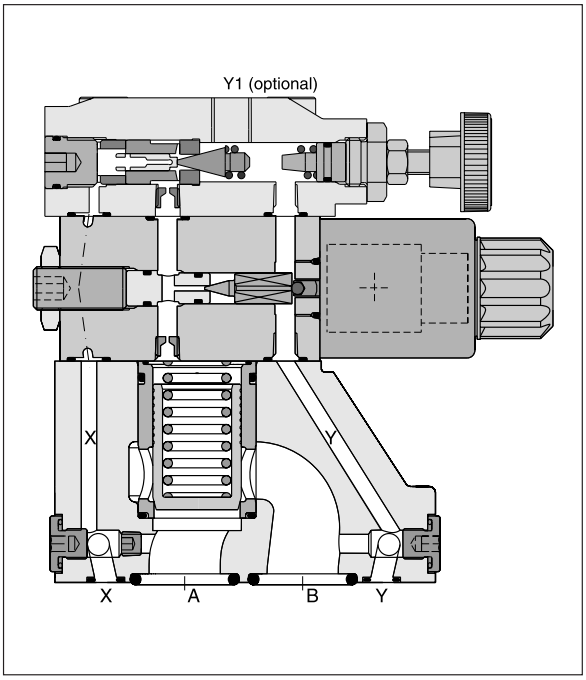


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RE25R*W



RE25M*W



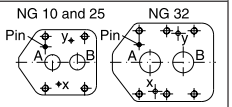
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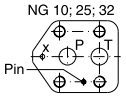
4

RE				W		S		1		W		
Proportional pressure relief valve	Nominal size	Interface	Pressure stages	Off-board electronics	Pilot oil	Poppet spring	Seals	Normaly open	Solenoid voltage	Without plug	Options	Design series (not required for ordering)

Code	Nominal size
10	NG10
25	NG25
32	NG32

Code	Interface	
M	Subplate mounting ISO 6264	NG 10 and 25 / NG 32
R [1]		NG 10; 25; 32





[1] external drain with pipe only

Code	Pressure stages
10	up to 105 bar
17	up to 175 bar
25	up to 250 bar
35	up to 350 bar

Code	Options
omit [2]	Without mech. max. adjust.
M	Mech. max. adjust.

[2] not for R*M

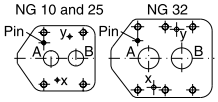
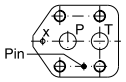
Code	Solenoid
K	12V, 2.3A
X	16V, 1.3A

Code	Seals
N	NBR
V	FPM

Pilot oil		
Code	Pilot	Drain
1	Internal	External
4	Internal	Internal

The Parker model code should be used for all new applications. Otherwise also refer to Denison model code.

R		V		-	5			-			-		-	GOR	-			-	
Pressure valve		Relief function			Max. Pressure (350 bar)									Solenoid voltage 12V/2.3A					
	Interface		Nominal size			Drain port		Mechanical adjustment		Pilot oil		Options			Design series		Seals		Modifi-cations

Code	Interface	
4	Subplate mounting ISO 6264	NG 10 and 25 / NG 32 
6		

Code	Seals
1	NBR
5	FPM

Code	Design
A	R4V
B	R6V

Code	Nominal size
03	NG10
06	NG25
10	NG32

Code	Options
P2	With mech. max. adjustment
PS [4]	w/o mech. max. adjustment

[4] not for R4V

Code	Interface	Drain port
3	R4V	Y port in mounting pattern
9	R6V	Y-port = G 1/8“

Pilot oil	
Code	Drain line
0	internal
1 [2]	external from subplate
2 [3]	external from valve body (Y-port)

[2] R4V only
[3] R6V only

Code	Pressure stages
1	up to 105 bar
3	up to 210 bar
5	up to 350 bar

Code	Interface	Mechanical adjustment
P [1]	R6V	Hexagon screw with lock nut
1	R4V	Hand knob
3	R4V	Acorn nut with lead seal

[1] Use code P also for valve w/o mechanical adjustment

DENISON Hydraulics

The Denison model code is available for existing applications. Otherwise also refer to Parker model code.

RE*W

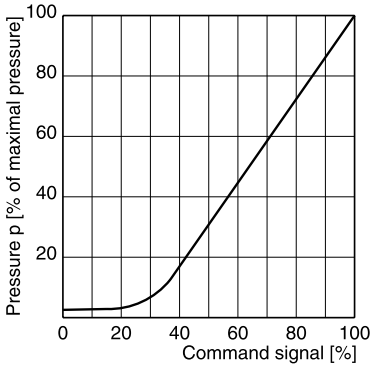
General					
Nominal size			**10**	**25**	**32**
Interface			Subplate mounting acc. ISO 6264		
Mounting position			as desired, horizontal mounting prefered		
Ambient temperature		[°C]	-20...+80		
Weight	Series RE*R	[kg]	5.2	6.4	8.3
	Series RE*M	[kg]	4.5	6.3	7.8
Hydraulic					
Max. operating pressure		[bar]	Ports P (or A) and X 350, port T (or B), B and Y depressurized		
Pressure stages		[bar]	105, 175, 250, 350 (series RE*W), 105, 210, 350 (series R*V)		
Nominal flow	Series RE*R	[l/min]	250	500	650
	Series RE*M	[l/min]	150	350	650
Fluid			Hydraulic oil according to DIN 51524 ... 525		
Viscosity, recommended		[cSt] / [mm²/s]	30 ... 50		
permitted		[cSt] / [mm²/s]	20 ... 380		
Fluid temperature		[°C]	-20 ... +70		
Filtration			ISO 4406 (1999); 18/16/13		
Electrical (prop. solenoid)					
Duty ratio		[%]	100 ED		
Protection class			IP65 in accordance with EN 60529 (plugged and mounted)		
Nominal voltage		[V]	12 (max. current 2.3A), 16 (max. current 1.3A)		
Coil resistance		[Ohm]	4 at 20°C		
Solenoid connectors			Connector as per EN 175301-803		
Power amplifier, recommended			PCD00A-400		

4

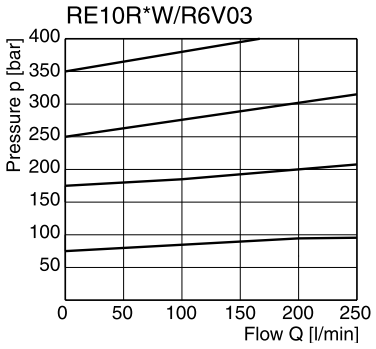
Tel: +45 63 12 83 00 | Email: ps@hymatik.com | www.hymatik.com | Hvidkaervej 27a, DK-5250 Odense SV, Denmark

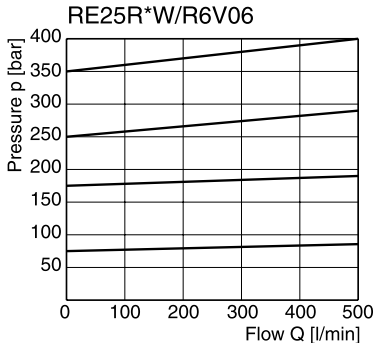
RE*R*W/R6V

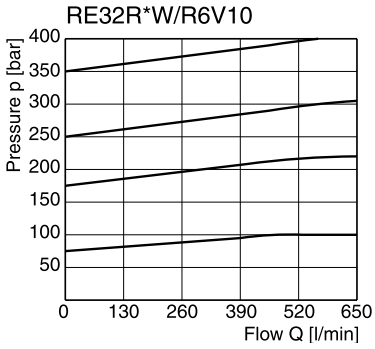
Signal/pressure curve



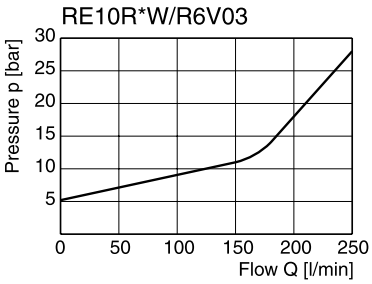
p/Q performance curves [1)]

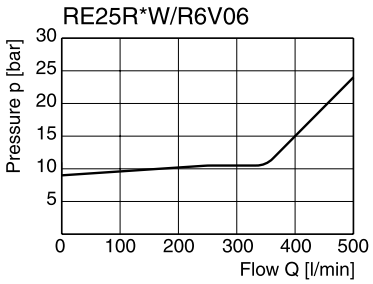


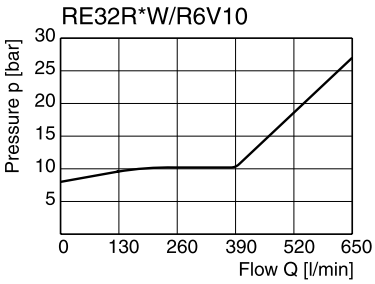




Minimum pressure curves [1)]







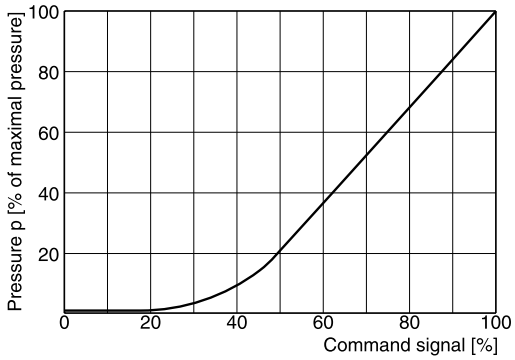
[1)] The performance curves are measured with external drain.
For internal drain the tank pressure has to be added to curve.

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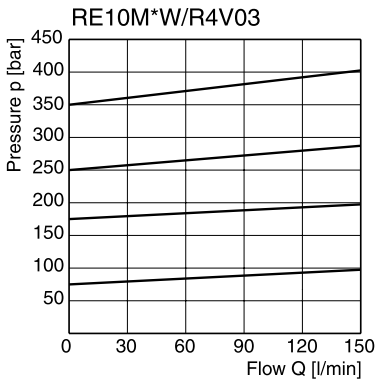
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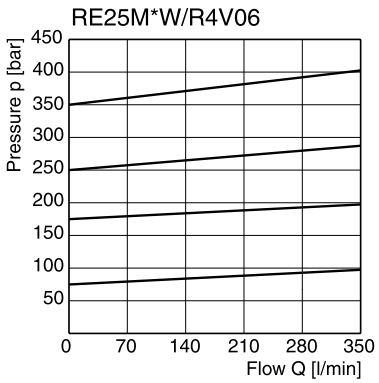
RE*M*W/R4V

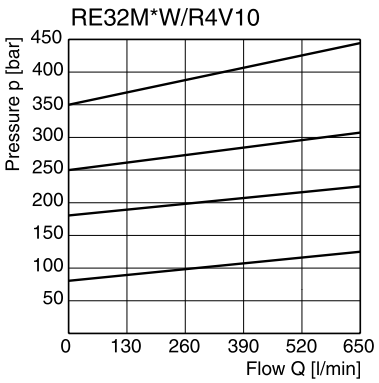
Signal/pressure curve



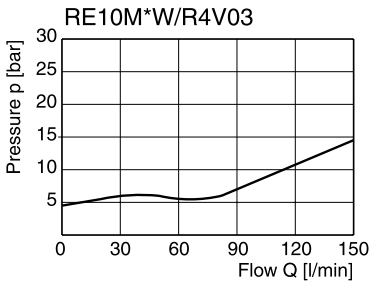
p/Q performance curves [1)]

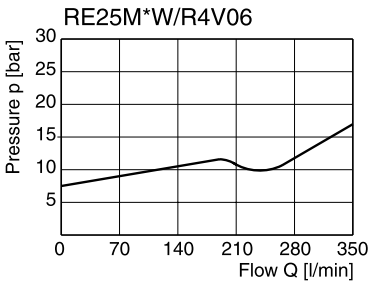


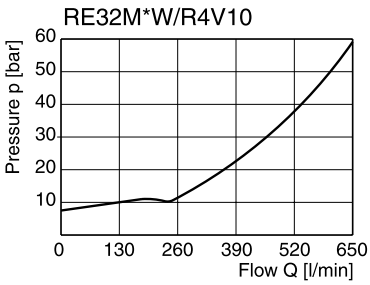




Minimum pressure curves [1)]

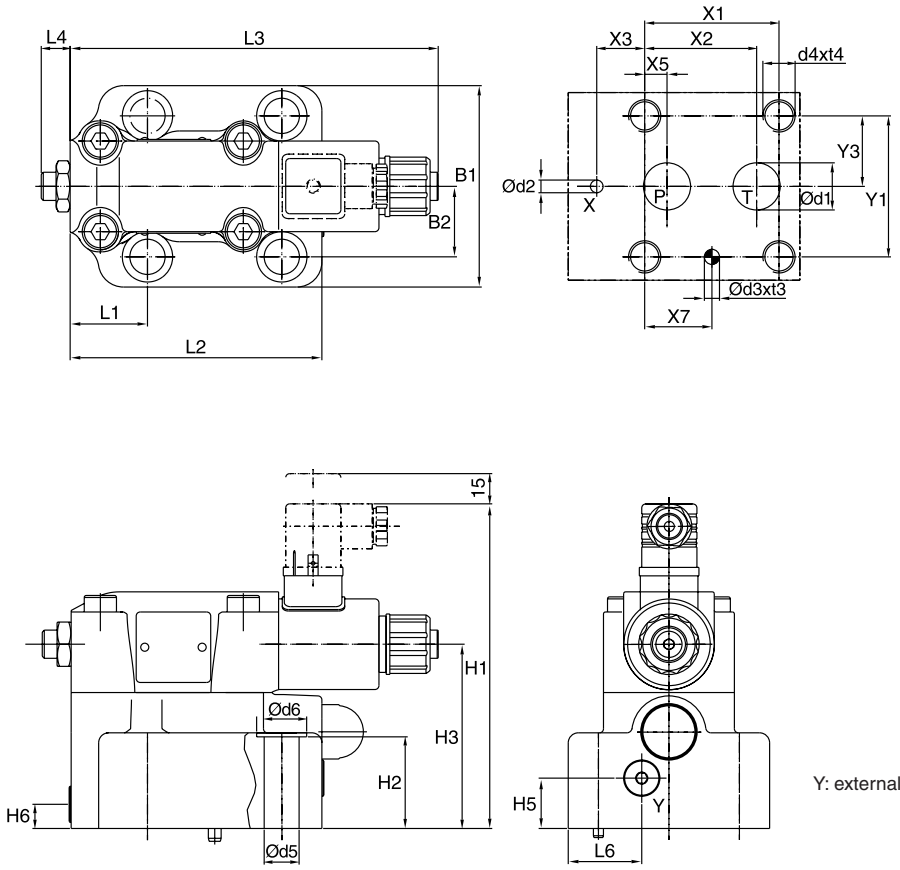




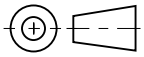


[1)] The performance curves are measured with external drain.
For internal drain the tank pressure has to be added to curve.

RE*R*W/R6V



Y: external drain port G 1/8“

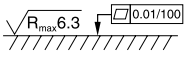


NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	6264-06-09-*-97	53.8	47.5	0	–	22.1	–	22.1	53.8	–	26.9	–	–	–
25	6264-08-13-*-97	66.7	55.6	23.8	–	11.1	–	33.4	70	–	35	–	–	–
32	6264-10-17-*-97	88.9	76.2	31.8	–	12.7	–	44.5	82.6	–	41.3	–	–	–

Tolerance at X and Y pin holes and screw holes ±0.1, at port holes ±0.2.

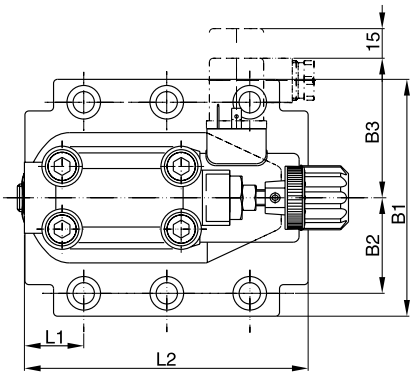
NG	ISO-code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6
10	6264-06-09-*-97	80	26.9	158.7	27	88	–	20.5	25	52.5	118.5	182.3	14.4		29.5
25	6264-08-13-*-97	100	35	161.2	45.5	91.5	–	25	12	37.9	124.5	182.3	14.4	–	36.5
32	6264-10-17-*-97	120	41.3	166.7	52	97	–	26.5	13.5	45	153	182.3	14.4		46.5

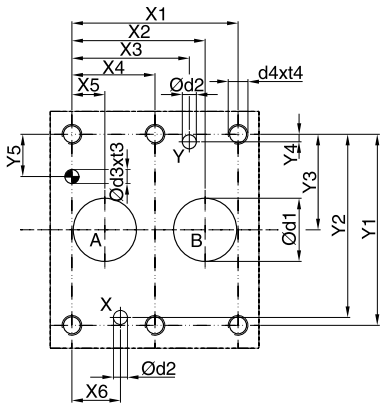
NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	6264-06-09-*-97	14.7	4.8	7.5	10	M12	20	13.5	20
25	6264-08-13-*-97	23.4	6.3	7.5	10	M16	27	17.5	25
32	6264-10-17-*-97	32	6.3	7.5	10	M18	28	20	30

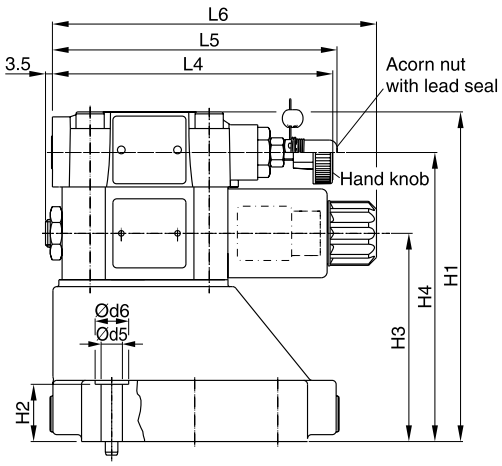
NG	ISO-code	Bolt kit			Kit		Surface finish
					NBR	FPM	
10	6264-06-09-*-97	BK 494	4x M12 x 45 DIN 912 12.9	108 Nm ±15%	SK-RE10RN50	SK-RE10RV50	
25	6264-08-13-*-97	BK 366	4x M16 x 70 DIN 912 12.9	264 Nm ±15%	SK-RE25RN50	SK-RE25RV50	
32	6264-10-17-*-97	BK 507	4x M18 x 75 DIN 912 12.9	398 Nm ±15%	SK-RE32RN50	SK-RE32RV50	

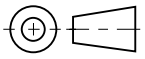
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RE*M*W







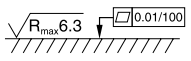


NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	6264-06-07-*-97	42.9	35.8	21.5	–	7.2	21.5	0	66.7	58.8	33.4	7.9	14.3	–
25	6264-08-11-*-97	60.3	49.2	39.7	–	11.1	20.6	0	79.4	73	39.7	6.4	15.9	–
32	6264-10-15-*-97	84.2	67.5	59.5	42.1	16.7	24.6	0	96.8	92.8	48.4	3.8	21.4	–

Tolerance at X and Y pin holes and screw holes ±0.1, at port holes ±0.2.

NG	ISO-code	B1	B2	B3	H1	H2	H3	H4	H6	L1	L2	L3	L4	L5	L6
10	6264-06-07-*-97	87.3	33.35	71	130	21	68.5	109.5	–	29	94.8	–	143	144.8	164.8
25	6264-08-11-*-97	105	39.7	71	156.5	29	95	136	–	34.7	126.8	–	143	144.8	164.8
32	6264-10-15-*-97	120	48.4	71	167	29	105.5	146.5	–	30.6	144.3	–	143	144.8	164.8

NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	6264-06-07-*-97	15	7	7.1	8	M10	16	10.8	17
25	6264-08-11-*-97	23.4	7.1	7.1	8	M10	18	10.8	17
32	6264-10-15-*-97	32	7.1	7.1	8	M10	20	10.8	17

NG	ISO-code	Bolt kit			Kit		Surface finish
					NBR	FPM	
10	6264-06-07-*-97	BK 505	4x M10 x 35 DIN 912 12.9	63 Nm ±15%	SK-RE10MN50	SK-RE10MV50	
25	6264-08-11-*-97	BK 485	4x M10 x 45 DIN 912 12.9	63 Nm ±15%	SK-RE25MN50	SK-RE25MV50	
32	6264-10-15-*-97	BK 506	4x M10 x 45 DIN 912 12.9	63 Nm ±15%	SK-RE32MN50	SK-RE32MV50	

REW_R4V-R6V_UK.INDD CM_29.01.2008.1

Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

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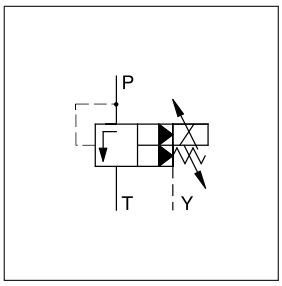
Proportional pressure relief valves with onboard electronics are available with both Parker (series RE*T) and Denison (series R*V) model codes.

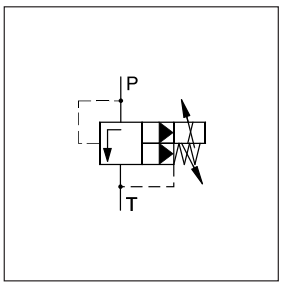
The proportional solenoid operated pilot stage with integrated electronics controls a seated type main stage.

Features

- Pilot operated pressure relief valve
- Onboard electronics
- Factory set
- Ramp time adjustment
- Linearized characteristics
- 4 pressure stages
- 2 interfaces: subplate, ISO 6264 (DIN 24340 Form D + Form E)
- Optional mechanical maximum pressure adjustment

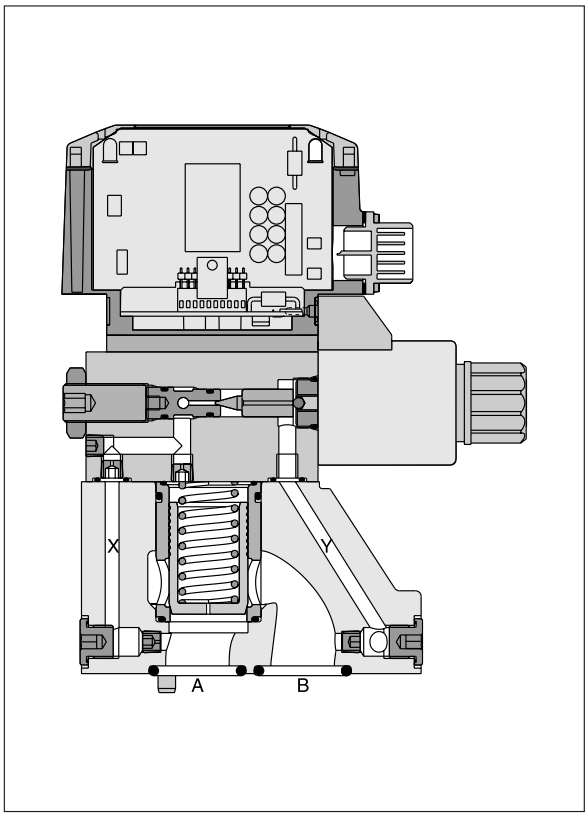




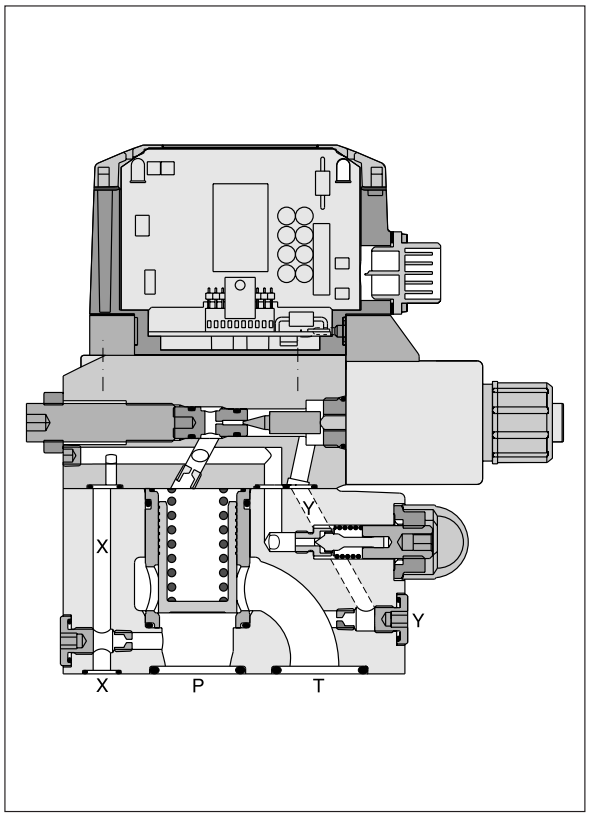


4

RE25M*T



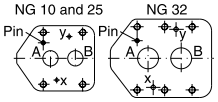
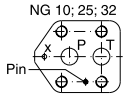
R25R*T



4

RE				T		S		1		0		
Pressure relief valve with elec. unloading	Nominal size	Interface	Pressure stages	On-board electronics	Pilot oil	Poppet spring	Seals	Normaly open	Command signal	Electronic attach-ments	Options	Design series (not required for ordering)

Code	Nominal size
10	NG10
25	NG25
32	NG32

Code	Interface	
M	Subplate mounting ISO 6264	NG 10 and 25 / NG 32 
R [1]		NG 10; 25; 32 

[1] external drain with pipe only

Code	Pressure stages
10	up to 105 bar
17	up to 175 bar
25	up to 250 bar
35	up to 350 bar

Code	Options
omit [2]	Without mech. max. adjust.
M	Mech. max. adjust.

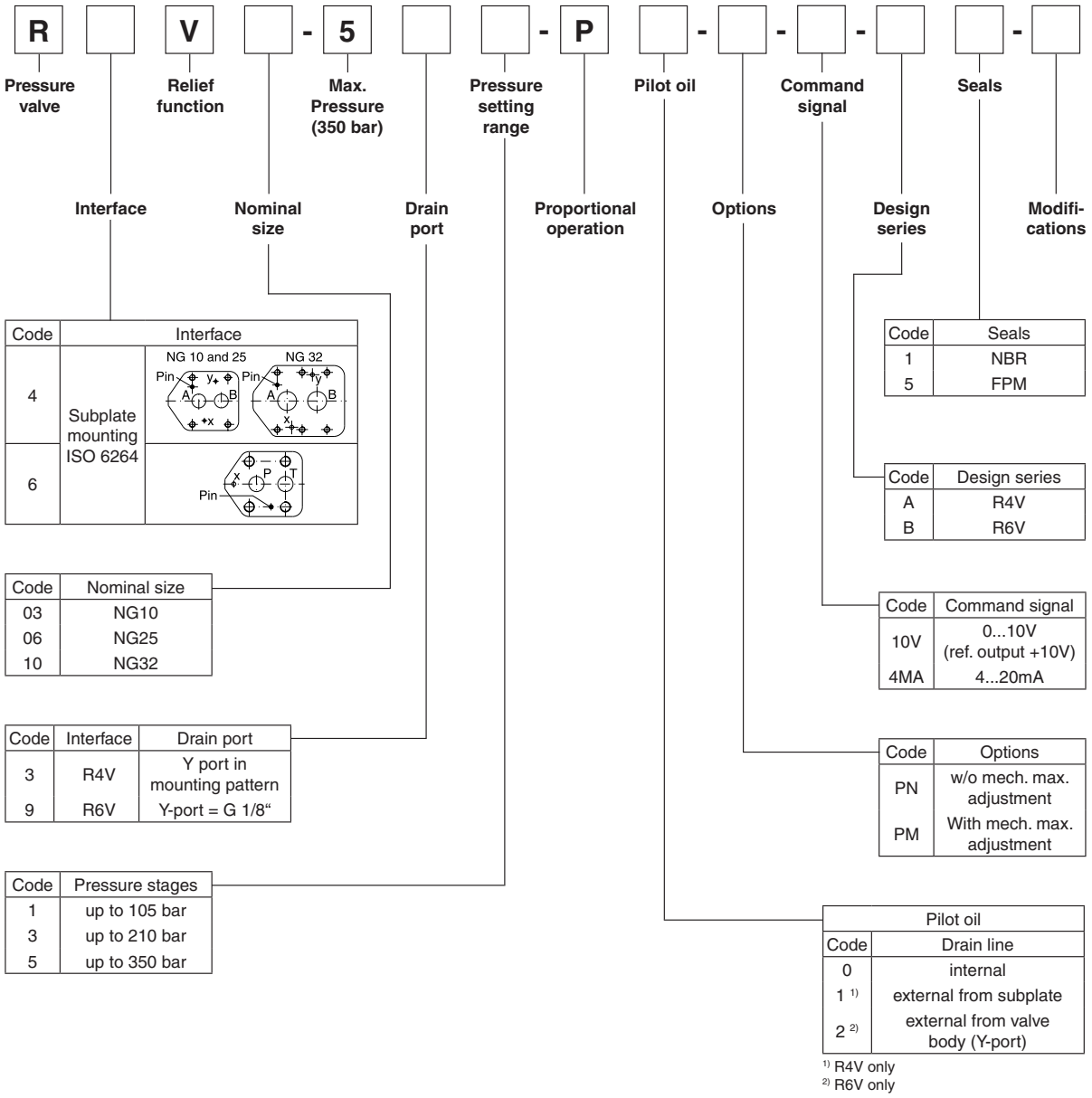
[2] not for R*M

Code	Command signal
F	Voltage input 0...+10V with ref. output +10V
R	Current input 4...20mA

Code	Seals
N	NBR
V	FPM

Pilot oil		
Code	Pilot	Drain
1	Internal	External
4	Internal	Internal

The Parker model code should be used for all new applications. Otherwise also refer to Denison model code.



Code	Interface	
4	Subplate mounting ISO 6264	NG 10 and 25 / NG 32
6		

Code	Seals
1	NBR
5	FPM

Code	Design series
A	R4V
B	R6V

Code	Nominal size
03	NG10
06	NG25
10	NG32

Code	Command signal
10V	0...10V (ref. output +10V)
4MA	4...20mA

Code	Interface	Drain port
3	R4V	Y port in mounting pattern
9	R6V	Y-port = G 1/8“

Code	Options
PN	w/o mech. max. adjustment
PM	With mech. max. adjustment

Code	Pressure stages
1	up to 105 bar
3	up to 210 bar
5	up to 350 bar

Pilot oil	
Code	Drain line
0	internal
1 [1)]	external from subplate
2 [2)]	external from valve body (Y-port)

[1)] R4V only
[2)] R6V only

DENISON Hydraulics

The Denison model code is available for existing applications. Otherwise also refer to Parker model code.

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RE*R/M/E*T

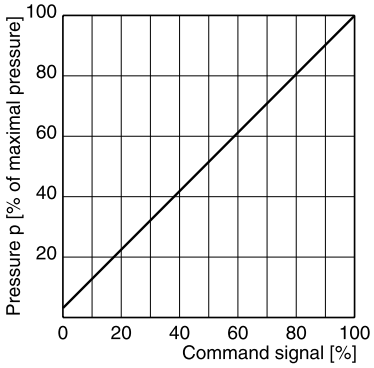
General					
Nominal size			**10**	**25**	**32**
Interface			Subplate mounting acc. ISO 6264		
Mounting position			as desired, horizontal mounting prefered		
Ambient temperature		[°C]	-20...+80		
Weight	Series RE*R	[kg]	5.4	6.6	8.6
	Series RE*M	[kg]	4.5	6.3	7.8
Hydraulic					
Max. operating pressure		[bar]	Ports P (or A) and X 350, port T (or B) and Y depressurized		
Pressure stages		[bar]	105, 175, 250, 350 (series RE*T), 105, 210, 350 (series R*V)		
Nominal flow	Series RE*R	[l/min]	250	500	650
	Series RE*M	[l/min]	150	350	650
Fluid			Hydraulic oil according to DIN 51524 ... 525		
Viscosity, recommended		[cSt] / [mm²/s]	30 ... 50		
permitted		[cSt] / [mm²/s]	20 ... 380		
Fluid temperature		[°C]	-20 ... +70		
Filtration			ISO 4406 (1999); 18/16/13		
Electrical (prop. solenoid)					
Duty ratio		[%]	100 ED		
Protection class			IP65 in accordance with EN 60529 (plugged and mounted)		
Supply voltage		[V]	14.5...30		
Ripple in supply voltage		[%]	max. 5		
Current consumption		[A]	max. 2.8		
Input range					
	voltage input	[V]	0...+10 max. / 10kOhm		
	current input	[mA]	4...+20 / 500Ohm		
Adjustm. range of ramp time		[s]	0...5		
Installation cross-section			Min. 1mm² shielded		
Cable length		[m]	Max. 50		
Electrical connection			No. 5004072; 6pole + PE / connector EN 175201-804 / cableØ 8...10mm		

4

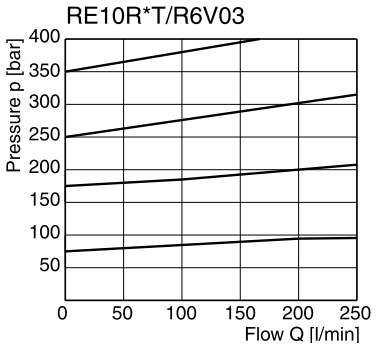
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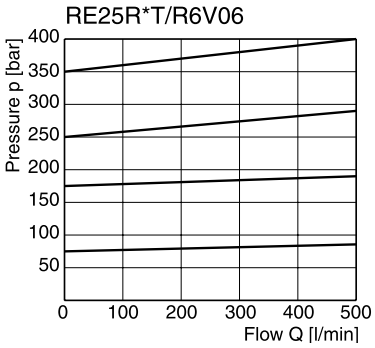
RE*R*T/R6V

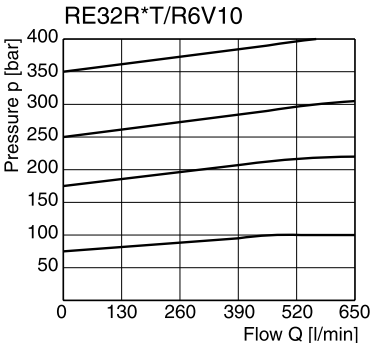
Command/pressure curve



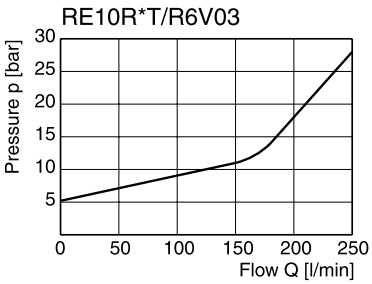
p/Q performance curves [1)]

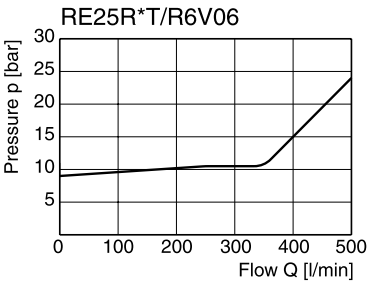


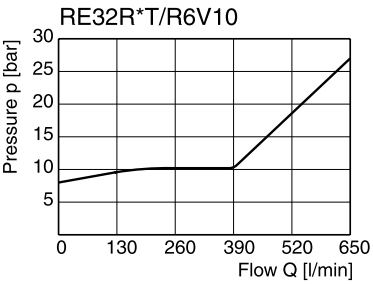




Minimum pressure curves [1)]







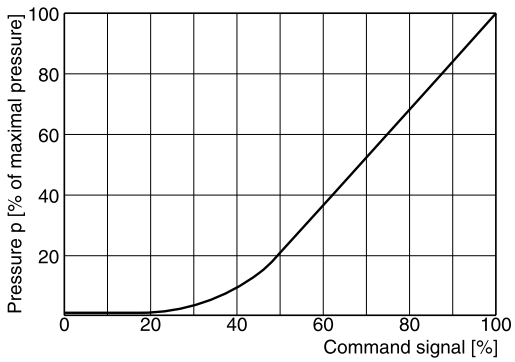
[1)] The performance curves are measured with external drain.
For internal drain the tank pressure has to be added to curve.

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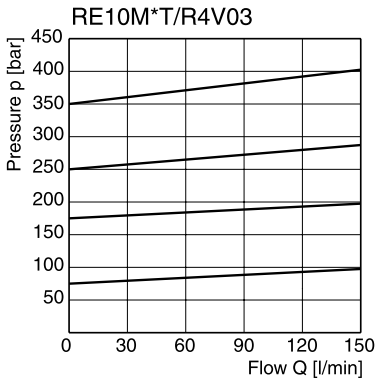
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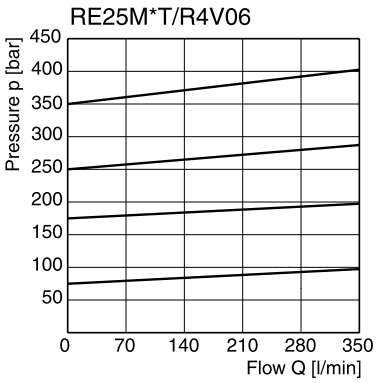
RE*M*T/R4V

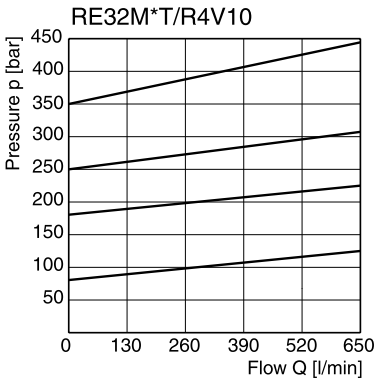
Command/pressure curve



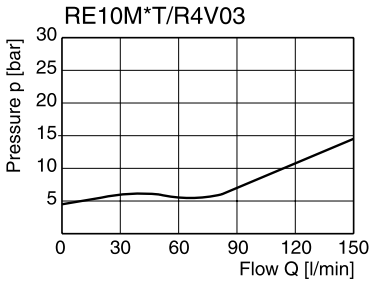
p/Q performance curves [1)]

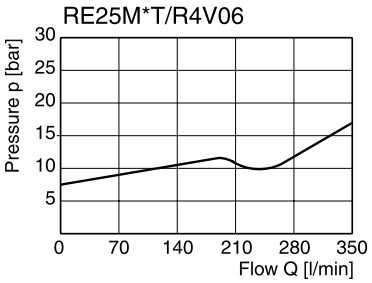


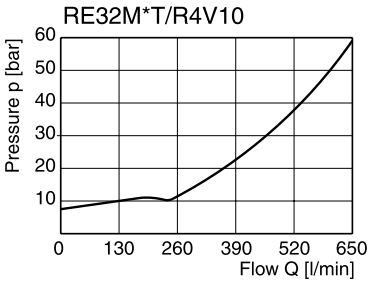




Minimum pressure curves [1)]



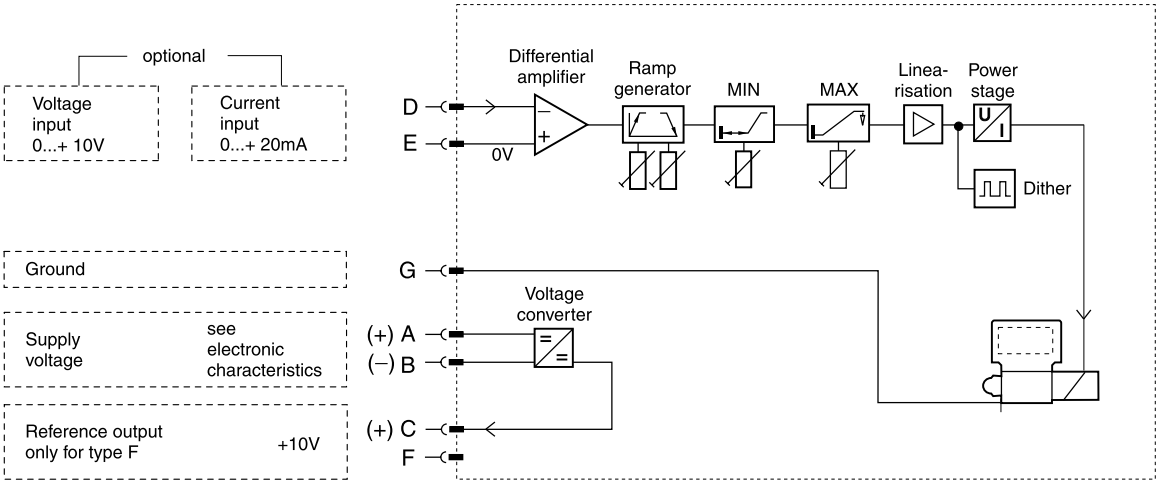




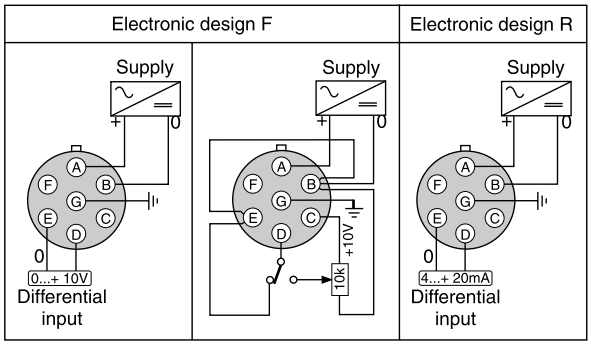
[1)] The performance curves are measured with external drain.
For internal drain the tank pressure has to be added to curve.

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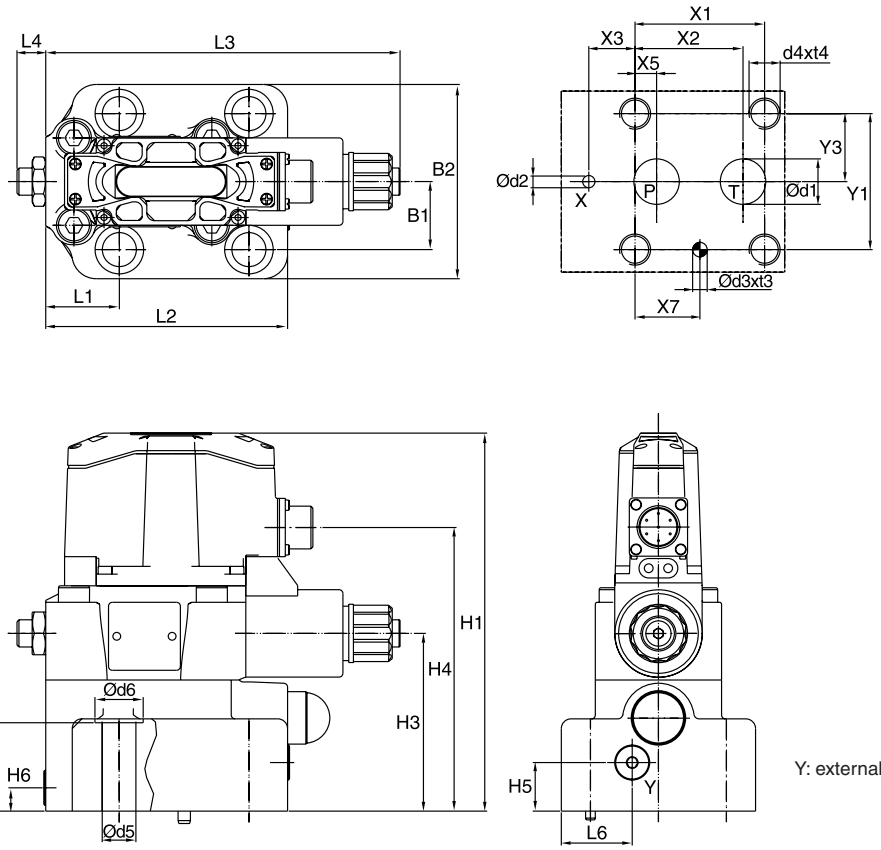
Block diagram



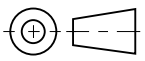
Connector wiring diagram



RE*R*T/R6V



Y: external drain port G 1/8"

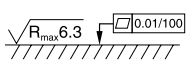


NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	6264-06-09-*-97	53.8	47.5	0	–	22.1	–	22.1	53.8	–	26.9	–	–	–
25	6264-08-13-*-97	66.7	55.6	23.8	–	11.1	–	33.4	70	–	35	–	–	–
32	6264-10-17-*-97	88.9	76.2	31.8	–	12.7	–	44.5	82.6	–	41.3	–	–	–

Tolerance at X and Y pin holes and screw holes ±0.1, at port holes ±0.2.

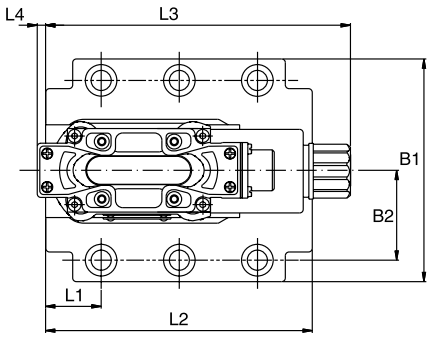
NG	ISO-code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6
10	6264-06-09-*-97	80	26.9	189.6	27	88	142.5	20.5	25	52.5	118.5	182.3	14.4	–	29.5
25	6264-08-13-*-97	100	35	193.1	45.5	91.5	146	25	12	37.9	124.5	182.3	14.4	–	36.5
32	6264-10-17-*-97	120	41.3	198.6	52	97	151.5	26.5	13.5	45	153	182.3	14.4	–	46.5

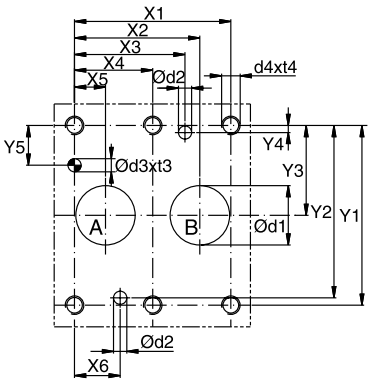
NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	6264-06-09-*-97	14.7	4.8	7.5	10	M12	20	13.5	20
25	6264-08-13-*-97	23.4	6.3	7.5	10	M16	27	17.5	25
32	6264-10-17-*-97	32	6.3	7.5	10	M18	28	20	30

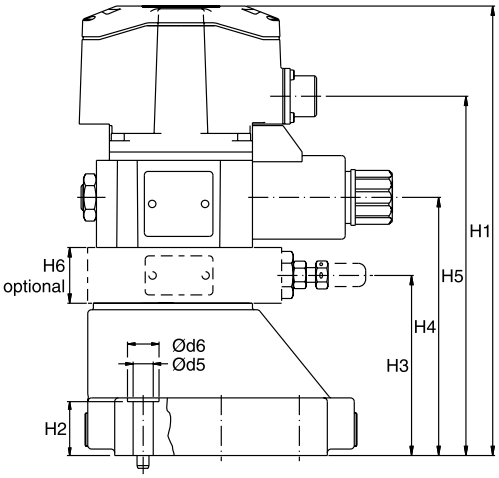
NG	ISO-code	Bolt kit			Kit		Surface finish
					NBR	FPM	
10	6264-06-09-*-97	BK 494	4x M12 x 45 DIN 912 12.9	108 Nm ±15%	SK-RE10RN50	SK-RE10RV50	
25	6264-08-13-*-97	BK 366	4x M16 x 70 DIN 912 12.9	264 Nm ±15%	SK-RE25RN50	SK-RE25RV50	
32	6264-10-17-*-97	BK 507	4x M18 x 75 DIN 912 12.9	398 Nm ±15%	SK-RE32RN50	SK-RE32RV50	

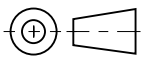
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RE*M*T/R4V









NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	6264-06-07-*-97	42.9	35.8	21.5	–	7.2	21.5	0	66.7	58.8	33.4	7.9	14.3	–
25	6264-08-11-*-97	60.3	49.2	39.7	–	11.1	20.6	0	79.4	73	39.7	6.4	15.9	–
32	6264-10-15-*-97	84.2	67.5	59.5	42.1	16.7	24.6	0	96.8	92.8	48.4	3.8	21.4	–

Tolerance at X and Y pin holes and screw holes ±0.1, at port holes ±0.2.

NG	ISO-code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6
10	6264-06-07-*-97	87.3	33.35	204.8	21	60	102	156.5	30	28.3	94.1	164.2	4.5	–	–
25	6264-08-11-*-97	105	39.7	231.3	29	86.5	128.5	183	30	34	126.1	164.2	4.5	–	–
32	6264-10-15-*-97	120	48.4	241.8	29	97	139	193.5	30	29.9	143.6	164.2	4.5	–	–

NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	6264-06-07-*-97	15	7	7.1	8	M10	16	10.8	17
25	6264-08-11-*-97	23.4	7.1	7.1	8	M10	18	10.8	17
32	6264-10-15-*-97	32	7.1	7.1	8	M10	20	10.8	17

NG	ISO-code	Bolt kit			Kit NBR	Kit FPM	Surface finish
10	6264-06-07-*-97	BK 505	4x M10 x 35 DIN 912 12.9	63 Nm ±15%	SK-RE10MN50	SK-RE10MV50	
25	6264-08-11-*-97	BK 485	4x M10 x 45 DIN 912 12.9	63 Nm ±15%	SK-RE25MN50	SK-RE25MV50	
32	6264-10-15-*-97	BK 506	6x M10 x 45 DIN 912 12.9	63 Nm ±15%	SK-RE32MN50	SK-RE32MV50	

RET_R4V-R6V_UK.INDD CM_29.01.2008.1

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Notes

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Pilot operated relief valve with proportional adjustment. Series VBY*K is a pilot operated pressure valve with external drain. The external drain allows an application as sequence and as pressure relief valve. For use as pressure relief valve observe hydraulic connection.

The optimum performance can be achieved in combination with the digital amplifier module PCD00A-400.

Features

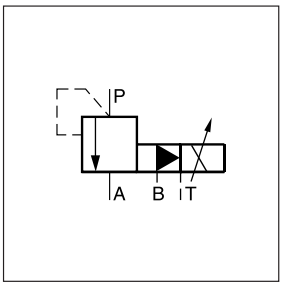
- Proportional adjustment
- Subplate mounting acc. to ISO 5781
- External drain
- Main stage spool type valve
- Pilot stage seated type valve



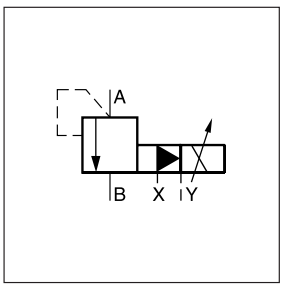
VBY*K06



VBY*K10

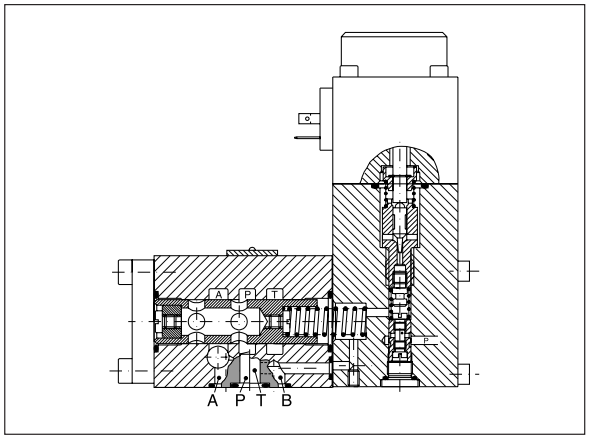


VBY*K06

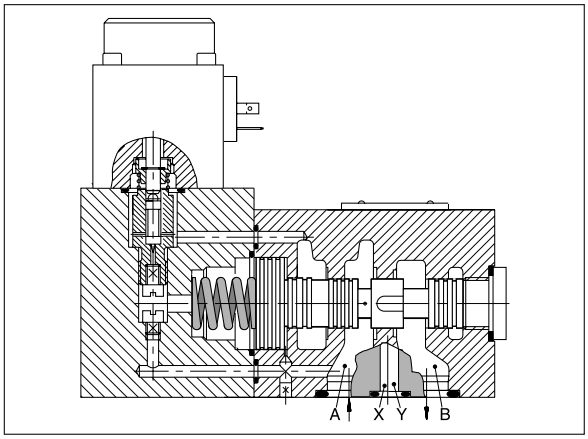


VBY*K10

VBY*K06



VBY*K10



Ordering code

VBY		K			
Sequence valve	Max. setting range	Proportional solenoid 9 VDC/2.5A	Nominal size	Seals	Design series (not required for ordering)

Code	Max. setting range
064	**64 bar**
100	100 bar
160	**160 bar**
210	210 bar
315	315 bar

Code	Seals
N	**NBR**
V	FPM

Code	Nominal size
06	**NG06**
10	**NG10**

Bold letters =
Short-term availability

VBYK_UK.INDD CM_29.01.2008.1

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Hydraulic Controls Division
Kaarst, Germany

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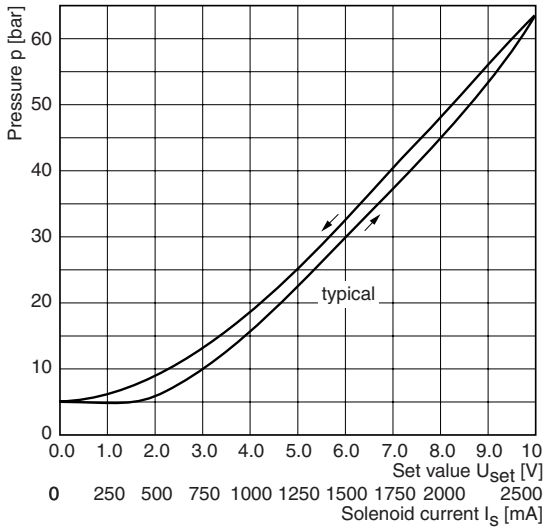
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Technical data

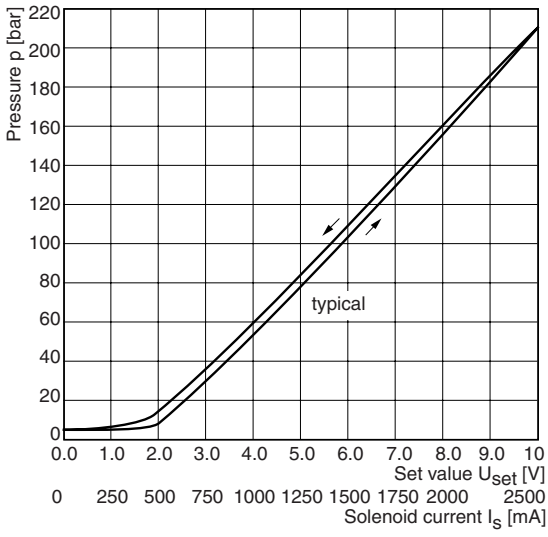
General				
Design			Proportional pressure relief valve	
Nominal size			**NG06**	**NG10**
Interface			Subplate mounting according to ISO 5781	
Actuation			Proportional solenoid	
Mounting position			unrestricted	
Ambient temperature		[°C]	-20 ... +70	
Weight		[kg]	2.4	4.5
Hydraulics				
Max. operating pressure		[bar]	Ports P and A 315; Port T depressurized	Ports A and B 315; Port Y depressurized
Nominal flow		[l/min]	40	160
Adjustment range		[bar]	up to 64, 100, 160, 210, 315	
Fluid			Hydraulic oil as per DIN 51 524 ... 525	
Viscosity	recommended	[cSt] / [mm²/s]	30 ... 50	
	maximum	[cSt] / [mm²/s]	20 ... 380	
Pressure medium temperature				
	recommended	[°C]	30 ... 50	
	maximum	[°C]	-20 ... +70	
Permitted contamination			ISO 4406 (1999); 18/16/13	
Linearity		[%]	±3.5 at > 15% pnom.	
Repeatability		[%]	<±2	
Hysteresis		[%]	±1.5 to pmax	
Response time		[ms]	<150	<200
Manufacturing tolerance		[%]	±5 to pmax	
Electrical				
Duty ratio		[%]	100 ED	
Protection class			IP65 at EN 60529 (plugged and mounted)	
Nominal voltage		[VDC]	9	
Max. current		[A]	2.7	
Nom. current		[A]	2.5	
Ambient temperature		[°C]	-20...+70	
Coil resistance		[Ohm]	21 at 20°C	
Solenoid connection			Connector as per EN 175301-803	
Power amplifier			PCD00A-400	

Characteristic pressure curves for NG06 p = f (U_{set})

Setting range max. 64 bar



Setting range max. 210 bar



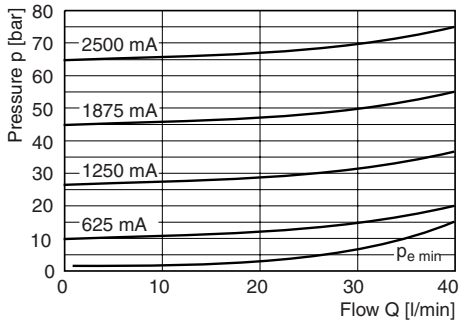
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p/Q characteristics

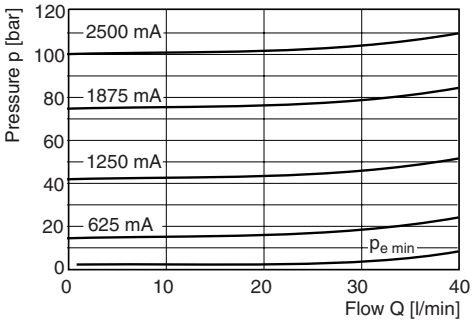
measured at t = 50°C and ν = 35 mm²/s

NG06

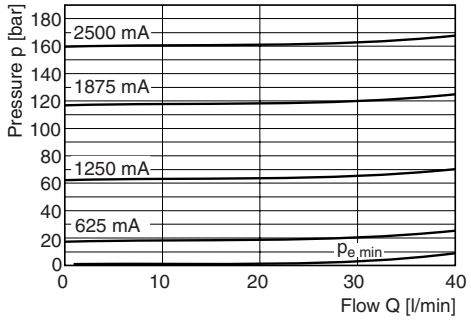
Setting range max. 64 bar



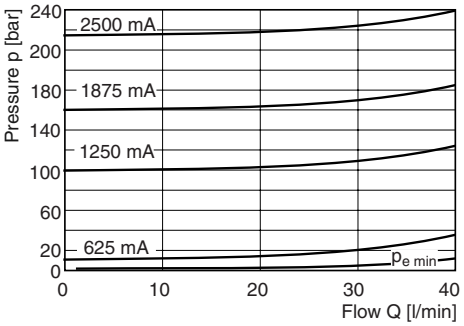
Setting range max. 100 bar



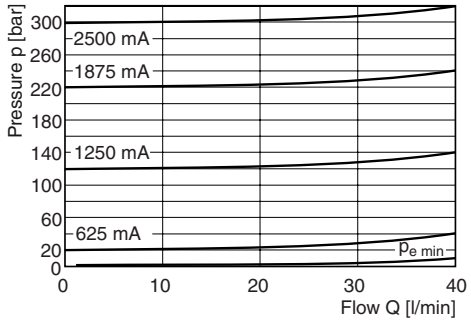
Setting range max. 160 bar



Setting range max. 210 bar



Setting range max. 315 bar



4

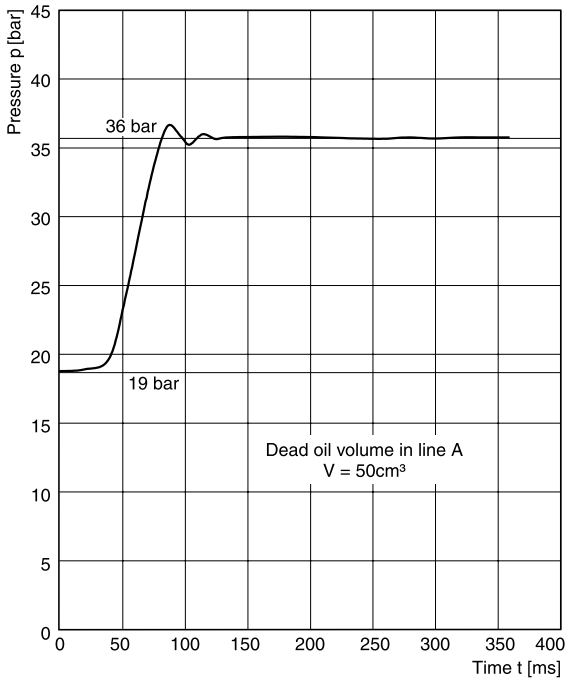
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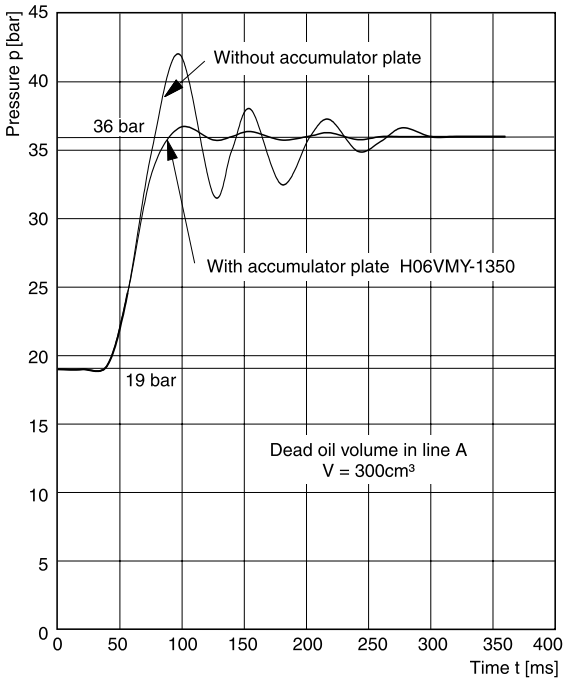
4

Step response signal

NG06

Setting range max. 210 bar



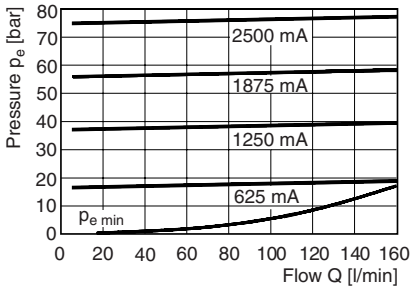


p/Q characteristics

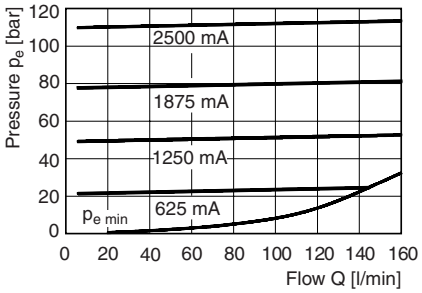
measured at t = 50°C and ν = 35 mm²/s

NG10

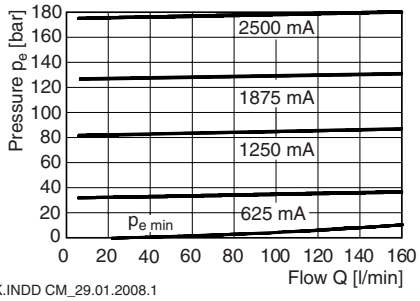
Setting range max. 64 bar



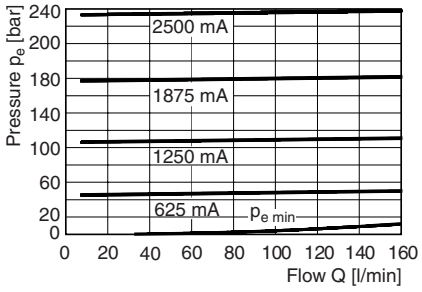
Setting range max. 100 bar



Setting range max. 160 bar



Setting range max. 210 bar

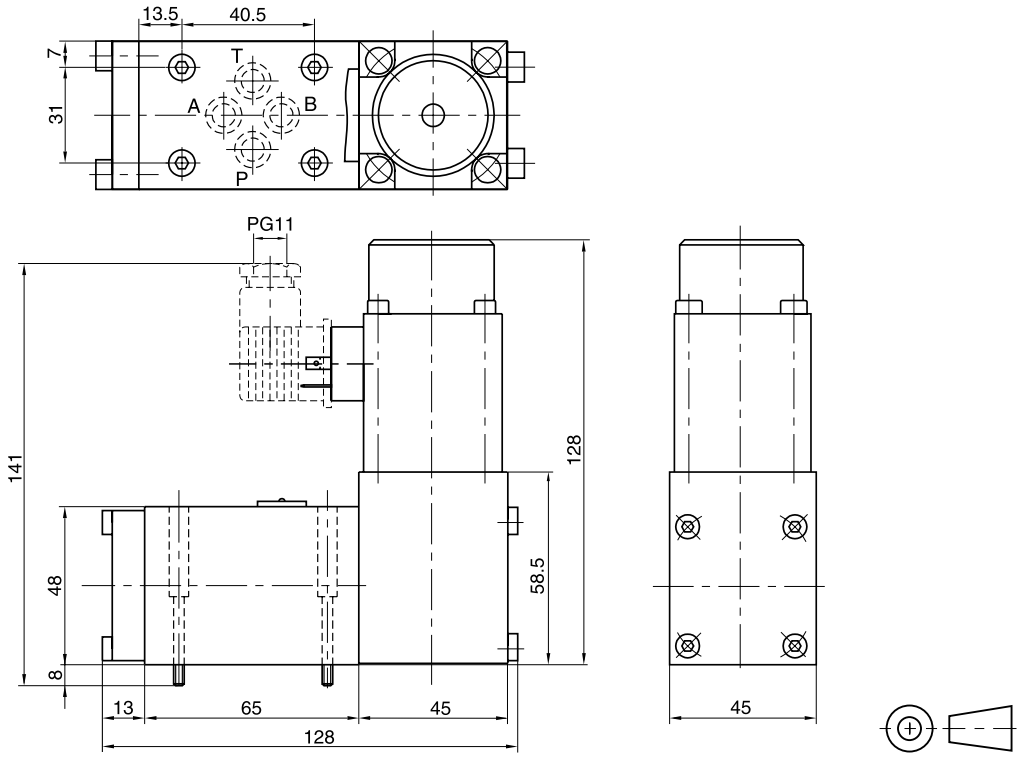


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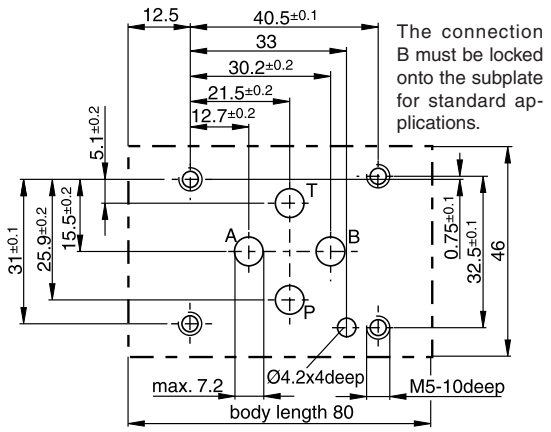
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NG06



Surface finish	Bolt kit			Kit NBR	Kit FPM
R_{max}6.3 ⏥ 0.01/100	BK 375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	SK-VMY-L06-N	SK-VMY-L06-V

Mounting pattern ISO 5781-03-04-0-00



The connection B must be locked onto the subplate for standard applications.

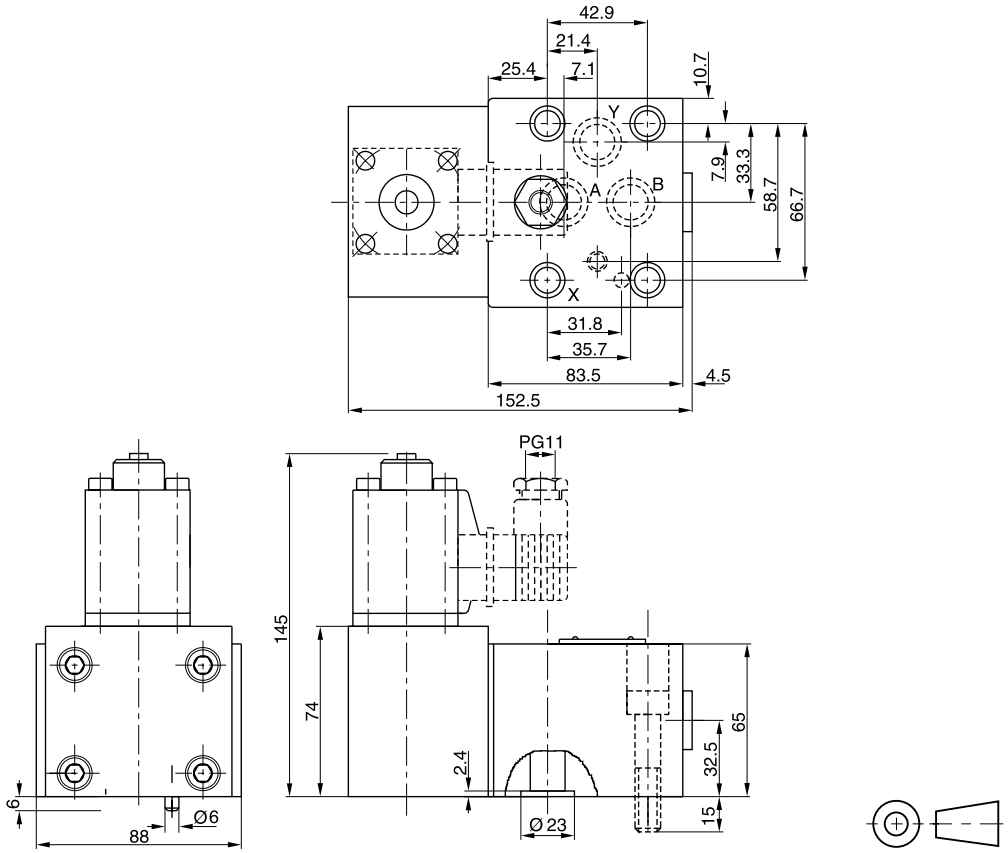
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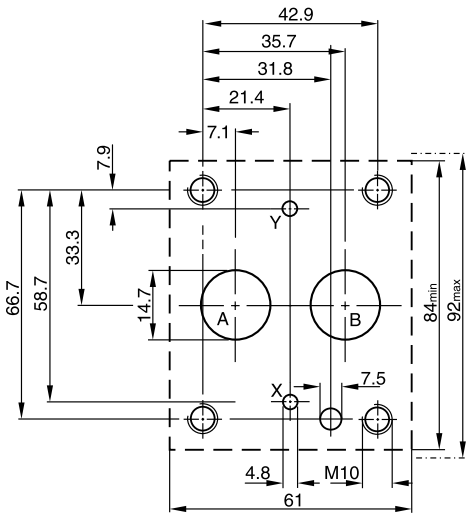
4

NG10



Surface finish	Bolt kit			Kit FPM
R_{max}6.3 0.01/100	BK 389	4x M10x50 DIN 912 12.9	63 Nm ±15%	SK-VB/VM-A10V

Mounting pattern ISO 5781-06-07-0-00



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Subplate mounted unloading valves are available with both Parker (series UR/US) and Denison (series R4U) model codes.

These valves are used to unload a circuit at low pressure. The mechanically adjustable pressure signal to unload the main stage has to be applied to port X. The pressure differential between opening and closing is nominal 15 or 28 % of the setting pressure.

28 % for pressure stages bar 105, 210

15 % for pressure stages bar 350

Typical applications are unloading of pumps in an accumulator circuit or unloading of the low pressure stage of a double pump.

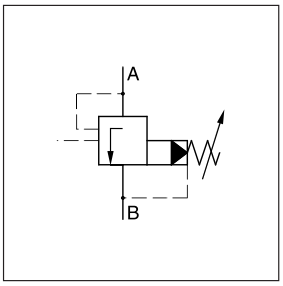
In addition, the US series is vented by electrical operation.

Features

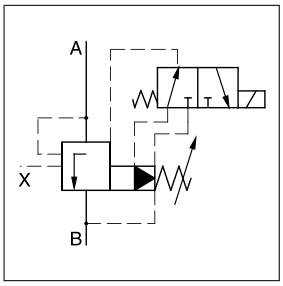
- Pilot operated unloading valve
- Interface
  - subplate mounting to ISO 5781
- 3 pressure stages
- 2 switching types (series US)
- 3 adjustment modes
  - hand knob
  - acorn nut with lead seal
  - Key lock





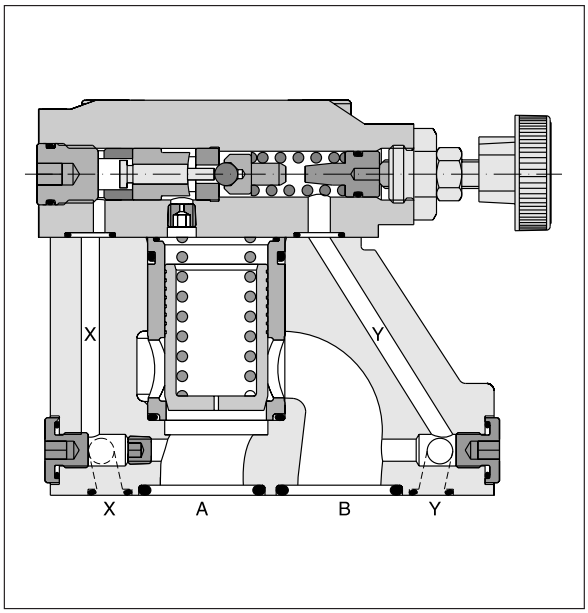


UR

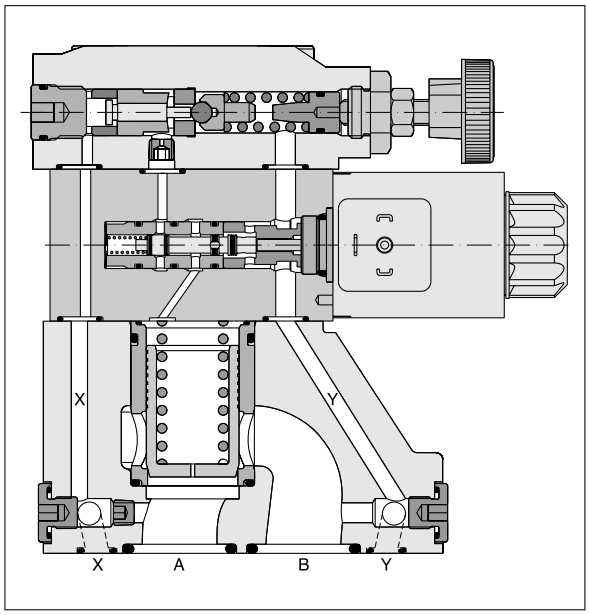


US

UR25M
R4U06



US25M
R4U06 with vent function

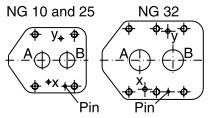


4

UR						S		
Unloading valve	Nominal size	Interface	Pressure stages	Adjust-ment	Pilot oil	Poppet spring	Seals	Design series (not required for ordering)

Code	Nominal size
10	NG10
25	NG25
32	NG32

Code	Seals
N	NBR
V	FPM

Code	Interface	
M	Subplate mounting ISO 5781	NG 10 and 25 / NG 32 

Pilot oil		
Code	Pilot	Drain
1	Internal	External
4	Internal	Internal

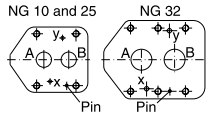
Code	Pressure stages
10	up to 105 bar
21	up to 210 bar
35	up to 350 bar

Code	Adjustment
S	Hand knob (Standard)
L	Key lock
A	Acorn nut with lead seal

The Parker model code should be used for all new applications. Otherwise also refer to Denison model code.

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R	4	U		-	5	3		-			A		-	
Pressure valve	Interface	Unloading function	Nominal size		Max. pressure (350 bar)	Body design	Pressure stages		Adjust-ment	Pilot oil	Design series	Seals		Modifi-cations

Code	Interface	
4	Subplate mounting ISO 5781	NG 10 and 25 / NG 32 

Code	Nominal size
03	NG10
06	NG25
10	NG32

Code	Pressure stages
1	up to 105 bar
3	up to 210 bar
5	up to 350 bar

Code	Seals
1	NBR
5	FPM

Pilot oil	
Code	Drain line
0	Internal
1	External from subplate

Code	Adjustment
1	Hand knob 32mm dia. (Standard)
3	Acorn nut with lead seal
4	Key lock

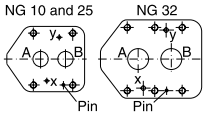
DENISON Hydraulics

The Denison model code is available for existing applications. Otherwise also refer to Parker model code.

4

US						S				W		
Unloading valve with elec. unloading	Nominal size	Interface	Pressure stages	Adjust-ment	Pilot	Poppet spring	Seals	Switching type	Solenoid	Without plug	Options	Design series (not required for ordering)

Code	Nominal size
10	NG10
25	NG25
32	NG32

Code	Interface	
M	Subplate mounting ISO 5781	NG 10 and 25 / NG 32 

Code	Pressure stages
07	up to 70 bar
17	up to 175 bar
25	up to 250 bar
35	up to 350 bar

Code	Adjustment
S	Hand knob (Standard)
L	Key lock
A	Acorn nut with lead seal

Code	Options
omit	Standard
S	with slow unloading

Code	Solenoid
K	12V =
J	24V =
U	98V =
G	205V =
Y	110V / 50Hz 120V / 60Hz
T	230V / 50Hz 240V / 60Hz

Code	Switching type
1	Solenoid not activ. unpress. circulation
9	Solenoid activated unpress. circulation

Code	Seals
N	NBR
V	FPM

Pilot oil		
Code	Pilot	Drain
1	Internal	External
4	Internal	Internal

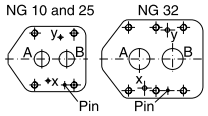
The Parker model code should be used for all new applications. Otherwise also refer to Denison model code.

UR-US-R4U_UK.INDD CM_29.01.2008.1

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R	4	U		-	5	3		-			-			-		-	A		-	
Pressure valve	Interface	Relief function	Nominal size		Max. pressure (350 bar)	Body design	Pressure stages		Adjust-ment	Pilot oil		Vent valve function		Solenoid voltage			Design series	Seals		Modifi-cations

Code	Interface	
4	Subplate mounting ISO 5781	NG 10 and 25 / NG 32 

Code	Nominal size
03	NG10
06	NG25
10	NG32

Code	Pressure stages
1	up to 105 bar
3	up to 210 bar
5	up to 350 bar

Code	Adjustment
1	Hand knob (Standard)
3	Acorn nut with lead seal
4	Key lock

Code	Seals
1	NBR
5	FPM

Code	Voltage
G0R	12V =
G0Q	24V =
GAR	98V =
GAG	205V =
W30	110V / 50Hz 120V / 60Hz
W31	230V / 50Hz 240V / 60Hz

Code	Vent valve
09	Solenoid not activ. unpress. circulation
11	Solenoid activated unpress. circulation

Pilot oil	
Code	Drain line
0	internal
1	external from subplate

DENISON Hydraulics

The Denison model code is available for existing applications. Otherwise also refer to Parker model code.

4

UR / R4U

General				
Nominal size		**10**	**25**	**32**
Interface		Subplate mounting acc. ISO 5781		
Mounting position		as desired, horizontal mounting prefered		
Ambient temperature	[°C]	-20...+80		
Weight	[kg]	2.7	4.5	6.0
Hydraulic				
Max. operating pressure	[bar]	Ports A and X 350, Ports B and Y depressurized		
Pressure stages	[bar]	75, 175, 250, 350		
Pressure differential		28 % (for pressure stages 75 bar and 175 bar); 15% (for pressure stages 250 bar and 350 bar)		
Nominal flow	[l/min]	150	350	650
Fluid		Hydraulic oil according to DIN 51524 ... 525		
Viscosity,				
recommended	[cSt] / [mm²/s]	30 ... 50		
permitted	[cSt] / [mm²/s]	20...380		
	[mm²/s]	20 ... 380		
Fluid temperature	[°C]	-20 ... +70		
Filtration		ISO 4406 (1999); 18/16/13		

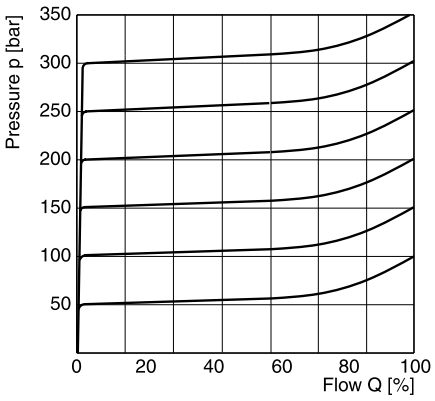
US / R4U with vent function

General							
Nominal size		**10**		**25**		**32**	
Interface		Subplate mounting acc. ISO 5781					
Mounting position		as desired, horizontal mounting prefered					
Ambient temperature	[°C]	-20...+80					
Weight	[kg]	4.4		6.2		7.7	
Hydraulic							
Max. operating pressure	[bar]	Ports A and X 350, Ports B and Y depressurized					
Pressure stages	[bar]	75, 175, 250, 350					
Pressure differential		28 % (for pressure stages 75 bar and 175 bar); 15% (for pressure stages 250 bar and 350 bar)					
Nominal flow	[l/min]	150		350		650	
Fluid		Hydraulic oil according to DIN 51524 ... 525					
Viscosity,							
recommended	[cSt] / [mm²/s]	30 ... 50					
permitted	[cSt] / [mm²/s]	20...380					
Fluid temperature	[°C]	-20 ... +70					
Filtration		ISO 4406 (1999); 18/16/13					
Electrical (solenoid)							
Duty ratio	[%]	100 ED; CAUTION: coil temperature up to 180 °C possible					
Max. switching frequency		160000 (DC), 7200 (AC)					
Protection class		IP65 in according with EN 60529 (plugged and mounted)					
Code Denison / Code Parker	Code	G0R / K	G0Q / J	GAR / U	GAG / G	W30 / Y	W31 / T
Supply voltage	[V]	12V =	24V =	98V =	205V =	110V/50Hz 120V/60Hz	230V/50Hz 240V/60Hz
Tolerance supply voltage	[%]	+5...-10	+5...-10	+5...-10	+5...-10	+5...-10	+5...-10
Power consumption hold	[W]	31	31	31	31	78	78
in rush	[W]	31	31	31	31	264	264
Solenoid connection		Connector as per EN 175301-803					
Wiring min.	[mm²]	3 x 1.5 recommended					
Wiring length max.	[m]	50 recommended					

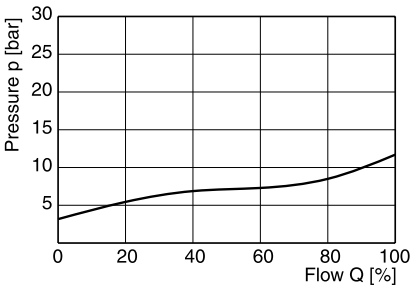
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p/Q performance curve

UR/US [1)]



Minimum pressure curve

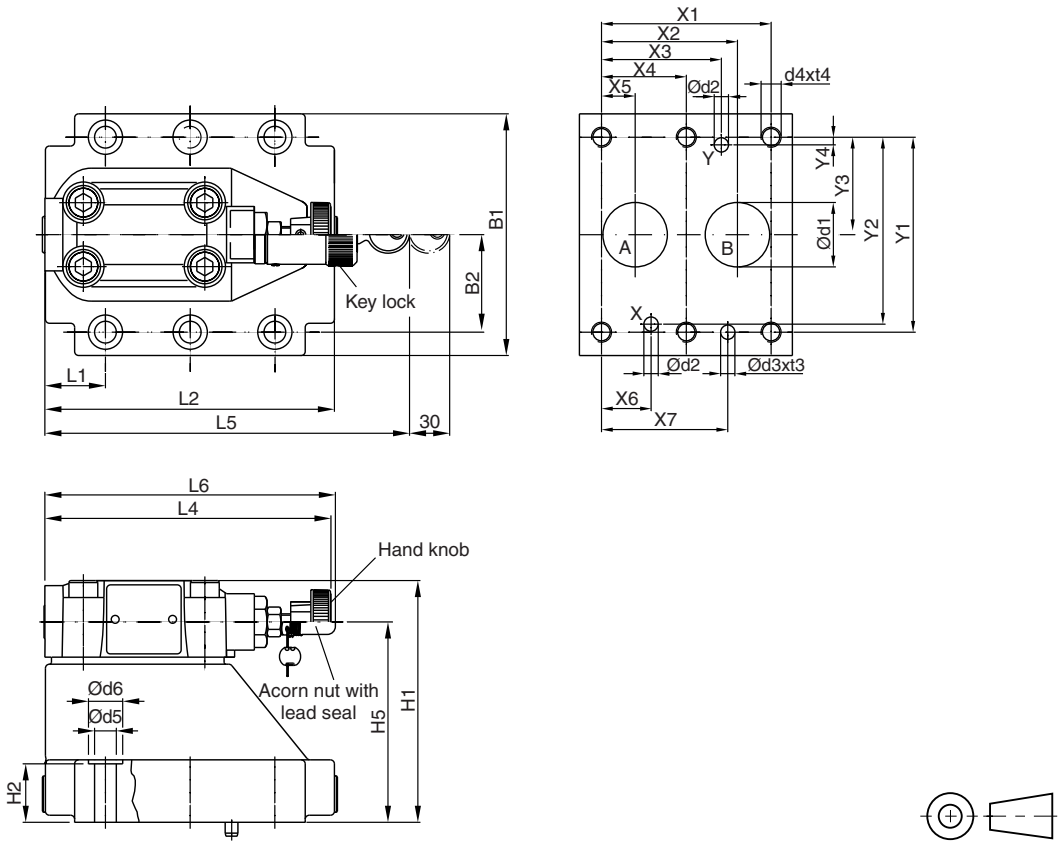


[1)] The performance curves are measured with external drain.
For internal drain the tank pressure has to be added to curve.

4

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UR*M / R4U



NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	5781-06-07-0-00	42.9	35.8	21.5	–	7.2	21.5	31.8	66.7	58.8	33.4	7.9	–	–
25	5781-08-10-0-00	60.3	49.2	39.7	–	11.1	20.6	44.5	79.4	73	39.7	6.4	–	–
32	5781-10-13-0-00	84.2	67.5	59.5	42.1	16.7	24.6	62.7	96.8	92.8	48.4	3.8	–	–

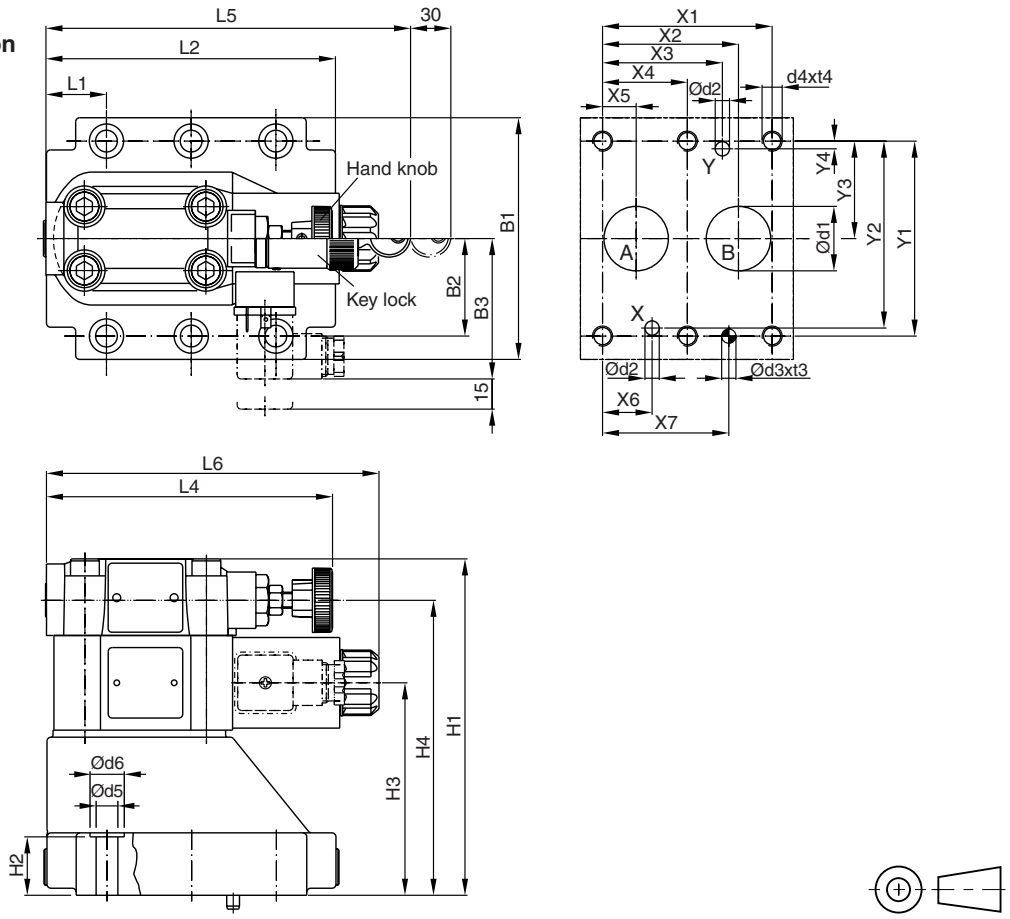
Tolerance at X and Y pin holes and screw holes ±0.1, at port holes ±0.2.

NG	ISO-code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6
10	5781-06-07-0-00	87.3	33.35	83	21	62.5	–	–	–	29	94.8	–	143	181	144.8
25	5781-08-10-0-00	105	39.7	109.5	29	89	–	–	–	34.7	126.8	–	143	181	144.8
32	5781-10-13-0-00	120	48.4	120	29	99.5	–	–	–	30.6	144.3	–	143	181	144.8

NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	5781-06-07-0-00	15	7	7.1	8	M10	16	10.8	17
25	5781-08-10-0-00	23.4	7.1	7.1	8	M10	18	10.8	17
32	5781-10-13-0-00	32	7.1	7.1	8	M10	20	10.8	17

NG	ISO-code	Bolt kit			Kit		Surface finish
					NBR	FPM	
10	5781-06-07-0-00	BK 505	4x M10 x 35 DIN 912 12.9	63 Nm ±15%	SK-UR10MN50	SK-UR10MV50	
25	5781-08-10-0-00	BK 485	4x M10 x 45 DIN 912 12.9	63 Nm ±15%	SK-UR25MN50	SK-UR25MV50	
32	5781-10-13-0-00	BK 506	6x M10 x 45 DIN 912 12.9	63 Nm ±15%	SK-UR32MN50	SK-UR32MV50	

US*M / R4U
with vent function



NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	5781-06-07-0-00	42.9	35.8	21.5	–	7.2	21.5	31.8	66.7	58.8	33.4	7.9	–	–
25	5781-08-10-0-00	60.3	49.2	39.7	–	11.1	20.6	44.5	79.4	73	39.7	6.4	–	–
32	5781-10-13-0-00	84.2	67.5	59.5	42.1	16.7	24.6	62.7	96.8	92.8	48.4	3.8	–	–

Tolerance at X and Y pin holes and screw holes ±0.1, at port holes ±0.2.

NG	ISO-code	B1	B2	B3	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6
10	5781-06-07-0-00	87.3	33.35	70	130	21	68.5	109.5	–	–	29	94.8	–	143	181	165.6
25	5781-08-10-0-00	105	39.7	70	156.5	29	95	136	–	–	34.7	126.8	–	143	181	165.6
32	5781-10-13-0-00	120	48.4	70	167	29	105.5	146.5	–	–	30.6	144.3	–	143	181	165.6

NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	5781-06-07-0-00	15	7	7.1	8	M10	16	10.8	17
25	5781-08-10-0-00	23.4	7.1	7.1	8	M10	18	10.8	17
32	5781-10-13-0-00	32	7.1	7.1	8	M10	20	10.8	17

NG	ISO-code	Bolt kit			Kit		Surface finish
					NBR	FPM	
10	5781-06-07-0-00	BK 505	4x M10 x 35 DIN 912 12.9	63 Nm ±15%	SK-RS10RN50	SK-RS10RV50	
25	5781-08-10-0-00	BK 485	4x M10 x 45 DIN 912 12.9	63 Nm ±15%	SK-RS25RN50	SK-RS25RV50	
32	5781-10-13-0-00	BK 506	6x M10 x 45 DIN 912 12.9	63 Nm ±15%	SK-RS32RN50	SK-RS32RV50	

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Kaarst, Germany

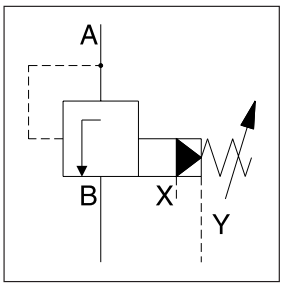
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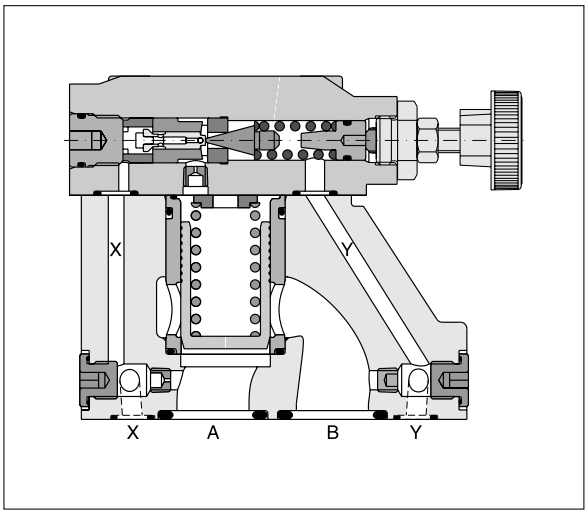
Notes

Subplate mounted sequence valves are available with both Parker (series S) and Denison (series R4S) model codes.

These valves enable a hydraulic system to operate in a pressure sequence. When the system pressure reaches the setting pressure the valve opens and permits flow to the secondary sub-system.







Features

- Pilot operated sequence valve
- Subplate mounting acc. to ISO 5781
- 4 pressure stages
- 3 adjustment modes
  - hand knob
  - acorn nut with lead seal
  - Key knob

4

Technical data S/R4S

General				
Nominal size		**10**	**25**	**32**
Interface		Subplate mounting acc. ISO 5781		
Mounting position		as desired, horizontal mounting prefered		
Ambient temperature	[°C]	-20...+80		
Weight Series S/R4S	[kg]	2.7	4.5	6.0
Hydraulic				
Max. operating pressure	[bar]	Ports A, B and X 350, port Y depressurized		
Pressure stages	[bar]	75, 175, 250, 350 (series S), 105, 210, 350 (series R45)		
Nominal flow	[l/min]	150	350	650
Fluid		Hydraulic oil according to DIN 51524 ... 525		
Viscosity, recommended	[cSt] / [mm²/s]	30 ... 50		
permitted	[cSt] / [mm²/s]	20 ... 380		
Fluid temperature	[°C]	-20 ... +70		
Filtration		ISO 4406 (1999); 18/16/13		

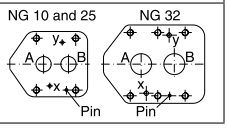
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Parker

S		M			1	U		
Sequence valve	Nominal size	Interface	Pressure stages	Adjust-ment	External drain from subplate	Poppet spring	Seals	Design series (not required for ordering)

Code	Nominal size
10	NG10
25	NG25
32	NG32

Code	Seals
N	NBR
V	FPM

Code	Interface	
M	Subplate mounting ISO 5781	NG 10 and 25 / NG 32 

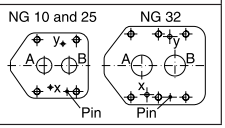
Code	Adjustment
S	Hand knob (Standard)
L	Key lock
A	Acorn nut with lead seal

Code	Pressure stages
07	up to 70 bar
17	up to 175 bar
25	up to 250 bar
35	up to 350 bar

The Parker model code should be used for all new applications. Otherwise also refer to Denison model code.

Denison

R	4	S		–	5	3		–		1	A	
Pressure valve	Interface	Relief function	Nominal size		Max. pressure (350 bar)	Plain cap	Pressure stages		Adjust-ment	External drain from subplate	Design series	Seals

Code	Interface	
4	Subplate mounting ISO 5781	NG 10 and 25 / NG 32 

Code	Seals
1	NBR
5	FPM

Code	Nominal size
03	NG10
06	NG25
10	NG32

Code	Adjustment
1	Hand knob 32mm dia. (Standard)
3	Acorn nut with lead seal
4	key lock

Code	Pressure stages
1	up to 105 bar
3	up to 210 bar
5	up to 350 bar

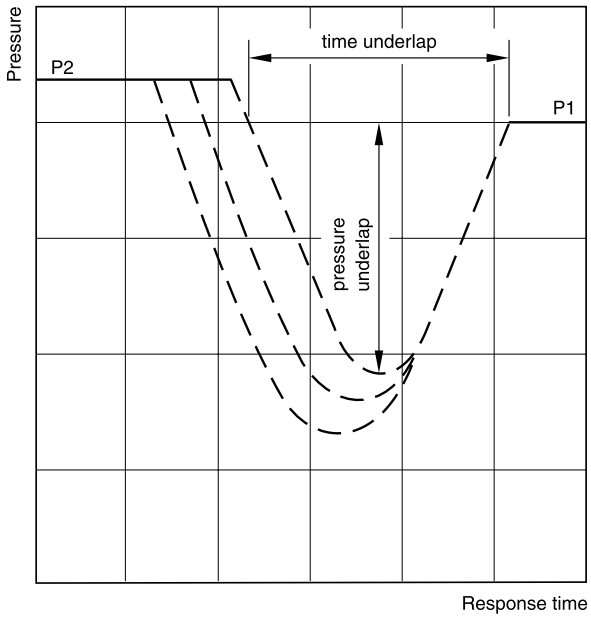
The Denison model code is available for existing applications. Otherwise also refer to Parker model code.

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Typical pressure characteristics at closing point

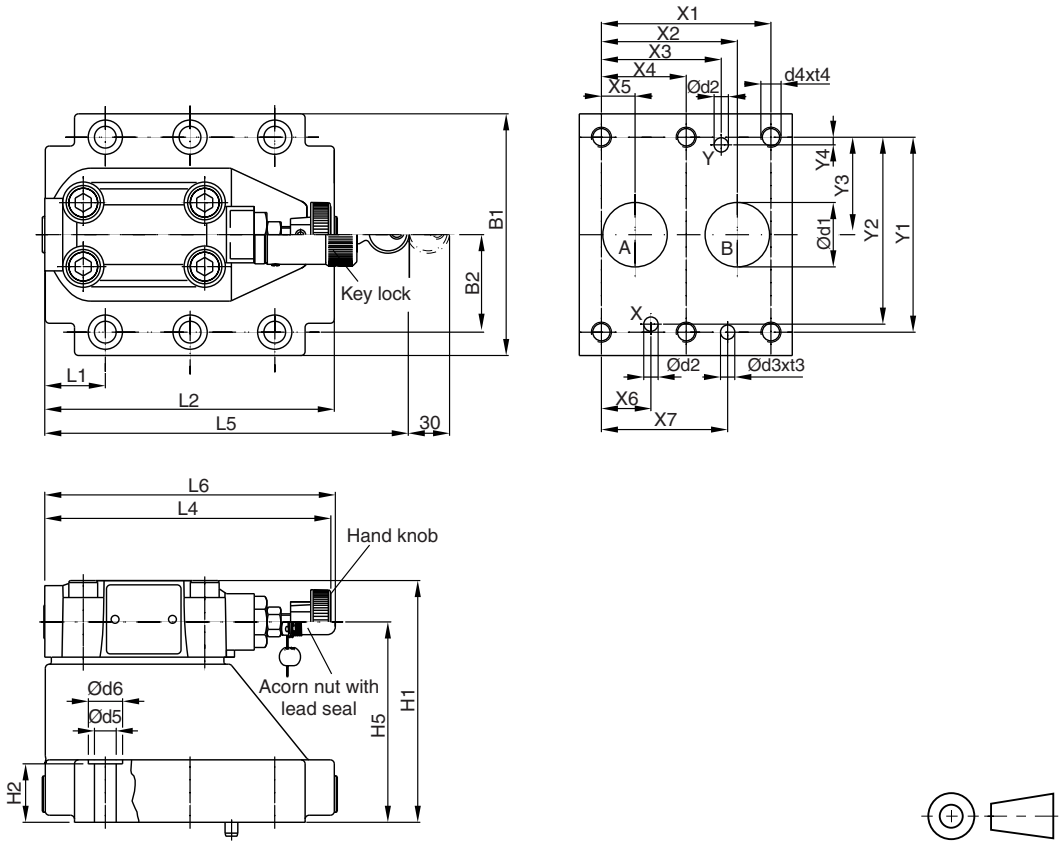
P1 = setting pressure

P2 = operating pressure



Time and pressure underlap depend on the characteristics of the specific system.

S*M



NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	5781-06-07-0-00	42.9	35.8	21.5	–	7.2	21.5	31.8	66.7	58.8	33.4	7.9	–	–
25	5781-08-10-0-00	60.3	49.2	39.7	–	11.1	20.6	44.5	79.4	73	39.7	6.4	–	–
32	5781-10-13-0-00	84.2	67.5	59.5	42.1	16.7	24.6	62.7	96.8	92.8	48.4	3.8	–	–

Tolerance at X and Y pin holes and screw holes ±0.1, at port holes ±0.2.

NG	ISO-code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6
10	5781-06-07-0-00	87.3	33.35	83	21	62.5	–	–	–	29	94.8	–	143	181	144.8
25	5781-08-10-0-00	105	39.7	109.5	29	89	–	–	–	34.7	126.8	–	143	181	144.8
32	5781-10-13-0-00	120	48.4	120	29	99.5	–	–	–	30.6	144.3	–	143	181	144.8

NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	5781-06-07-0-00	15	7	7.1	8	M10	16	10.8	17
25	5781-08-10-0-00	23.4	7.1	7.1	8	M10	18	10.8	17
32	5781-10-13-0-00	32	7.1	7.1	8	M10	20	10.8	17

NG	ISO-code	Bolt kit			Kit		Surface finish
					NBR	FPM	
10	5781-06-07-0-00	BK 505	4x M10 x 35 DIN 912 12.9	63 Nm ±15%	SK-UR10MN50	SK-UR10MV50	R_{max}6.3 ⏥ 0.01/100
25	5781-08-10-0-00	BK 485	4x M10 x 45 DIN 912 12.9	63 Nm ±15%	SK-UR25MN50	SK-UR25MV50	
32	5781-10-13-0-00	BK 506	6x M10 x 45 DIN 912 12.9	63 Nm ±15%	SK-UR32MN50	SK-UR32MV50	

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Direct operated pressure reducing valve with manual adjustment. Series VM is a direct-controlled, spring loaded 3 way pressure reducing valve, that is open in neutral position. The valve closes the connection when the pre-set pressure is exceeded.

Primary port: NG06 -P, NG10 - B
Secondary port: NG06 - A, NG10 - A
Tank port: NG06 - T, NG10 - Y

If the pressure increases due to an external influence the spool opens to port T until the pre-set pressure is reached.

Features

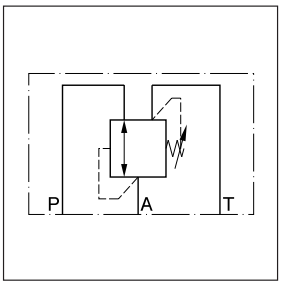
- Spool type valve
- Subplate mounting acc. to ISO 5781
- 5 pressure stages at NG06
- 3 pressure stages at NG10
- 2 adjustment modes



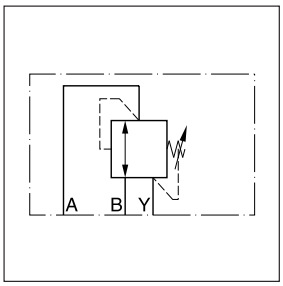
NG06



NG10



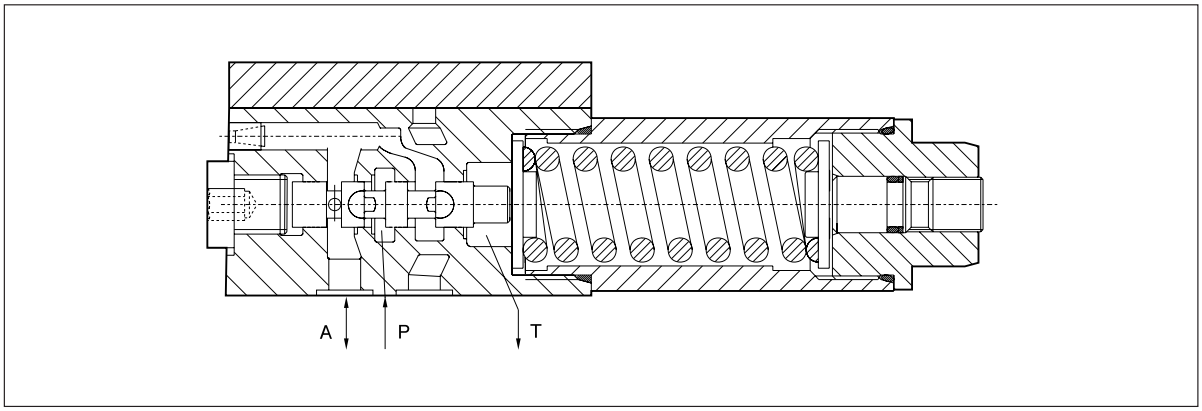
NG06



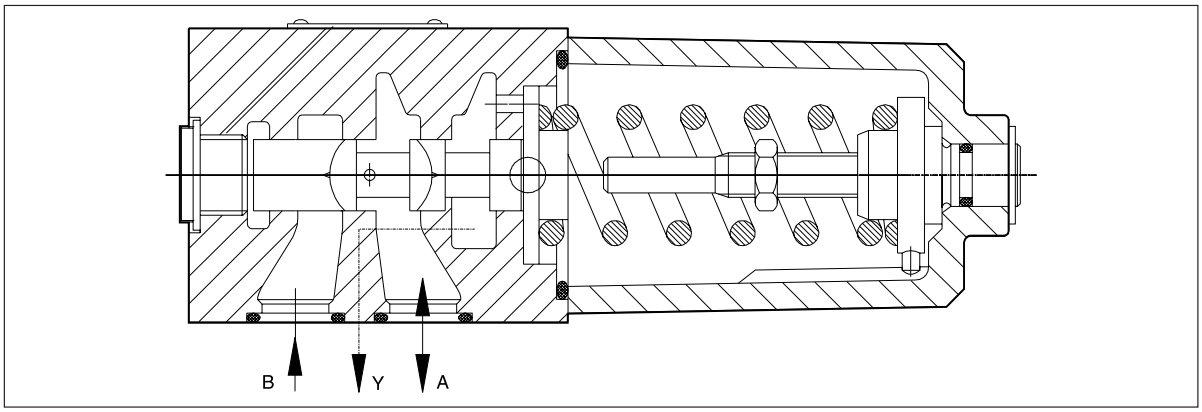
NG10

4

NG06



NG10

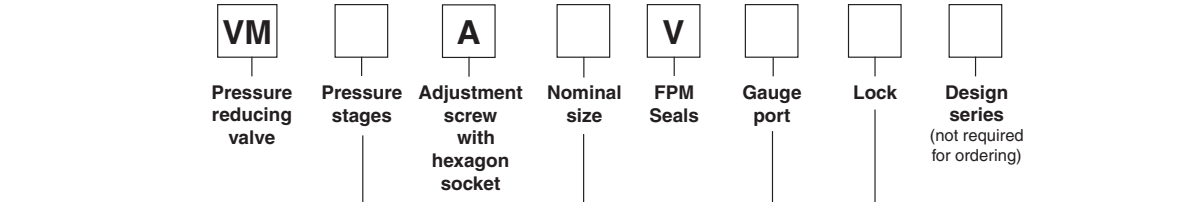


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Ordering code



Code	Pressure stages
025 [1]	up to 25 bar
064	**up to 64 bar**
125 [2]	**up to 125 bar**
160 [1]	**up to 160 bar**
210	**up to 210 bar**
350 [1]	up to 350 bar

[1] only NG 06
[2] only NG 10

Code	Lock
omit	**Normal**
Z	Key lock

Code	Gauge port
G [1]	**G 1/4”**
M [2]	**M18x1.5**

Code	Nominal size
06	**NG 06**
10	**NG 10**

Bold letters =
Short-term availability

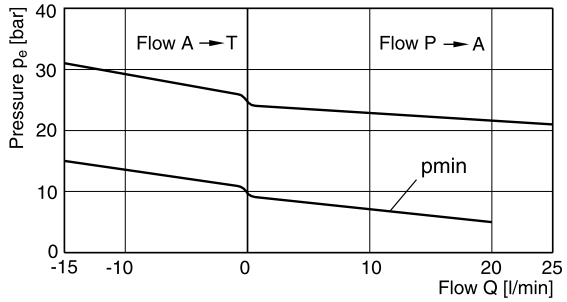
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Technical data

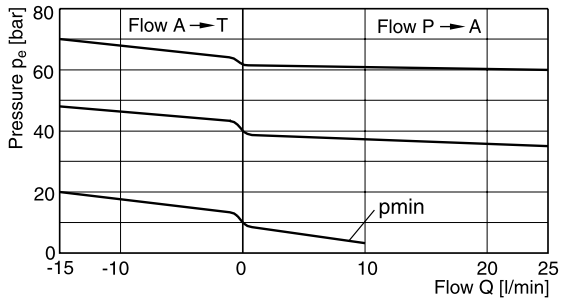
General			
Design		Pressure reducing valve, direct operated, spool type	
Nominal size		**NG 06 (CETOP 03 / NFPA D03)**	**NG 10 (CETOP 05 / NFPA D05)**
Interface		Subplate mounting according to ISO 5781	
Mounting position		unrestricted	
Ambient temperature	[°C]	-20...+80	
Weight	[kg]	1.3	3.7
Hydraulics			
Max. operating pressure	[bar]	Port P and A 350 Port T depressurized	Port A and B 210 Port Y depressurized
Pressure stages	[bar]	25; 64; 160; 210; 350	64; 125; 210
Nominal flow	[l/min]	25	60
Fluid		Hydraulic oil according to DIN 51524...525	
Fluid temperature	[°C]	-20...+70	
Viscosity recommended permitted	[cSt] / [mm²/s] [cSt] / [mm²/s]	30...50 20...380	
Filtration		ISO 4406 (1999); 18/16/13	

NG06

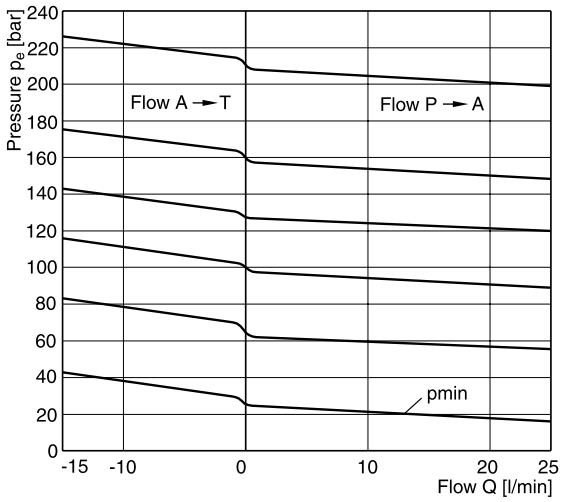
Setting pressure max. 25 bar



Setting pressure max. 64 bar

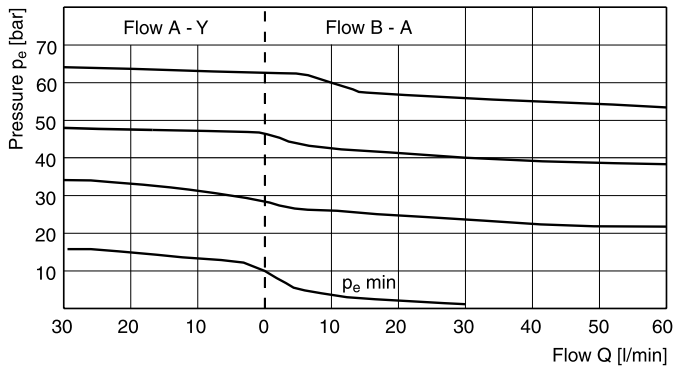


Setting pressure max. 160 or 210 bar

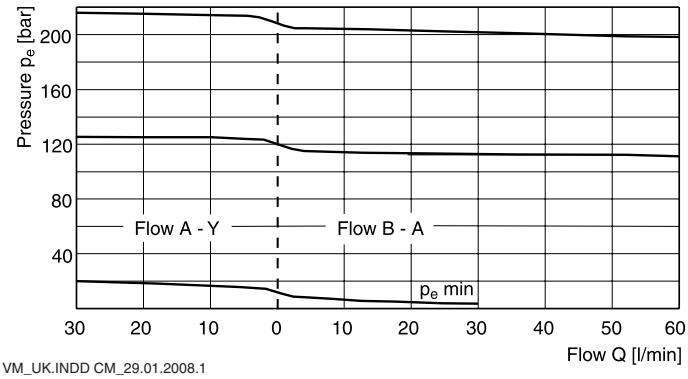


NG10

Setting pressure max. 64 bar



Setting pressure max. 210 bar



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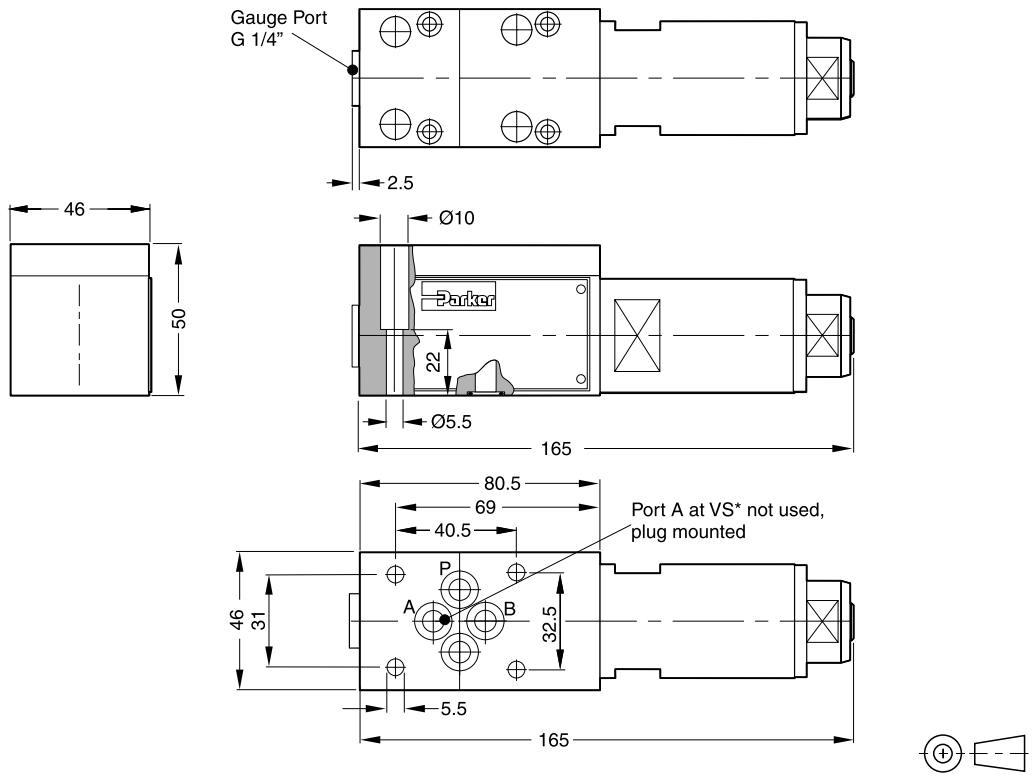
4

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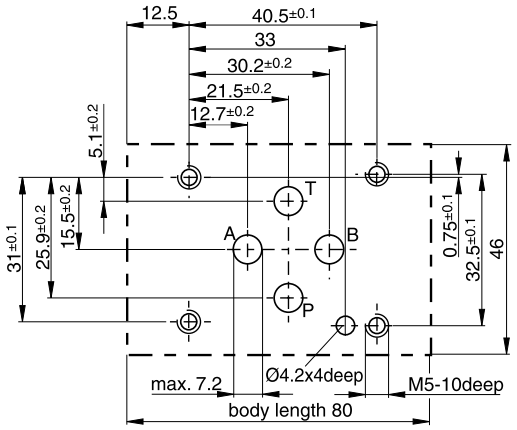
4

NG06



Surface finish	Bolt kit			Kit FPM
R_{max}6.3 0.01/100	BK 375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	SK-VB/VM/VS-A06V

Mounting pattern ISO 5781-03-04-0-00

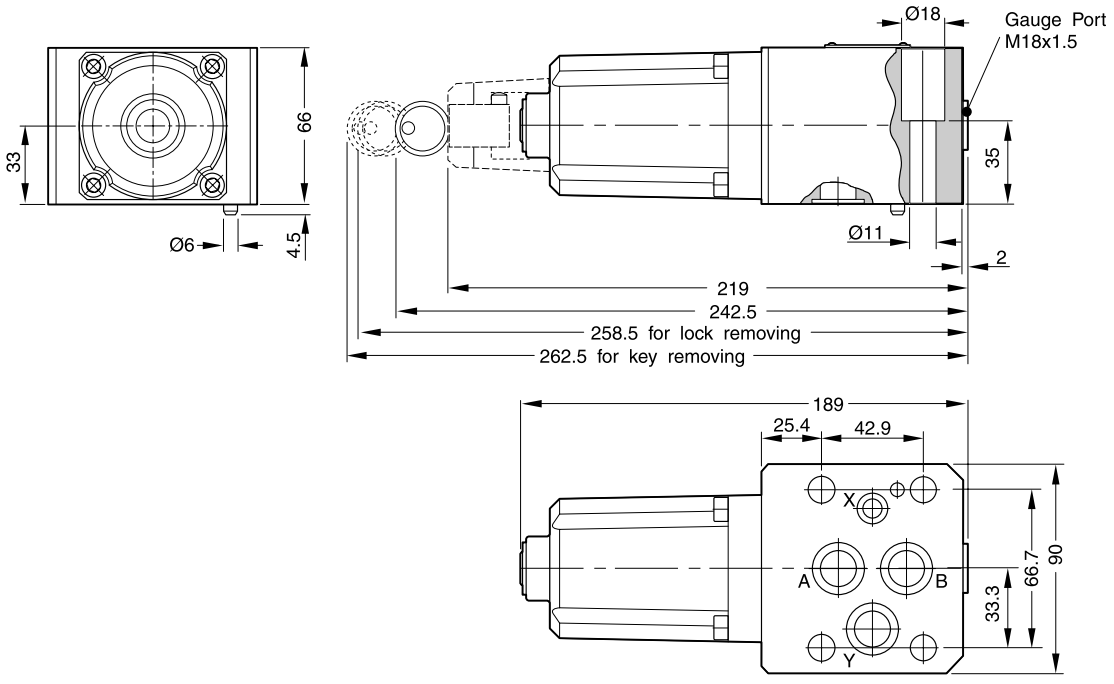


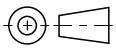
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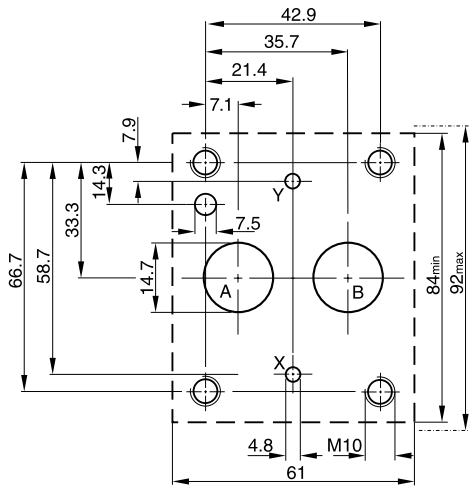
NG10





Surface finish	Bolt kit			Kit FPM
R_{max}6.3 0.01/100	BK 389	4x M10x50 DIN 912 12.9	63 Nm ±15%	SK-VB/VM-A10V

Mounting pattern ISO 5781-06-07-0-00



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Notes

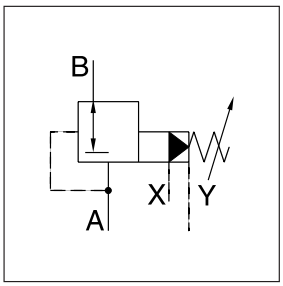
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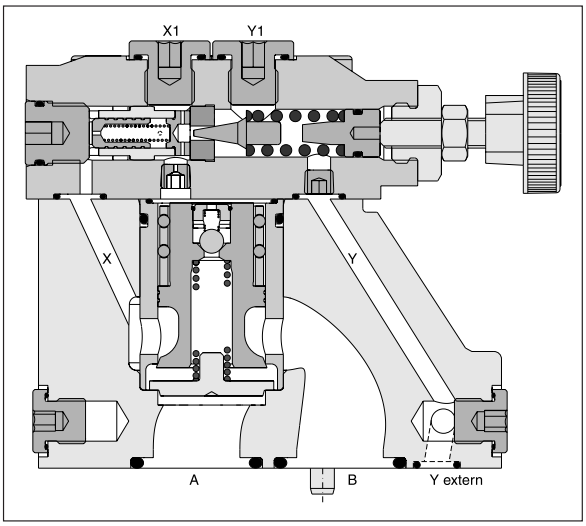
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Subplate mounted pressure reducing valves are available with both Parker (series PR) and Denison (series R4R) model codes.

These valves are used to control the pressure in the secondary part of the hydraulic system. Independent of the primary pressure the secondary pressure is reduced to the pressure setting. In order to avoid undesired motion the valves are normally closed.







4

Features

- Pilot operated with manual adjustment
- Subplate mounting acc. to ISO 5781
- Normally closed to avoid unintended motion
- 4 pressure stages
- 3 adjustment modes
  - hand knob
  - acorn nut with lead seal
  - Key lock

Technical data

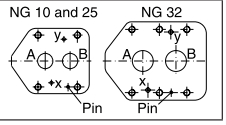
General				
Nominal size		**10**	**25**	**32**
Interface		Subplate mounting acc. ISO 5781		
Mounting position		as desired, horizontal mounting prefered		
Ambient temperature	[°C]	-20...+80		
Weight	[kg]	4.8	7.2	13.5
Hydraulic				
Max. operating pressure	[bar]	Ports A, B and X 350, port Y depressurized		
Pressure stages	[bar]	105, 175, 250, 350 (series PR), 105, 210, 350 (series R4R)		
Nominal flow	[l/min]	150	350	500
Fluid		Hydraulic oil according to DIN 51524 ... 525		
Viscosity, recommended	[cSt] / [mm²/s]	30 ... 50		
permitted	[cSt] / [mm²/s]	20 ... 380		
Fluid temperature	[°C]	-20 ... +70		
Filtration		ISO 4406 (1999); 18/16/13		

Parker

PR		M			1	P		9	
Pressure reducing valve	Nominal size	Interface	Pressure stages	Adjust-ment	Pilot oil: external drain	Poppet spring	Seals	Normaly closed	Design series (not required for ordering)

Code	Nominal size
10	NG10
25	NG25
32	NG32

Code	Seals
N	NBR
V	FPM

Code	Interface	
M	Subplate mounting ISO 5781	NG 10 and 25 / NG 32 

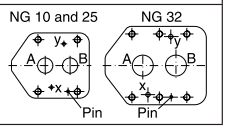
Code	Adjustment
S	Hand knob (Standard)
L	Key lock
A	Acorn nut with lead seal

Code	Pressure stages
10	up to 105 bar
17	up to 175 bar
25	up to 250 bar
35	up to 350 bar

The Parker model code should be used for all new applications. Otherwise also refer to Denison model code.

Denison

R	4	R		–	5	9		–			B		
Pressure valve	Interface	Reducing function	Nominal size		Max. pressure (350 bar)	Pilot ports G1/4“	Pressure stages		Adjust-ment	Pilot oil	Design series	Seals	Modifi-cations

Code	Interface	
4	Subplate mounting ISO 5781	NG 10 and 25 / NG 32 

Code	Seals
1	NBR
5	FPM

Pilot oil		
Code	Pilot	Drain
1	Internal	External from Y
2	Internal	External from Y1

Code	Nominal size
03	NG10
06	NG25
10	NG32

Code	Adjustment
1	Hand knob 32mm dia. (Standard)
3	Acorn nut with lead seal
4	Key lock

Code	Pressure stages
1	up to 105 bar
3	up to 210 bar
5	up to 350 bar

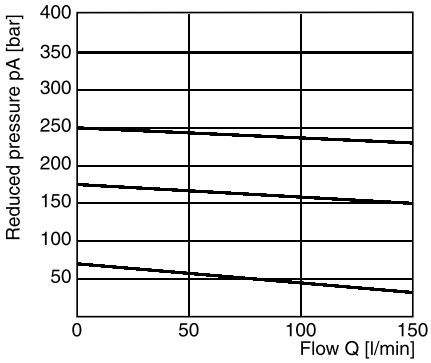
The Denison model code is available for existing applications. Otherwise also refer to Parker model code.

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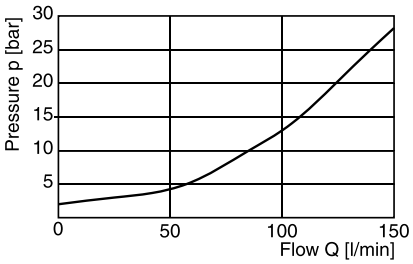
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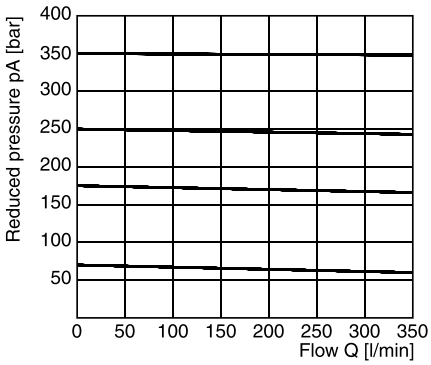
Reduced pressure pA versus flow Q
PR10M [1)]



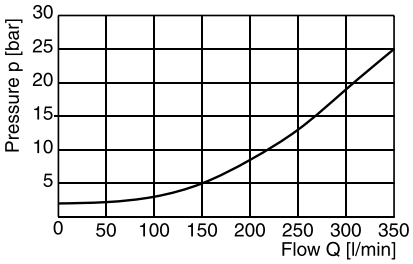
Minimum pressure curve



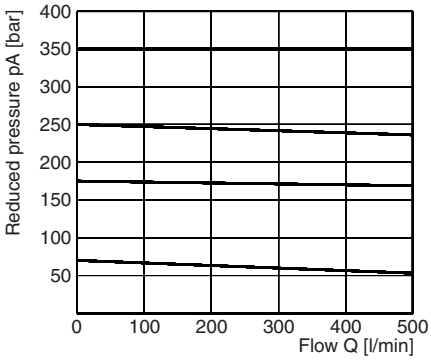
Reduced pressure pA versus flow Q
PR25M [1)]



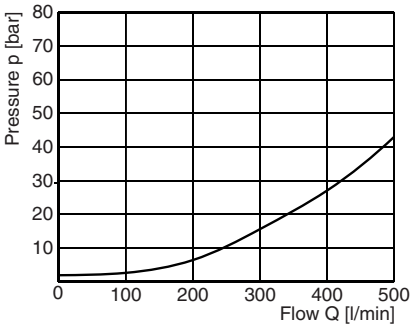
Minimum pressure curve



Reduced pressure pA versus flow Q
PR32M [1)]

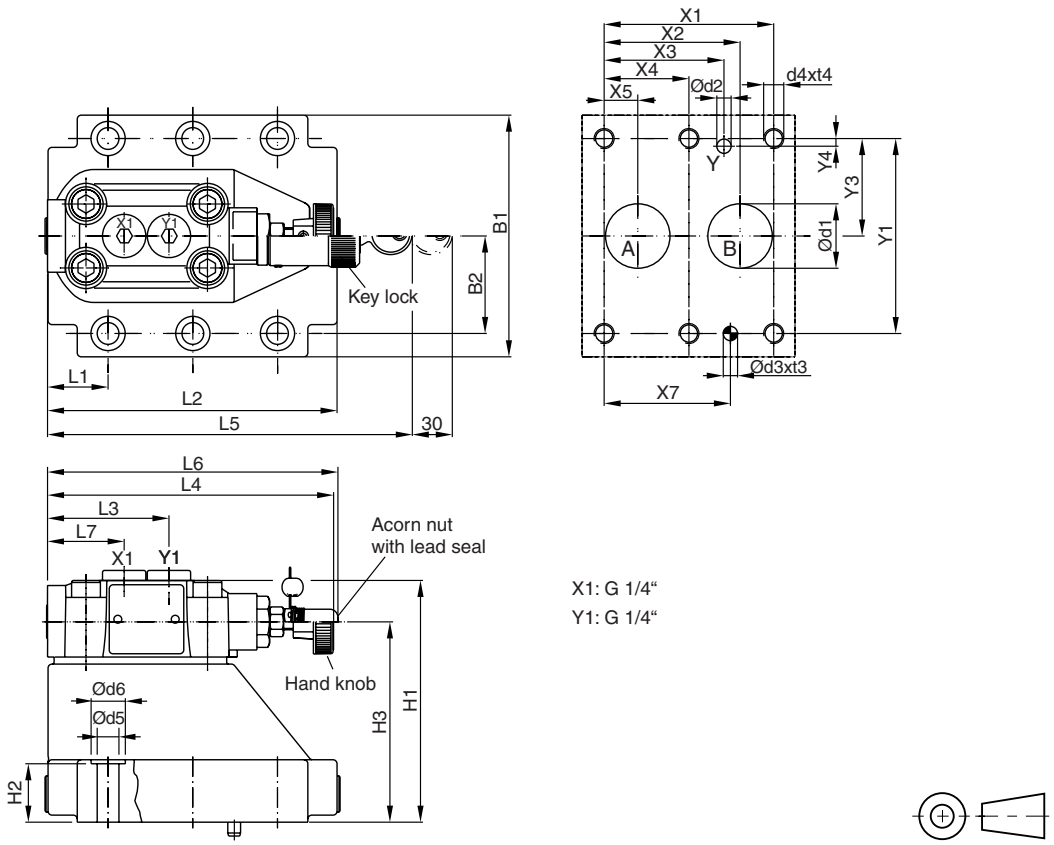


Minimum pressure curve



[1)] Measured at 350 bar primary pressure pB.

PR*M



NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	5781-06-07-0-00	42.9	35.8	21.5	–	7.2	–	31.8	66.7	–	33.4	7.9	–	–
25	5781-08-10-0-00	60.3	49.2	39.7	–	11.1	–	44.5	79.4	–	39.7	6.4	–	–
32	5781-10-13-0-00	84.2	67.5	59.5	42.1	16.7	–	62.7	96.8	–	48.4	3.8	–	–

Tolerance for all dimensions ±0.2

NG	ISO-code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6	L7
10	5781-06-07-0-00	87.3	33.35	83	21	62.5	–	–	–	29	94.8	60.8	143	181	144.8	38.6
25	5781-08-10-0-00	105	39.7	109.5	29	89	–	–	–	34.7	126.8	60.8	143	181	144.8	38.6
32	5781-10-13-0-00	120	48.4	120	29	99.5	–	–	–	30.6	144.3	60.8	143	181	144.8	38.6

NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	5781-06-07-0-00	15	7	7.1	8	M10	16	10.8	17
25	5781-08-10-0-00	23.4	7.1	7.1	8	M10	18	10.8	17
32	5781-10-13-0-00	32	7.1	7.1	8	M10	20	10.8	17

NG	ISO-code	Bolt kit			Kit		Surface finish
					NBR	FPM	
10	5781-06-07-0-00	BK 505	4x M10 x 35 DIN 912 12.9	63 Nm ±15%	SK-PR10MN50	SK-PR10MV50	
25	5781-08-10-0-00	BK 485	4x M10 x 45 DIN 912 12.9	63 Nm ±15%	SK-PR25MN50	SK-PR25MV50	
32	5781-10-13-0-00	BK 506	6x M10 x 45 DIN 912 12.9	63 Nm ±15%	SK-PR32MN50	SK-PR32MV50	

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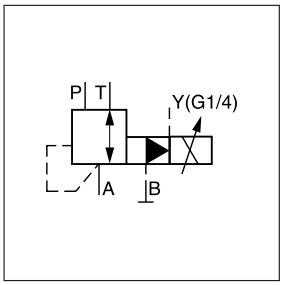
Proportional pressure reducing valves of the series VMY allow the variable adjustment of the reduced pressure from 0 bar up to the nominal pressure.

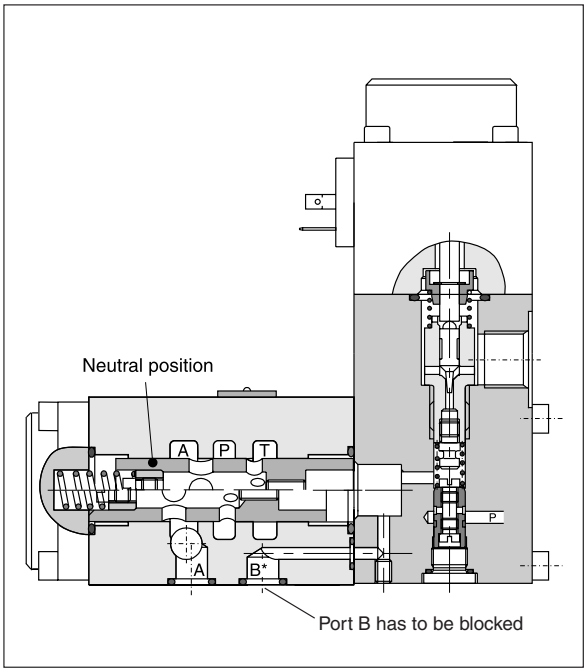
The valve consists of a spool type main stage and a proportionally operated pilot stage. The desired pressure can be variably set corresponding to the command signal specified on the amplifier. The proportional solenoid converts the current of the amplifier into force on the valve poppet of the pilot stage.

Typical applications are pressure systems, test equipment, or counterweight systems.

The optimum performance can be achieved in combination with the digital amplifier module PCD00A-400 for open loop systems or with PWDXXA-40* for closed loop systems.







4

Function

With the proportional solenoids de-energized the main spring forces the main spool into the neutral position. Port A is connected to port T. Thus the reduced pressure only depends on the back pressure in the external drain pipe and/or the tank pressure and can accordingly be reduced down to 0 bar. The pressure present in the P line delivers the pilot oil to the pilot stage via a flow control valve.

When the proportional solenoid is energized, the pilot pressure is increased in the pilot pressure area, and the main spool moves against the spring until the connection P - A opens. The regulation of the reduced pressure on connection A takes place by the constant comparison of the actual pressure and the reference pressure of the pilot stage.

Ordering code

VMY		K					P
Reducing valve	Pressure stages	Proportional solenoid 9V/2.5A	Nominal size	Pilot	Seals	Design series (not required for ordering)	High pressure channel

Code	Pressure stages
064	**up to 64 bar**
100	**up to 100 bar**
160	**up to 160 bar**
210	**up to 210 bar**
315	up to 315 bar

Code	Nominal size
06	**NG06**
10	**NG10**

Code	Seals
N [3]	**NBR**
V	FPM

[3] not for NG06

Pilot oil			
Code	Size	Pilot	Drain
omit	10		
N [1]	06	Internal	External [2]
T	06	Internal	Internal

[1] connection on port Y
[2] pmin = 0 bar possible

Bold letters =
Short-term availability

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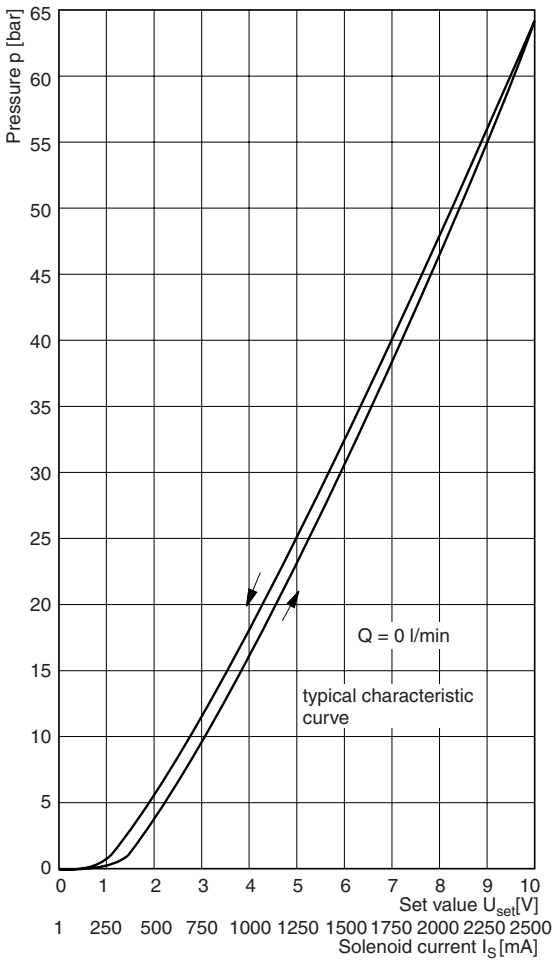
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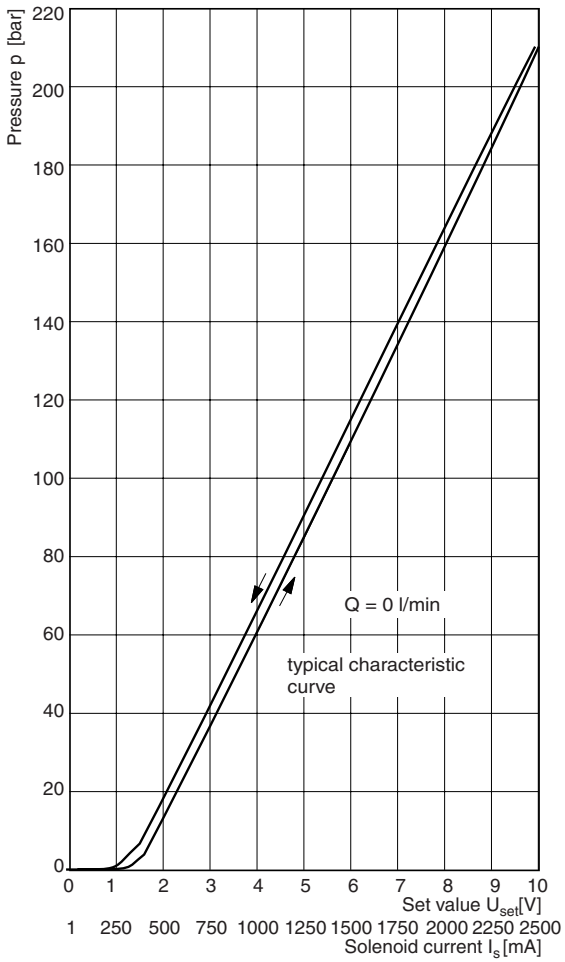
General			
Design		3 way proportional reducing valve, pilot operated, spool design	
Nominal size		**06 (DIN NG06/CETOP03/NFPA D03)**	**10 (DIN NG10/CETOP05/NFPA D05)**
Interface		Subplate mounting according to ISO 5781	
Actuation		Proportional solenoid	
Mounting position		unrestricted	
Ambient temperature	[°C]	-20 ... +80	
Weight	[kg]	2.8	5
Hydraulics			
Max. operating pressure	[bar]	Ports P, A 315; Port T, Y depressurized; port B has to be blocked	
Pressure stages	[bar]	64, 100, 160, 210, 315	
Nominal flow	[l/min]	40 (NG06)	160 (NG10)
Fluid		Hydraulic oil as per DIN 51 524 ... 535	
Viscosity recommended permitted	[cSt] / [mm²/s] [cSt] / [mm²/s]	30 ... 50 20 ... 380	
Fluid temperature	[°C]	-20 ... +70	
Filtration		ISO 4406 (1999); 18/16/13	
Linearity	[%]	See characteristic pressure curves	±3.5 at > 15% $p_{nom.}$
Repeatability	[%]	<±2	
Hysteresis	[%]	±1.5 to pmax	
Response time	[ms]	<150	<200
Electrical			
Duty ratio	[%]	100 ED	
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)	
Nominal voltage	[VDC]	9	
Max. current	[A]	2.7	
Nom. current	[A]	2.5	
Ambient temperature	[°C]	-20...+70	
Coil resistance	[Ohm]	-2.1 (at 20°C)	
Solenoid connection		Connector as per EN 175301-803	
Power amplifier, recommended		PCD00A-400	

NG06
Characteristic pressure lines p = f (U_{set})

Setting range max. 64 bar



Setting range max. 210 bar



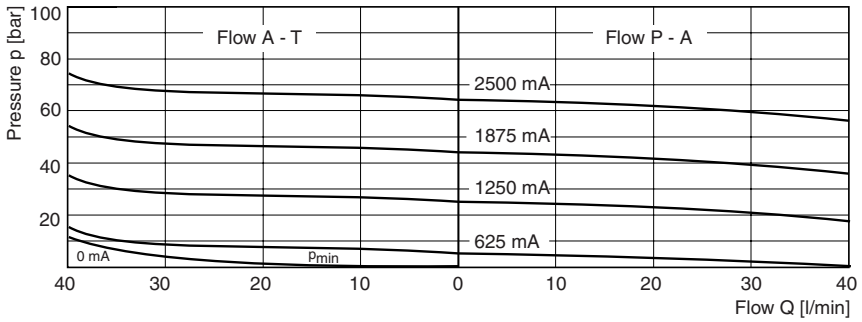
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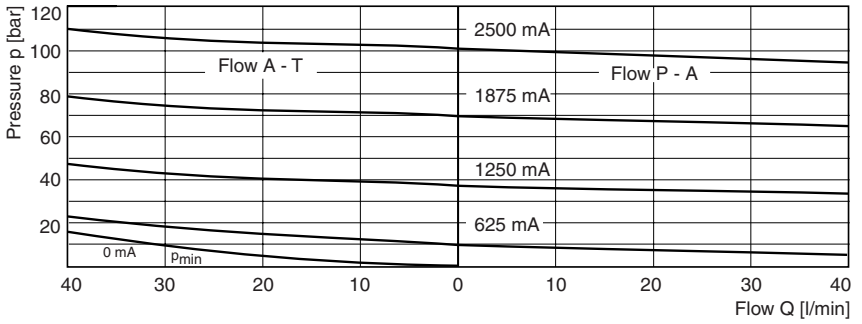
4

NG06
p/Q characteristics
measured at t = 50°C and ν = 35 mm²/s

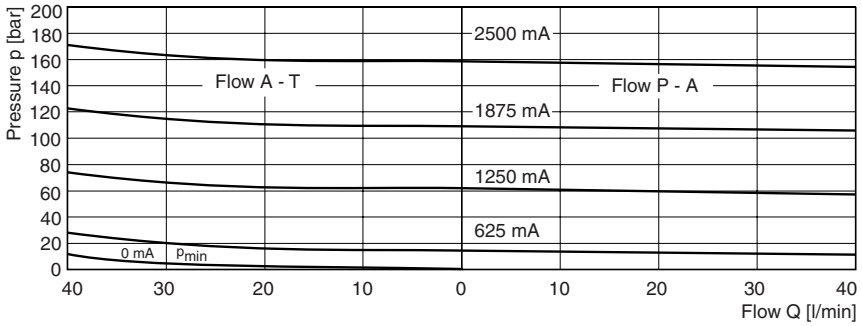
Setting range max. 64 bar



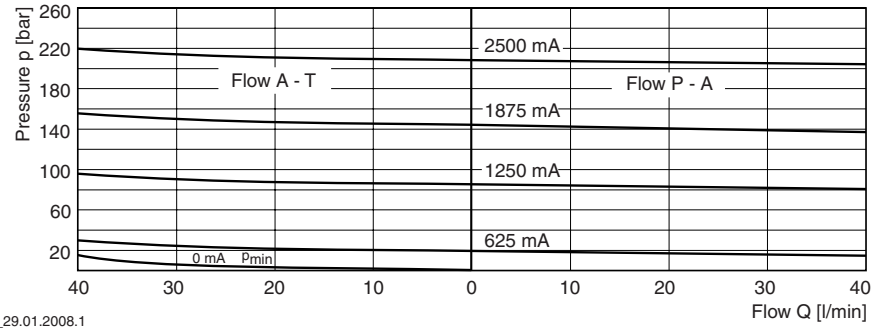
Setting range max. 100 bar



Setting range max. 160 bar



Setting range max. 210 bar

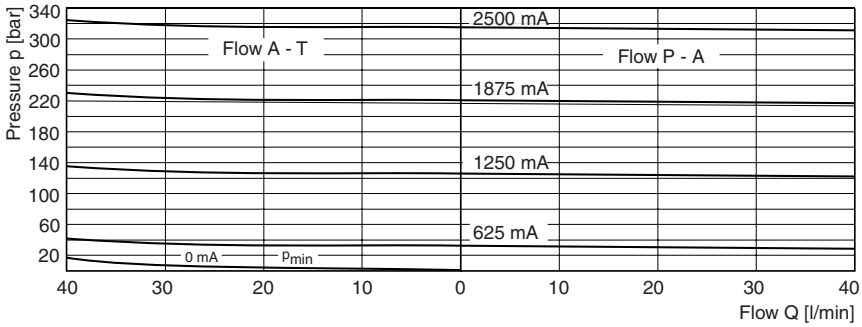


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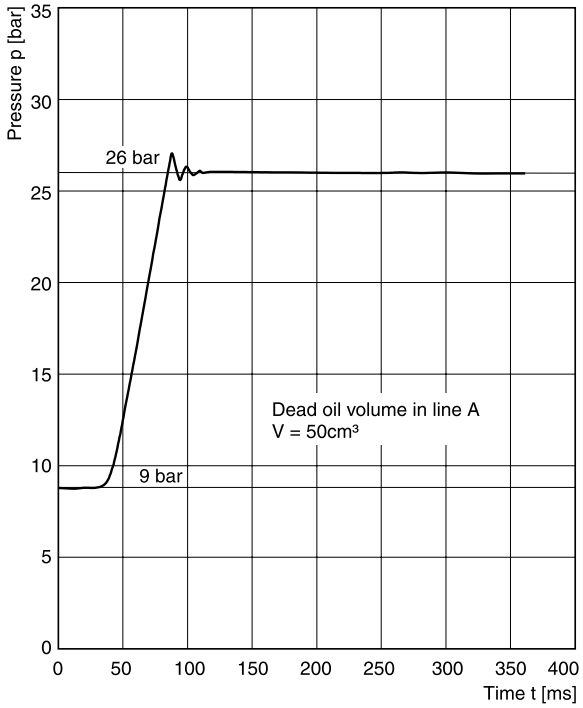
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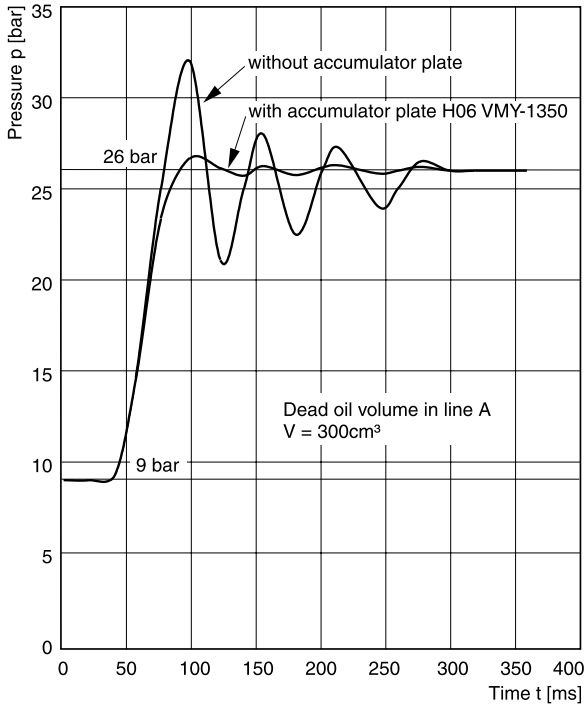
NG06
p/Q characteristics
measured at t = 50°C and ν = 35 mm²/s
Setting range max. 315 bar



4

Step response
Typical curve

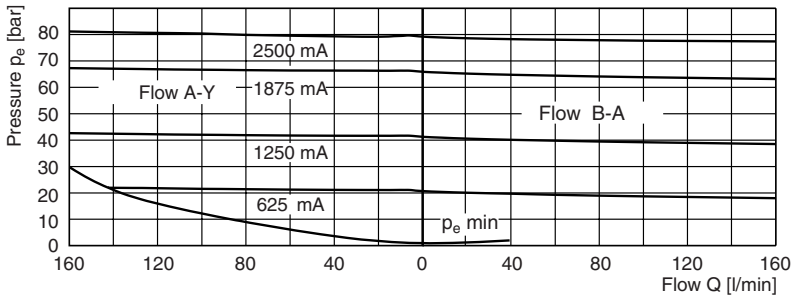




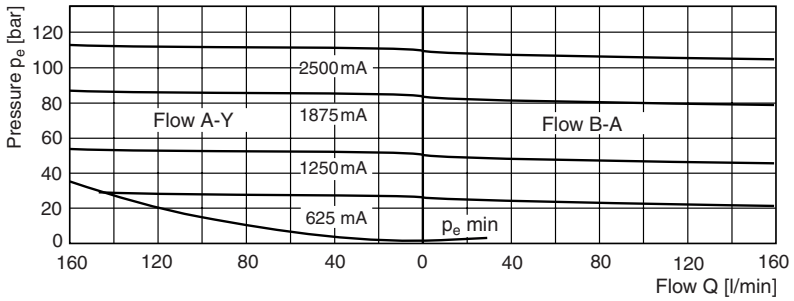
4

NG10
p/Q characteristics
for pilot oil supply from high pressure channel P, measured at t = 50°C and ν = 35 mm²/s

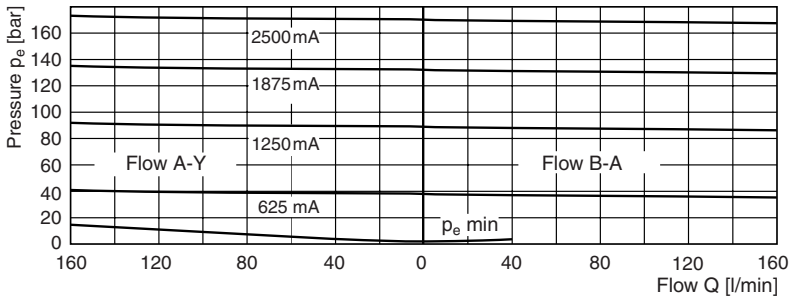
Setting range max. 64 bar



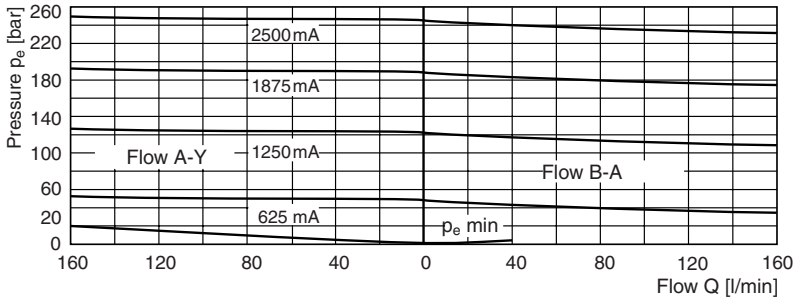
Setting range max. 100 bar



Setting range max. 160 bar



Setting range max. 210 bar

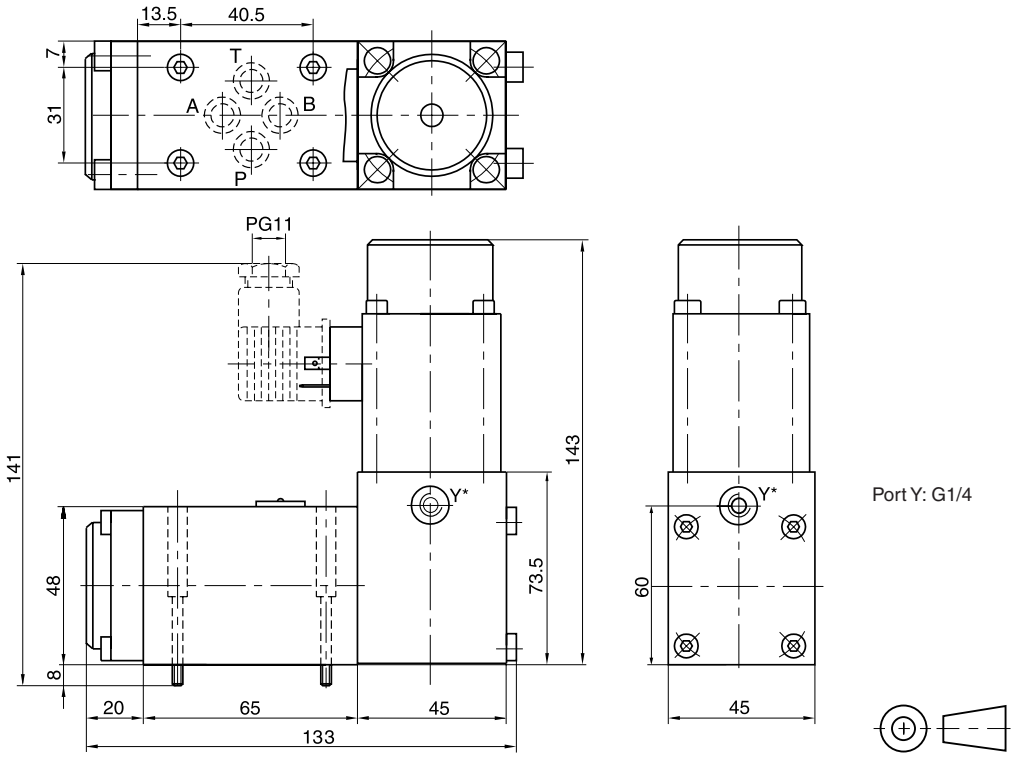


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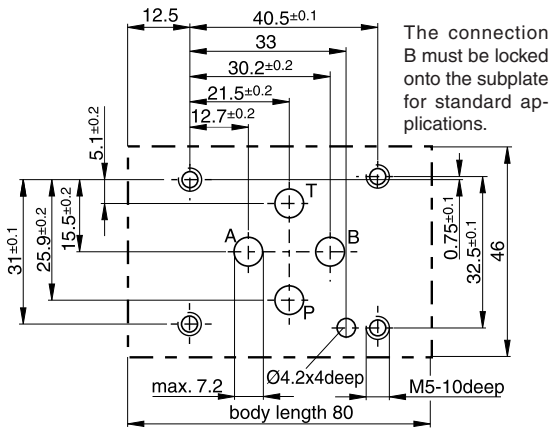
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NG06



Surface finish	Bolt kit			Kit FPM
R_{max}6.3 0.01/100	BK 375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	SK-VMY-L06-V

Mounting pattern ISO 5781-03-04-0-00



The connection B must be locked onto the subplate for standard applications.

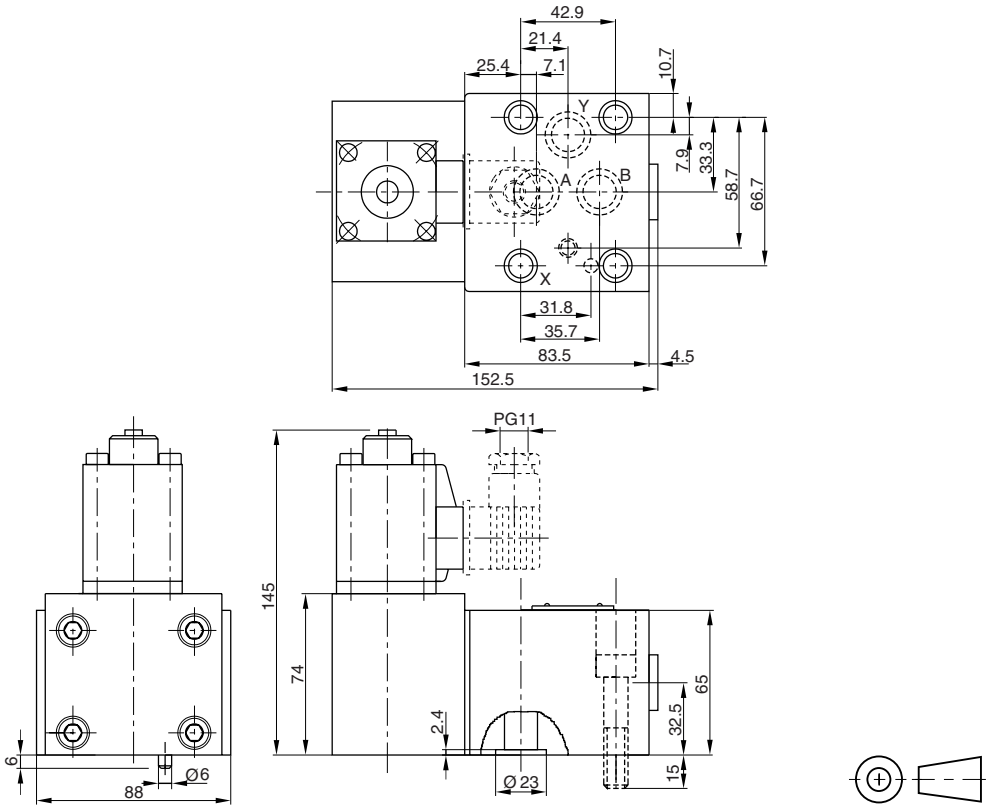
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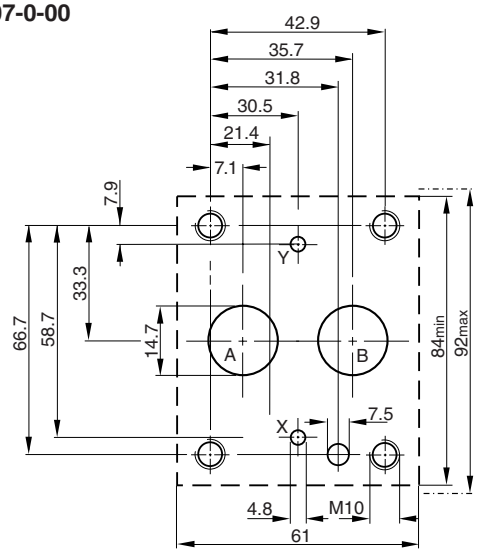
4

NG10



Surface finish	Bolt kit			Kit FPM
R_{max}6.3 0.01/100	BK 389	4x M10x50 DIN 912 12.9	63 Nm ±15%	SK-VB/VM-A10V

Mounting pattern ISO 5781-06-07-0-00



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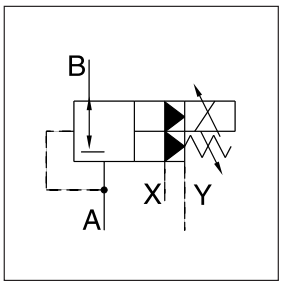
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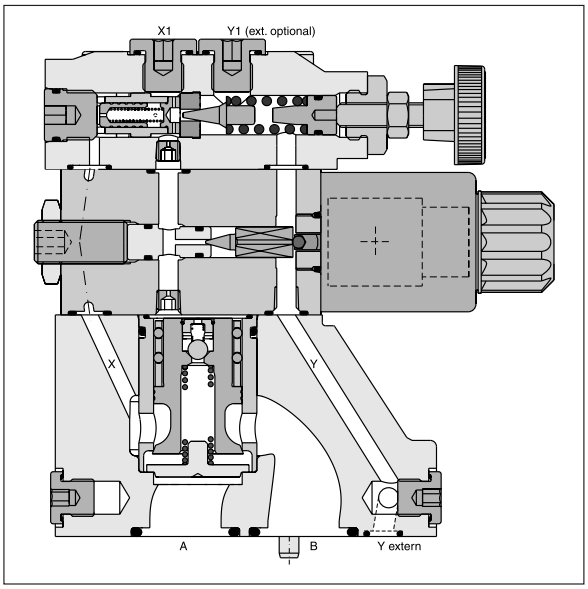
Subplate mounted proportional pressure reducing valves are available with both Parker (series PE*W) and Denison (series R4R) model codes.

These valves have a proportional solenoid operated pilot stage and a cartridge main stage.

The optimum performance can be achieved in combination with the digital amplifier module PCD00A-400.







Features

- Pilot operated with proportional solenoid
- Continuous adjustment by proportional solenoid
- Subplate mounting according to ISO 5781
- 3 pressure stages
- Mechanical maximum pressure adjustment

4

Technical data

General				
Nominal size		**10**	**25**	**32**
Interface		Subplate mounting acc. ISO 5781		
Mounting position		as desired, horizontal mounting prefered		
Ambient temperature	[°C]	-20...+80		
Weight	[kg]	2.7	4.5	6.0
Hydraulic				
Max. operating pressure	[bar]	Ports A, B and X 350, port Y depressurized		
Pressure stages	[bar]	105, 250, 350		
Nominal flow	[l/min]	150	350	500
Fluid		Hydraulic oil according to DIN 51524 ... 525		
Viscosity recommended	[cSt] / [mm²/s]	30 ... 50		
permitted	[cSt] / [mm²/s]	20 ... 380		
Fluid temperature	[°C]	-20 ... +70		
Filtration		ISO 4406 (1999); 18/16/13		
Electrical				
Duty ratio	[%]	100 ED		
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)		
Nominal voltage	[V]	12		
Max. current	[A]	2.3		
Coil resistance	[Ohm]	4 at 20°C		
Solenoid connection		Connector as per EN 175301-803		
Power amplifier, recommended		PCD00A-400		

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4

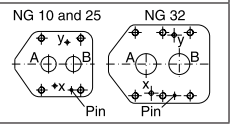
Parker

PE		M		W	1	P		9	K	W	
Proportional pressure reducing valve	Nominal size	Interface	Pressure stages	Off-board electronics	Pilot oil: external drain	Poppet spring	Seals	Normaly closed	Solenoid 12V, 2.3A	Plug connection EN 175301-803	Design series (not required for ordering)

Code	Nominal size
10	NG10
25	NG25
32	NG32

Code	Seals
N	NBR
V	FPM

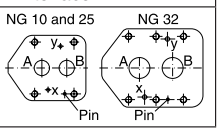
Code	Pressure stages
10	up to 105 bar
21	up to 210 bar
35	up to 350 bar

Code	Interface	
M	Subplate mounting ISO 5781	NG 10 and 25 / NG 32 

The Parker model code should be used for all new applications. Otherwise also refer to Denison model code.

Denison

R	4	R		–	5	9		–			–	P2	GOR	B		
Pressure valve	Interface	Reducing function	Nominal size		Max. pressure 350 bar	Pilot ports G1/4“	Pressure stages		Adjust-ment	Pilot oil		Prop. operation	Solenoid voltage 12V, 2.3A	Design series	Seals	Modifi-cations

Code	Interface	
4	Subplate mounting ISO 5781	NG 10 and 25 / NG 32 

Code	Seals
1	NBR
5	FPM

Code	Nominal size
03	NG10
06	NG25
10	NG32

Pilot oil		
Code	Pilot	Drain
1	Internal	External from Y
2	Internal	External from Y1

Code	Adjustment
1	Hand knob 32mm dia. (Standard)
3	Acorn nut with lead seal

Code	Pressure stages
1	up to 105 bar
3	up to 210 bar
5	up to 350 bar

DENISON Hydraulics

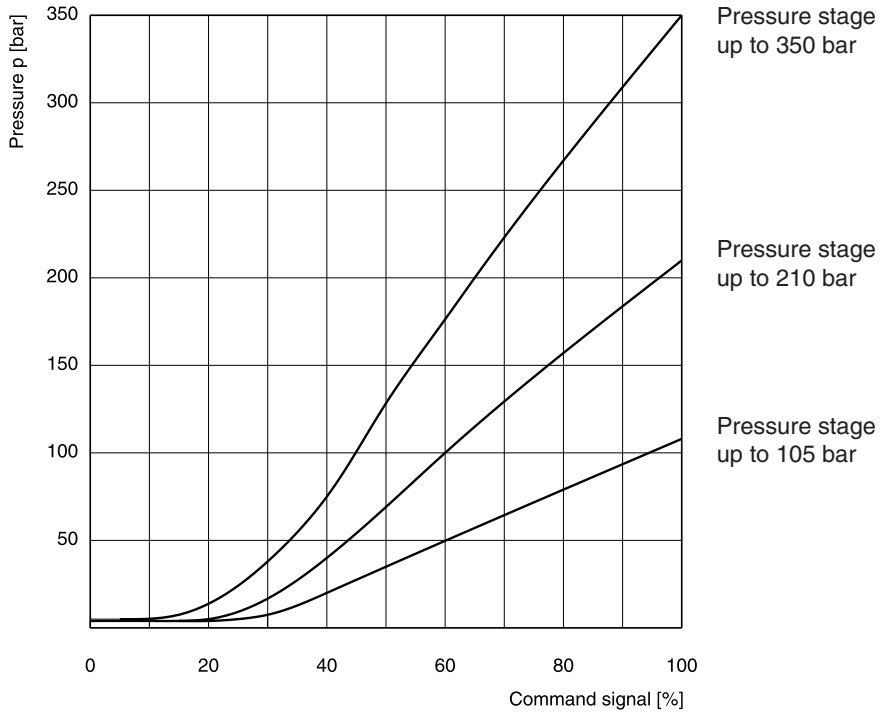
The Denison model code is available for existing applications. Otherwise also refer to Parker model code.

PEW-R4R_UK.INDD CM_29.01.2008.1

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Command/pressure curve

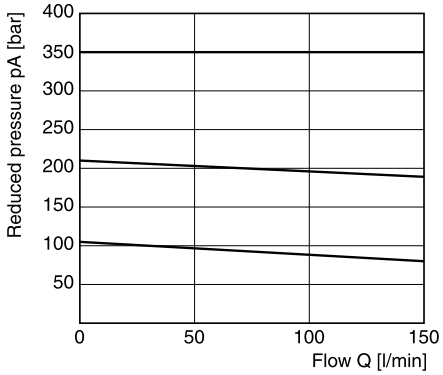


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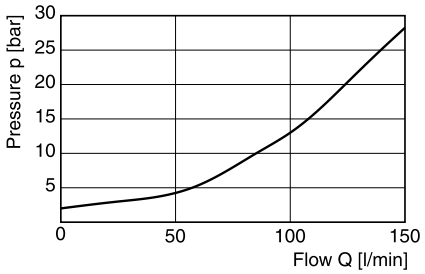
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4

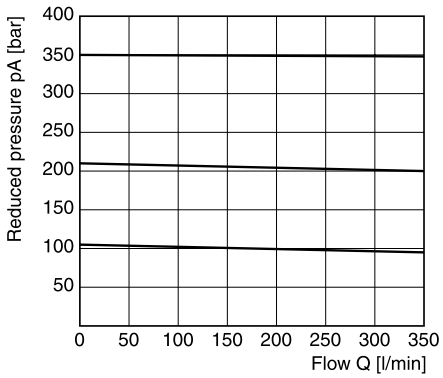
Reduced pressure pA versus flow Q
PE10M*W / R4R03 [1)]



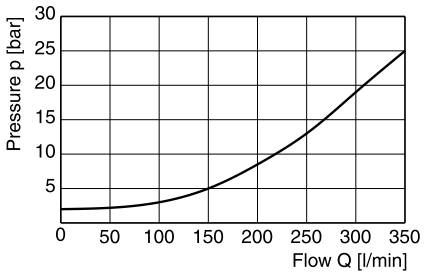
Minimum pressure curve



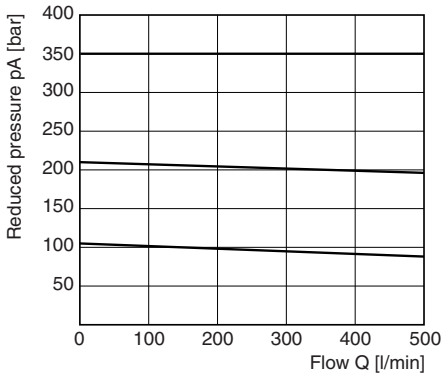
Reduced pressure pA versus flow Q
PE10M*W / R4R06 [1)]



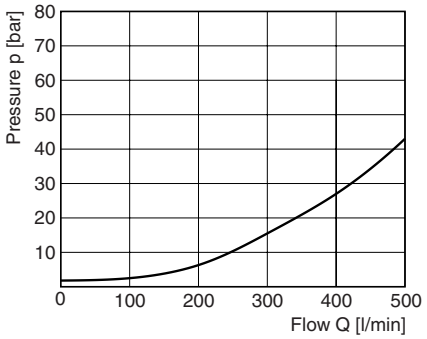
Minimum pressure curve



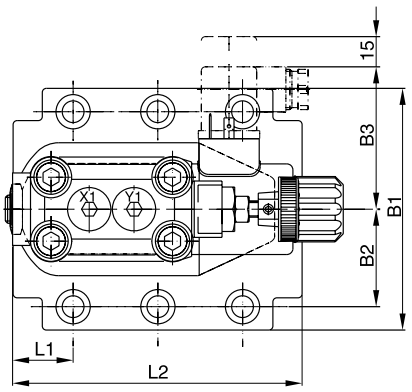
Reduced pressure pA versus flow Q
PE10M*W / R4R10 [1)]

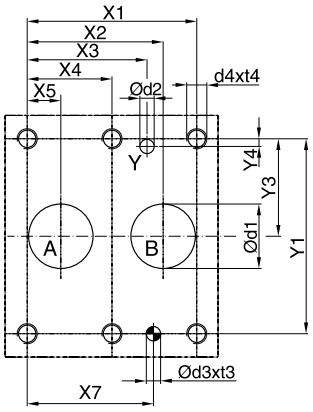


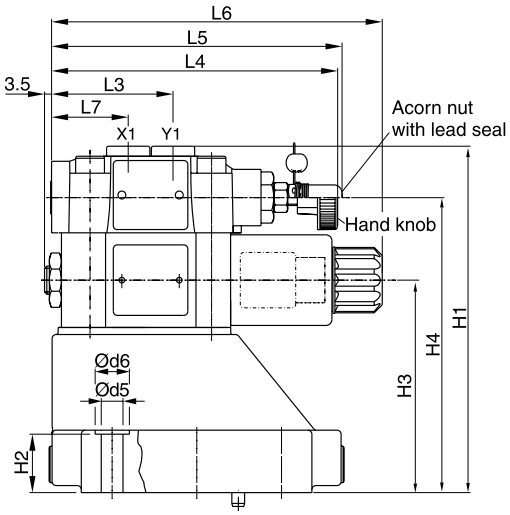
Minimum pressure curve



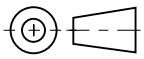
[1)] Measured at 350 bar primary pressure pB.







X1: G 1/4“
Y1: G 1/4“

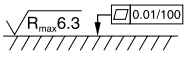


NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	5781-06-07-0-00	42.9	35.8	21.5	–	7.2	–	31.8	66.7	–	33.4	7.9	–	–
25	5781-08-10-0-00	60.3	49.2	39.7	–	11.1	–	44.5	79.4	–	39.7	6.4	–	–
32	5781-10-13-0-00	84.2	67.5	59.5	42.1	16.7	–	62.7	96.8	–	48.4	3.8	–	–

Tolerance for all dimensions ±0.2

NG	ISO-code	B1	B2	B3	H1	H2	H3	H4	L1	L2	L3	L4	L5	L6	L7
10	5781-06-07-0-00	87.3	33.35	71	134	21	68.5	109.5	29	94.8	60.8	143	144.8	164.8	38.6
25	5781-08-10-0-00	105	39.7	71	160.5	29	95	136	34.7	126.8	60.8	143	144.8	164.8	38.6
32	5781-10-13-0-00	120	48.4	71	171	29	105.5	146.5	30.6	144.3	60.8	143	144.8	164.8	38.6

NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	5781-06-07-0-00	15	7	7.1	8	M10	16	10.8	17
25	5781-08-10-0-00	23.4	7.1	7.1	8	M10	18	10.8	17
32	5781-10-13-0-00	32	7.1	7.1	8	M10	20	10.8	17

NG	ISO-code	Bolt kit			Kit		Surface finish
					NBR	FPM	
10	5781-06-07-0-00	BK 505	4x M10 x 35 DIN 912 12.9	63 Nm ±15%	SK-PE10MN50	SK-PE10MV50	
25	5781-08-10-0-00	BK 485	4x M10 x 45 DIN 912 12.9	63 Nm ±15%	SK-PE25MN50	SK-PE25MV50	
32	5781-10-13-0-00	BK 506	6x M10 x 45 DIN 912 12.9	63 Nm ±15%	SK-PE32MN50	SK-PE32MV50	

Notes

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Description	Threaded cable joint	Body colour coding	Figures switching	Order no.
Plug DIN 43650, design type AF, protection class IP 65 Voltages up to 250 V	PG 9	black, B grey, A	Fig. 1	**5001710** **5001711**
	PG11	black, B grey, A	Fig. 1	**5001716*** **5001717***
Plug with LED insert 24 V	PG11	black, B grey, A	Fig.1 and Fig. 3	**5001571** **5001572**
Plug with lamp insert 110 V	PG11	black, B grey, A	Fig.1 and Fig. 4	**5001573** **5001574**
Plug with lamp insert 220 V	PG11	black, B grey, A	Fig.1 and Fig. 4	**5001575** **5001576**
Plug with LED insert 24V and suppressing circuitry	PG11	black, B grey, A	Fig.1 and Fig. 5	**5001708** **5001709**
Plug with rectifier. Rectifier with 4 silicon diodes in bridge circuit. Varistor in alternating current side to protect the diodes against power peaks	PG11	black, B grey, A	Fig.1 and Fig. 6	**5001737** **5001738**
Plug with pull relief and translucent cover	PG11	black, B grey, A	Fig. 2	**5001723** **5001724**
Application with bridge rectifier suitable for 5001723 and 5001724	—	—	Fig. 2 and Fig. 7	**5001727**
Application with bridge rectifier and lamp suitable for 5001723 and 5001724	—	—	Fig. 2 and Fig. 8	**5001734**

* If not ordered otherwise, valves with code P are supplied with these connectors.

Fig. 1

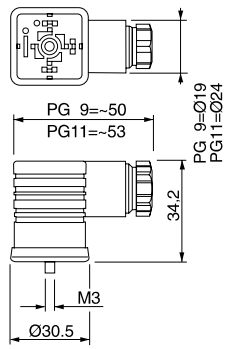


Fig. 3

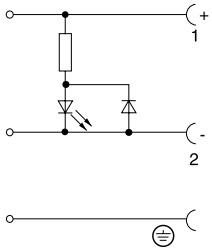


Fig. 5

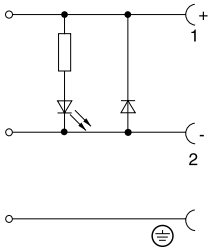


Fig. 7

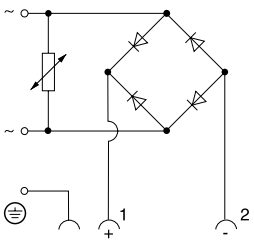


Fig. 2

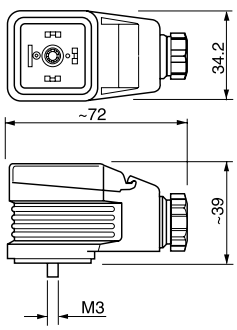


Fig. 4

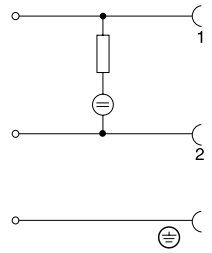


Fig. 6

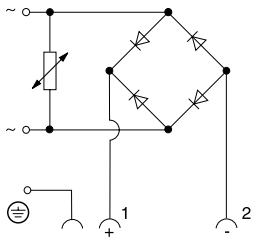
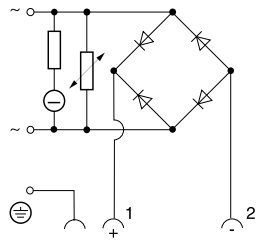


Fig. 8



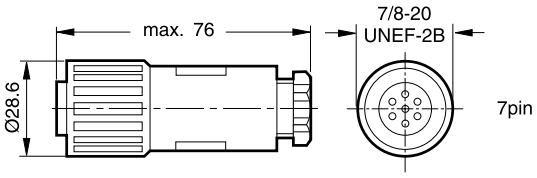
Input voltage
max. 240 V~
Output voltage
max. 213 V=

access04_UK.INDD CM_29.01.2008.1

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Central connector



Description	Order No.
DIN 43563 6+PE	5004072

4

Series Parker	Series Denison	Description	Size								Mounting		Page
		Parker Standard DIN / ISO	1/4	3/8	1/2	3/4	1	06	10	16	Subplate	Screw-in	
		Throttle valves, manual adjustment											
MVI	–		•	•	•	•						•	5-3
NS	–		•	•	•	•	•				•		5-5
FS	–	With free return flow	•	•	•	•	•				•		5-7
		Flow control valves, manual adjustment											
PC*MS	–		•	•	•	•	•				•		5-9
GFG2	–							•			•		5-11
–	2F1C								•	•	•		5-15
		Flow control valves, proportional adjustment											
DUR*L	–							•			•		5-21
		Accessories											
		Plug-in connectors											5-25

More flow valves are presented in the following chapters:
Chapter 7: Sandwich Valves
Chapter 8: Slip-In Cartridge Valves
Chapter 9: SAE Flange Valves
Chapter 10: Valves for Pipe Mounting

5

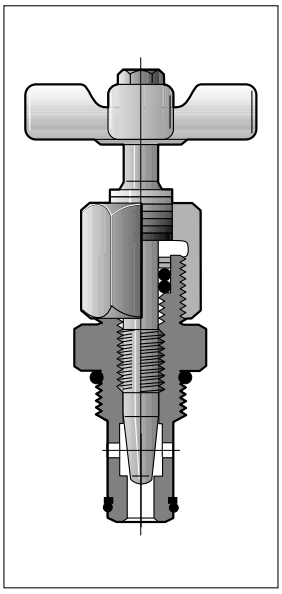
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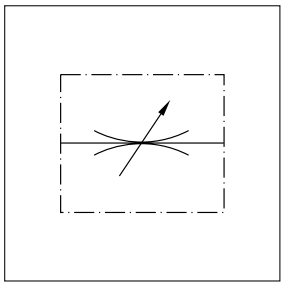
Notes

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Manatrol needle valve with steel body as screw-in valve for block insertion, optionally with a 30° taper-fine, V-notch or micro-fine rectangular slot. The form of the metering opening influences the accuracy of the flow adjustment, which is pressure and viscosity dependent. The needle is made of stainless steel and fits into a ring gap in the valve cartridge. For details of cutting tools for reaming the block bore, see 'Accessories' at the end of this chapter.







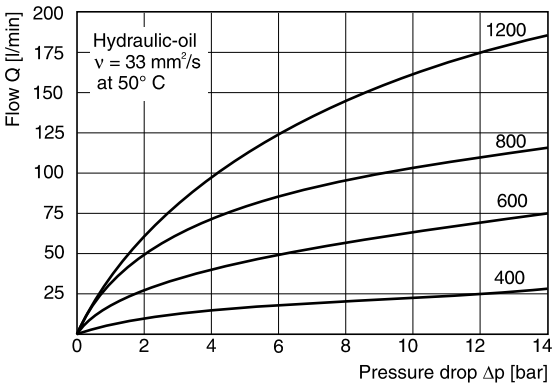
Characteristic values

Size	Operating press. [bar]	Flow [l/min] Δp 10bar	Max. orifice area [cm²]	Kv factor valve	Weight [kg]
400	350	25	0.14	6.3	0.18
600	350	65	0.37	18.5	0.32
800	350	105	0.55	27.5	0.59
1200	350	160	0.90	45.7	0.95
Needle size					
400-2		11	0.52		
400-3		2	0.012		

$$\text{Flow rate } Q\ [l/min] = Kv \cdot \sqrt{\frac{\Delta p}{\gamma}}$$

Kv — see table
Δp [bar]
γ [kg/dm³] = specific gravity of fluid
(γ for mineral oil = 0.85 – 0.9)

Δp/Q curves



Ordering code

MVI — Cartridge-type needle valve
□ — Size and screw-in threads
S — Steel body
□ — Needle
□ — Seal

Code	Size	Threads
400	**1/4"**	**3/4 - 16 UNF-2B**
600	**3/8"**	**7/8 -14 UNF-2B**
800	**1/2"**	**1 1/16 - 12 UN-2B**
1200	**3/4"**	**1 5/16 - 12 UN-2B**

Code	Seal
omit	**NBR**
V	FPM

Code	Needle
omit	**Standard 30° taper**
2*	Fine V-notch
3*	Micro-fine slotted

* only for size 400

Bold letters =
Short-term availability

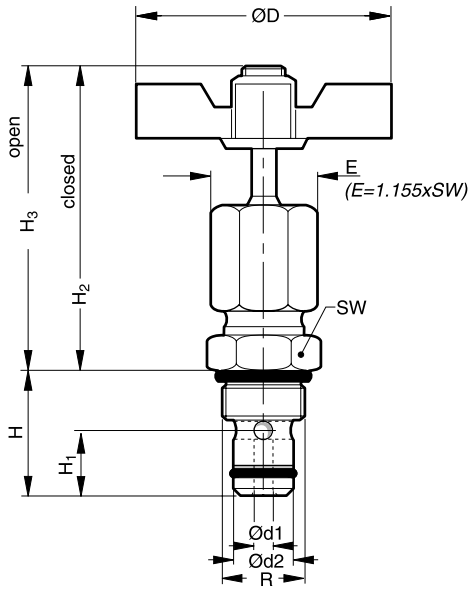
MVI_UK.INDD CM_18.01.2008.1

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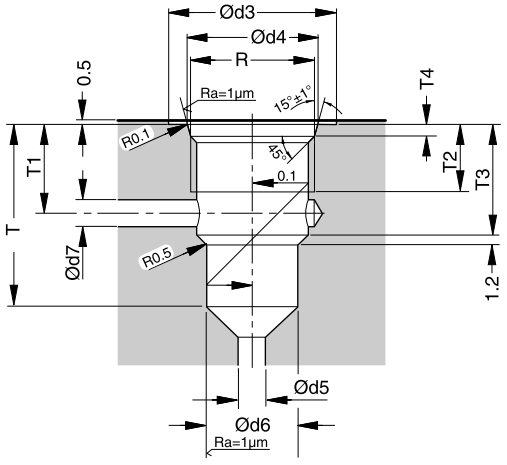
5

Threaded cartridge valve



Size	H	H3	H2	H1	Ød1	Ød2	R (Threads)	ØD	SW
MVI 400	25.4	65	60	10.9	4.6	14.22	3/4 - 16 UNF-2	51	22.1
MVI 600	30	81	73	13.5	7.9	15.8	7/8 - 14 UNF-2	64	25.4
MVI 800	39.6	91	79	15.2	9.4	20.55	1 1/16 - 12 UN-2	83	31.8
MVI 1200	43.4	102	88	19.1	11.7	26.92	1 5/16 - 12 UN-2	98	38.1

Mounting cavity



Size	Ød3	Ød4+ 0.12	Ød5 (min)	Ød6+ 0.05	Ød7	T4+ 0.38	T2	T3	T	T1
MVI 400	26	20.6	5.3	14.275	5.3	2.54	15	17.8	27	14.2
MVI 600	30	23.93	8.1	15.85	8.1	2.54	17	21.6	32	16.5
MVI 800	37	29.16	10.2	20.6	10.2	3.3	19	30	42	24.1
MVI 1200	44	35.54	12.7	26.975	12.7	3.3	19	31.8	46	24.6

MVI_UK.INDD CM_18.01.2008.1

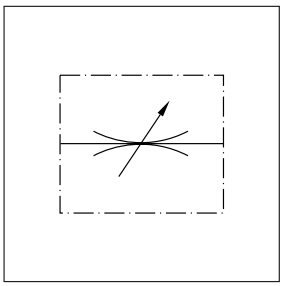
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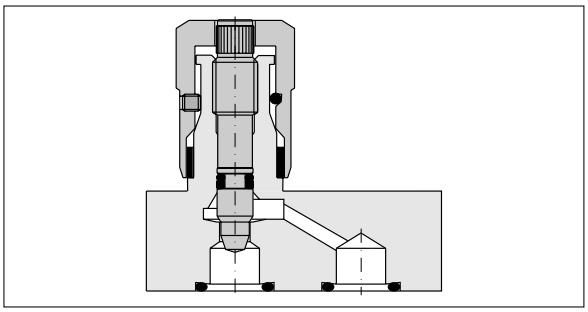
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Manatrol shut-off and metering valves with 2 stage needle cone. Fine adjustment for the first stage can be achieved with 3 rotations of the adjustment knob. The second stage with normal throttle characteristics is achieved with 3 further rotations.

A cylindrical needle with a rectangular slot is provided to reduce the viscosity effect for sizes 400 and 600. The flow is dependent on pressure and viscosity.







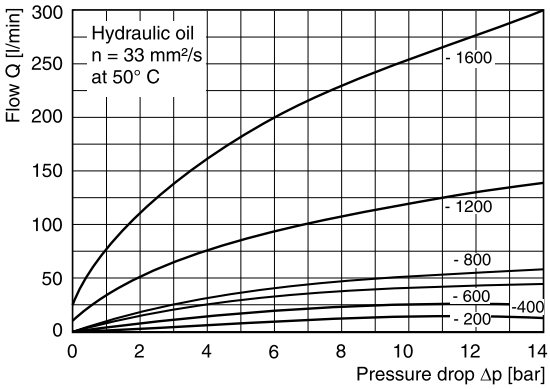
Characteristic values
(only for standard 2 stage needle)

Size	Press. [bar] steel	Press. [bar] brass	Flow [l/min] Δp 10bar	Max. cross-section [cm²]	Kv factor valve open	Weight [kg]
400	210	140	25	0.13	6.3	0.4
600	210	140	40	0.22	11.2	0.6
800	210	140	50	0.28	13.9	1.0
1200	210	140	120	0.70	35.4	2.0
1600	210	35	250	1.48	75	4.0

$$\text{Flow rate } Q\ [l/min] = Kv \cdot \sqrt{\frac{\Delta p}{\gamma}}$$

Kv	from the table
Δp [bar]	
γ [kg/dm³]	= specific weight of the medium
(γ for mineral oil	= 0.85 – 0.9)

Δp/Q curves



Ordering code

N	S		S			
Needle valve	Manifold mounting	Size	Steel body	Needle	Clamping screw	Seal

Code	Size
400	**400**
600	**600**
800	**800**
1200	**1200**
1600	1600

Code	Needle
omit	**Standard 2 stage needle**
4*	Micro-fine hollow needle with slot

* only for sizes 400 to 600

Code	Seal
omit	**NBR**
V	FPM

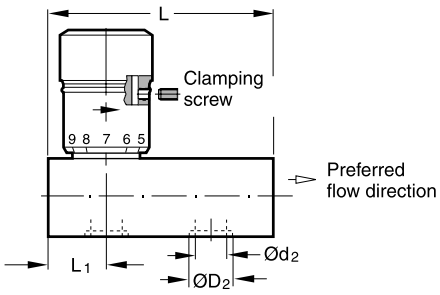
Code	Clamping screw
omit	**Hexagon socket**
F	With knurled knob

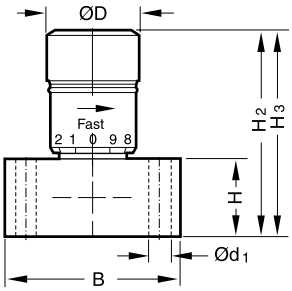
Bold letters =
Short-term availability

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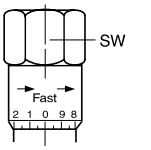
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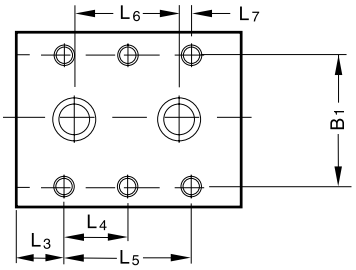


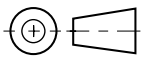


H_2 = closed
H_3 = open



Hexagon adjusting knob, standard for size 1600





5

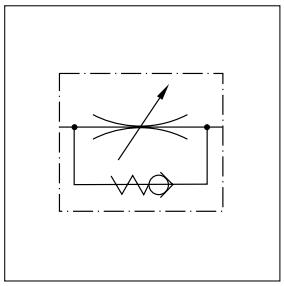
Size	L	L5	L4	L3	L7	L6	ØD2	Ød2	B1	B	H3	H2	H	Ød1	ØD	SW	L1
400	47.5	34.8	-	6.4	4.5	25.4	13.3	7	33.5	44.5	55	50	21	6.8	21	-	11
600	51	33.3	-	8.6	4.1	25.4	16	10	38.1	51	67	61	25.4	7	25	-	13
800	75	38.1	-	18.5	4.1	30	19.1	13	44.5	57.5	77	70	25.4	7	30	-	23
1200	93.5	76.2	38.1	8.6	11.2	54.4	24	17	54	70	95	80	29	9.5	35	-	20
1600	111	95.3	47.5	7.9	19	57.2	32	22	60.2	76.5	140	123	45	9.5	-	47.8	27

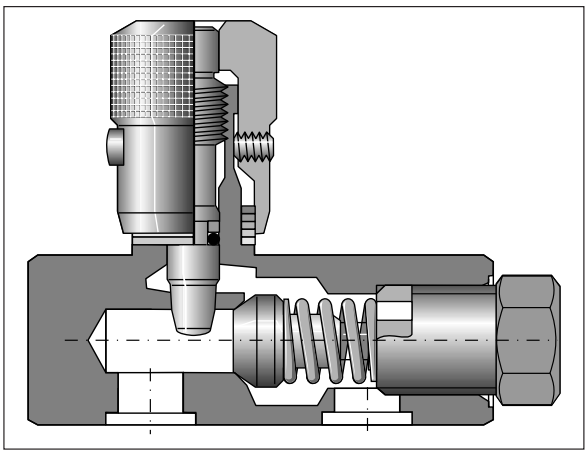
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Manatrol throttle check valves of series FS allow the adjustment of the flow for a defined direction.

A 2 stage needle allows for very exact setting of smaller flow rates with the first 3 rotations of the adjustment knob. After 3 more rotations, the valve is completely open. The valve setting can be locked by a locking screw.







Flow rate $Q\ [l/min] = Kv \cdot \sqrt{\frac{\Delta p}{\gamma}}$

Kv	from the table
Δp [bar]	
γ [kg/dm³]	= specific gravity of fluid
(γ for mineral oil	= 0.85 – 0.9)

Characteristic values

Size	Pressure [bar]	Max. flow [l/min Δp10bar]	Opening [cm²]	Check Kv factor	Throttle surface [cm²]	Throttle v. open Kv factor	Weight [kg]
400	210	25	0.37	18.6	0.13	6.3	0.23
600	210	40	0.62	30.4	0.22	11.2	0.31
800	210	50	0.86	43.4	0.28	14	0.67
1200	210	120	1.18	60	0.70	35.4	1.17
1600	210	250	2.23	111	1.48	75	2.31

Ordering code

F	S	☐	S	☐	☐	☐
Throttle and check valve	Subplate mounting	Size	Steel body	Needle	Clamping screw	Seal

Code	Size
400	**400**
600	**600**
800	**800**
1200	**1200**
1600	1600

Code	Needle
omit	**Standard 2 stage needle**
4*	Micro-fine hollow needle with slot

* only for sizes 400 to 600

Code	Seal
omit	**NBR**
V	FPM

Code	Clamping screw
omit	**Hexagon socket**
F	With knurled knob

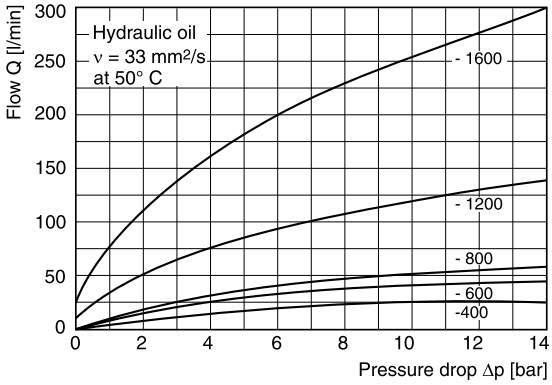
Bold letters =
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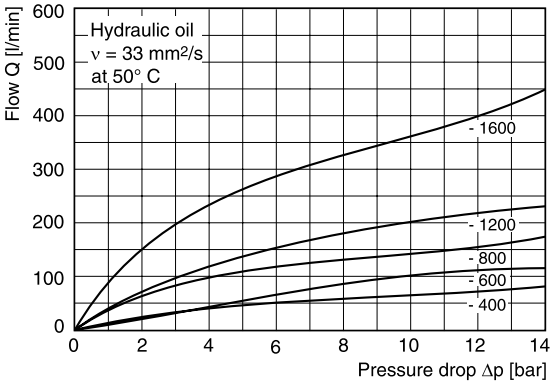
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Δp/Q performance curves

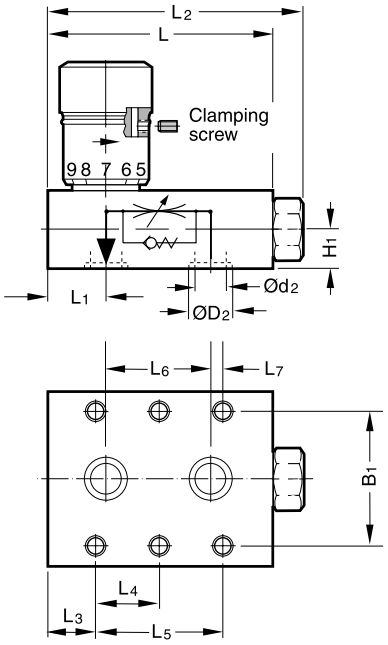


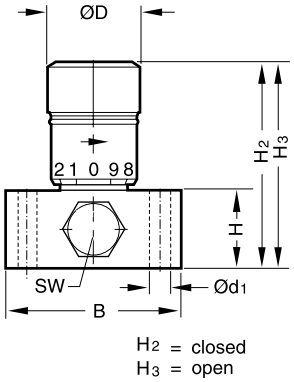
Δp/Q performance curves free flow



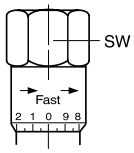
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Dimensions

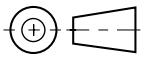




H2 = closed
H3 = open



Hex head adjusting knob Standard for Size 1600



Size	L2	L5	L4	L3	L7	L6	ØD2	Ød2	B1	B	H3	H2	H	Ød1	H1	ØD	SW	W1	L1	L
400	71	34.8	-	14.2	4.8	25.5	13.3	7	33.5	44.5	56.5	51	22	6.8	11	21	-	17.5	21.5	63
600	78	33.5	-	18	4.0	25.5	16	10	38.1	51	67.5	61	25.5	7	12.2	25	-	22.2	25.5	70
800	89	38.1	-	21.3	4.0	30	19.1	13	44.5	57.5	84	76	32	7	16	30	-	25.5	24.5	81
1200	114	76.2	38.1	13.7	11.4	54.1	24	14	54	70	111	96	45	9	22.5	35	-	31.8	38.5	104
1600	138	95.2	47.7	15.8	19	57.2	32	22	60.2	76.5	146.5	130	51	9	25.5	-	47.8	38.1	44.5	127

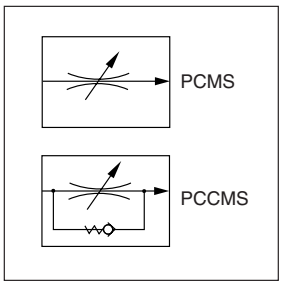
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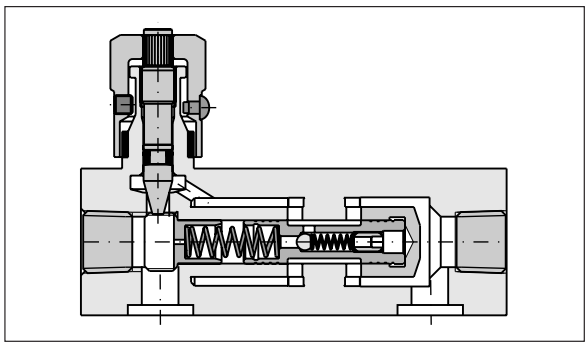
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Manatrol 2 way flow control valves for pressure compensated regulation of the flow. As a consequence of pressure changes, the set value can vary by ± 5% within the tolerance range. Changes in viscosity and in temperature have the same effect and are to be observed.

The series PCCMS is addionally equipped with a built-in ckeck valve for the return flow.







Characteristic values

Size	Max. press. [bar]	Flow control Q* [l/min]	Flow control Δp [bar]	Check valve Q_{max} [l/min]	Check valve Δp [bar]	Weight [kg]
400	210	1 - 10	7	20	3	0.77
600	210	2 - 25	7	30	3	1.23
800	210	6 - 60	11	75	8	2.50
1200	210	10 - 100	11	130	8	3.18
1600	210	19 - 190	11	250	10	7.41

* Min. and max. flow rate

5

Ordering code

PC		M	S		S			
Pressure compens. flow control valvel	**Check valve**	**Manual adjustment**	**Subplate mounting**	**Size**	**Steel body**	**Clamping screw**	**Seal**	**Design series** (not required for ordering)

Code	Check valve
omit	**Without check valve**
C	With check valve

Code	Nominal size
400	400
600	**600**
800	**800**
1200	1200
1600	1600

Code	Seal
omit	**NBR**
V	FPM

Code	Clamping screw
omit	**Hexagon socket**
F	With knurled knob

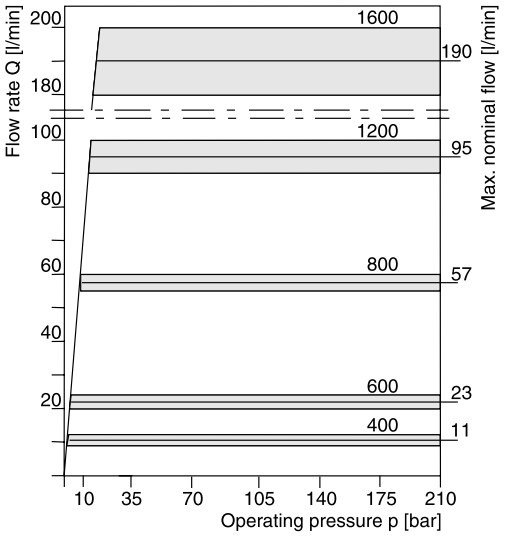
Bold letters =
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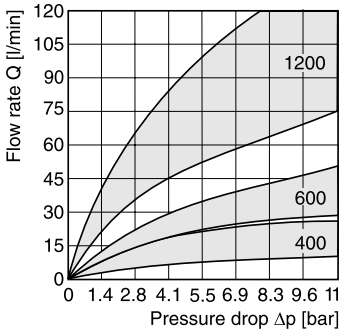
Controlled flow vs. pressure drop



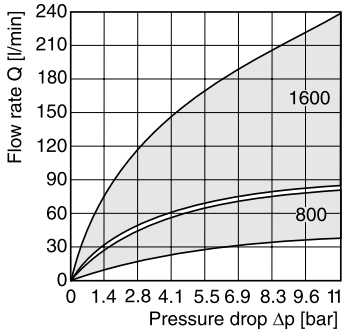
The curves refer to hydraulic oil of 33 cSt / 50°C.

Reverse flow vs. pressure drop at minimum and maximum settings

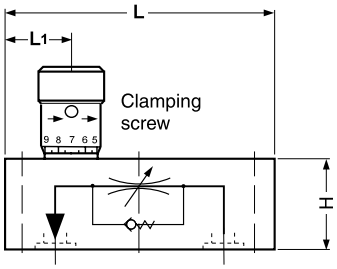
Sizes 400, 600 and 1200

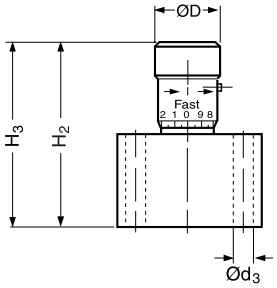


Sizes 800 and 1600

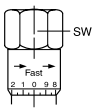


Dimensions

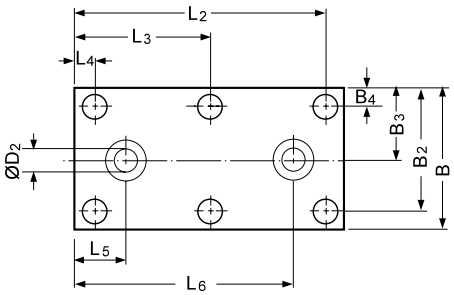


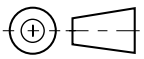


H_2 = closed
H_3 = open



Hexagon adjusting knob, standard for size 1600





Size	B	B2	B3	B4	L4	L5	L6	L2	L	H	Ød3	H3	H2	ØD2	ØD	L1	L3	SW
400	45	38.9	22.4	5.6	6.4	15.7	69.9	79.2	86	29	6.8	63	58	7.1	21	21	-	-
600	51	44.5	25.4	6.4	6.4	16.8	84.8	95.3	102	32	7	73	68	8.6	25	25	-	-
800	58	50.8	28.4	6.4	6.7	19.1	98.6	111.3	117	45	7	103	95	11.9	30	45	-	-
1200	70	62.0	35.1	7.9	9.7	25.4	117.3	133.4	143	57	9.5	129	116	16.8	35	41	71.4	-
1600	76	68.3	38.1	7.9	12.7	31.7	139.7	158.7	172	70	9.5	175	158	22.3	-	49	85.8	47.8

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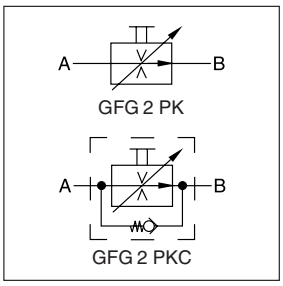
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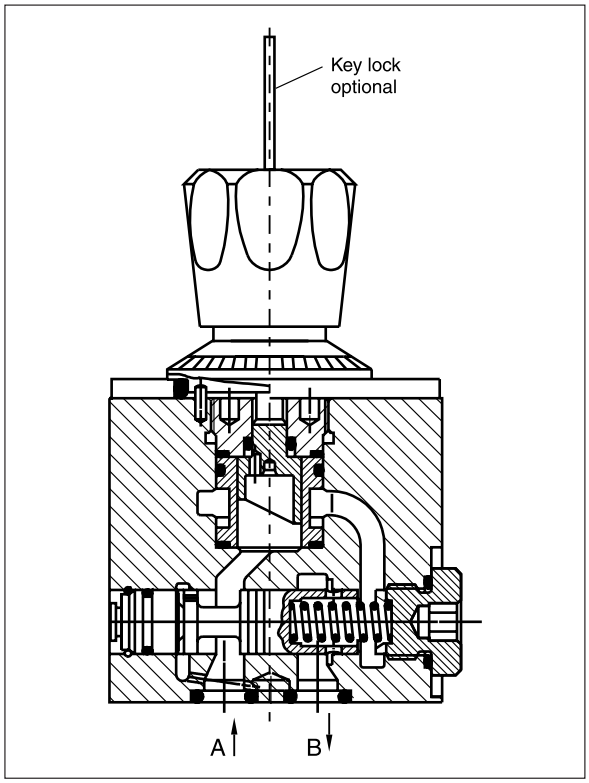
2 way flow control valves are used to provide pressure compensated flow. The valve design also compensates temperature and viscosity variations to a certain extent.

Optionally the flow from A to B can be blocked by external pilot pressure applied to port P (option X). This can be used to avoid unintended initial movements of actuators.

The GFG is optionally equipped with a built-in check valve for the return flow.







Design

The 2 way flow control valves are fitted with a triangular flow restrictor and a subsequent pressure compensator. The setting of the flow rate can be locked by a key lock in the adjusting knob against unauthorised adjustment (option C).

Function

The fluid enters through port A through the flow restrictor. Downstream of the flow restrictor the pressure compensator is located. The control edges are provided by four radial bores in the poppet, which are fully open to port B in the neutral position.

This can cause a short non-compensated flow when the valve is initialized.

Optionally the compensator spool can be held in closed position by external pilot pressure in port P (option X).

The flow adjustment is done via the flow resistor which is adjusted by the hand knob. The adjusting angle of the hand knob is 270°.

Features

- Flow rate independent of pressure, temperature and viscosity
- Available for 7 different flow rates
- Good fine adjustment
- Optional reverse flow check valve
- Turn knob with key lock (option C)

Note

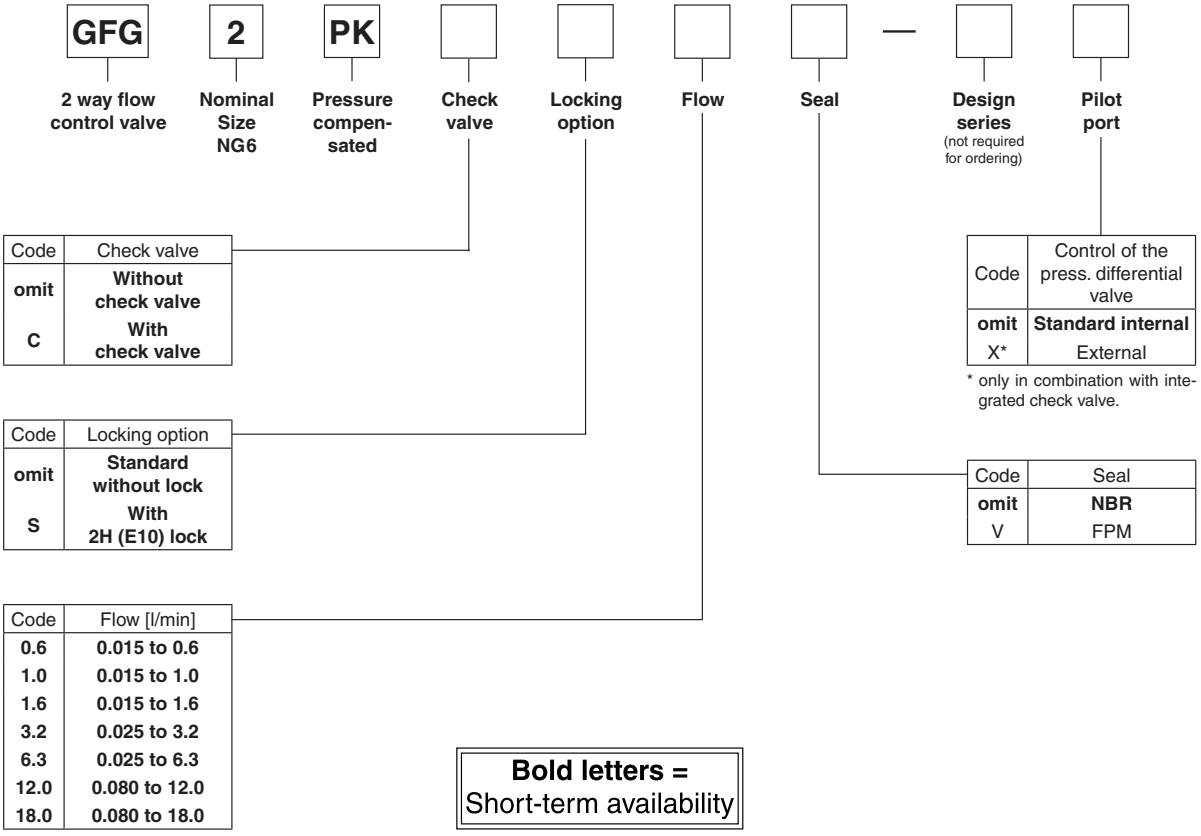
Rectifier plate see 'Accessories' at the end of this chapter.

5

Technical data

Design		Orifice, infinitely variable, pressure-compensated
Actuator		Manual flow rate adjustment
Mounting type		ISO 6263 code: ISO 6263-AB-03-4-B
Mounting position		unrestricted
Weight	[kg]	1.1 (without subplate)
Fluid temperature	[°C]	Max. 70
Ambient temperature	[°C]	-25...+50
Viscosity range	[cSt] / [mm²/s]	2.8...400
Filtering	[µm]	ISO 4406 (1999); 18/16/13
Min. pressure difference	[bar]	5 (GFG*1.6/3.2), 8.5 (GFG*6.3/12/18)
Operating pressure	[bar]	A; B = 315 , P = 5 (GFG*, GFG*C), A, B, P = 160 (GFG*X)
Effect of pressure on Q_{max} at p = 160 bar	[%]	± 2 (GFG*1.6/3.2/6.3/12), ± 2.5 (GFG*18)
Flow direction		
A → B		Flow control function
B → A		Throttle function or free flow through check valve

Ordering code



Code	Check valve
omit	**Without check valve**
C	**With check valve**

Code	Locking option
omit	**Standard without lock**
S	**With 2H (E10) lock**

Code	Flow [l/min]
0.6	**0.015 to 0.6**
1.0	**0.015 to 1.0**
1.6	**0.015 to 1.6**
3.2	**0.025 to 3.2**
6.3	**0.025 to 6.3**
12.0	**0.080 to 12.0**
18.0	**0.080 to 18.0**

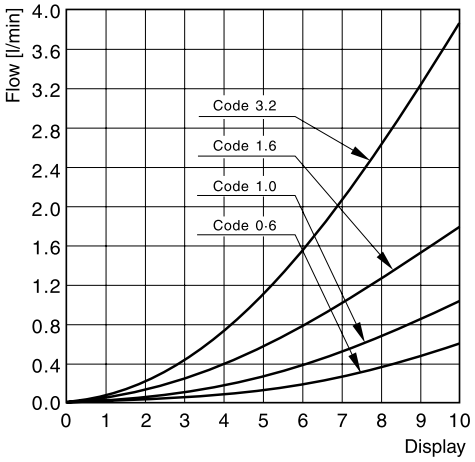
Code	Control of the press. differential valve
omit	**Standard internal**
X*	External

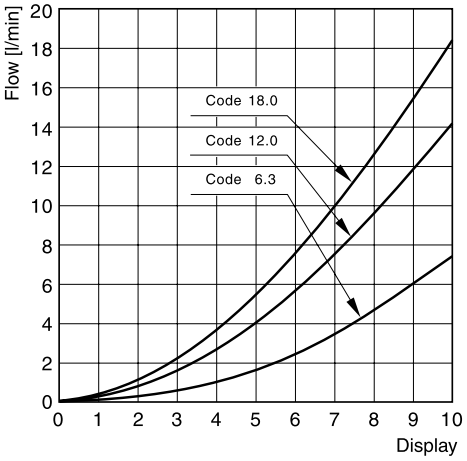
* only in combination with integrated check valve.

Code	Seal
omit	**NBR**
V	FPM

Bold letters =
Short-term availability

Performance curves

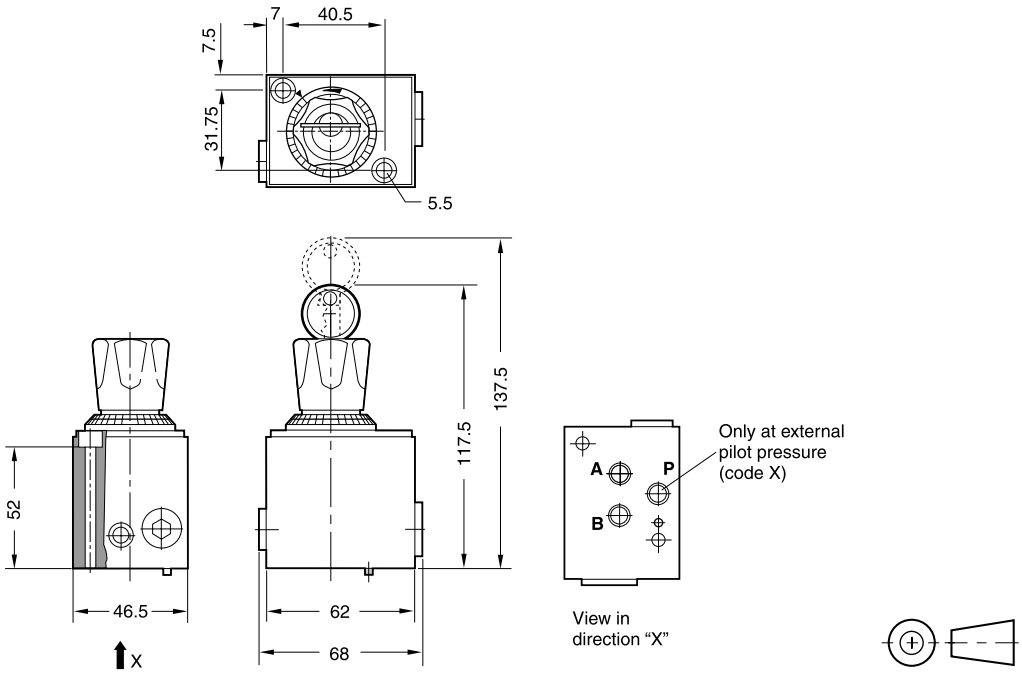




Changes in pressure cause a change of pre-set flow rate.
Flow rate deviations a Q_{max}: ± 2%

5

Dimensions



Bolt kits (Cylinder head DIN 912-12.9 not included)

Nom. size Valve	Valve model	Quantity	Tightening torque [Nm]	Valve without rectifier plate		Valve with rectifier plate	
				Dimensions	Order No.	Dimensions	Order No.
NG6	GFG2	2	8.1Nm	2xM5x60	BK380	2xM5x100	BK466

O-rings for sealing the connecting surface

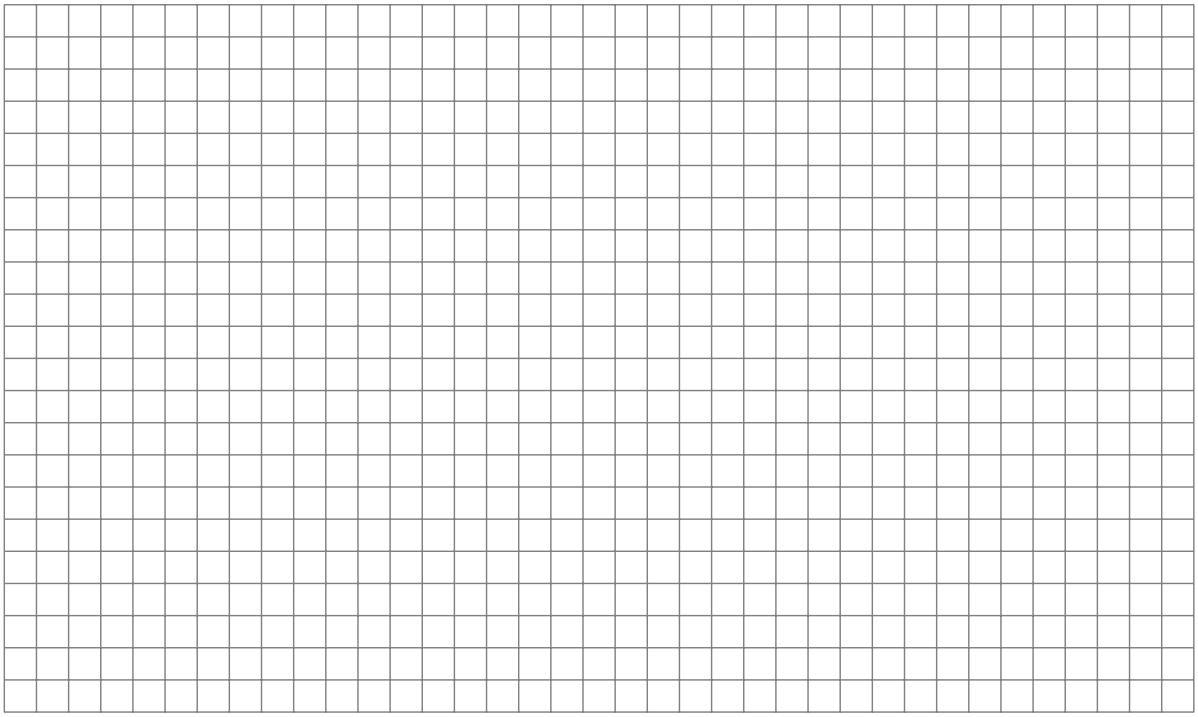
Nom. size Valve	Valve model	Ports	Dimensions Ø-inner x cord thickness	Quantity	Seal kits	
					NBR	FPM
NG6	GFG2	A and B	9x1.5	3	SK-GFG2	SK-GFG2 FPM

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Notes

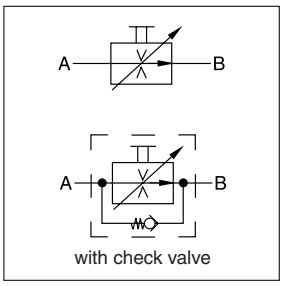


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2 way flow control valves series 2F1C provide pressure and viscosity compensated flow from port A to port B. The counter direction is blocked (standard) or can be open via an integral reverse flow check valve (optional).





Function

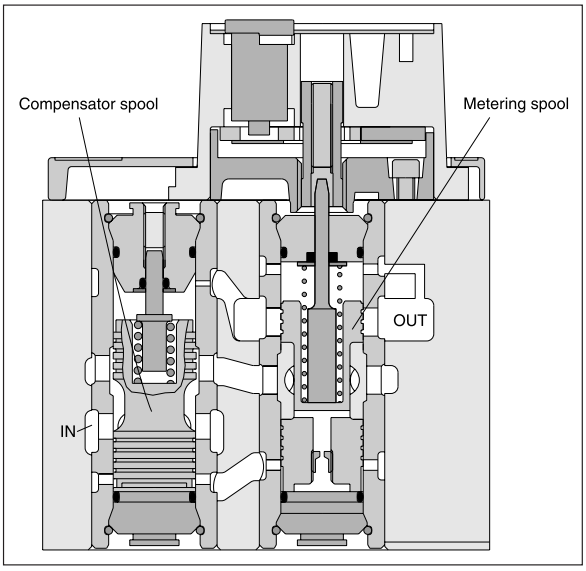
The compensator spool is located in front of the metering spool. The metering spool is closed in the neutral position to avoid undesired initial actuator motion. The oil flow to open the metering spool has to pass a needle valve (not shown in the sectional drawing). The needle valve can be adjusted from the front panel to set the response time of the 2F1C.

The metering spool is adjusted by the main control knob. The key lock has three positions:

Lock: Adjustment is locked.

Adjust: Full adjustment is permitted.

Trim: Fine adjustment of +/- 5% is possible.



Features

- 2 way flow control valve
- Subplate mounting according to ISO 6263
- Excellent fine adjustment
- Adjustable response time
- Closed in neutral position
- Optional reverse flow check valve
- 2 sizes, NG10 (3/8“), NG16 (3/4“)

5

Ordering code

2F1C	☐	—	01	—	B	—	5	—	☐	—	☐
2 way flow control valve	Size		Adjustment knob with lock		Design series		Seal FPM		Reverse flow check		Options

Code	Size
02	NG10 (3/8”)
03	NG16 (3/4”)

Code	Check valve
0	without check
C	with check

Technical data

Design			Orifice, infinitely variable, pressure-compensated	
Actuator			Manual flow rate adjustment	
Mounting type			ISO 6263	
Mounting position			unrestricted	
Weight		[kg]	6.0 (2F1C02), 9.0 (2F1C03)	
Fluid temperature		[°C]	Max. 70	
Ambient temperature		[°C]	-25...+50	
Viscosity range		[cSt] / [mm²/s]	2.8...400	
Filtering		[µm]	ISO 4406 (1999); 18/16/13	
Min. pressure difference		[bar]	see diagram	
Max. operating pressure			**2F1C02**	**2F1C03**
	Port A	[bar]	14...280	14...350
	Port B	[bar]	0...270	0...340
Flow direction				
A → B			Flow control function	
B → A			blocked or free flow through check valve	

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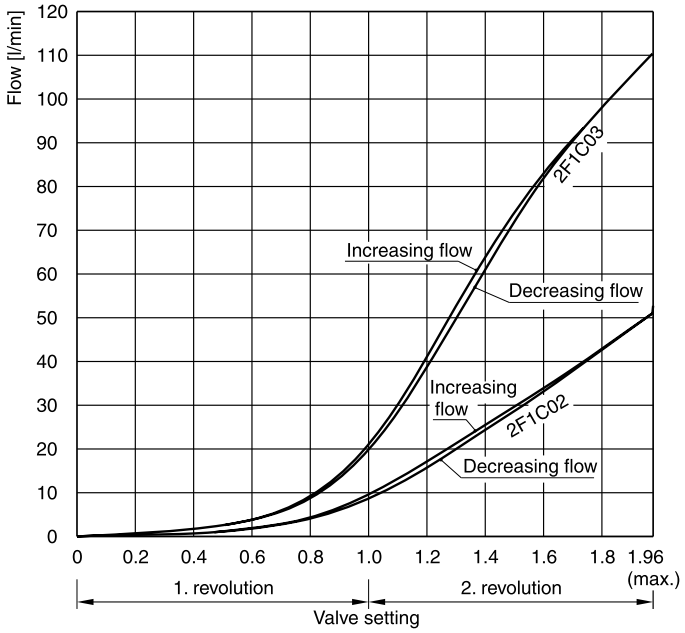
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Performance curves

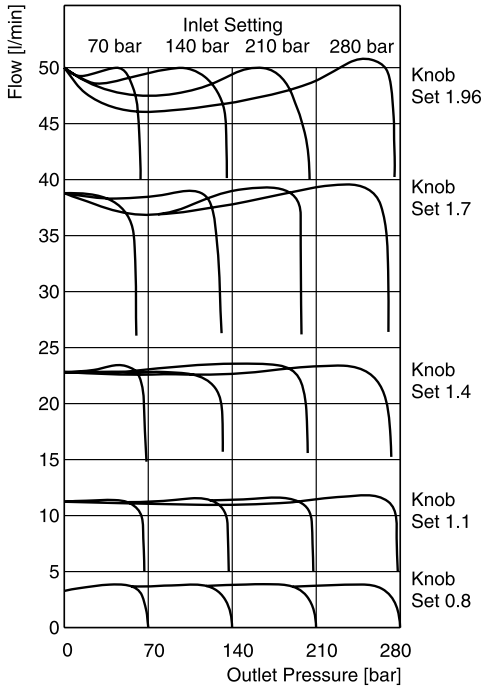
Flow / knob adjustment characteristics at 210 bar



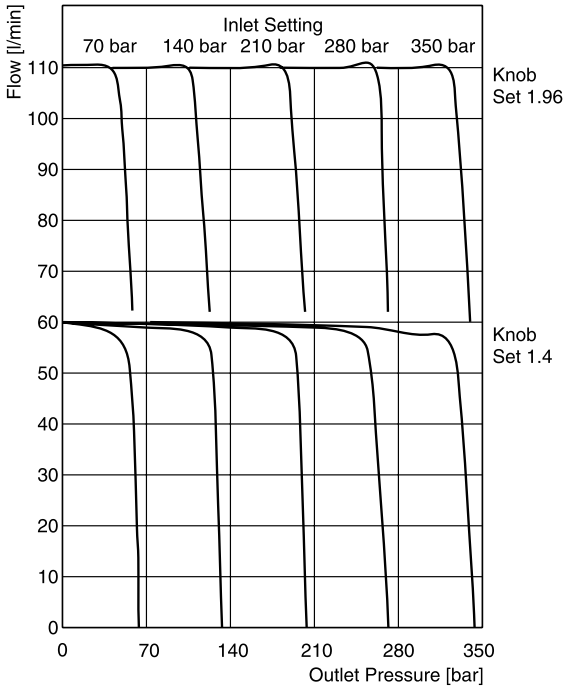
Flow / pressure drop curves

Constant inlet pressure – variable outlet pressure

2F1C02



2F1C03



Fluid viscosity 40 cSt at 50°C

2F1C_UK.INDD CM_10.03.2008.1

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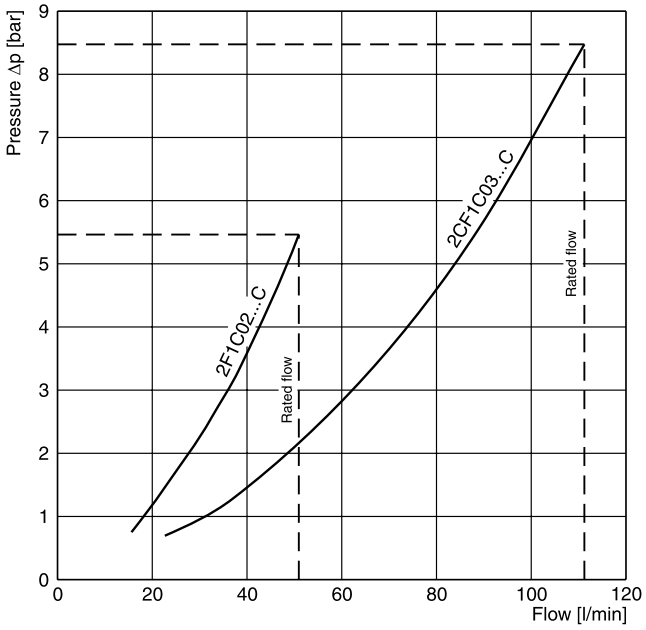
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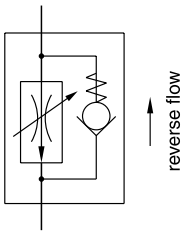
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Δp/Q performance curves

for reverse flow direction

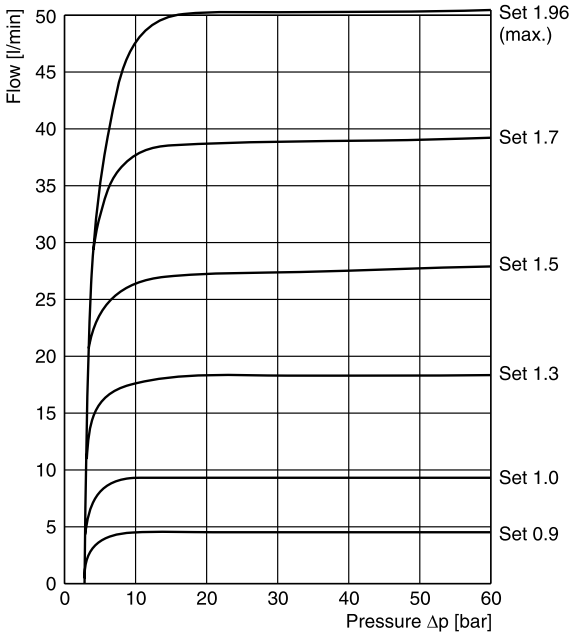
2F1C02 at 280 bar
2F1C03 at 350 bar



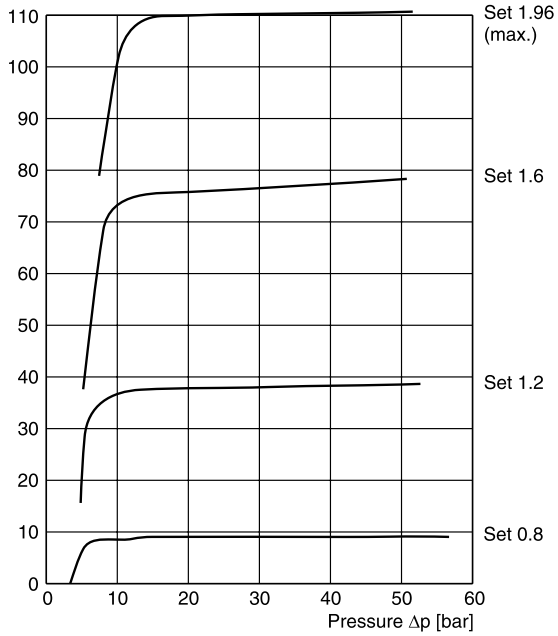


Minimum pressure difference curves

2F1C02



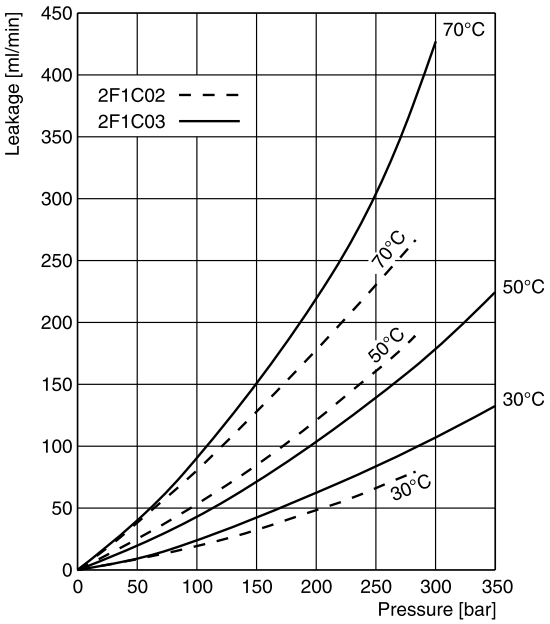
2F1C03



Fluid viscosity 40 cSt at 50°C

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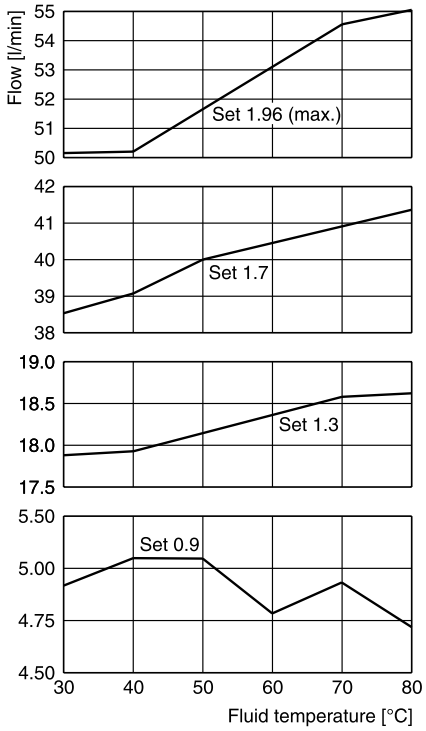
Leakage / pressure curves



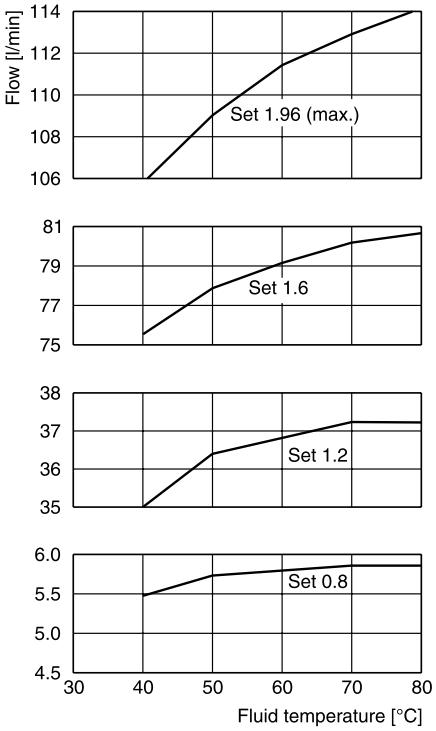
Flow / temperature curves

at 210 bar

2F1C02



2F1C03



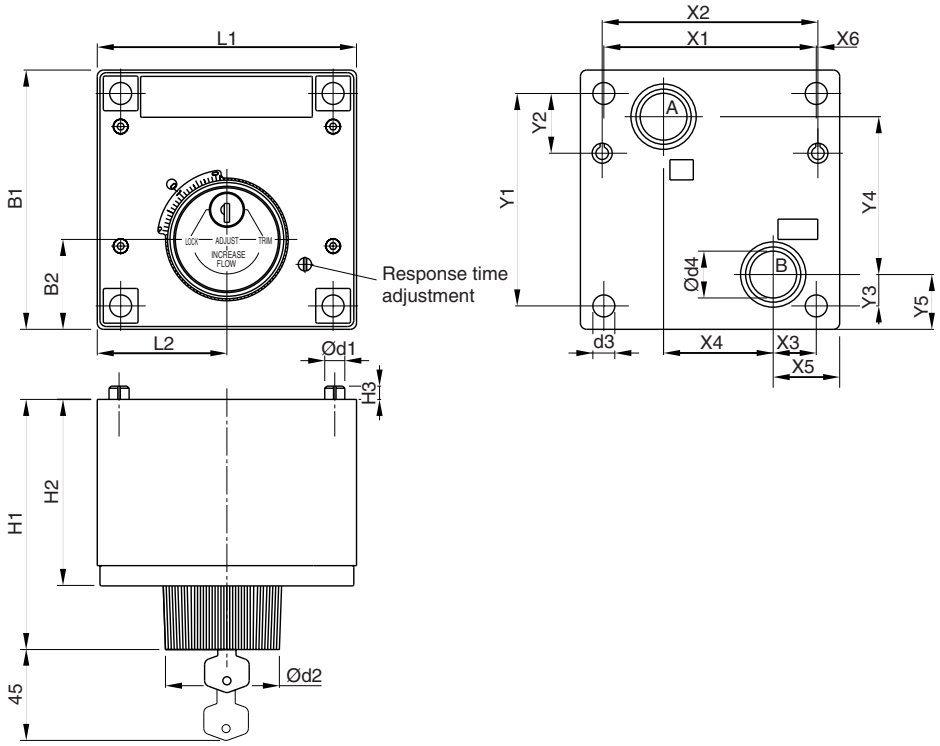
Fluid viscosity 40 cSt at 50°C

2F1C_UK.INDD CM_10.03.2008.1

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Size	ISO-code	x1	x2	x3	x4	x5	x6	y1	y2	y3	y4	y5
02	6263-AM-07-2-A	76.2	79.4	9.5	44.5	19	–	82.5	23.8	30.2	41.3	39.7
03	6263-AK-06-2-A	101.6	103.2	20.6	52.4	31.8	0.8	101.6	28.6	15.1	75.4	26.2

Size	ISO-code	B1	B2	H1	H2	H3	L1	L2	d1	d2	d3	d4
02	6263-AM-07-2-A	101.6	38.1	119.6	87.4	6.4	95.2	47.6	6.4	57.2	8.7	14.2
03	6263-AK-06-2-A	123.8	42.9	121.4	89.2	6.4	123.8	61.9	9.5	57.2	10.5	22.4

NG	ISO-code	Bolt kit - DIN912 12.9		Kit	Surface finish
02	6263-AM-07-2-A	BK-700-70842-8 4xM8x100	31.8 Nm ±15%	on request	R_{max}6.3 ⏥ 0.01/100
03	6263-AK-06-2-A	BK395 4xM10x100	63 Nm ±15%		

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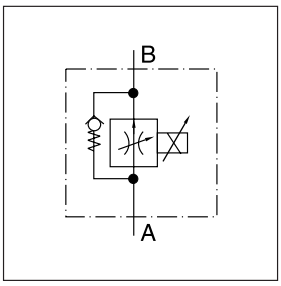
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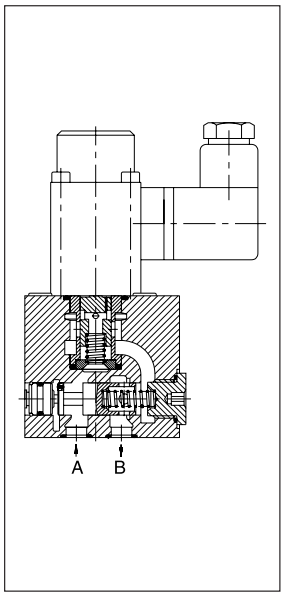
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Proportional flow control valves of the series DUR*L06 are used to generate pressure-compensated flow from A to B. The valve is equipped with a built-in check valve for the return flow.

For meter-in and meter-out control of an actuator a rectifier plate can be used. See 'Accessories' at the end of this chapter.







Function

When solenoid current is applied, the metering spool opens against the reset spring and the flow is regulated by the pressure compensating spool to port B.

With the aid of the pressure compensating spool, the pressure drop is held constant on the metering window. Thus pressure load changes are compensated, and the oil flow remains constant.

In combination with the digital electronic module PC-D00A-400 the valve parameters can be saved changed and duplicated.

Technical features

- Low hysteresis
- High reproducibility
- Load-independent oil flow
- Bypass check valve
- Mounting pattern to ISO 6263
- 5 flow rates

5

Technical data

Design		Electrically adjustable orifice valve with load sensing
Mounting type		Subplate NG06, Interface DIN 24340, ISO, CETOP
Mounting position		unrestricted, preferably horizontal
Ambient temperature	[°C]	-20°C...+50
Weight	[kg]	1.6
Type of voltage	[V]	24
Max. control current	[mA]	680
Coil resistance	[Ohm]	24
Duty cycle		100% ED
Solenoid connection		Connector as per EN 175301-803
Protection class		IP 65 in accordance with EH60529 (plugged amd mounted)
Amplifier module		PCD00A-400
Operating pressure	[bar]	Max. 210
Fluid temperature	[°C]	+20 up to max. +70
Viscosity range	[cSt] / [mm²/s]	12...230
Filtration		ISO 4406 (1999); 18/16/13
Min. pressure difference	[bar]	DUR 1.6/3.2: 3; DUR 6.3/12: 5; DUR 18: 8
Hysteresis at Q_{nom}	[%]	6
Hysteresis at $Q \leq 20\% \bullet Q_{nom}$	[%]	6
Repeatability at ΔU_{set} = 5V	[%]	2

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Ordering code

DUR		L	06	P	K		
2 way flow control valve with bypass check valvel	Nominal flow	Linear solenoid	Size NG06	Progressive performance curve	Solenoid	Seal	Design series (not required for ordering)

Code	Flow [l/min]
1,6	1.6
3,2	3.2
6,3	6.3
12	12.0
18	18.0

Code	Seal
A	NBR
1	FPM

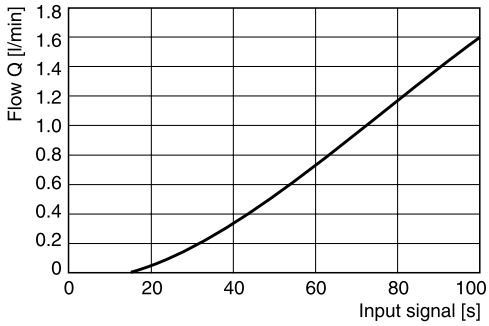
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Seal kits

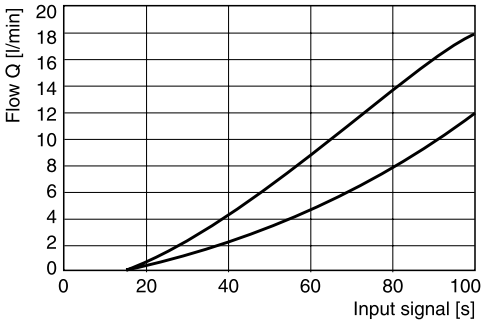
NBR	FPM
SK-DUR***L	SK-DUR***L FPM

Performance curves

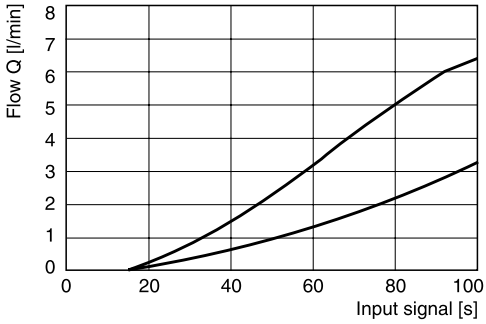
DUR 1.6 L 06 PK*



DUR 12 L 06 PK* / DUR 18 L 06 PK*

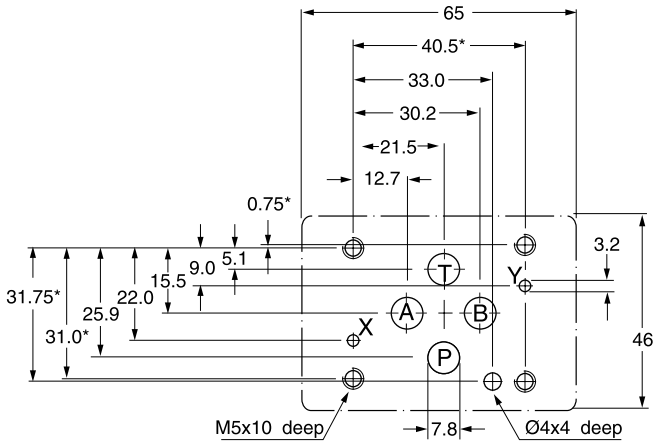


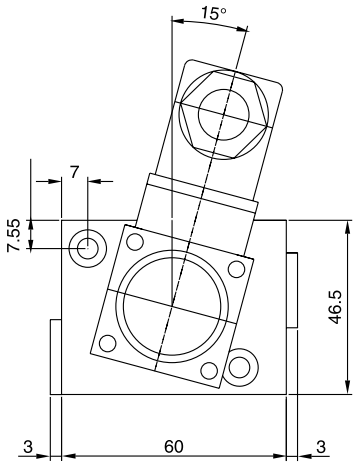
DUR 3.2 L 06 PK* / DUR 6.3 L 06 PK*

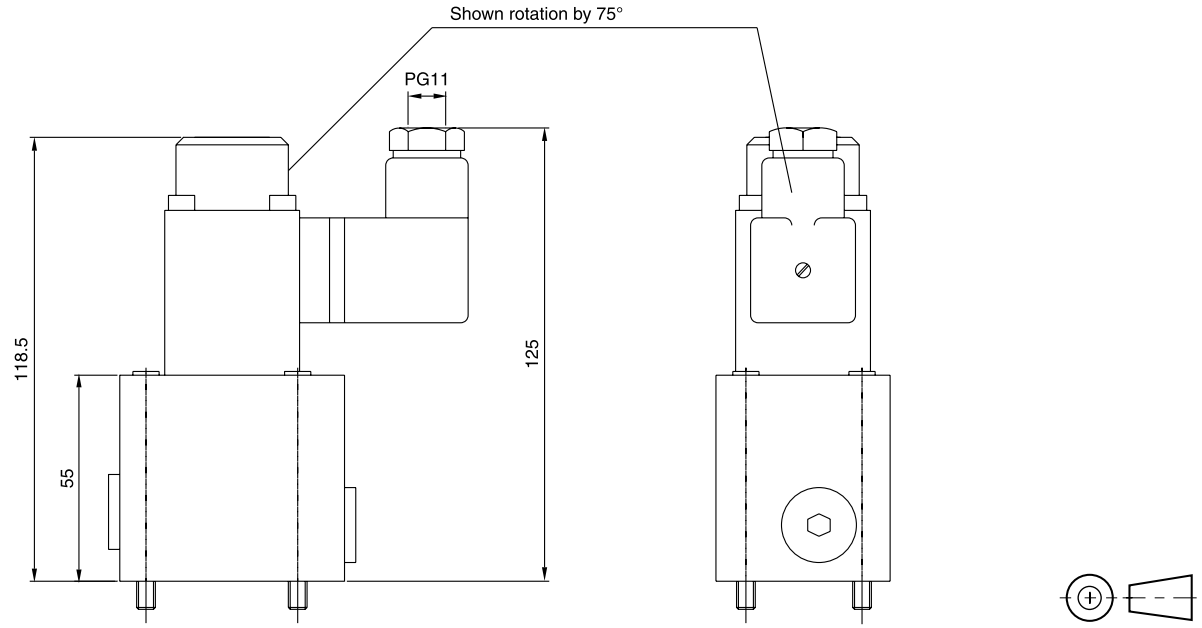


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Dimensions







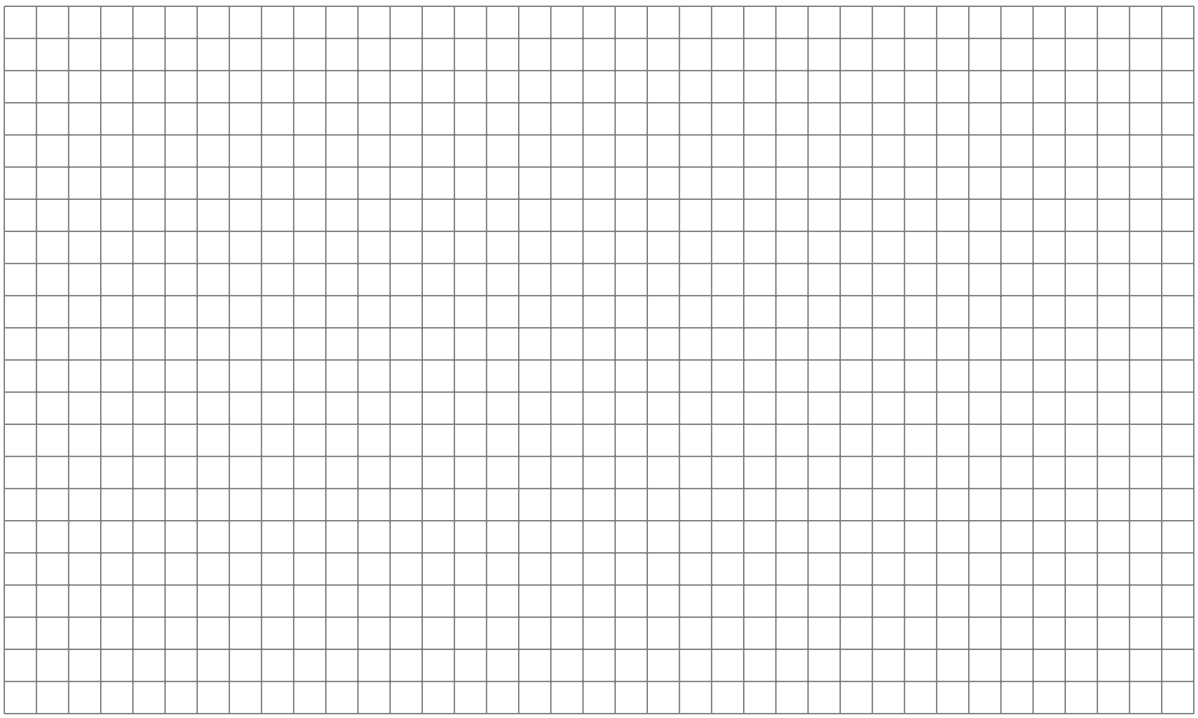
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Notes



Description	Threaded cable joint	Body colour coding	Figures switching	Order no.
Plug DIN 43650, design type AF, protection class IP 65 Voltages up to 250 V	PG 9	black, B grey, A	Fig. 1	**5001710** **5001711**
	PG11	black, B	Fig. 1 grey, A	**5001716*** **5001717***
Plug with LED insert 24 V	PG11	black, B grey, A	Fig.1 and Fig. 3	**5001571** **5001572**
Plug with LED insert 110 V	PG11	black, B grey, A	Fig.1 and Fig. 4	**5001573** **5001574**
Plug with LED insert 220 V	PG11	black, B grey, A	Fig.1 and Fig. 4	**5001575** **5001576**
Plug with LED insert 24V and suppressing circuitry	PG11	black, B grey, A	Fig.1 and Fig. 5	**5001708** **5001709**
Plug with rectifier. Rectifier with 4 silicon diodes in bridge circuit. Varistor in alternating current side to protect the diodes against power peaks	PG11	black, B grey, A	Fig.1 and Fig. 6	**5001737** **5001738**
Plug with pull relief and translucent cover	PG11	black, B grey, A	Fig. 2	**5001723** **5001724**
Application with bridge rectifier suitable for 5001723 and 5001724	—	—	Fig. 2 and Fig. 7	**5001727**
Application with bridge rectifier and lamp suitable for 5001723 and 5001724	—	—	Fig. 2 and Fig. 8	**5001734**

* If not ordered otherwise, valves with code P are supplied with these connectors.

Fig. 1

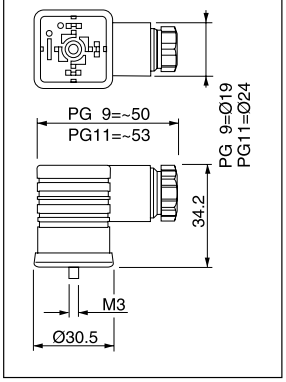


Fig. 3

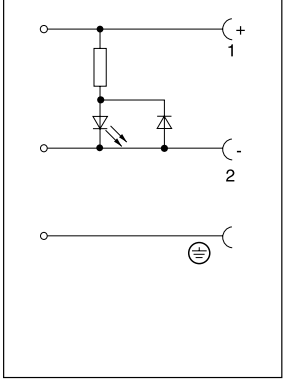


Fig. 5

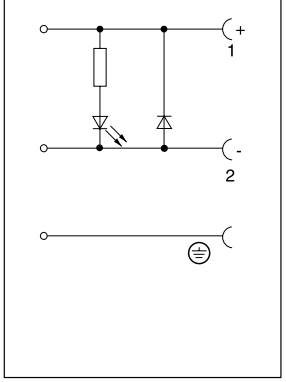


Fig. 7

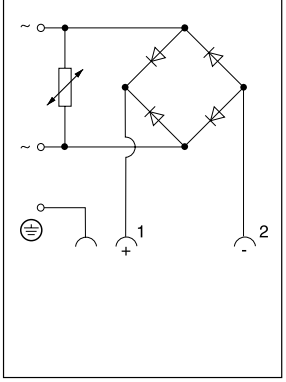


Fig. 2

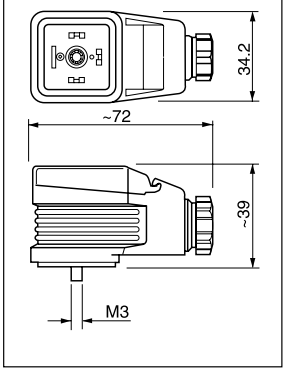


Fig. 4

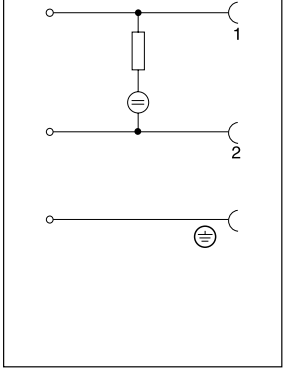


Fig. 6

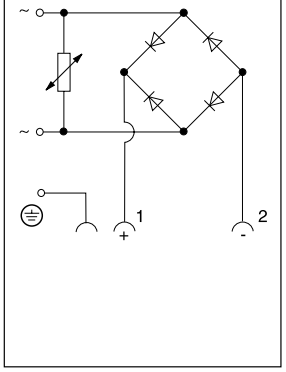
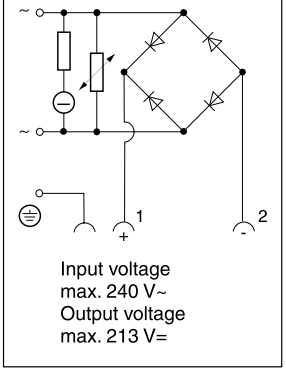


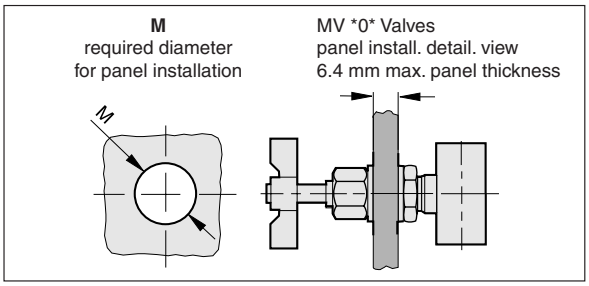
Fig. 8



Input voltage
max. 240 V~
Output voltage
max. 213 V=

Mounting sets (MVK) for panel installation

Description	M (mm)	Valve
MVK 2	15	MV 200
MVK 4	20	MV 400, MV 620
MVK 6	23	MV 600, MV 820
MVK 8	29	MV 800, MV 1020
MVK 12	36	MV 1200
MVK 12	36	MV 1600



Drills for MVI valves

Material	Valve sizes and ordering code		
	400	600	800 and 1200
Cutting alloy	SE 1062	SE 567	on request
Steel	SE 1063	SE 1061	

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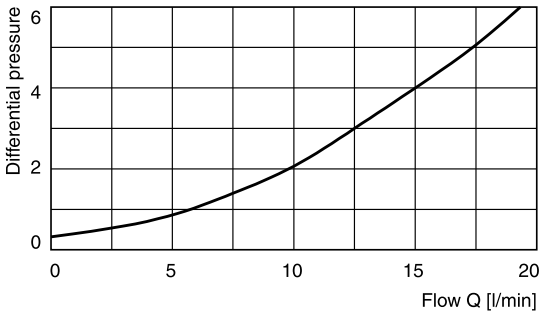
Sandwich rectifier plate for the model GFG 2

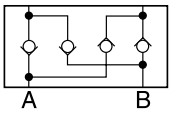
If a 2 way flow control valve is used in combination with a rectifier plate the valve can be used for meter-in and meter-out flow control of an actuator.

Design

The intermediate rectifier plate is designed with 4 identical, symmetrically arranged check valves. Thus the differential pressure is the same in both flow directions.

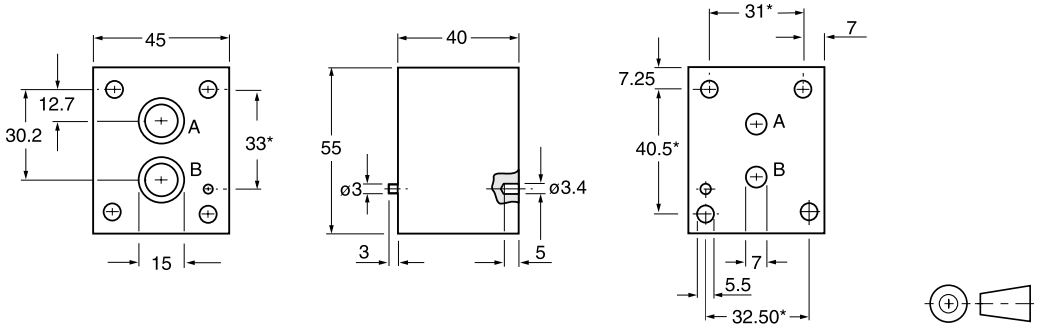
Δp/Q Performance curve





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Dimensions



Dimension tolerances
* : ± 0.1mm
others : ± 0.2 mm
holes and silhouette of
valve body : untoleranced dimension

Ordering code: HR OA 06 C

O-ring for sealing the connecting surface

(not included)

Connections	Dimensions	required units
A, B	12 x 1.5	2

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Notes

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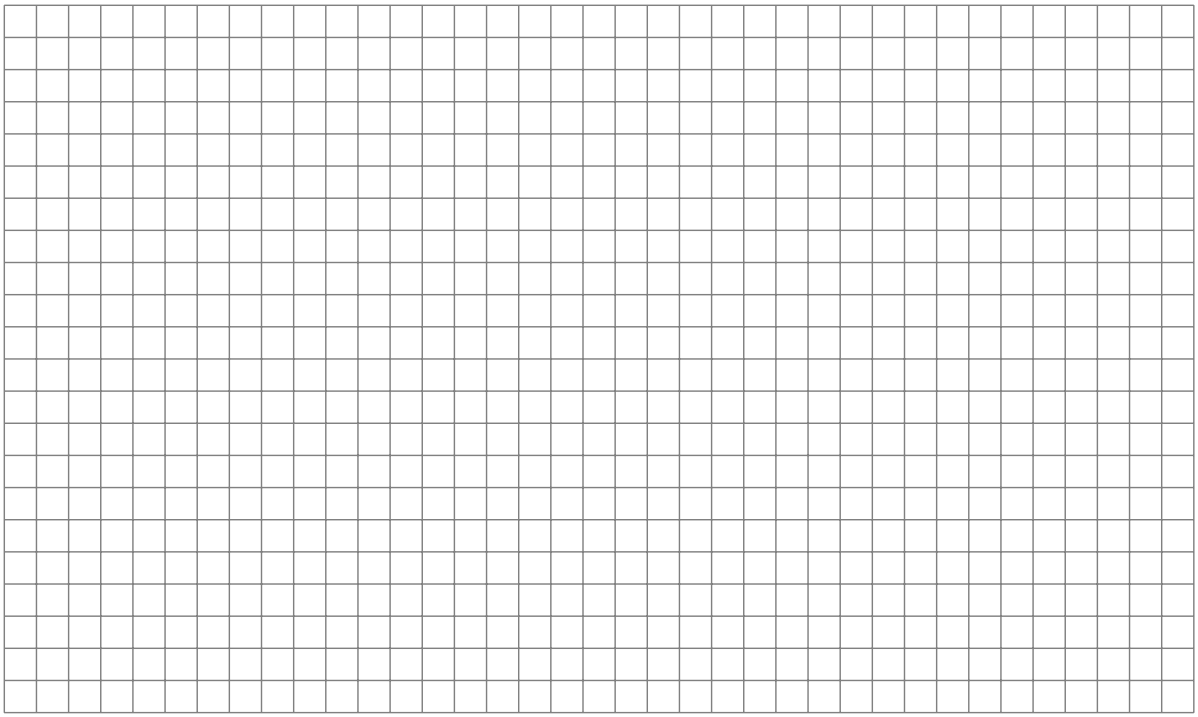
Series Parker	Series Denison	Description	Size											Mounting			Page
		Parker Standard DIN / ISO	1/8	1/4	3/8	1/2	3/4	1	06	10	16	25	32	Subplate	Screw-in	Slip-in	
		Shuttle valves															
SSR	–								•	•					•		6-3
		Check valves, direct operated															
RK / RB	–		•	•	•	•									•		6-5
CS	–			•	•	•	•	•						•			6-9
SPZBE	–										•	•	•			•	6-11
SPV / SPZ	–								•	•					•		6-13
SPR	C4V									•		•	•	•			6-15
		Check valves, pilot operated															
CPS	–				•									•			6-19
	D4S	2/2 way seat valves								•		•	•	•			6-21
SVLE	C4V									•		•	•	•			6-31
		Accessories															
		Plugs															6-35

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More check valves are presented in the following chapters:
Chapter 7: Sandwich Valves
Chapter 8: Slip-In Cartridge Valves
Chapter 9: SAE Flange Valves
Chapter 10: Valves for Pipe Mounting

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Notes



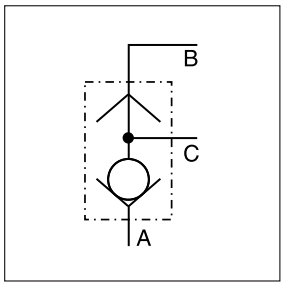
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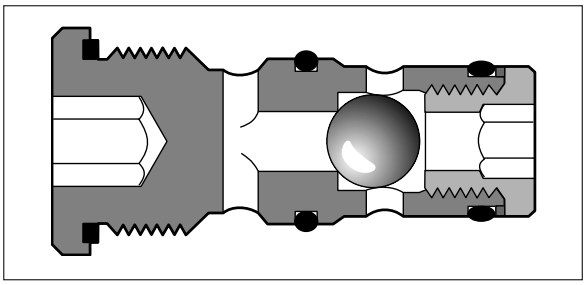
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The shuttle valve series SSR is designed as a threaded cartridge valve. All parts are assembled in one unit and easy to mount.







Features

- Little space required
- Leak-free
- Easy assembly

6

Technical data

Design			Threaded cartridge valve	
Mounting position			Unrestricted	
Ambient temperature		[°C]	-40 ... +60	
Nominal size			NG06	NG10
Weight		[kg]	0.5	0.8
Hydraulic				
Flow direction			See symbols	
Fluid			Hydraulic oil as per DIN 51 524 ... 525	
Viscosity	recommended	[cSt] [mm²/s]	30 ... 80	
	permitted	[cSt] [mm²/s]	20 ... 380	
Fluid temperature		[°C]	-20 ... +60	
Filtration			ISO 4406 (1999); 18/16/13	
Nominal pressure		[bar]	350	
Flow		[l/min]	40	60

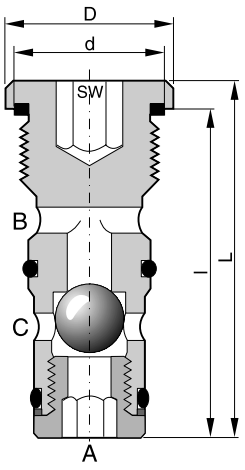
Ordering code

	–	SSR	B	080	E	
Seal		Shuttle valve	Design series	Factory norm, direct operated	Threaded cartridge	Valve size

Code	Seal
omit	**NBR**
V	FPM

Code	Size
06	**NG06**
10	**NG10**

Bold letters =
Short-term availability



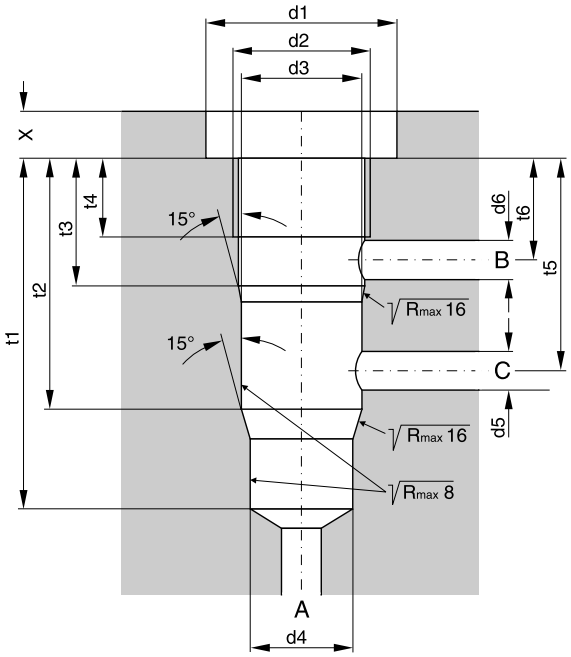
Dimensions	NG06	NG10
D	24	34
L	50	74
d	M18x1.5	M24x1.5
l	45	66
SW	8	12

6

Seal kits

NG	NBR seals	FPM seals
06	SK-SSRB0E06	SK-SSRB0E06V
10	SK-SSRB0E10	SK-SSRB0E10V

Mounting cavity



Dimensions	NG06	NG10
d1	25	35
d2	M18 x 1.5	M24 x 1.5
$d3^{H7}$	16	22
$d4^{H7}$	14	20
$d5_{max.}$	6	9
$d6_{max.}$	6	9
t1	45	68
t2	32	51
t3	16	20
t4	10	15
t5	27.5	40
t6	12	13.5

The check valves are designed to go into simple, threaded cavities. The connection is O-ring sealed on the 118° shoulder in the mounting cavity.





Type RK



Type RB

Technical data

Series design with pipe thread

Code		RK0	RK1	RK2	RK3	RB1	RB2	RB3
Flow	[l/min]	10	20	50	80	20	50	80
Operating pressure	[bar]	700	700	700	500	700	700	500
Opening pressure	[bar]	0.15	0.18	0.2	0.25	0.15	0.07	0.17
Thread (DIN ISO 228/1)		G1/8A	G1/4A	G3/8A	G1/2A	G1/4A	G3/8A	G1/2A
Tightening torque* ±20%	[Nm]	10	15	20	40	15	20	40
Weigh	[g]	5	5	15	15	5	15	20
Mounting position		unrestricted						
Fluid		Hydraulic oil in accordance with DIN 51524/51525						
Viscosity permitted	[cSt]/[mm²/s]	4...1500 ; opt. 10...500 viscosity recommended						
Temperatures	[°C]	Ambient and oil -40...+80, observe viscosity range.						

* In case of strong vibration, it is recommended to secure the mounting threads.

6

Ordering code

R		
Check valve, screwable	Mounting direction	Size

Code	Mounting direction
K	**in the blocked direction**
B	**in open flow direction**

Code	Flow [l/min]	Thread
0*	**10**	**G1/8A**
1	**20**	**G1/4A**
2	**50**	**G3/8A**
3	**80**	**G1/2A**

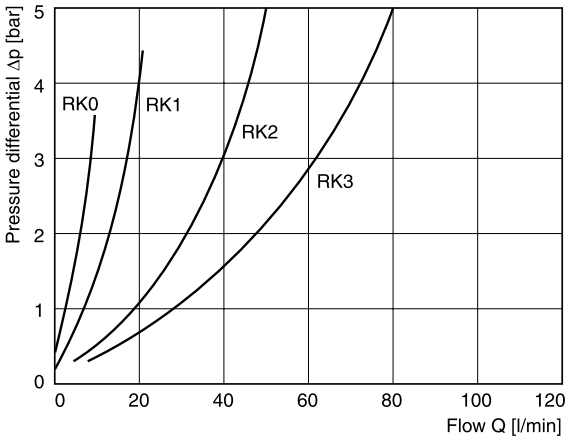
* only series RK available

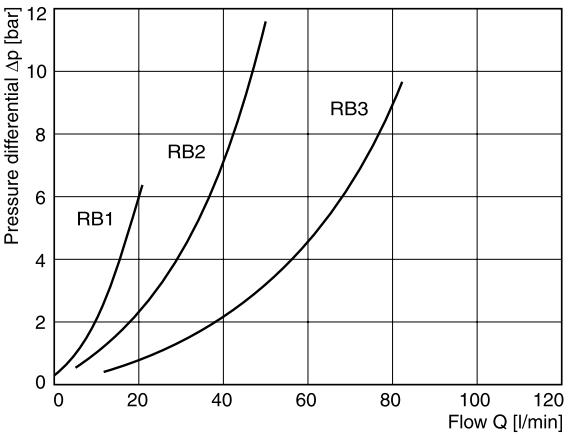
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Δp/Q perfomance curves

Oil viscosity during measurement 50mm²/s

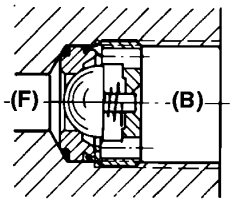




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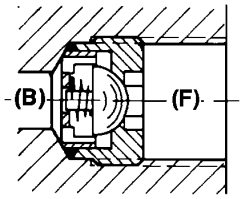
Mounting direction

Type RK



Screwed in,
in the blocked direction

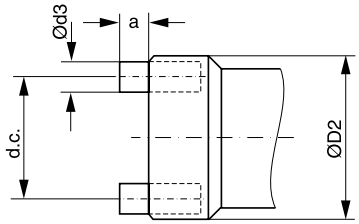
Type RB



Screwed in,
in the open flow direction

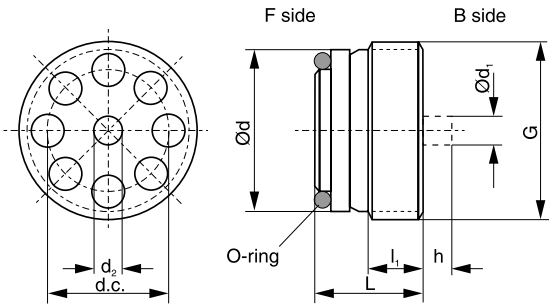
Mounting tool

Type RK



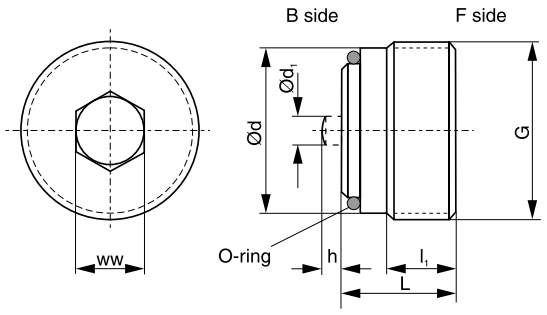
Type	D_2	a	d_3
RK0	8.6	2	1.5
RK1	11.5	2.5	2
RK2	15	2	2.5
RK3	18.8	4	3.5

Type RK



Type	Thread	L	l_1	d	d_1	d_2	h	d.c.	O-ring
RK0	G1/8A	7.2	4	8.6	1.8	1.6	1.3	6.8	6x1
RK1	G1/4A	9	4.5	11.5	2.4	2.2	1.5	$8.8_{-0.1}$	9x1
RK2	G3/8A	11	6	15	3.2	3	2.5	11	11x1.5
RK3	G1/2A	13	7.5	18.5	4	3.8	3	$14.2_{-0.1}$	14x1.5

Type RB

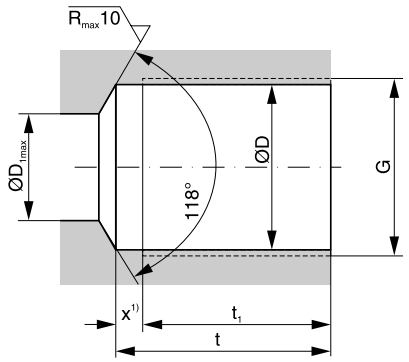


Type	Thread	L	l_1	d	d_1	h	ww	O-ring
RB1	G1/4A	9.8	5	11.6	2	1.3	5	9x1
RB2	G3/8A	11.5	7.0	15	2.8	2	6	11x1.5
RB3	G1/2A	13.15	7.5	18.5	3.2	2.5	8	14x1.5

6

Mounting cavity

- for connecting in combination with tube fitting

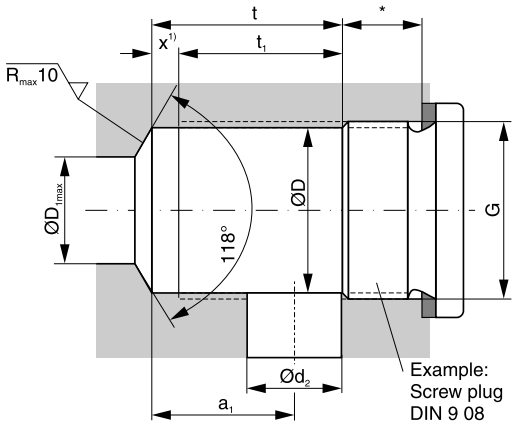


Type	Thread	D	D_1	t	t_1 2)	x 1)
RK0	G1/8	8.7	5	16	13.7	2.3
RK1 and RB1	G1/4	11.8	8	22	19	3
RK2 and RB2	G3/8	15.25	9	24.5	21.5	3
RK3 and RB3	G1/2	19	12	29	25.5	3.5

1) Thread runout x must be maintained. It may be smaller, but not larger (requirement for a perfect seal using the O-ring).

2) Fully cut-out thread

- for internal line channels

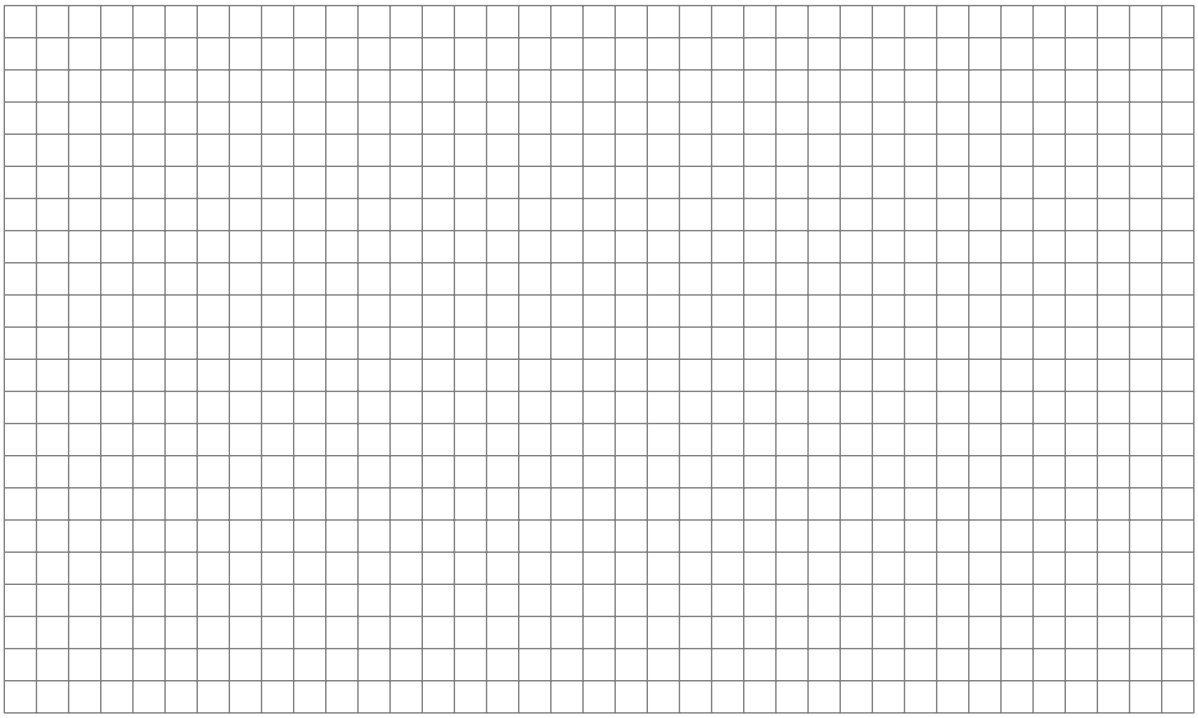


* Required depth depending on type of screw plug, connecting plate, etc. used.

Type	Thread	D	D_1	t	t_1 2)	x 1)	a_1	d_2
RK0	G1/8	8.7	5	12.3	10	2.3	9.5	5
RK1 and RB1	G1/4	11.8	8	14	11	3	11	6
RK2 and RB2	G3/8	15.25	9	17	14	3	13	8
RK3 and RB3	G1/2	19	12	22	18.5	3.5	16	12

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Notes



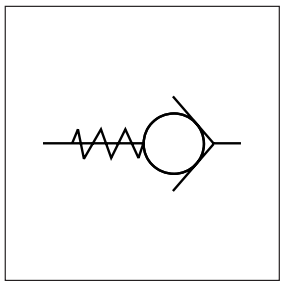
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Manatrol check valves of the series CS for subplate mounting provide free flow in one direction and block flow in the counter direction.

Specific Manatrol poppets and poppet guides ensure reliable functional integrity even at high flow rates and/or pulsations.

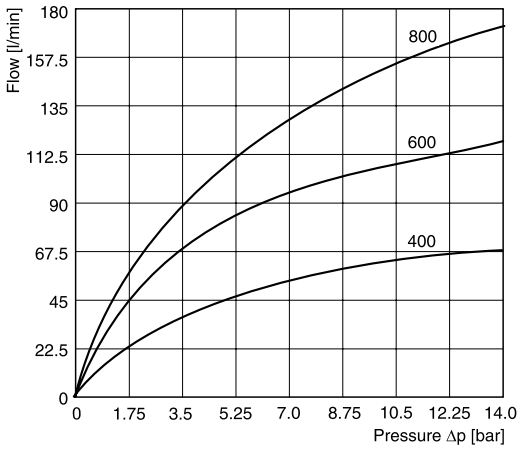


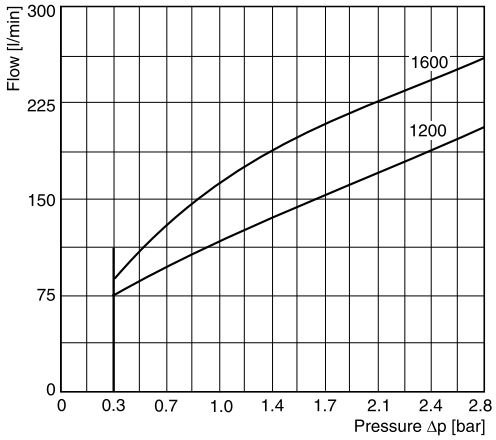


Technical data

Size		400	600	800	1200	1600
Operating pressure	[bar]	210	210	210	210	210
Pressure drop Δp	[bar]	10	10	10	1	1
Flow	[l/min]	65	110	155	112	160

Δp/Q performance curves





The curves refer to hydraulic oil of 33 cSt and 50°C.

Ordering code

CS		S		
Manifold design	Nominal size	Steel body	Opening pressure	Seal

Code	Size
400	**400 (1/4)**
600	**600 (3/8)**
800	**800 (1/2)**
1200	**1200 (3/4)**
1600	1600 (1)

Code	Seal
omit	**NBR**
V	FPM

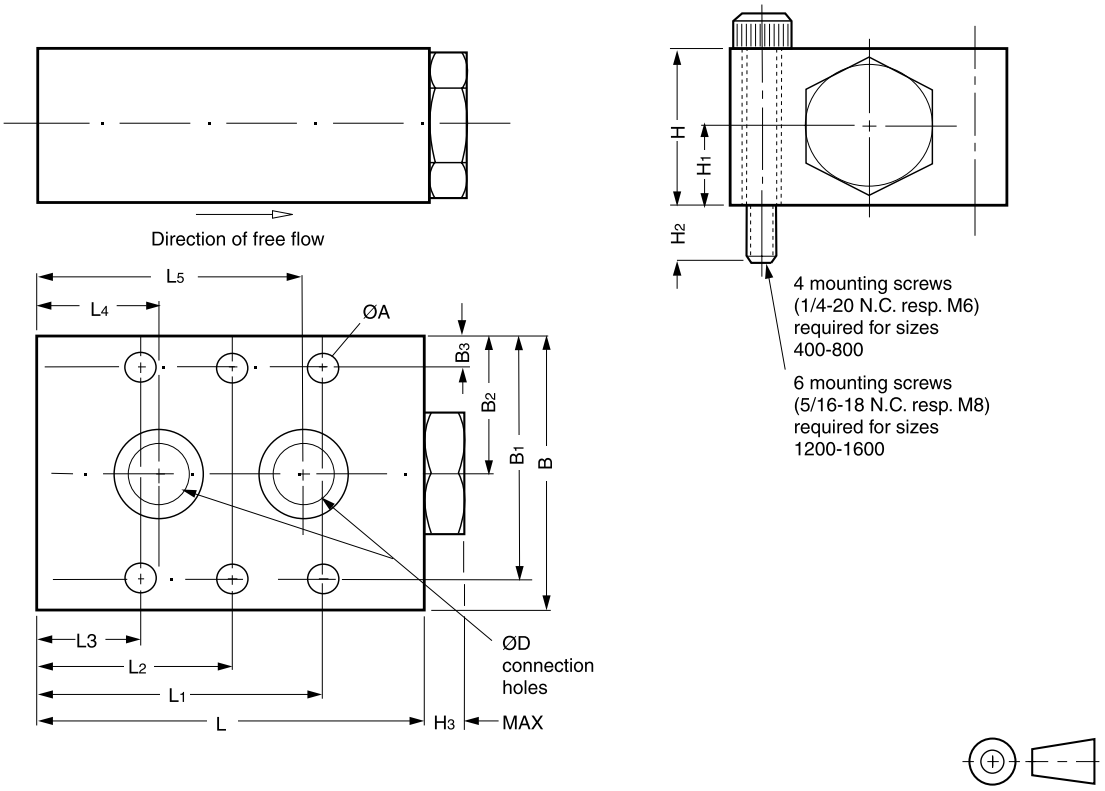
Code	Pressure [bar]
omit	**0.35**
65	4.5

Bold letters =
Short-term availability

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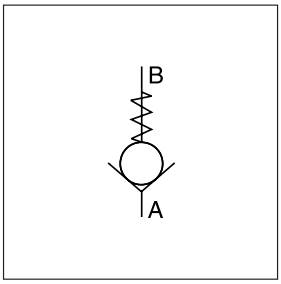


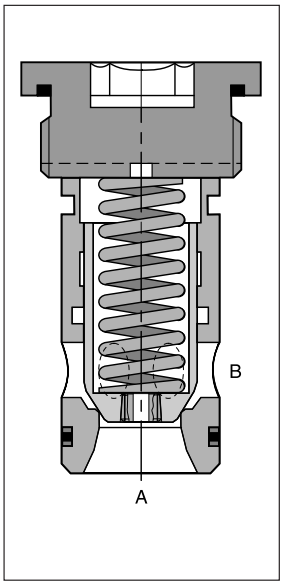
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Size	ØD	ØA	L	L1	L2	L3	L4	L5	B3	B2	B1	B	H	H1	H2	H3	Weight [kg]
CS 400S	7.1	6.35	63.5	49.0	-	14.2	19.1	44.5	5.3	22.1	38.9	44.5	22.1	10.9	9.9	7.9	0.5
CS 600S	10.2	6.35	69.9	51.6	-	18.0	22.1	47.5	6.4	25.4	44.5	50.8	25.4	12.7	13.0	8.1	0.7
CS 800S	11.9	6.35	80.7	59.4	-	21.3	25.4	55.6	6.4	28.4	50.8	57.2	31.8	15.7	13.2	8.1	1.0
CS 1200S	17.3	8.5	103.9	89.9	51.8	13.7	25.1	79.2	7.9	34.8	61.7	69.9	44.5	22.1	14.5	10.7	2.3
CS 1600S	22.1	8.5	127.0	111.0	63.5	15.7	34.8	91.9	7.9	38.1	68.1	76.2	50.8	25.4	14.5	10.7	3.5

The check valves series SPZBE are slip-in cartridge valves. The function unit is fixed inside the manifold by a hexagonal plug with slot.
The design is based on CE series with same poppet and sleeve. The different mounting cavity has to be considered.







Features

- Little space required
- Leak-free from port B to A
- 4 different opening pressures

6

Technical data

Design			Threaded cartridge valve		
Mounting position			Optional		
Ambient temperature		[°C]	-40 ... +60		
Nominal size			NG16	NG25	NG32
Weight		[kg]	0.25	0.5	1.2
Hydraulic					
Flow direction			Port A to B		
Fluid			Hydraulic oil as per DIN 51 524 ... 536		
Viscosity	recommended	[cSt] [mm²/s]	30 ... 80		
	permitted	[cSt] [mm²/s]	20 ... 380		
Fluid temperature		[°C]	-20 ... +60		
Filtration			ISO 4406 (1999); 18/16/13		
Nominal pressure		[bar]	350		
Opening pressure		[bar]	0.1; 0.5; 1.6 and 4.0		
Flow		[l/min]	250	450	900

Ordering code

[ ]	–	SP	Z	BE	1010	E	[ ]	[ ]
Seal		Check valve	Flow direction A to B	Design series, screwed cover	Factory norm, poppet, direct operated	Slip-in valve	Valve size	Opening pressure

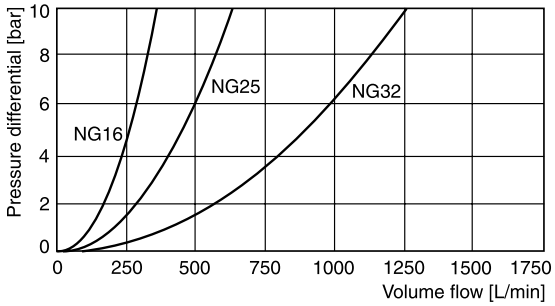
Code	Seal
omit	**NBR**
V	FPM

Code	Size
16	**NG16**
25	**NG25**
32	**NG32**

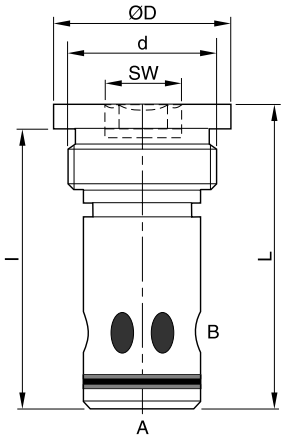
Code	Pressure [bar]
L	0.1
N	**0.5**
S	1.6
U	4.0

Bold letters =
Short-term availability

Performance curves



Dimensions



Dimensions	NG16	NG25	NG32
D	40	55	72
L	72.5	89	109.5
d	M33x2	G½"	G2"
l	66	80.5	99.5
SW	17	24	32

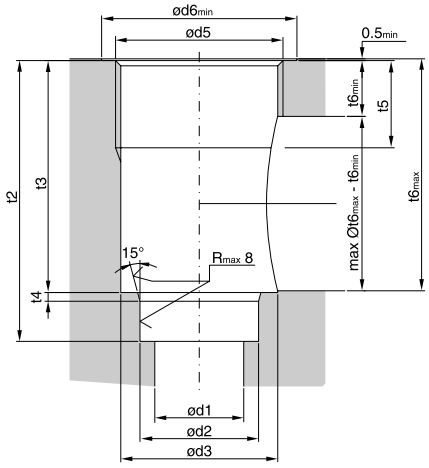
Seal kits

NG	NBR seals	FPM seals
16	SK-SPZBE10E16	SK-SPZBE10E16V
25	SK-SPZBE10E25	SK-SPZBE10E25V
32	SK-SPZBE10E32	SK-SPZBE10E32V

Springs

Spring Type	Ordering Number		
	NG16	NG25	NG32
L 0.1 bar	45051368	45051375	45051376
N 0.5 bar	45051369	45051374	45051377
S 1.6 bar	45051370	45051372	45051378
U 4.0 bar	45051371	45051373	45051379

Mounting cavity



Size	NG16	NG25	NG32
d1	18	25.5	36
$d2^{H7}$	25	34	45
d3	31	45	57
d5	M33x2	G1½"	G2"
$d6_{min}$	41	56	73
$t2^{+0.1}$	66	80.5	99.5
t3	53	66.5	84.5
t4	2	2.5	2.5
t5	21	25	30
$t6_{min}$	16	16	24
$t6_{max}$	52.5	66	84
t7	6.5	6.5	10

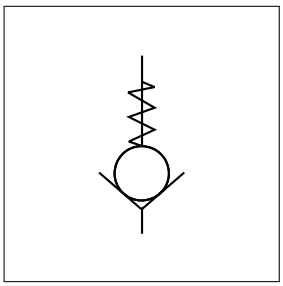
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The check valve series SPV and SPZ are designed as a threaded cartridge valve. All parts are assembled in one unit and easy to mount.

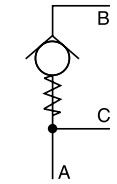




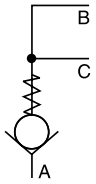
Features

- Little space required
- Leak-free
- Easy assembly

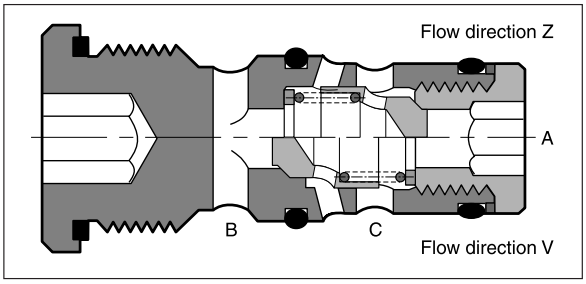
Ports



Flow direction V



Flow direction Z



6

Technical data

Design			Threaded cartridge valve	
Mounting position			Unrestricted	
Ambient temperature		[°C]	-40 ... +60	
Nominal size			NG06	NG10
Weight		[kg]	0.5	0.8
Hydraulic				
Flow direction			See symbols	
Fluid			Hydraulic oil as per DIN 51 524 ... 536	
Viscosity	recommended	[cSt] [mm²/s]	30 ... 80	
	permitted	[cSt] [mm²/s]	20 ... 380	
Fluid temperature		[°C]	-20 ... +60	
Filtration			ISO 4406 (1999); 18/16/13	
Nominal pressure		[bar]	350	
Opening pressure		[bar]	0.3	
Flow		[l/min]	40	60

Ordering code

	—	SP		B	030	E		M
Seal		Check valve	Flow direction	Design series	Factory norm, direct operated	Threaded cartridge	Valve size	Spring 0.3 bar

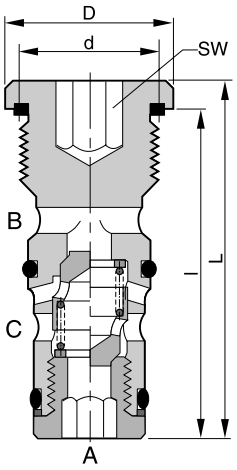
Code	Seal
omit	**NBR**
V	FPM

Code	Flow direction
V	**Port B -> A and C**
Z	**Port A -> B and C**

Code	Size
06	**NG06**
10	**NG10**

Bold letters =
Short-term availability

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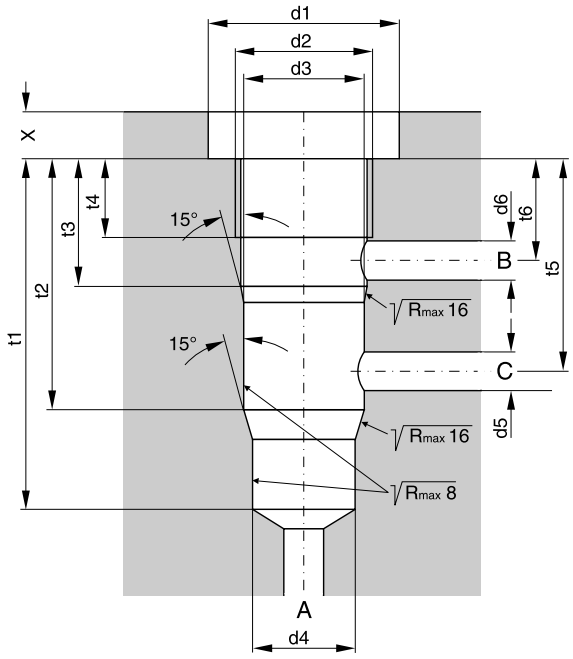
Dimensions	NG06	NG10
D	24	34
L	50	74
d	M18x1.5	M24x1.5
l	45	66
SW	8	12

6

Seal kits

NG	NBR seals	FPM seals
06	SK-SPV/ZB0E06	SK-SPV/ZB0E06V
10	SK-SPV/ZB0E10	SK-SPV/ZB0E10V

Mounting cavity



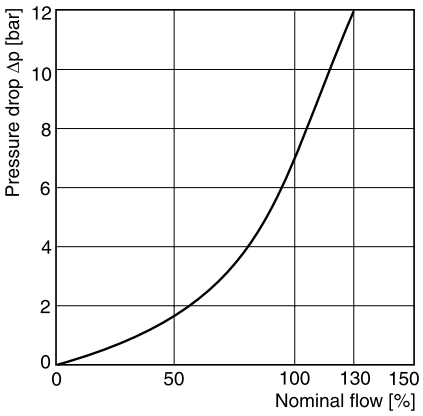
Dimensions	NG06	NG10
d1	25	35
d2	M18 x 1.5	M24 x 1.5
$d3^{H7}$	16	22
$d4^{H7}$	14	20
$d5_{max.}$	6	9
$d6_{max.}$	6	9
t1	45	68
t2	32	51
t3	16	20
t4	10	15
t5	27.5	40
t6	12	13.5

Direct operated check valves are available with both Parker (series SPR) and Denison (series C4V) ordering codes.
Check valves allow free flow from A to B. The counter direction is blocked. The SPR/C4V series are equipped with a leak-free seat type cartridge.

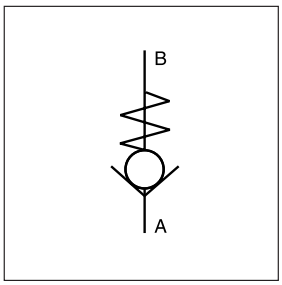
Function

The pressure arising in port A lifts the poppet from the valve seat and releases the flow to B. In the counter direction, the spring and the pressure on top of the cartridge hold the poppet onto the seat and block the flow.

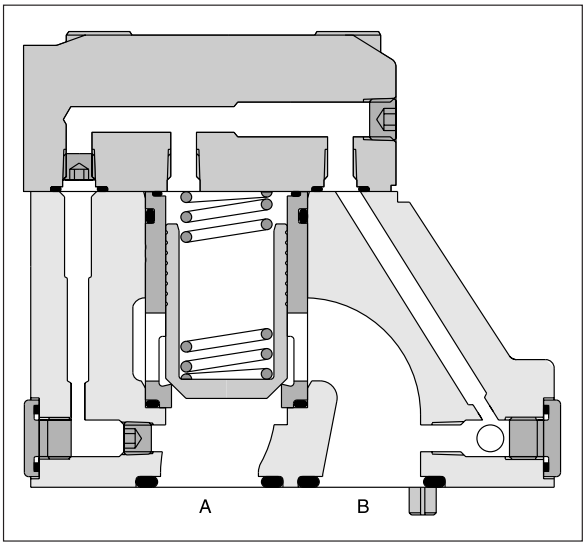
Δp/Q performance curve







C4V06



C4V10

6

Technical data

General					
Nominal size			**NG10**	**NG25**	**NG32**
Subplate mounting			ISO 5781		
Mounting position			Unrestricted		
Ambient temperature		[°C]	-20...+80		
Weight		[kg]	2.8	4.6	6.1
Hydraulic					
Max. operating pressure		[bar]	350		
Nominal flow		[l/min]	150	270	450
Fluid			Hydraulic oil to DIN 51524		
Viscosity	recommended	[cSt]/[mm²/s]	30...50		
	permitted	[cSt]/[mm²/s]	20...380		
Fluid temperature	recommended	[mm²/s]	30...50		
	permitted	[mm²/s]	-20...+70		
Filtration			ISO 4406 (1999); 18/16/13		

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Parker



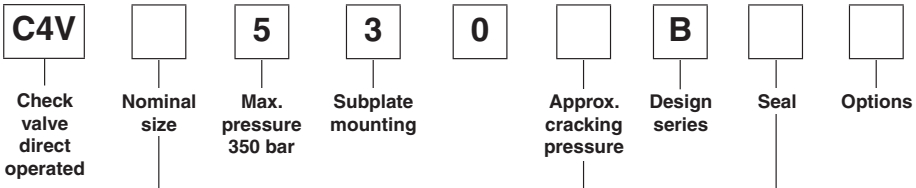
Code	Seal
omit	**NBR**
V	FPM

Code	Pressure [bar]
N	**0.5**
R	**1.0**
T	**2.0**
U	**4.0**

Code	Size
P15	**NG10**
P20	**NG25**
P32	**NG32**

The Parker model code should be used for all new applications. Otherwise also refer to Denison model code.

Denison



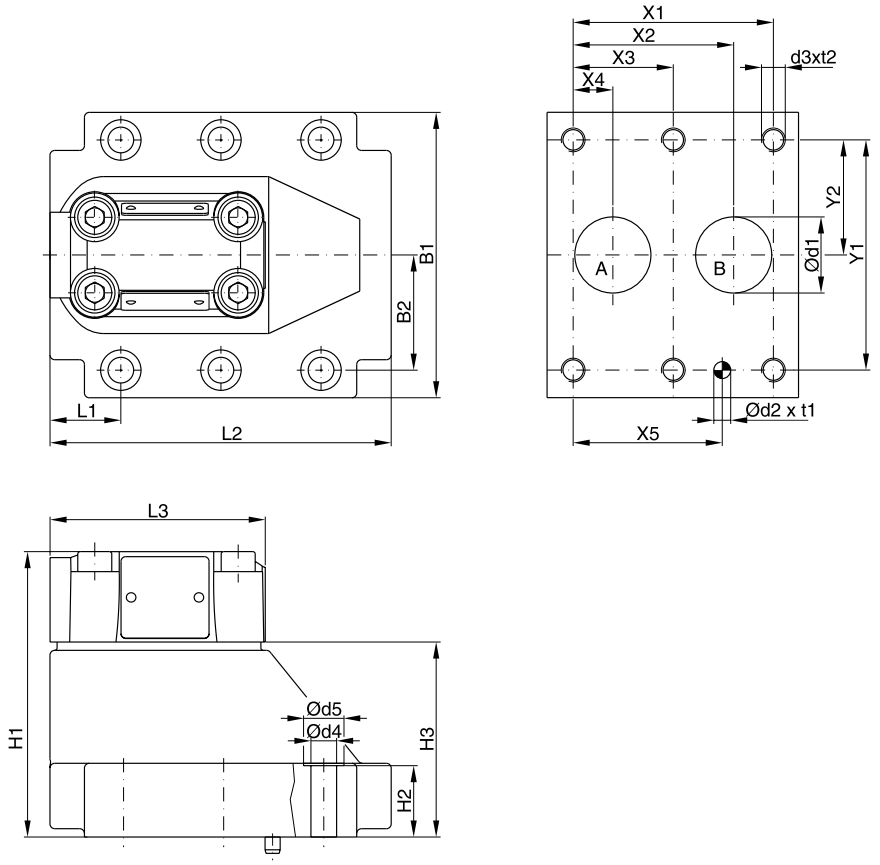
Code	Nominal size
03	NG10
06	NG25
10	NG32

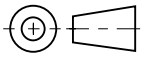
Code	Approx. cracking pressure [bar]	
	C4V03	C4V06/10
1	2.8	3.5
2	0.5	0.5
3	0.3	0.3
4	2.2	2.2
5	—	9.0
6	1.2	1.2
7	3.0	—

Code	Seal
1	NBR
5	FPM

The Denison model code is available for existing applications. Otherwise also refer to Parker model code.

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NG	ISO-code	x1	x2	x3	x4	x5	y1	y2	B1	B2	H1	H2	H3	L1	L2
10	5781-06-07-0-00	42.9	35.8	-	7.2	31.8	66.7	33.4	87.3	33.4	83	21	45	29	94.8
25	5781-08-10-0-00	60.3	49.2	-	11.1	44.5	79.4	39.7	105	39.7	109.5	29	71.5	34.7	126.8
32	5781-10-13-0-00	84.2	67.5	42.1	16.7	62.7	96.8	48.4	120	48.4	120	29	82	30.6	144.3

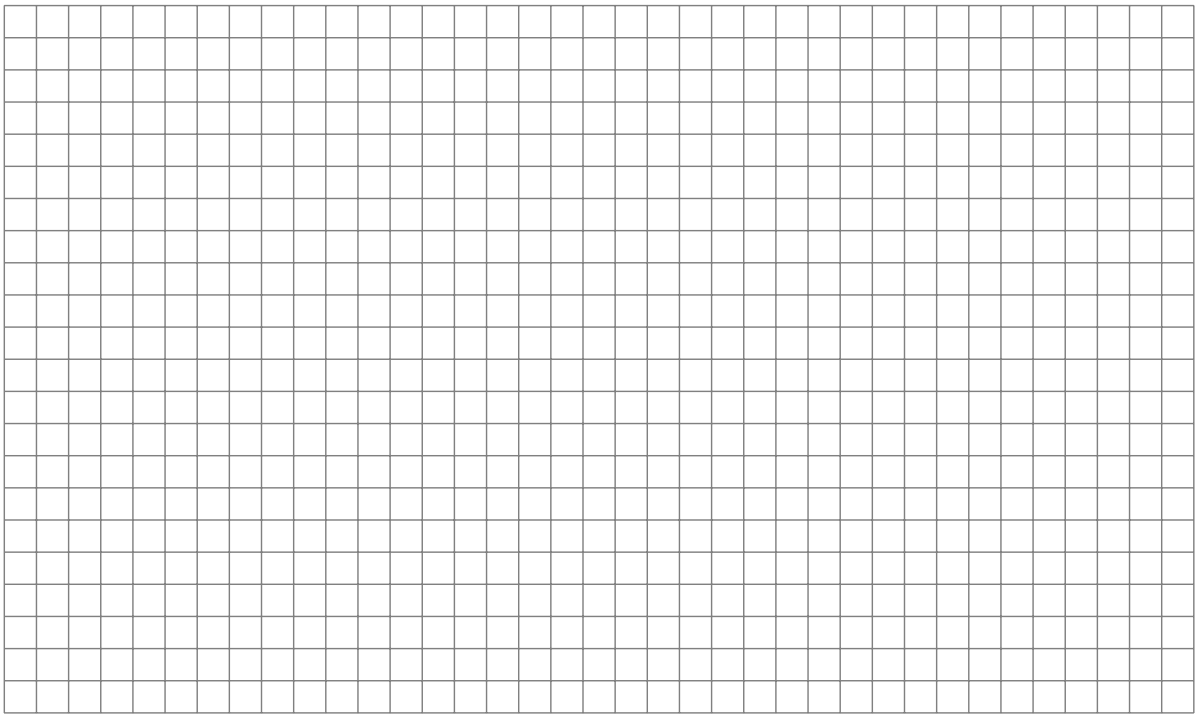
Tolerance for all dimensions ±0.2

NG	ISO-code	d1max	d2	t1	d3	t2	d4	d5
10	5781-06-07-0-00	15	7.1	8	M10	16	10.8	17
25	5781-08-10-0-00	23.4	7.1	8	M10	18	10.8	17
32	5781-10-13-0-00	32	7.1	8	M10	20	10.8	17

NG	ISO-code	Bolt kit			Kit NBR	Kit FPM	Surface finish
10	5781-06-07-0-00	BK 505	4x M10 x 35 DIN 912 12.9	63 Nm ±15%	SK-SVLE5P10	SK-SVLE5P10V	
25	5781-08-10-0-00	BK 485	4x M10 x 45 DIN 912 12.9	63 Nm ±15%	SK-SVLE5P25	SK-SVLE5P25V	
32	5781-10-13-0-00	BK 506	6x M10 x 45 DIN 912 12.9	63 Nm ±15%	SK-SVLE5P32	SK-SVLE5P32V	

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Notes



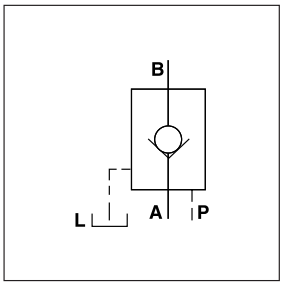
Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

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Pilot operated check valves of the series CPS allow free flow in one direction (A to B).

The counter-flow direction (B to A) is blocked. By applying pilot pressure, the poppet can be lifted from its seat against the pressure in port B. Thus flow in the counter-direction is also possible. There are 1 and 2 stage poppets available with pilot ratios of 5 : 1 and 40 : 1, to suit different operating conditions. The CPS needs to be externally drained via port L.



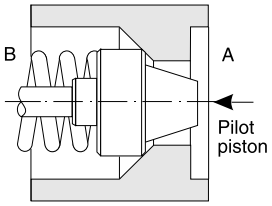


Technical data

Size		600	1200
Max. operating pressure	[bar]	210	210
Max. pilot pressure	[bar]	210	70
Flow Q_{max} at Δp 2,7bar	[l/min]	30	95
Nominal size		3/8	3/4
Weight	[kg]	4	7

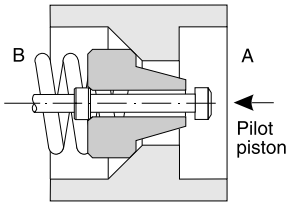
Pilot ratios

Poppet 1 stage



Surface ratio 5 : 1 (pilot spool: poppet surface) for quick response time without decompression.

Poppet 2 stage



Surface ratio 40 : 1 (pilot spool: decompression pin surface) for low shock or oscillation performance from decompression.

Ordering code

CP	S		S		M	
Pilot operated check valve	Manifold mounting	Port size	Steel body	Pilot ratio	Steel poppet	Seal

Code	Port size
600	**NG06**
1200	**NG10**

Code	Seal
omit	**NBR**
V	FPM

Code	Ratio	Stage
5	**5:1**	**1**
40	40:1	2

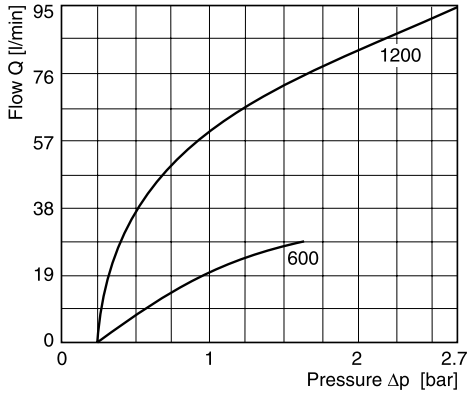
Bold letters =
Short-term availability

CPS_UK.INDD RH_06.03.08

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Hydraulic Controls Division
Kaarst, Germany

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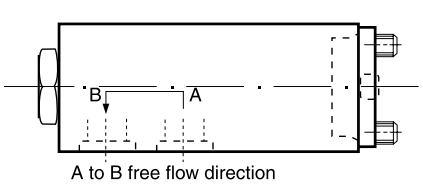
Δp/Q performance curves

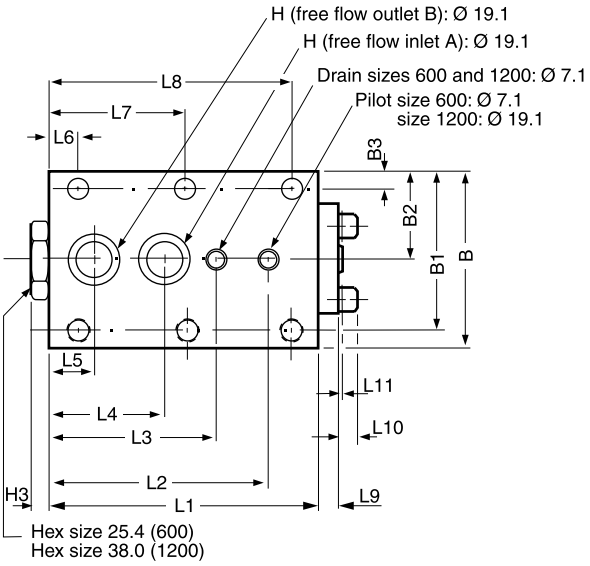


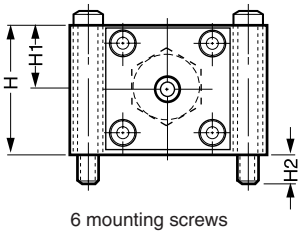
The curves refer to hydraulic oil of 33 cSt and 50°C.

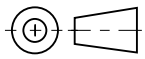
Dimensions

6





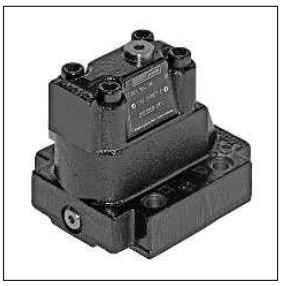


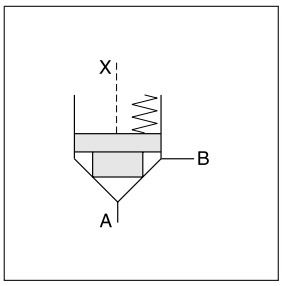


Size	L3	L2	L1	L9	L11	H	H1	H2	H3	L10	L8	L7	L6	B3	B2	B1	B	ØH	L5	L4
CPS600S	76.2	101.6	120.7	10.7	1.0	50.8	25.4	12.7	7.9	-	108.0	60.2	12.7	8.6	38.1	67.3	76.2	11.2	21.3	53.3
CPS1200S	93.7	127.0	152.4	11.4	1.0	63.5	31.8	12.7	10.2	7.9	136.4	76.2	15.7	10.2	50.8	91.2	101.6	19.1	25.4	63.5

Seat valves series D4S are designed for directional control functions. A large variety of poppets, springs and covers - including shuttle valves, stroke limiters, solenoid valves (VV01) and position control - allow to design individual hydraulic solutions for nominal flow up to 600 l/min.

A complete program is offered under the Denison brand:
subplate mounted valves (D4S - chapter 6),
SAE flange valves (D5S - chapter 9),
pipe mounted valves (D4S - chapter 10),
slip-in cartridges (CAR - on request).

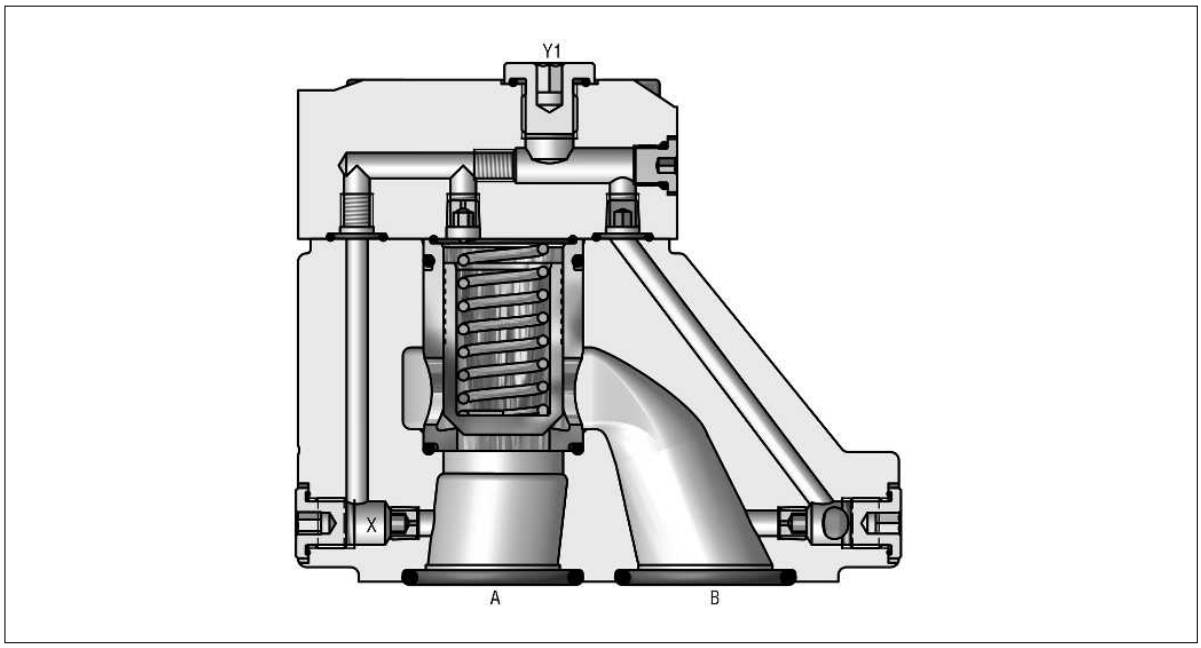




Features

- Subplate mounting acc. to ISO 5781
- Leak-free seat valve design
- Numerous pilot options
- 6 poppet types
- 3 sizes, NG10, 25, 32

D4S10



D4S | ☐ | – | 9 | ☐ | ☐ | – | ☐ | ☐ | ☐ | – | ☐ | ☐ | – | B | ☐ | – | ☐

Seat valve	Nominal size	Subplate mounting ISO 6264, Y1 port G¼"	Pilot connec-tion	Cap version	Sleeve	Spool type	Spring	Switching type	Solenoid voltage	Design series	Seals	Options

Code	Nominal size
03	NG10
06	NG25
10	NG32

Code	Pilot oil line in body	A-X	B-Y
1	internal from A	⊖	○
2	external from X	●	○
A[1]	internal from A	⊖	●
B[1]	external from X	●	●
C	internal from A + B	⊖	⊖
D	internal from B	●	⊖
G	external from Y	●	●

[1] With VV01 only

Code	Ports	X	Y	Z	X-Y	Y1	VV01
	Standard						
1	Pilot oil = pilot drain	—	●	⊖	○	●	—
C	Pilot oil = pilot drain	●	○	⊖	○	●	—
	With solenoid valve (VV01)						
2	Ext. PD from cap	—	○	⊖	●	○	●
6	Internal pilot drain	—	○	⊖	●	●	—
	With stroke limiter (not for D4S03)						
3	Pilot oil = pilot drain	⊖	●	—	—	—	—
4	Pilot oil = pilot drain	●	⊖	—	—	—	—

○ open bore ● closed bore ⊖ orifice Ø 1.2

Code	Sleeve
1	AA=95%, AB=5%
3	AA=60%, AB=40%

Code	Size	Poppet type	Sleeve
1	03, 06,10	With closed bottom and 15° chamfer (pZ max. = pA +20bar	1
2	03	With 0.8 dia. orifice at the bottom and 15° chamfer	1
	06, 10	With 1.2 dia. orifice at the bottom and 15° chamfer	1
4	03, 06,10	With closed bottom and 45° chamfer	1, 3
A [2]	06, 10	Safety spool (for position control only)	3
B [2]	06, 10	Throttle spool, 10° chamfer	3
C [2]	06, 10	Throttle spool, 3° chamfer	3

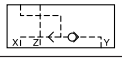
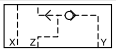
[2] Springs 2, 3, 4 and 6 only

Code	Spring (approx. cracking pressure [bar])					
	Sleeve Code 1		Sleeve Code 3			
	A -> B		A -> B		B -> A	
	D5S03	D5S06/10	D5S03	D5S06/10	D5S03	D5S06/10
1	2.8	3.5	6.5	6.5	9.5	11.0
2	0.5	0.5	1.0	1.0	1.5	1.7
3	0.3	0.3	0.6	0.6	0.9	1.0
4	2.2	2.2	4.0	3.5	5.5	6.0
5	—	9.0	—	16.0	—	28.0
6	1.2	1.2	2.0	2.2	3.0	3.8
7	3.0	—	8.0	—	12.0	—

Code	Options
omit	Standard
013	Cover for end position control

Code	Seals
1	NBR
5	FPM

Code	Solenoid voltage
omit	Standard w/o vent function
G0R	12V=
G0Q	24V=
GAR	98V=
GAG	205V=
W30	110V / 50Hz 120V / 60Hz
W31	230V / 50Hz 240V / 60Hz

Code	Switching type	
omit	Standard w/o vent function	
09	VV01 with manual override	de-energized: power comp. open
10	VV01 without manual override	
11	VV01 with manual override	de-energized: power comp. closed
12	VV01 without manual override	
CA	Shuttle valve	
DA	Shuttle valve	
CB	VV01 code 09 and shuttle valve code CA	
CD	VV01 code 11 and shuttle valve code CA	
DB	VV01 code 09 and shuttle valve code DA	
DD	VV01 code 11 and shuttle valve code DA	
BH	VV01 code 10 and shuttle valve code CA and position control [3] with amplifier	
BK	VV01 code 12 and shuttle valve code CA and position control [3] with amplifier	
BN	VV01 code 10 and shuttle valve code DA and position control [3] with amplifier	
BQ	VV01 code 12 and shuttle valve code DA and position control [3] with amplifier	
BC	VV01 code 10 and position control [3] with amplifier	
BE	VV01 code 12 and position control [3] with amplifier	
BA	Position control [3] with amplifier	
BF	Position control [3] with amplifier and shuttle valve code CA	
BL	Position control [3] with amplifier and shuttle valve code DA	

[3] Position control for D4S06/10 only.
Spring 2 or 4. Spool A and sleeve 3.
Valve open: proximity switch damped.

6

D4S_UK.INDD RH_17.01.08

Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

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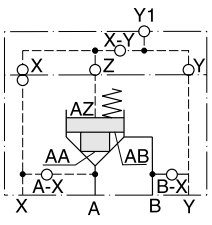
General				
Size		**03**	**06**	**10**
Mounting		Subplate mounting acc. to ISO 6264		
Mounting position		unrestricted		
Ambient temperature	[°C]	-20...+50		
Weight	[kg]	2.7	4.5	6.0
Hydraulic				
Operating pressure	[bar]	Ports A, B up to 350; Port Y 140 (with VV01)		
Nominal flow	[l/min]	180	360	600
Fluid		Hydraulic oil as per DIN 51524...525		
Fluid temperature	[°C]	-20...+80		
Viscosity permitted	[cSt]/[mm²/s]	10...650		
Viscosity recommended	[cSt]/[mm²/s]	30		
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)		

Electrical (solenoid)							
Duty ratio	[%]	100					
Response time	[ms]	Energized / de-energized AC: 20/18 , DC: 46/27					
	Code	G0R	G0Q	GAR	GAG	W30	W31
Supply voltage	[V]	12V =	24V =	98V =	205V =	110 at 50Hz 120 at 60Hz	230 at 50Hz 240 at 60Hz
Tolerance supply voltage	[%]	+5...-10	+5...-10	+5...-10	+5...-10	+5...-10	+5...-10
Power consumption, hold	[W]	31	31	31	31	78	78
Power consumption, in rush	[W]	31	31	31	31	264	264
Max. switching frequency	[1/h]	AC: up to 7.200, DC: up to 16.000					
Solenoid connection		Connector as per EN175301-803					
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)					
Coil insulation class		H (180 °C)					

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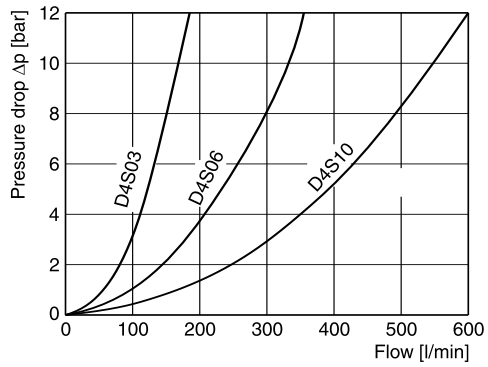
D4S pilot configuration

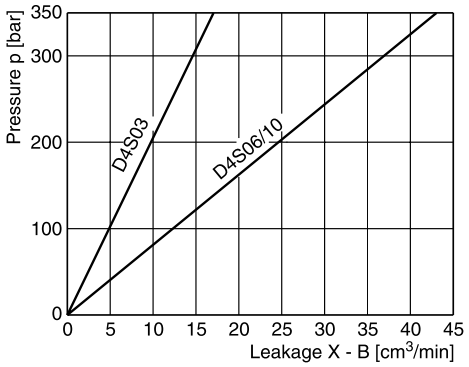
Subplate mounting



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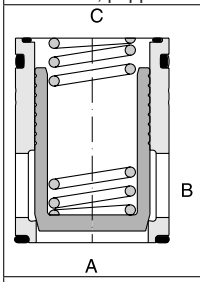
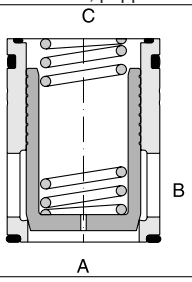
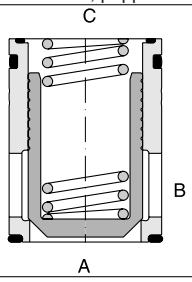
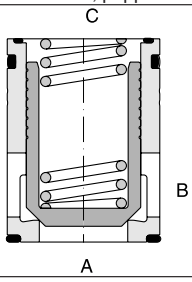
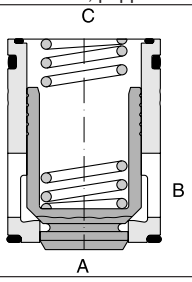
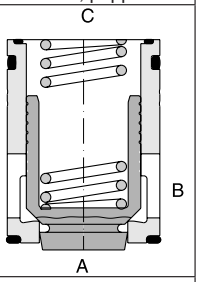
Δp/Q performance curves

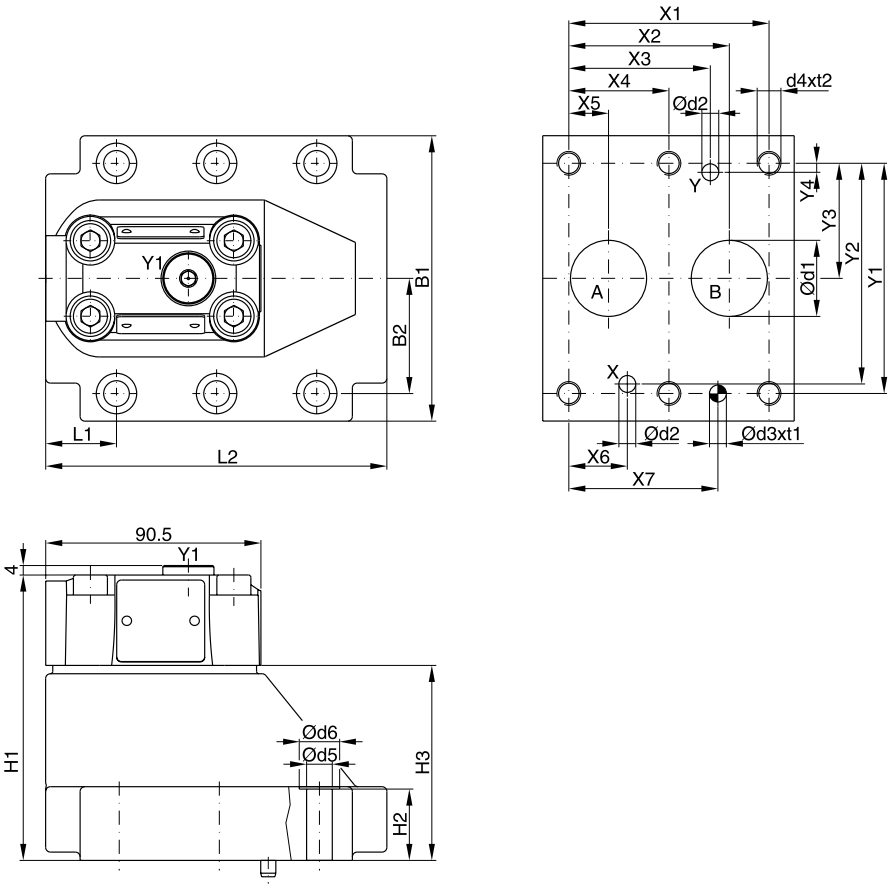




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Selection of Cartridges

Sleeve 1, poppet 1	Sleeve 1, poppet 2	Sleeve 1, poppet 4	Sleeve 3, poppet 4	Sleeve 3, poppet A	Sleeve 3, poppet B/C
					
1 : 1.05 $A_A = 0.95\ A_C$ $A_B = 0.05\ A_C$ 15° chamfer	1 : 1.05 $A_A = 0.95\ A_C$ $A_B = 0.05\ A_C$ 15° chamfer orifice	1 : 1.05 $A_A = 0.95\ A_C$ $A_B = 0.05\ A_C$ 45° chamfer	1 : 1.67 $A_A = 0.6\ A_C$ $A_B = 0.4\ A_C$ 45° chamfer	1 : 1.67 $A_A = 0.6\ A_C$ $A_B = 0.4\ A_C$ 45° chamfer safety spool	1 : 1.67 $A_A = 0.6\ A_C$ $A_B = 0.4\ A_C$ 45° chamfer throttle spool



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NG	ISO-code	X1	X2	X3	X4	X5	X6	X7	Y1	Y2	Y3	Y4
10	6264-06-09-*-97	42.9	35.8	21.5	-	7.2	21.5	31.8	66.7	58.8	33.4	7.9
25	6264-08-13-*-97	60.3	49.2	39.7	-	11.1	20.6	44.5	79.4	73	39.7	6.4
32	6264-10-17-*-97	84.2	67.5	59.5	42.1	16.7	24.6	62.7	96.8	92.8	48.4	3.8

NG	ISO-code	B1	B2	H1	H2	H3	L1	L2	D1	D2	D3	t1	D4	t2	D5	D6
10	6264-06-09-*-97	87.3	33.35	83	21	45	29	94.8	15	7	7.1	8	M10	16	10.8	17
25	6264-08-13-*-97	105	39.7	109.5	29	71.5	34.7	126.8	23.4	7.1	7.1	8	M10	18	10.8	17
32	6264-10-17-*-97	120	48.4	120	29	82	30.6	144.3	32	7.1	7.1	8	M10	20	10.8	17

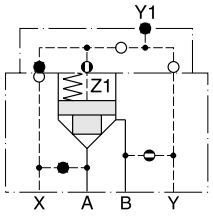
NG	ISO-code	Bolt kit			Kit		Surface finish
					NBR	FPM	
10	6264-06-07-*-97	BK 505	4x M10 x 35 DIN 912 12.9	63 Nm ±15%	SK-R10MN50	SK-R10MV50	
25	6264-08-11-*-97	BK 485	4x M10 x 45 DIN 912 12.9	63 Nm ±15%	SK-R25MN50	SK-R25MV50	
32	6264-10-15-*-97	BK 506	6x M10 x 45 DIN 912 12.9	63 Nm ±15%	SK-R32MN50	SK-R32MV50	

D4S_UK.INDD RH_17.01.08

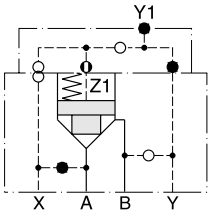
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D4S direct operated

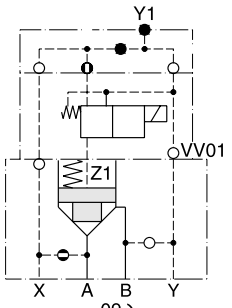


D4S..-.DC
Pilot oil Y = internal from B

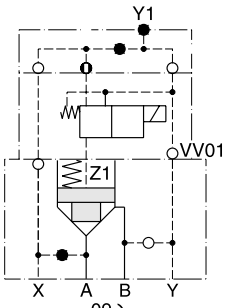


D4S..-.21
Pilot oil X = external

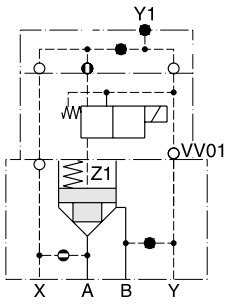
D4S with VV01



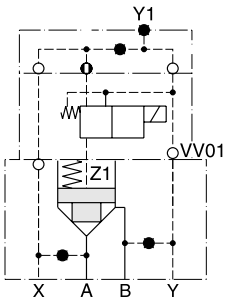
D4S..-.16-...- 09 10 11 12 } with VV01
Pilot oil X = internal from A
Drain Y = internal to B



D4S..-.26-...- 09 10 11 12 } with VV01
Pilot oil X = external
Drain Y = internal to B



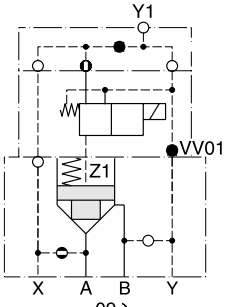
D4S..-.A5-...- 09 10 11 12 } with VV01
Pilot oil X = internal from A
Drain Y = external to subplate



D4S..-.B5-...- 09 10 11 12 } with VV01
Pilot oil X = external
Drain Y = external to subplate

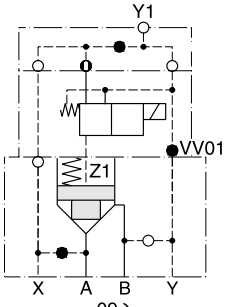
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D4S with VV01



D4S..-.12-...- 09 / 10 / 11 / 12 } with VV01

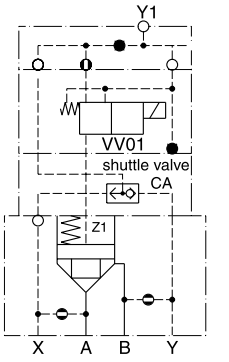
Pilot oil X = internal from A
Drain Y1 = external out of the cap



D4S..-.22-...- 09 / 10 / 11 / 12 } with VV01

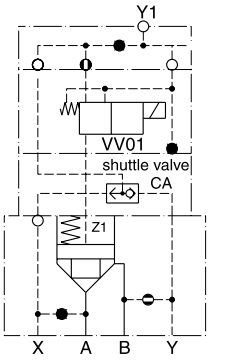
Pilot oil X = external
Drain Y1 = external out of the cap

D4S with shuttle valve



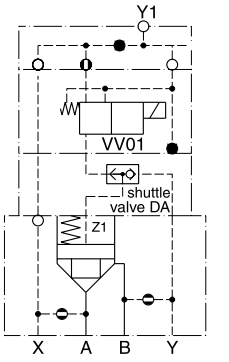
D4S..-.C2-...- CB / CD } with shuttle valve CA and VV01

Pilot oil = internal from A and B
Drain Y1 = external out of the cap



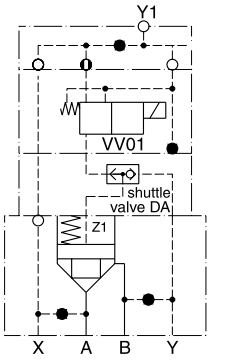
D4S..-.D2-...- CB / CD } with shuttle valve CA and VV01

Pilot oil = internal from B and external from X
Drain Y1 = external out of the cap



D4S..-.C2-...- DB / DD } with shuttle valve DA and VV01

Pilot oil = internal from A and B
(B-A = Check valve function)
Drain Y1 = external out of the cap



D4S..-.B2-...- DB / DD } with shuttle valve DA and VV01

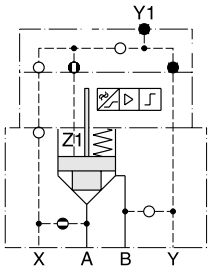
Pilot oil = external from X and Y
Drain Y1 = external out of the cap

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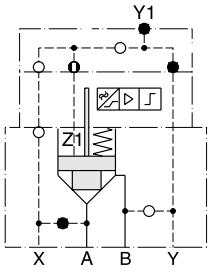
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D4S with position control



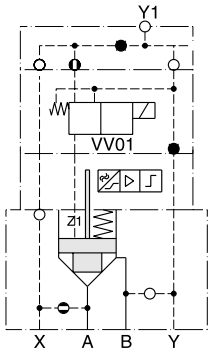
D4S..-.11-3A.-BA
(with position control)

Pilot oil X = internal from A



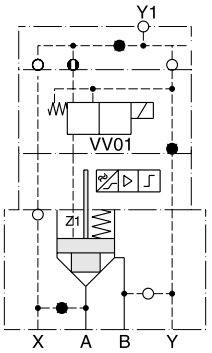
D4S..-.21-3A.-BA
(with position control)

Pilot oil X = external



D4S..-.12-3A.- BC / BE } with position control and VV01

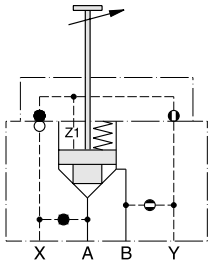
Pilot oil X = internal from A
Drain Y1 = external out of the cap



D4S..-.22-3A.- BC / BE } with position control and VV01

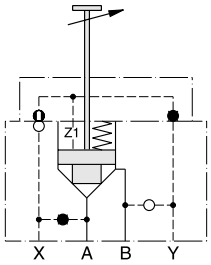
Pilot oil X = external
Drain Y1 = external out of the cap

D4S with stroke limiter



D4S..-.D4-34. with stroke limiter
Pilot oil Y = internal from B

Note: for D4S06 and D4S10 only

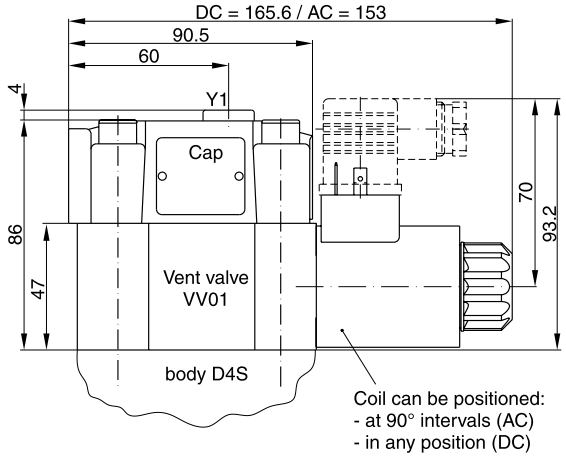


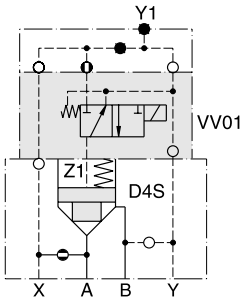
D4S..-.23-3B. with stroke limiter
Pilot oil X = external

Note: for D4S06 and D4S10 only

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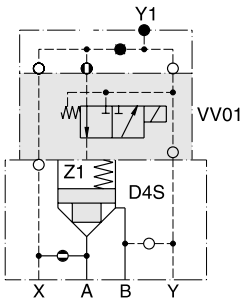
Dimensions D4S with VV01





with manual override / without manual override

D4S..-...-...-09/10-
Solenoid energized:
D4S blocked
Solenoid de-energized:
Flow from A-B or B-A

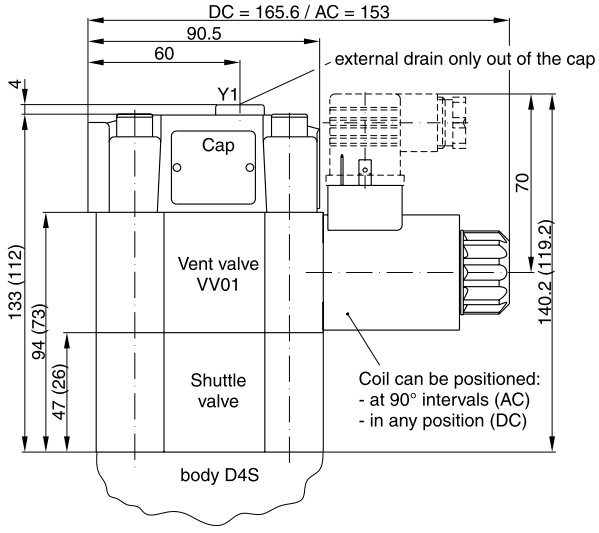


with manual override / without manual override

D4S..-...-...-11/12-
Solenoid energized:
Flow from A-B or B-A
Solenoid de-energized:
D4S Blocked

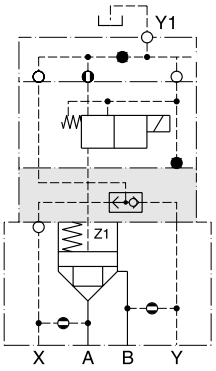
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Dimensions D4S with shuttle valve

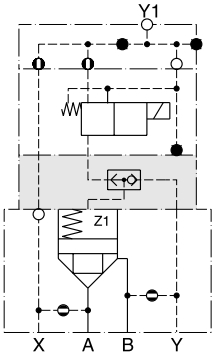


() Dimensions in brackets are for version VV01with shuttle valve code DB or DD.

Note: Shuttle valves only use in connection with vent valve VV01.



cap
vent valve VV01
shuttle valve
(pilot oil from A and B)
body version
series D4S
Code CB
or CD



cap
vent valve VV01
shuttle valve 1)
body version
series D4S
Code DB
or DD

1) pilot oil from A and B,
from B to A check valve function

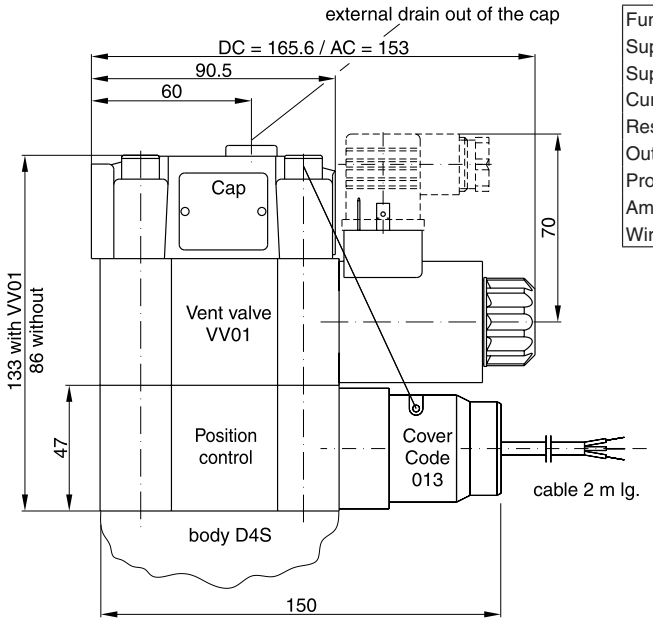
D4S_UK.INDD RH_17.01.08

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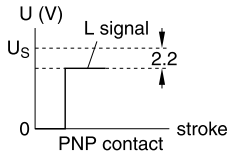
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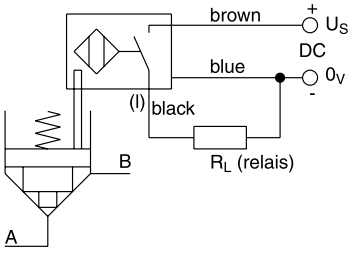
Dimensions D4S position control



Technical data (proximity switch)

Function		PNP, contact
Supply voltage (Us)	[VDC]	10...30
Supply voltage ripple	[%]	≤ 10
Current consumption	[mA]	max. 8
Residual voltage L-signal	[V]	Us - 2.2 at I_{max}
Output current (I)	[mA]	≤ 200
Protection class		IP67
Ambient temperature	[C°]	-25...+70
Wire cross section	[mm²]	3 x 0.5





Position control by proximity switch (incl. amplifier)

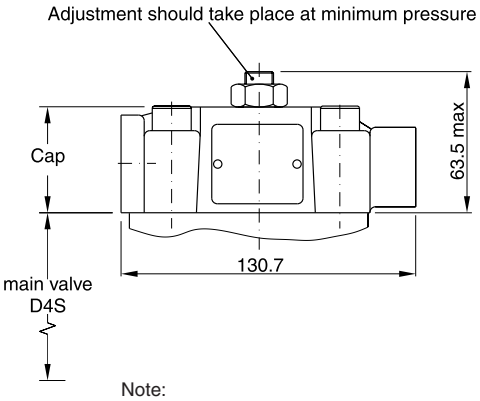
Valve open: proximity switch activated.

This proximity switch is pressure proof and has no wearing parts.

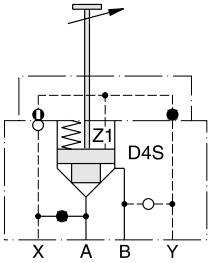
Note

Position control for D4S06 and D4S10 only.

Dimensions D4S stroke limiter



Example: D4S$^{06}_{10}$-.23-3B.



Note:
Stroke limiter not for use with D4S03, vent valve VV01, shuttle valve and positon control.

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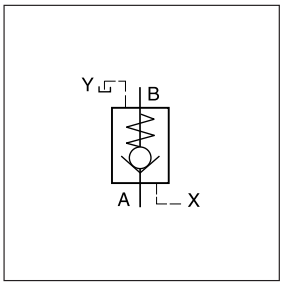
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Pilot operated check valves are available with both Parker (series SVL) and Denison (series C4V) model codes. Hydraulically pilot operated check valves allow free flow from A to B. The counter-flow direction is blocked.

When pressure is applied to control port X, the ring chamber flow from B to A is released.

Up to four different pilot control ratios are available (see ordering code).



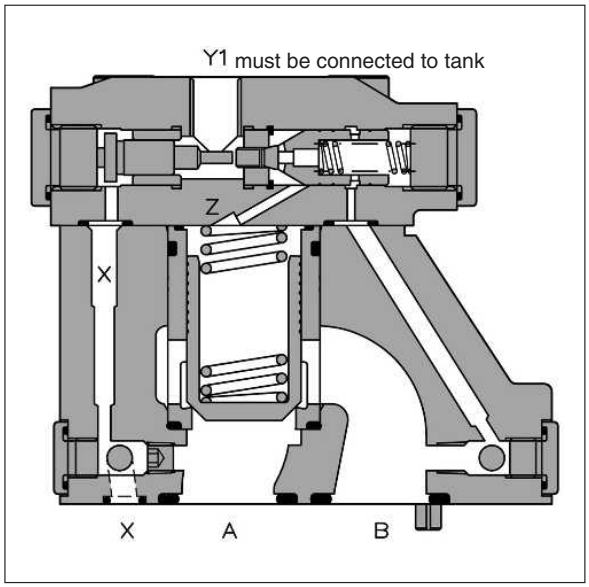


Function

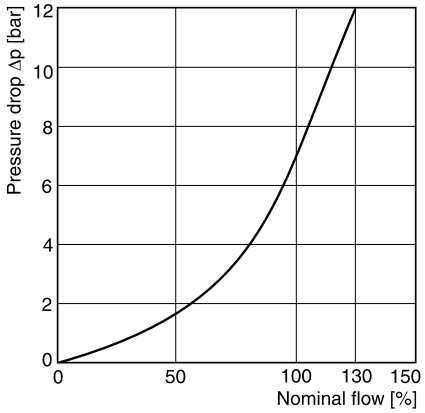
When no pressure is applied to the X-port, the flow from B to A is blocked, because the pressure in B is also in effect on top of the poppet.

Pressurizing the X port relieves the area on top of the poppet to the drain port and allows flow from B to A.

The seat design of the SVL valve series provides leak-free separation of port A and B in the closed position.



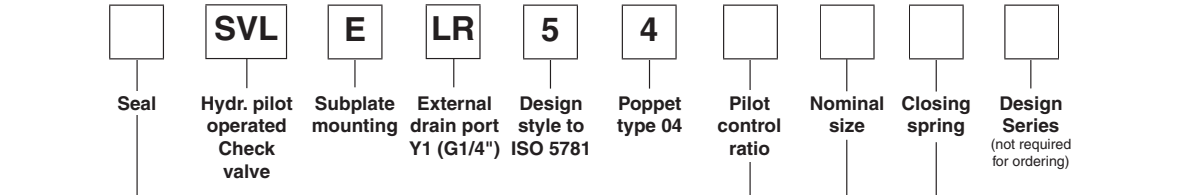
Δp/Q flow curve



Technical data

General					
Nominal size			**NG10**	**NG25**	**NG32**
Subplate mounting			ISO 5781		
Mounting position			Unrestricted		
Ambient temperature		[°C]	-20...+80		
Weight		[kg]	2.8	4.6	6.1
Hydraulic					
Max. operating pressure		[bar]	350		
Nominal flow		[l/min]	150	270	450
Fluid			Hydraulic oil to DIN 51524		
Viscosity	recommended	[cSt]/[mm²/s]	30...50		
	permitted	[cSt]/[mm²/s]	20...380		
Fluid temperature	recommended	[°C]	30...50		
	permitted	[°C]	-20...+70		
Filtration			ISO 4406 (1999); 18/16/13		

Parker



Code	Seal
omit	NBR
V	FPM

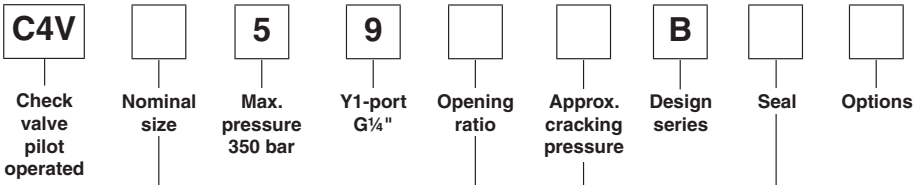
Code	Ratio
1	1 : 1
3	3 : 1
8	8 : 1
9	10 : 1

Code	Pressure [bar]
N	0.5
R	1.0
T	2.0
U	4.0

Code	Size
P10	NG10
P25	NG25
P32	NG32

The Parker model code should be used for all new applications. Otherwise also refer to Denison model code.

Denison



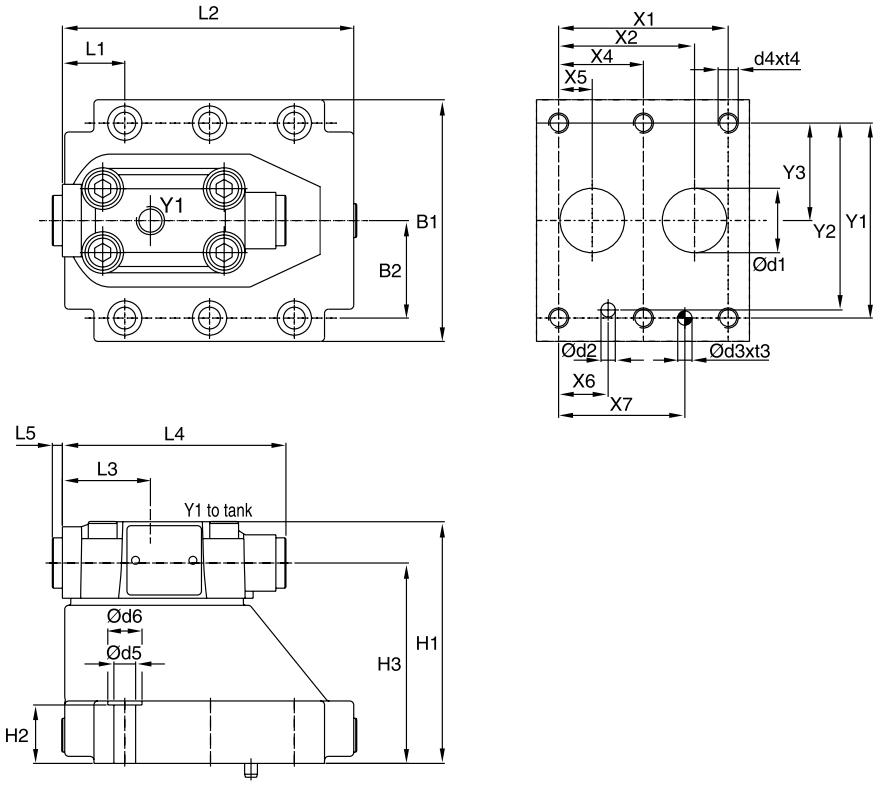
Code	Nominal size
03	NG10
06	NG25
10	NG32

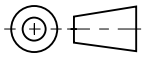
Code	Opening ratio
1	1 : 1
3	3 : 1
8	8 : 1
9	10 : 1

Code	Seal
1	NBR
5	FPM

Code	Approx. cracking pressure [bar]			
	Flow A to B		Flow B to A	
	C4V03	C4V06/10	C4V03	C4V06/10
2	1.0	1.0	1.5	1.7
4	4.0	3.5	5.5	6.0
6	2.0	2.2	3.0	3.8

The Denison model code is available for existing applications. Otherwise also refer to Parker model code.





NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	5781-06-07-0-00	42.9	35.8	-	-	7.2	21.5	31.8	66.7	58.8	33.4	-	-	-
25	5781-08-10-0-00	60.3	49.2	-	-	11.1	20.6	44.5	79.4	73	39.7	-	-	-
32	5781-10-13-0-00	84.2	67.5	-	42.1	16.7	24.6	62.7	96.8	92.8	48.4	-	-	-

Tolerance for all dimensions ±0.2

NG	ISO-code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6
10	5781-06-07-0-00	87.3	33.4	83	21	62.5	-	-	-	29.4	95.2	43.7	111	5	-
25	5781-08-10-0-00	105	39.7	109.5	29	89	-	-	-	35.1	127.2	43.7	111	5	-
32	5781-10-13-0-00	120	48.4	120	29	99.5	-	-	-	31	144.7	43.7	111	5	-

NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	5781-06-07-0-00	15	7	7.1	8	M10	16	10.8	17
25	5781-08-10-0-00	23.4	7.1	7.1	8	M10	18	10.8	17
32	5781-10-13-0-00	32	7.1	7.1	8	M10	20	10.8	17

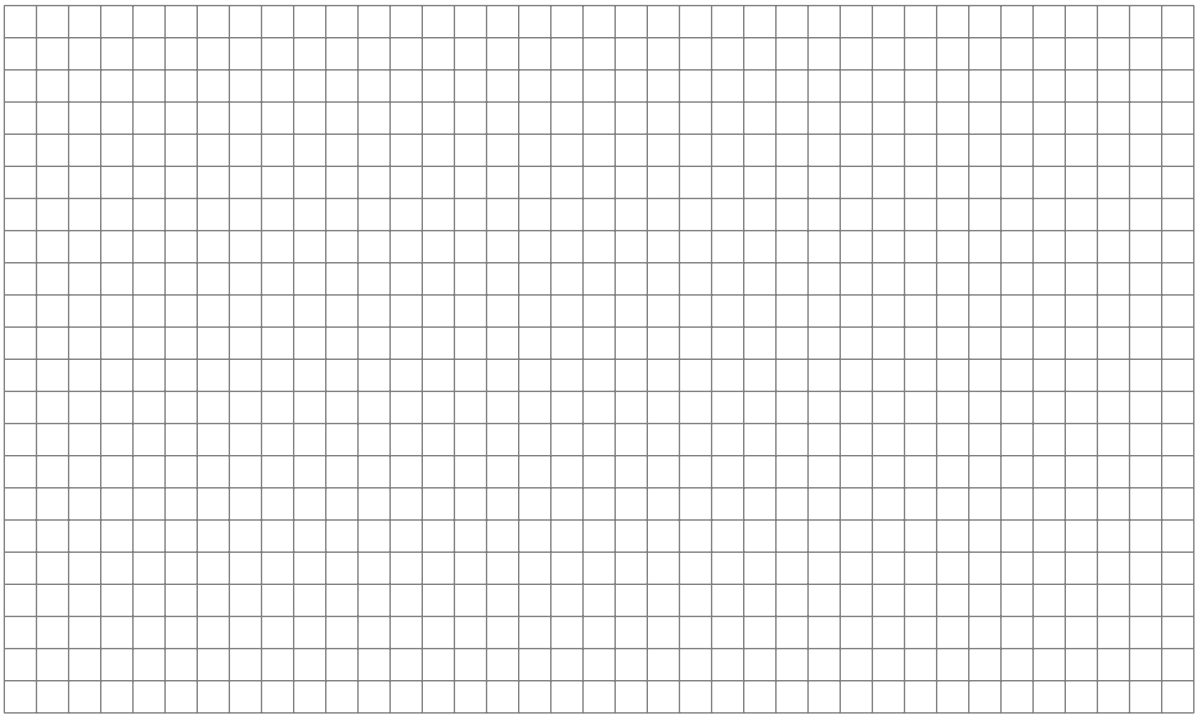
NG	ISO-code	Bolt kit			Kit NBR	Kit FPM	Surface finish
10	5781-06-07-0-00	BK 505	4x M10 x 35 DIN 912 12.9	63 Nm ±15%	SK-SVLE5P10	SK-SVLE5P10V	
25	5781-08-10-0-00	BK 485	4x M10 x 45 DIN 912 12.9	63 Nm ±15%	SK-SVLE5P25	SK-SVLE5P25V	
32	5781-10-13-0-00	BK 506	6x M10 x 45 DIN 912 12.9	63 Nm ±15%	SK-SVLE5P32	SK-SVLE5P32V	

SVLE-C4V_UK.INDD RH_17.01.08

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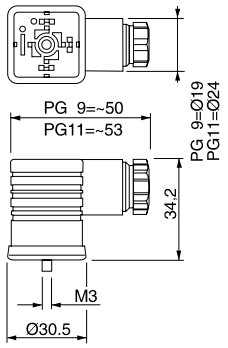
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Notes



Description	Threaded cable joint	Body colour coding	Figures switching	Order no.
Plug DIN 43650, design type AF, protection class IP 65 Voltages up to 250 V	PG 9	black, B grey, A	Fig. 1	**5001710** **5001711**
	PG11	black, B grey, A	Fig. 1	**5001716** **5001717**

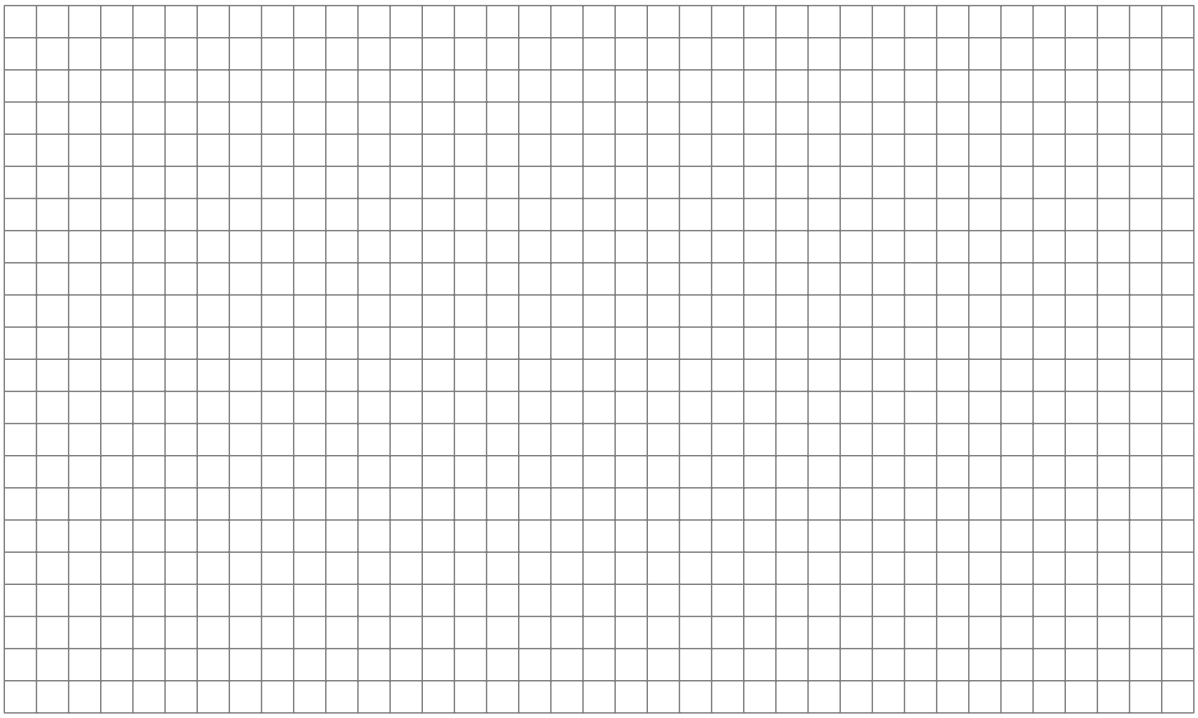
Fig. 1



Other plugs on request

6

Notes



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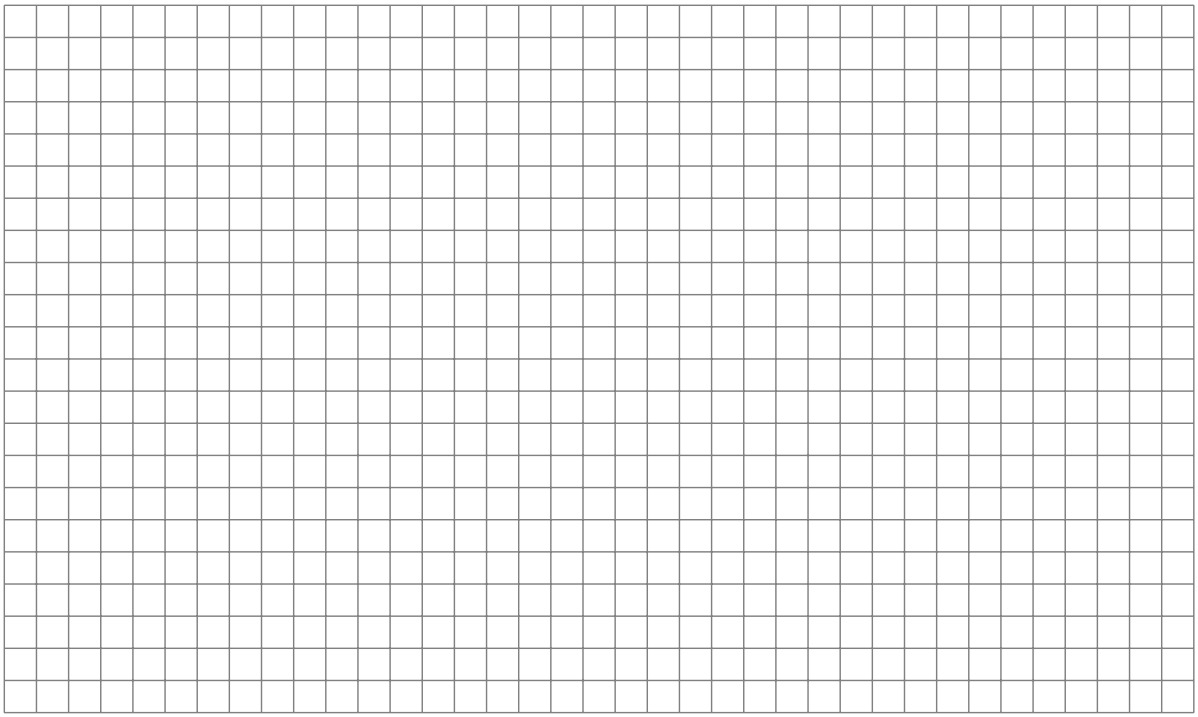
Series Parker	Series Denison	Description	Size DIN / ISO 06	10	16	25	Page
		Pressure relief valves, manual operation					
RDM	—	Direct operated	•	•			7-3
RM	—	Pilot operated		•	•	•	7-7
—	ZDV	Pilot operated, high precision	•	•	•		7-13
		Pressure reducing valves, manual operation					
PRDM	—	Direct operated, 3-way	•	•			7-19
PRM	—	Pilot operated, 2-way		•	•	•	7-25
—	ZDR	Pilot operated, 2-way, high precision	•	•	•		7-33
		Pressure reducing valves, proportional operation					
PRPM	—	Pilot operated, 3-way	•	•			7-39
		Pressure compensators					
LCM	—	2-way pressure compensator	•	•			7-43
—	SPC	2-way pressure compensator	•	•			7-45
—	SPC	3-way pressure compensator	•	•	[1]	[1]	7-45
		Throttle check valves					
FM	—		•	•	•	•	7-49
—	ZRD	High precision	•	•	•		7-57
		Check valves					
CM	—		•	•			7-63
—	ZRV		•	•			7-69
		Check valves, pilot operated					
CPOM	—		•	•	•	•	7-73
—	ZRE	High precision	•	•	•		7-79
		Accessories					
		Mounting patterns, general information					7-85

[1] on request

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Notes



Pressure relief valves series RDM are direct operated piston type valves with low hysteresis. They can be used as P-T relief or as T-T controlled counter balance valve. The valve body is equipped with a preesure gauge port.

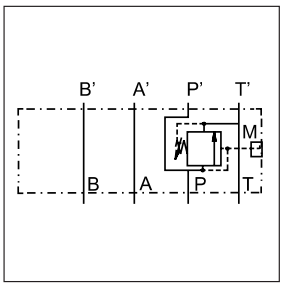
Function

PT... pressure is relieved from P to T at the adjusted value.

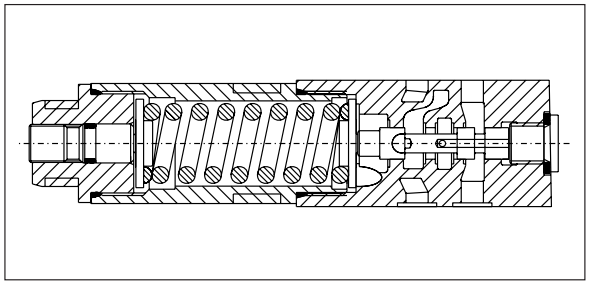
TT... pressure is relieved from T' to T at the adjusted pressure.



RDM2



Example PT



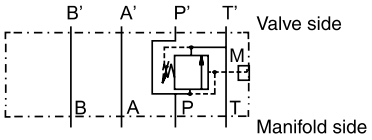
RDM2

Features

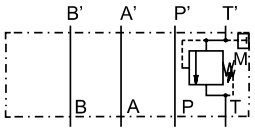
- The direct operated, cushioned piston design results in fast response, low leakage and minimal hysteresis.
- Up to 5 pressure adjustment ranges are available with max. pressure settings of:
  bar 25, 64, 160, 210, 350 for RDM2,
  bar 19, 50, 100, 150, 210 for RDM3.
- Adjustment modes:
  - Slotted head with lock nut
  - Key lock
  - Turning knob
- RDM2 - NG06 (CETOP3)
  RDM3 - NG10 (CETOP5)

Schematics

RDM*PT



RDM*TT

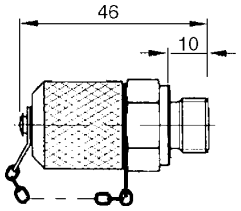


Technical data

Series		RDM2	RDM3
Port size		**NG06**	**NG10**
Mounting pattern		ISO 4401	
Max. operating pressure			
P, A, B	[bar]	350	315
T	[bar]	50	10
Max. flow	[l/min]	40	80
Weight	[kg]	1.3	2.6
Viscosity range	[cSt][mm²/s]	12...230	
Filtration		ISO 4406: 1999; 18/16/13	

Max. leakage P - A: 5ml/min.

Gauge port option C



Ordering code

RD	M					V		
Pressure relief valve, direct operated	Manapak	Size	Pressure relief	Pressure range	Adjustment	Seal FPM	Gauge port	Design series

Code	Size
2	**NG06**
3	**NG10**

Code	Pressure relief
PT	**P**
TT[1]	T

[1] NG06 only, max. 160 bar

Pressure range			
Code	RDM2	Code	RDM3
02	1.5 to 25 bar	01	1.5 to 19 bar
06	**1.5 to 64 bar**	05	1.5 to 50 bar
16	**3 to 160 bar**	10	3 to 100 bar
21	**3 to 210 bar**	15	3 to 150 bar
35	5 to 350 bar	21	3 to 210 bar

Code	Gauge port
G[2]	**G¼**
C	Coupling M16

[2] Standard in housing

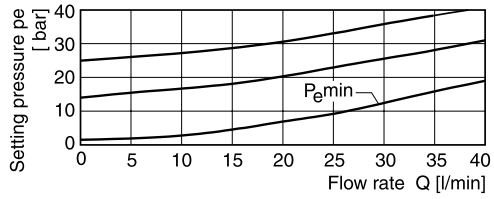
Code	Adjustment
S	**Slotted head screw with lock nut**
L	Key lock
K	Turning knob[3]

[3] NG06 only

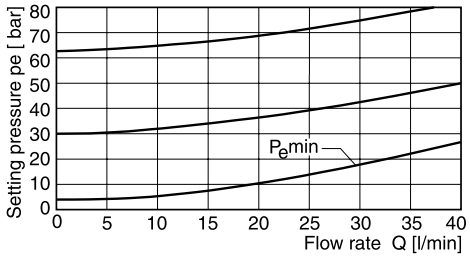
Bold letters =
Short-term availability

Performance curves

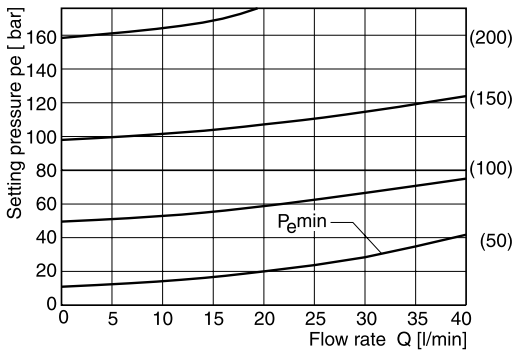
RDM2 02



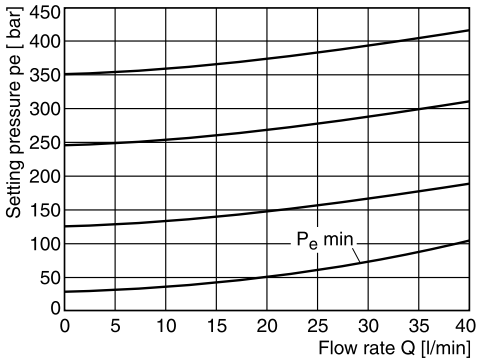
RDM2 06



RDM2 16/21



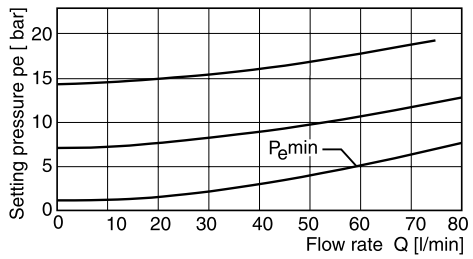
RDM2 35



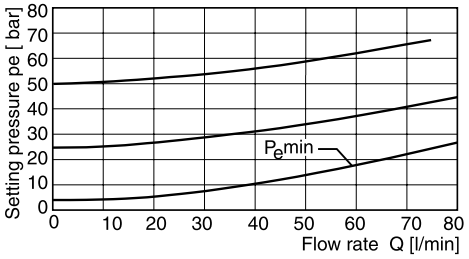
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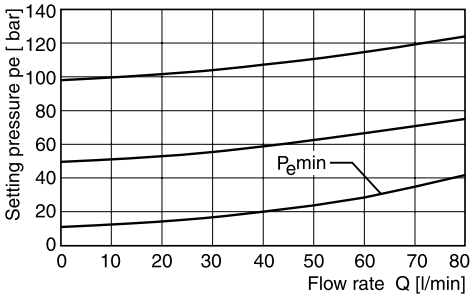
RDM3 01



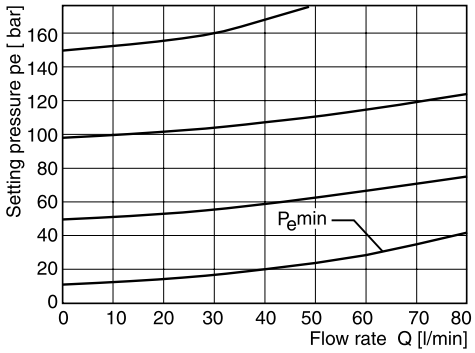
RDM3 05



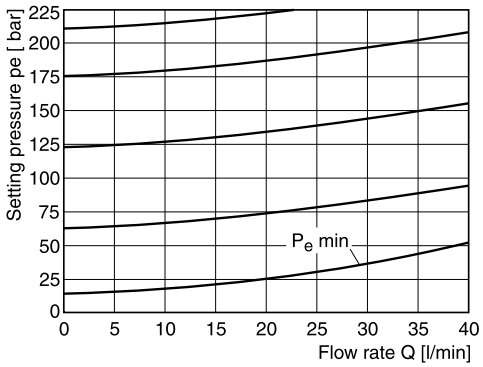
RDM3 10



RDM3 15



RDM3 21

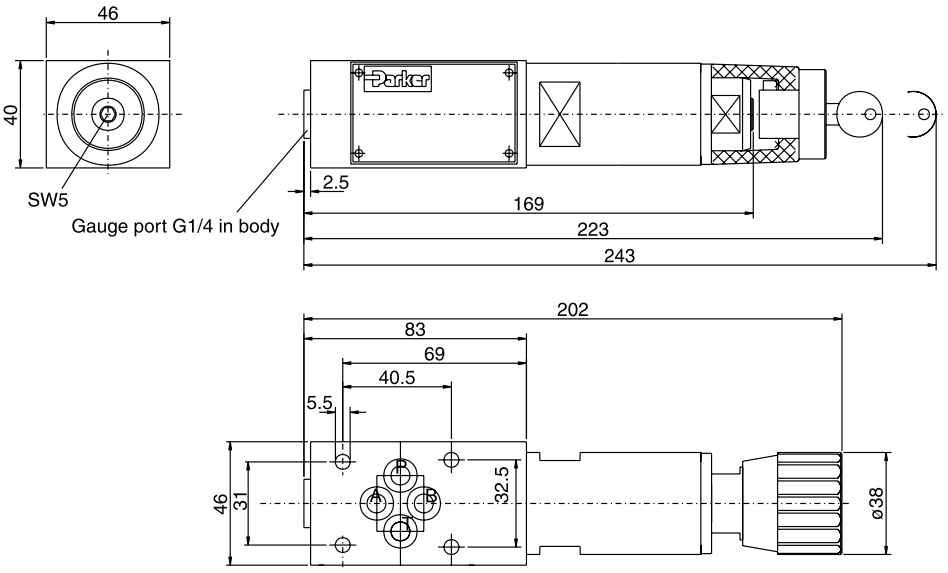


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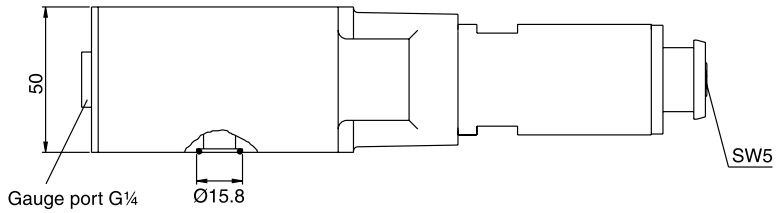
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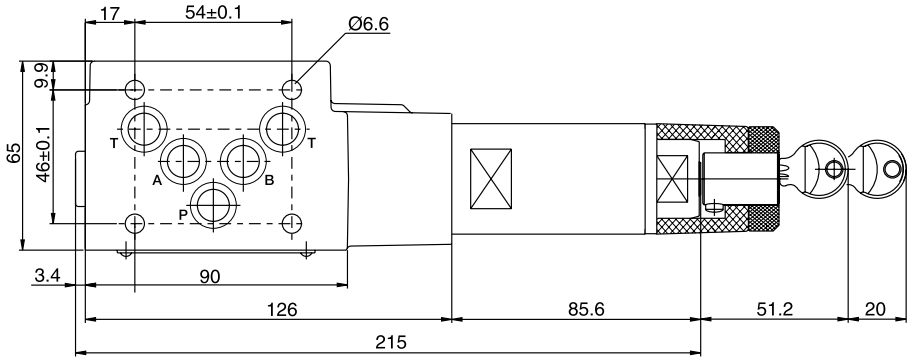
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RDM2

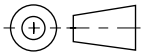


RDM3





Seal kit order code		
Seal	RDM2	RDM3
V	SK-RDM2-V	SK-RDM3-V



RDM_UK.INDD RH_20.11.07

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Kaarst, Germany

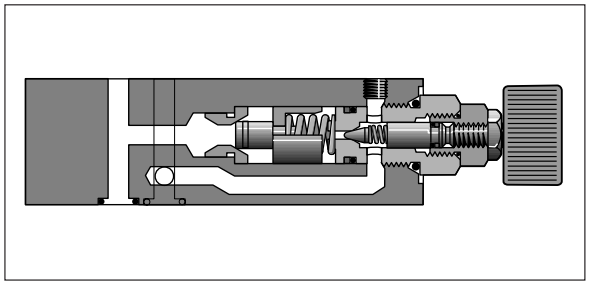
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The pilot operated pressure relief valves from the Parker Manapak series RM are in sandwich design for easy configuration of stack systems. Depending on type, pressure limiting can be achieved in ports P, A or B with unloading to port T.

RM valves may only be mounted in the defined mounting position.



RM3



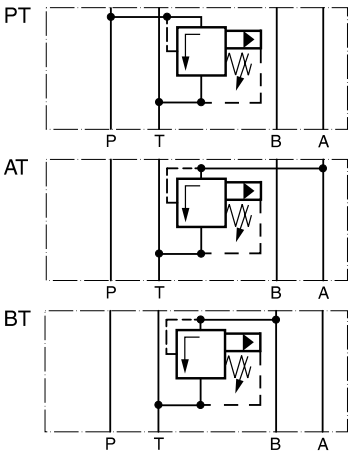
RM3

Features

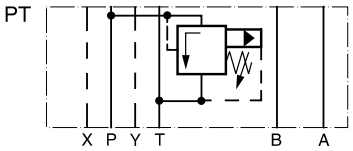
- The valve bodies of the Parker Manapak valve series RM are made of steel.
- The pressure can be set by slotted head screw, knob, or knob with DIN-lock.
- Piloting results in a flat p/Q performance curve.
- The orifices located in the main spool limit the pilot oil flow.

Schematics

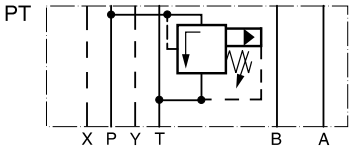
RM3-NG10



RM4-NG16



RM6-NG25



7

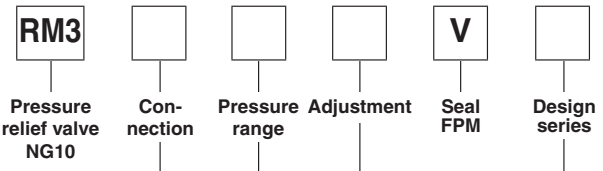
Technical data

General				
Design		Pilot operated pressure relief valve		
Actuation		hydraulic		
Size		**NG10**	**NG16**	**NG25**
Mounting interface		ISO 4401		
Mounting position		unrestricted		
Ambient temperature	[°C]	-40...+60		
Weight	[kg]	3.7	4.9	5.9
Hydraulic				
Max. operating pressue	[bar]	350		
Fluid		Hydraulic oil to ISO		
Fluid temperature	[°C]	-20...+80		
Viscosity recommended	[cSt]/[mm²/s]	30...80		
permitted	[cSt]/[mm²/s]	20...380		
Filtration		ISO 4406 : 1999; 18/16/13		

RM_UK.INDD RH_18.12.07

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Hydraulic Controls Division
Kaarst, Germany

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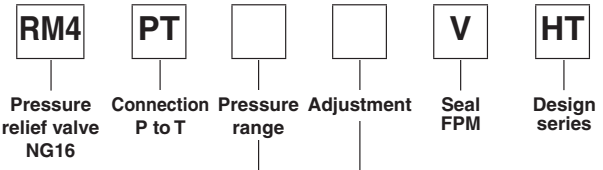
Code	Connection
PT	**P to T**
AT	A to T
BT	B to T

Code	Connection
omit	P to T
HT	A to T
omit	B to T

Code	Pressure range	Type		
		P-T	A-T	B-T
07[1)]	4 to 70 bar	•	•	•
17	**10 to 175 bar**	•		•
21	**10 to 210 bar**		•	
25	**10 to 250 bar**	•		•
32	10 to 315 bar		•	
35	10 to 350 bar	•		•

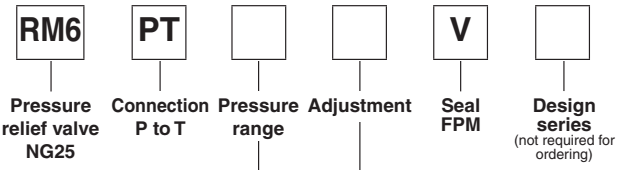
Code	Adjustment
S	**Slotted head screw with lock nut**
L	Key lock
K	Turning knob

[1)] Type AT = 5-65 bar



Code	Pressure range
07	5 to 65 bar
21	**10 to 210 bar**
35	10 to 350 bar

Code	Adjustment
S	**Slotted head screw with lock nut**
K	Turning knob



Code	Pressure range
07	5 to 70 bar
17	10 to 175 bar
25	**10 to 250 bar**
35	10 to 350 bar

Code	Adjustment
S	**Slotted head screw with lock nut**
L	Key lock

Bold letters =
Short-term availability

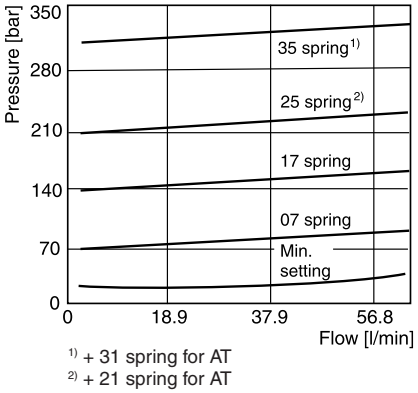
RM_UK.INDD RH_18.12.07

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Hydraulic Controls Division
Kaarst, Germany

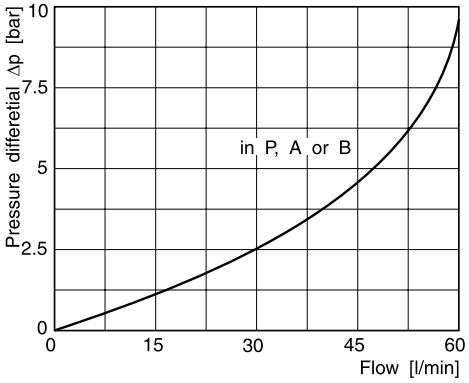
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p/Q performance curves

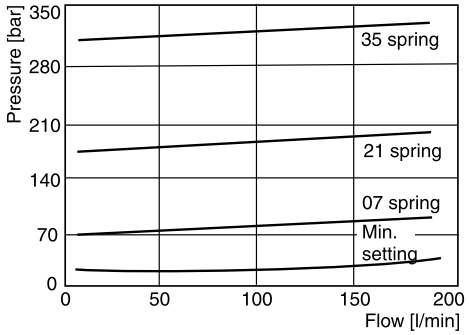
RM3

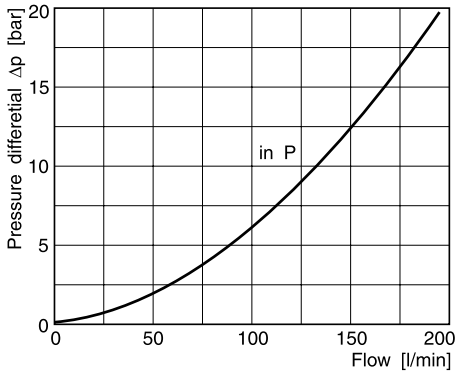


1) + 31 spring for AT
2) + 21 spring for AT

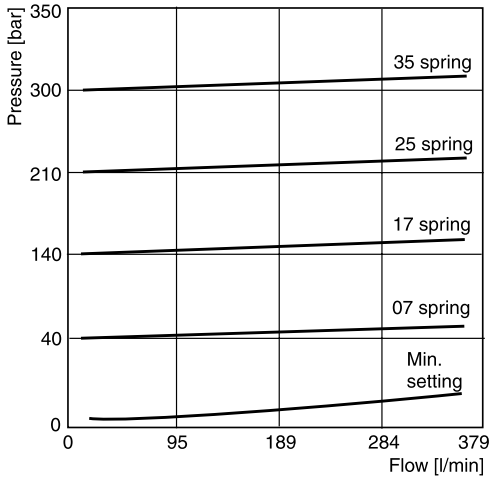


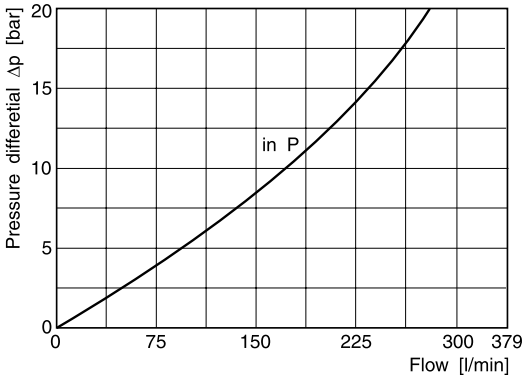
RM4





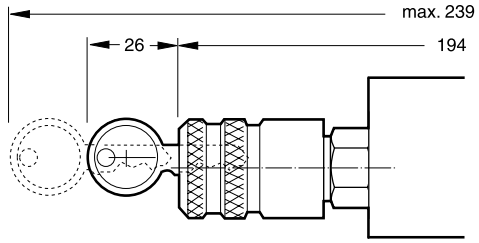
RM6



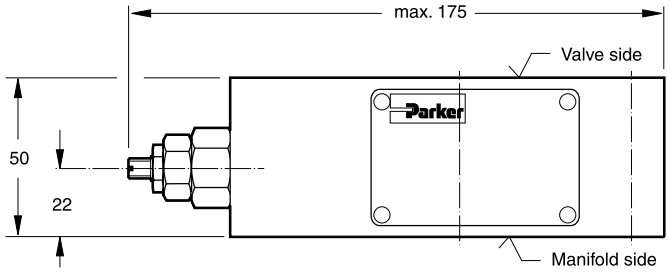


RM3 PT/BT

Adjustment code L



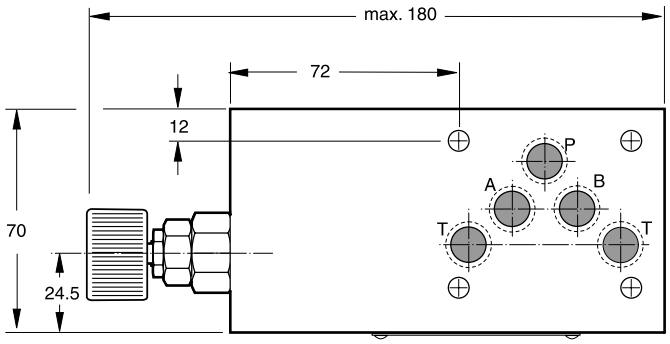
Adjustment code S



Seal kit RM3	
Seal	Order code
V	SK-RM3-V-11

Note:
The O-rings for sealing the connecting surface of the manifold side are included. The O-rings and the positioning pin are always mounted on the manifold side.

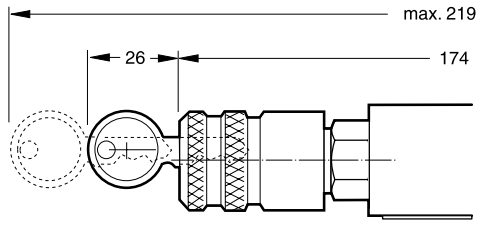
Adjustment code K



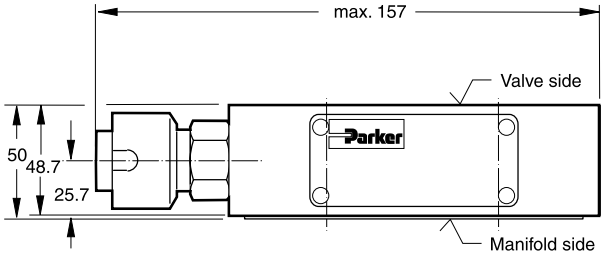
7

RM3 AT*HT

Adjustment code L

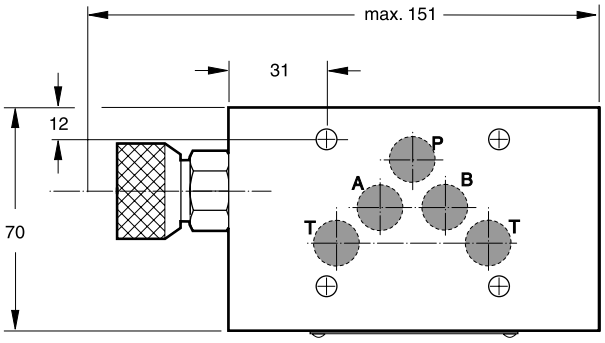


Adjustment code S

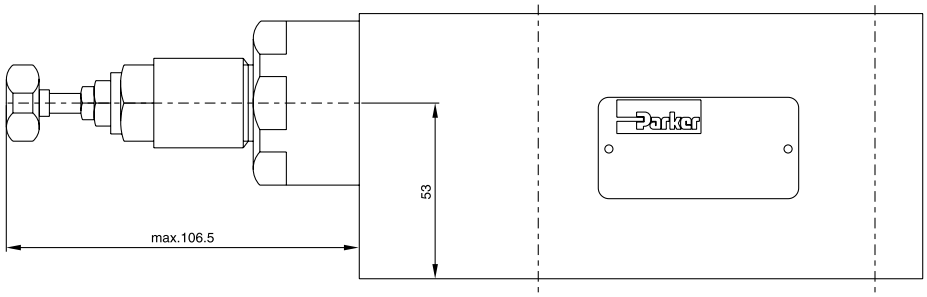


Note:
The seal plate and the O-rings for sealing the connecting surface of the manifold side are included with the HT model.

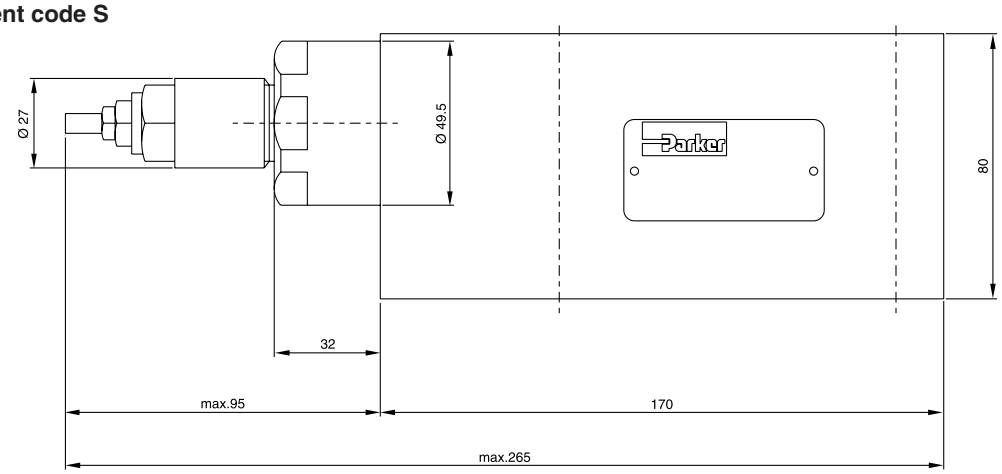
Adjustment code K

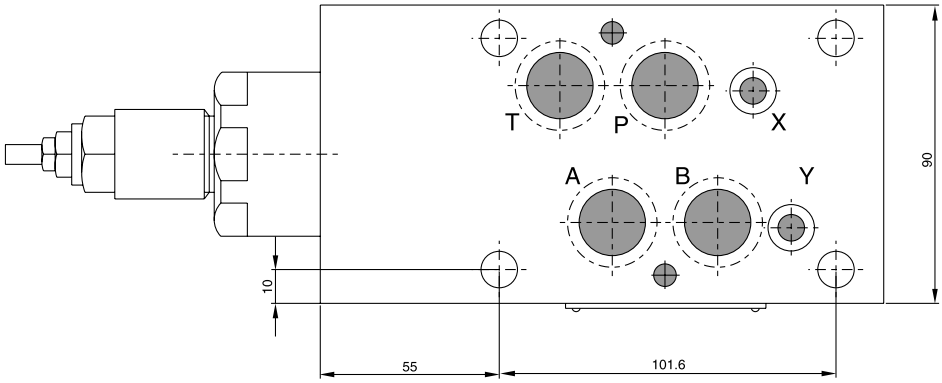


RM4
Adjustment code K



Adjustment code S





Seal kit RM4	
Seal	Order code
V	SK-RM4-V-10

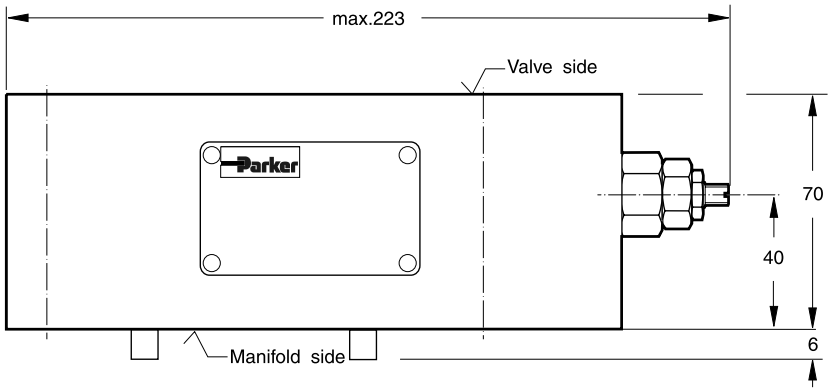
Note:
The O-rings for sealing the connecting surface of the manifold side are included. The O-rings and the positioning pins are always mounted on the manifold side.

RM_UK.INDD RH_18.12.07

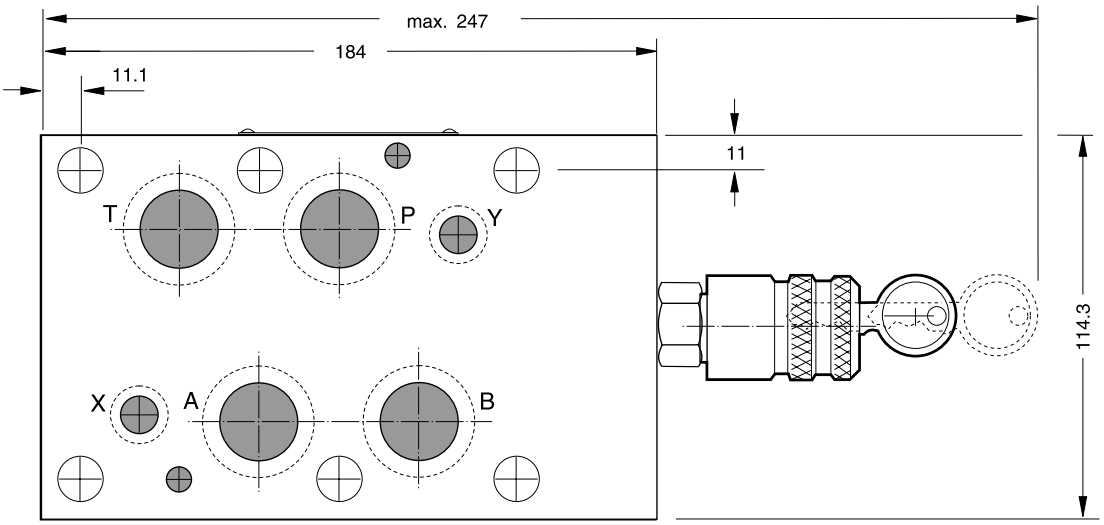
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Kaarst, Germany

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RM6
Adjustment Code S



Adjustment Code L



Seal kit RM6	
Seal	Order code
V	SK-RM6-V-11

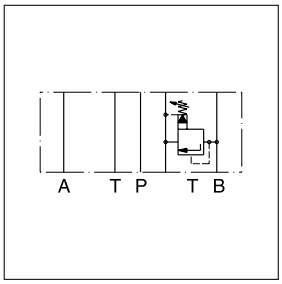
Note:
The O-rings for sealing the connecting surface of the manifold side are included. The O-rings and the positioning pins are always mounted on the manifold side.

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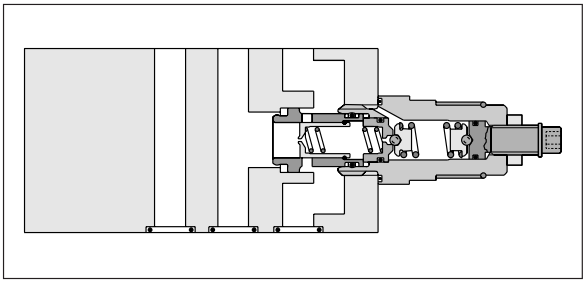
Pilot operated pressure relief valves series ZDV are designed for maximum flow rates.
The relief function can be located between P and T, A and T, B and T or A and T + B and T for typical pressure relief functions.
For a pre-charge function the ZDV can be ordered with pressure function between A and B + B and A.



ZDV-P01



ZDV-B02



ZDV-B02

Features

- High flow capacity
- Pressure function in P, A, B or A + B
- Sizes
  - ZDV01 - NG06 / CETOP3
  - ZDV02 - NG10 / CETOP5
  - ZDV03 - NG16 / CETOP7

Technical data

General					
Size			**06**	**10**	**16**
Mounting interface			DIN 24340 A6 ISO 4401 NFPA D03	DIN 24340 A10 ISO 4401 NFPA D05	DIN 24340 A16 ISO 4401 NFPA D08
Mounting position			CETOP RP 121 unrestricted		
Ambient temperature		[°C]	-20...+50		
Weight	1 cartridge	[kg]	1.6	3.0	8.45
	2 cartridges	[kg]	2.5	3.7	5.7
Hydraulic					
Max. operating pressure		[bar]	up to 350 (ZDV*ABS and size 10 up to 315)		
Nominal flow		[l/min]	80	140	300
Fluid			Hydraulic oil as per DIN 51524...525		
Fluid temperature		[°C]	-20...+80		
Viscosity permitted		[cSt]/[mm²/s]	10...650		
Viscosity recommended		[cSt]/[mm²/s]	30		
Filtration			ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)		

Ordering code

ZDV – ☐ ☐ – ☐ **S0** – ☐ ☐

Pressure relief valve	Pressure control	Nominal size	Pressure stages	Hexagon screw with lock nut	Design series	Seal

Code	Size	Press. control
P	06/10/16	P - T
A	06/10/16	A - T
B	06/10/16	B - T
AB	06/10	A - T & B - T
ABS	06/10	A - B & B - A

Code	Nominal size
01	NG06
02	NG10
03	NG16

Code	Press. stages
1	up to 70 bar
5 [1]	up to 350 bar

[1] Code ABS and size 10 up to 315 bar

Code	Seal
1	NBR
5	FPM

Code	Design series
C	01
D	02, 03

Ordering code details see end of chapter.

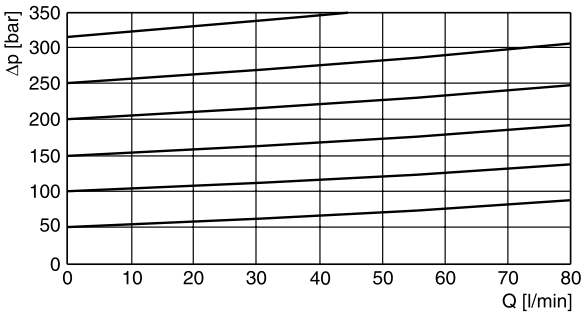
ZDV_UK.INDD RH_10.03.08

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Hydraulic Controls Division
Kaarst, Germany

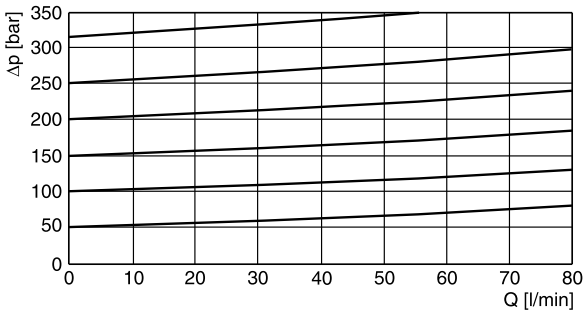
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p/Q performance curves

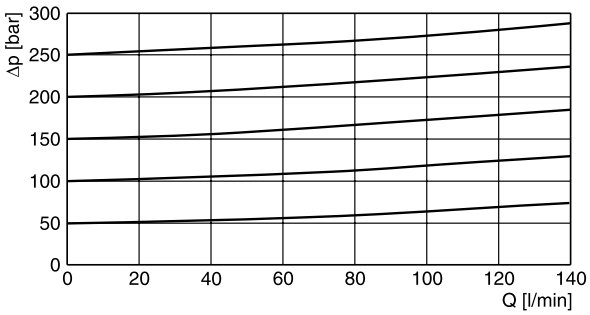
ZDV-P/A/B/ABS01



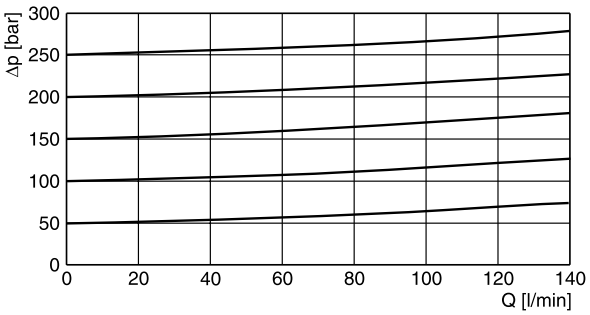
ZDV-AB01



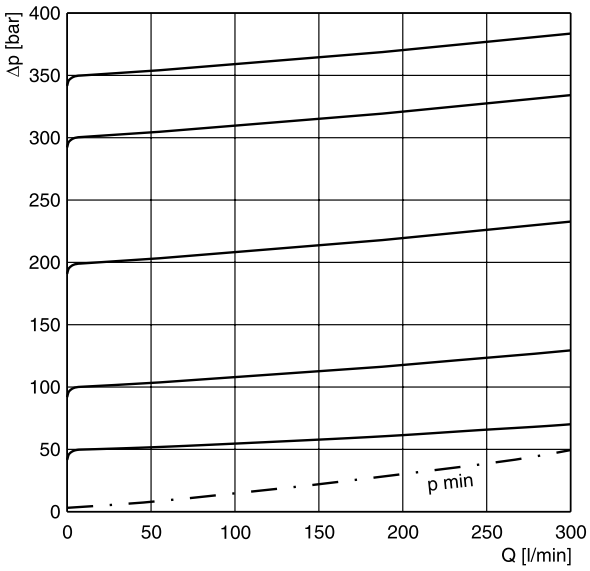
ZDV-P/A/B/AB02



ZDV-ABS02



ZDV-P03-5

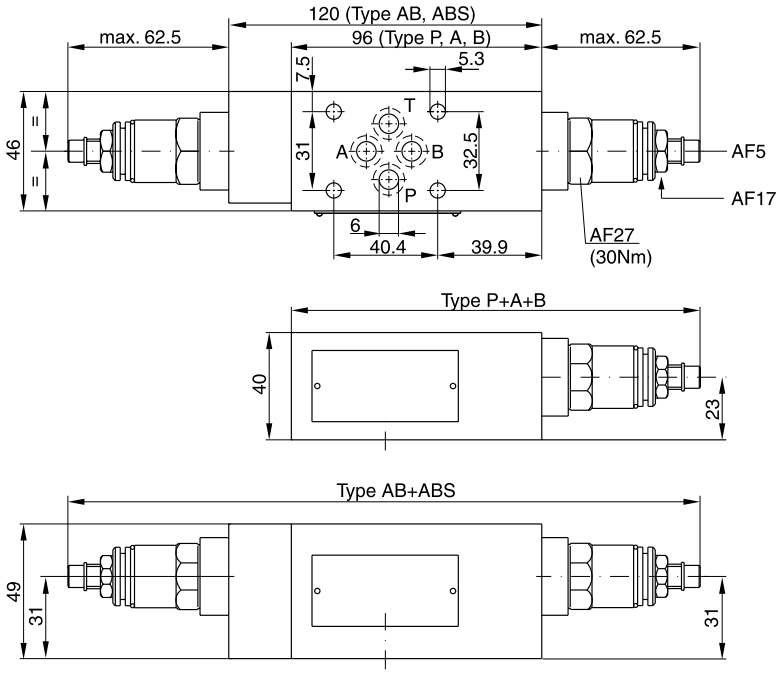


Fluid viscosity 30 cSt at 50°C

7

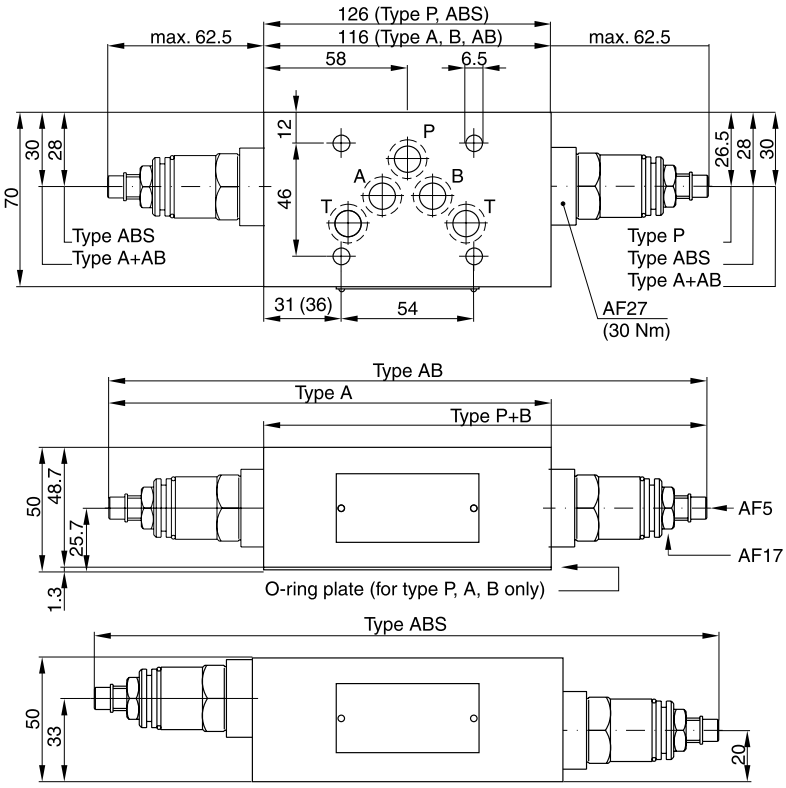
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ZDV01



Seal kit	
Seal	Order code
1	098-91182-0
5	098-91183-0
Complete cartridge	
Seal	Order code
1	098-91116-0
5	098-91117-0

ZDV02

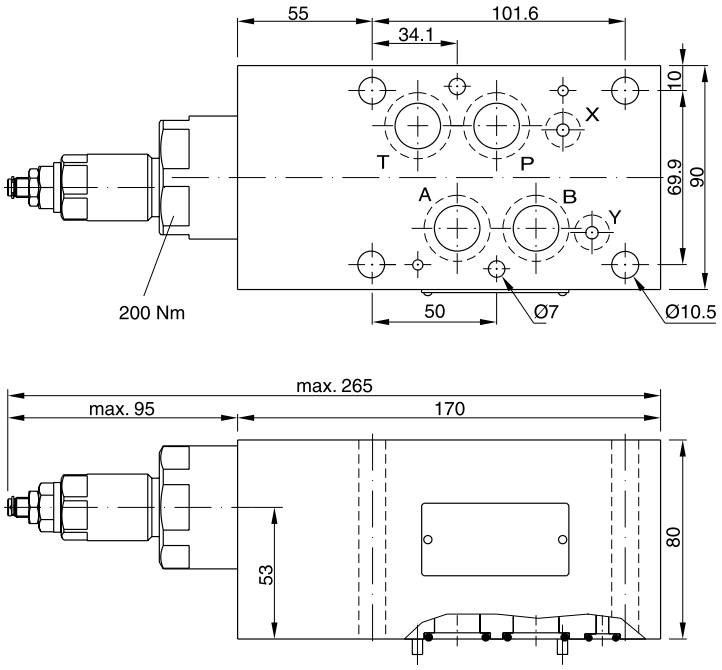


Seal kit	
Seal	Order code
1	098-91076-0
5	098-91077-0
Complete cartridge	
Seal	Order code
1	098-91116-0
5	098-91117-0

7

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ZDV03

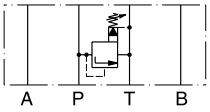


Seal kit	
Seal	Order code
1	098-91435-0
5	098-91436-0
Complete cartridge	
Seal	Order code
1	098-91433-0
5	098-91434-0

7

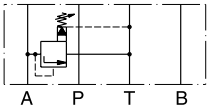
ZDV01

Pressure control P-T



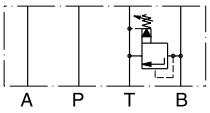
Series	Order No.
ZDV-P01-1-S0-D1	098-91201-0
ZDV-P01-5-S0-D1	098-91202-0

Pressure control A-T



Series	Order No.
ZDV-A01-1-S0-D1	098-91203-0
ZDV-A01-5-S0-D1	098-91204-0

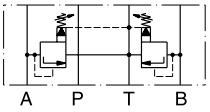
Pressure control B-T



Series	Order No.
ZDV-B01-1-S0-D1	098-91205-0
ZDV-B01-5-S0-D1	098-91206-0

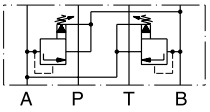
1 = 7 … 70 bar
5 = 7 … 350 bar

Pressure control A-T & B-T



Series	Order No.
ZDV-AB01-1-S0-D1	098-91207-0
ZDV-AB01-5-S0-D1	098-91208-0

Pressure control A-B & B-A

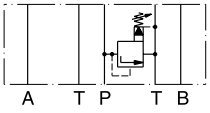


Series	Order No.
ZDV-ABS01-1-S0-D1	098-91209-0
ZDV-ABS01-5-S0-D1	098-91210-0

1 = 7 … 70 bar
5 = 7 … 315 bar

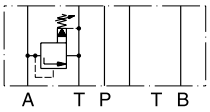
ZDV02

Pressure control P-T



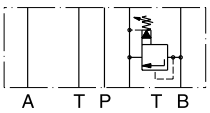
Series	Order No.
ZDV-P02-1-S0-D1	098-91034-0
ZDV-P02-5-S0-D1	098-91035-0

Pressure control A-T



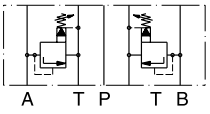
Series	Order No.
ZDV-A02-1-S0-D1	098-91036-0
ZDV-A02-5-S0-D1	098-91037-0

Pressure control B-T



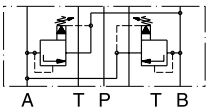
Series	Order No.
ZDV-B02-1-S0-D1	098-91038-0
ZDV-B02-5-S0-D1	098-91039-0

Pressure control A-T & B-T



Series	Order No.
ZDV-AB02-1-S0-D1	098-91040-0
ZDV-AB02-5-S0-D1	098-91041-0

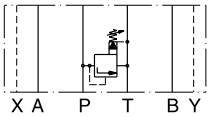
Pressure control A-B & B-A



Series	Order No.
ZDV-ABS02-1-S0-D1	098-91042-0
ZDV-ABS02-5-S0-D1	098-91043-0

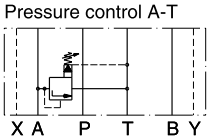
ZDV03

Pressure control P-T



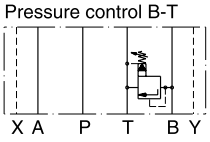
Series	Order No.
ZDV-P03-1-S0-C1	098-91432-0
ZDV-P03-5-S0-C1	098-91418-0

Pressure control A-T



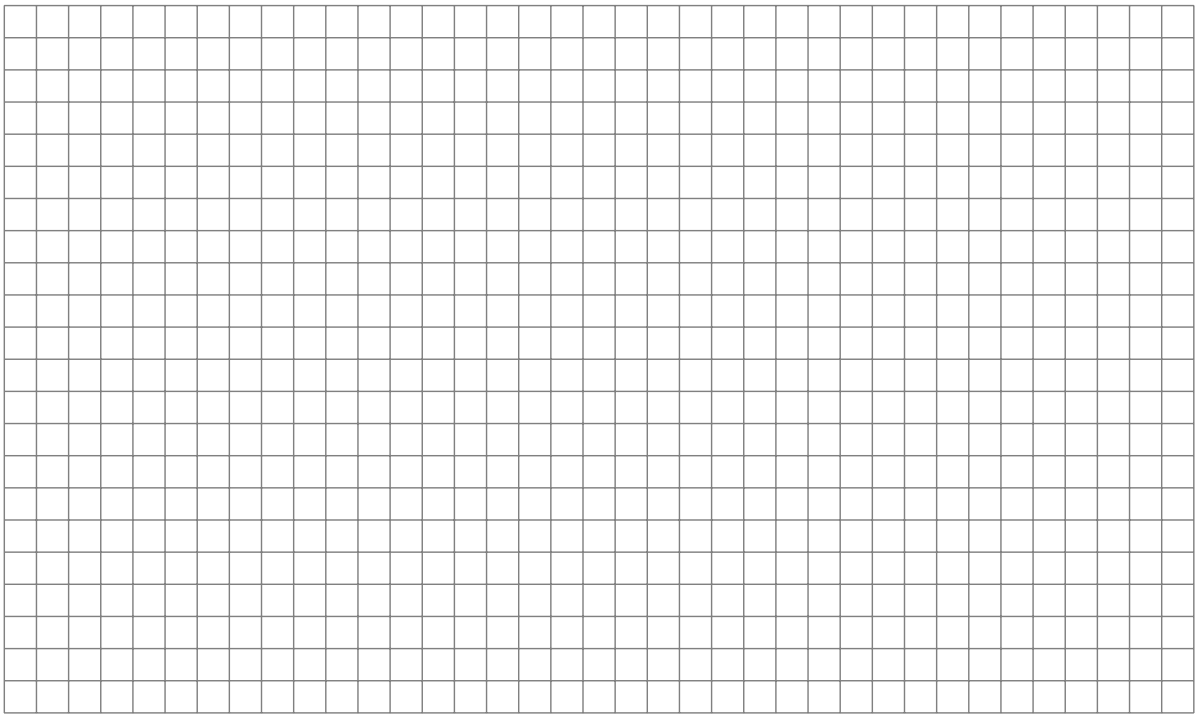
Series	Order No.
ZDV-A03-1-S0-C1	098-91415-0
ZDV-A03-5-S0-C1	098-91416-0

Pressure control B-T



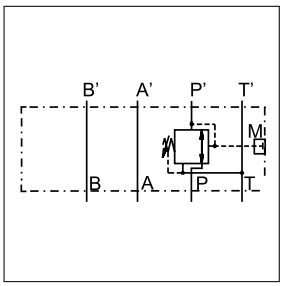
Series	Order No.
ZDV-B03-1-S0-C1	098-91431-0
ZDV-B03-5-S0-C1	098-91417-0

Notes

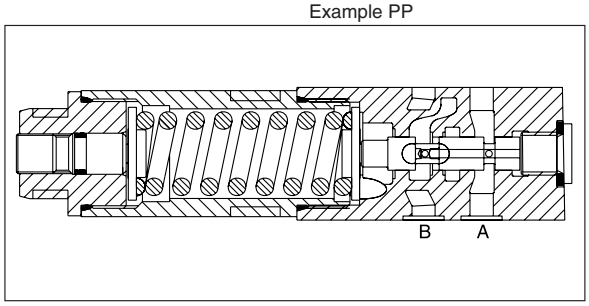


Series PRDM are direct operated pressure reducing valves to regulate pressure in one area of a hydraulic circuit at a predetermined level below normal system pressure. Additionally, an integral pressure relieving function for the secondary reduced pressure circuit is incorporated into the design.





Example PP



Funtion

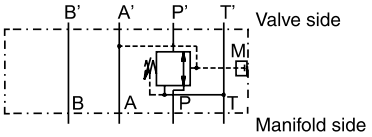
These valves are "normally open" devices that allow fluid to flow trough the controlled port during their non-actuated or "at rest" condition. When downstream pressure exceeds the value set by the spring force, the control piston moves off its seat, closing off the flow path and thus reducing the fluid passing through from the main system. The cushioned piston modulates to maintain the preset pressure in this branch of the hydraulic circuit. If, due to external forces, the pressure continues to rise in this branch circuit, the piston will keep moving against the spring force allowing fluid to be drained to the tank, thereby limiting maximum pressure to the valve's setting.

Features

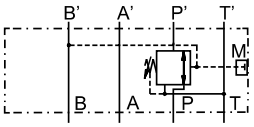
- PRDM Manapak sandwich valves may be selected to reduce pressure in the 'P', 'A' or 'B' port.
- The direct operated, cushioned piston design results in fast response, low leakage and minimal hysteresis.
- Up to 5 pressure adjustment ranges are available with max. pressure settings of:
  bar 25, 70, 160, 210, 350 for PRDM2,
  bar 19, 50, 100, 150, 210 for PRDM3.
- Adjustment modes:
  - Slotted head with lock nut
  - Key lock
  - Turning knob
- PRDM2 - NG06 (CETOP 3)
  PRDM3 - NG10 (CETOP 5)

Schematics

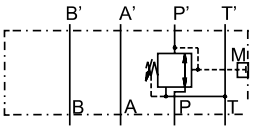
PRDM*AA



PRDM*BB



PRDM*PP

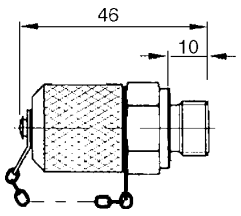


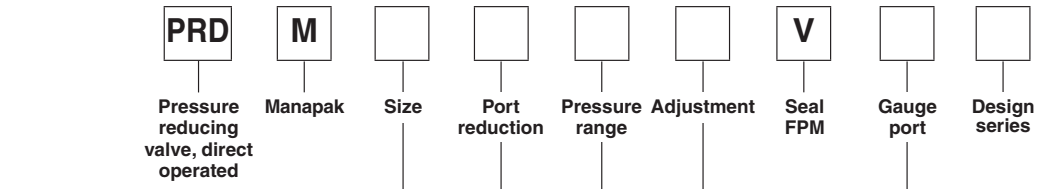
Technical data

Series		PRDM2	PRDM3
Port size		**NG06**	**NG10**
Mounting pattern		ISO 4401	
Max. operating pressure			
P, A, B	[bar]	350	315
T	[bar]	50	50
Weight	[kg]	1.3	2.6
Viscosity range	[cSt][mm²/s]	12...230	
Filtration		ISO 4406 (1999) 18/16/13	

Max. leakage P - A: 5ml/min

Gauge port option C





Code	Size
2	**NG06**
3	**NG10**

Code	Connection
PP	**P**
AA	**A**
BB	**B**

Pressure range [1]			
Code	PRDM2	Code	PRDM3
02	1.5 to 25 bar	**01**	**1.5 to 19 bar**
06	**up to 64 bar**	**05**	**up to 50 bar**
16	**up to 160 bar**	10	up to 100 bar
21	**up to 210 bar**	**15**	**up to 150 bar**
35	up to 350 bar	**21**	**up to 210 bar**

[1] For optimum performance it is recommended to use the appropriate pressure stage, e.g. for 150 bar reduced pressure use code 16 - 160 bar.

Code	Gauge port
G	**G¼**
C	Coupling M16

Code	Adjustment
S	**Slotted head screw with lock nut**
L	Key lock
K	Turning knob[2]

[2] NG06 only

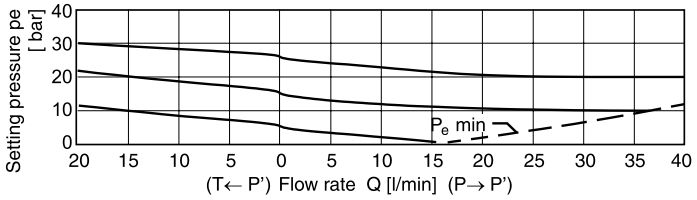
Bold letters =
Short-term availability

7

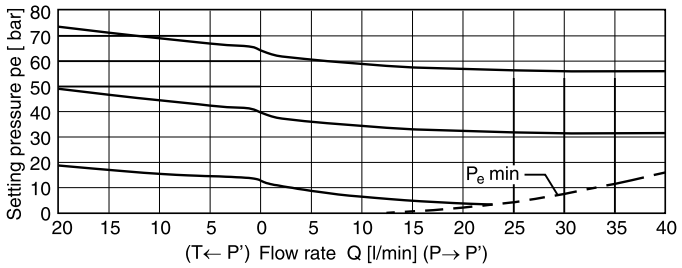
Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

Tel: +45 63 12 83 00 | Email: ps@hymatik.com | www.hymatik.com | Hvidkaervej 27a, DK-5250 Odense SV, Denmark

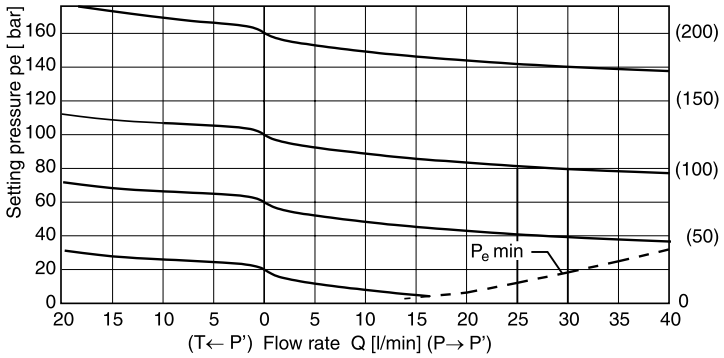
PRDM2 02



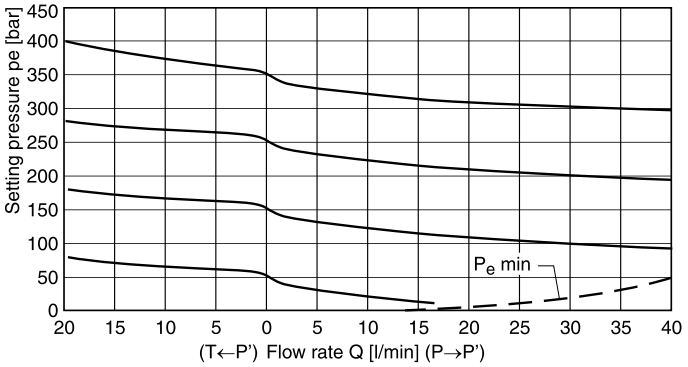
PRDM2 06



PRDM2 16/21



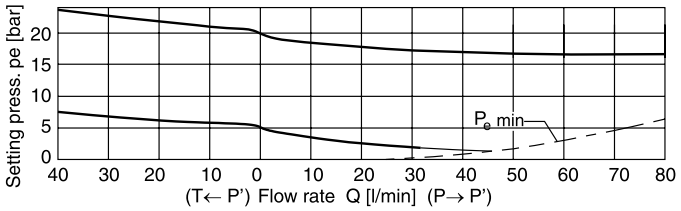
PRDM2 35



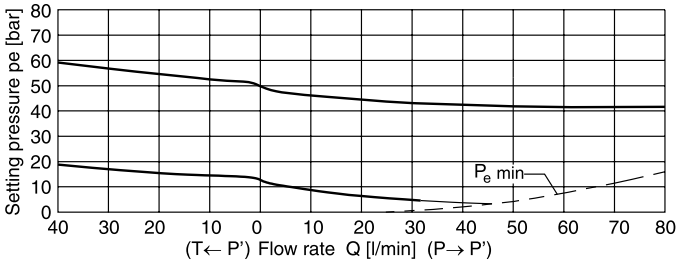
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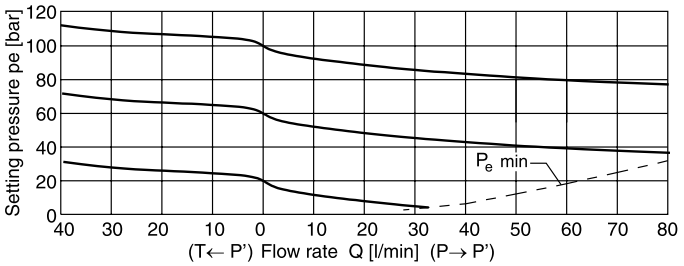
PRDM3 01



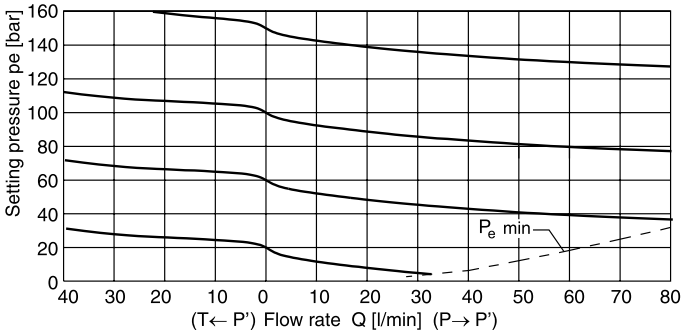
PRDM3 05



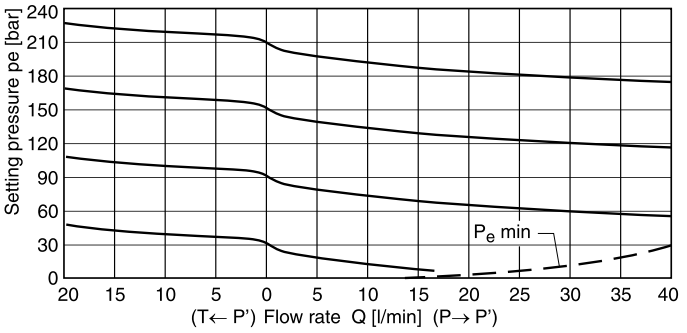
PRDM3 10



PRDM3 15



PRDM3 21

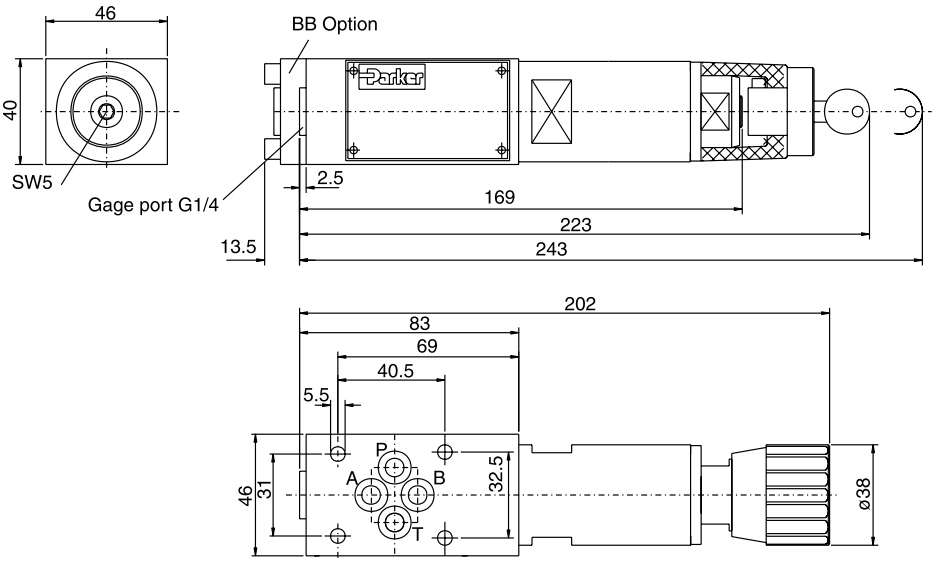


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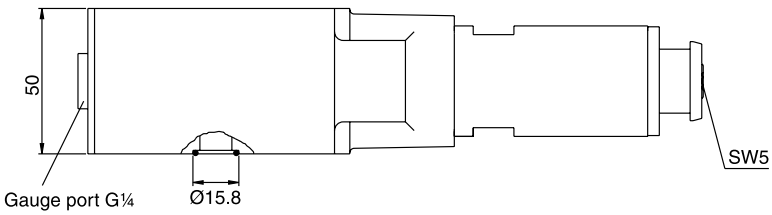
Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

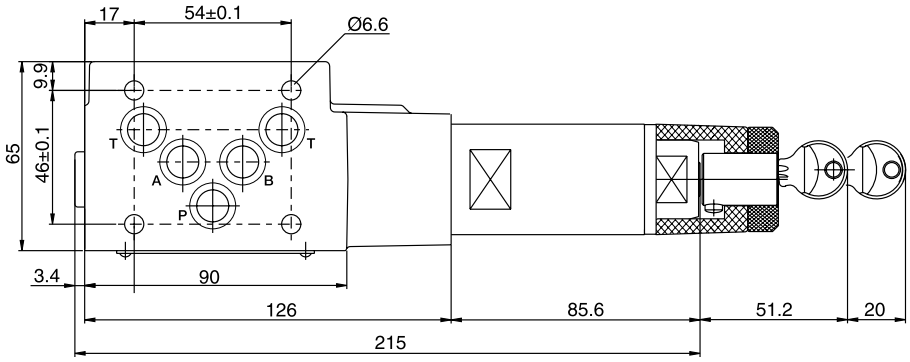
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PRDM2

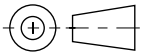


PRDM3



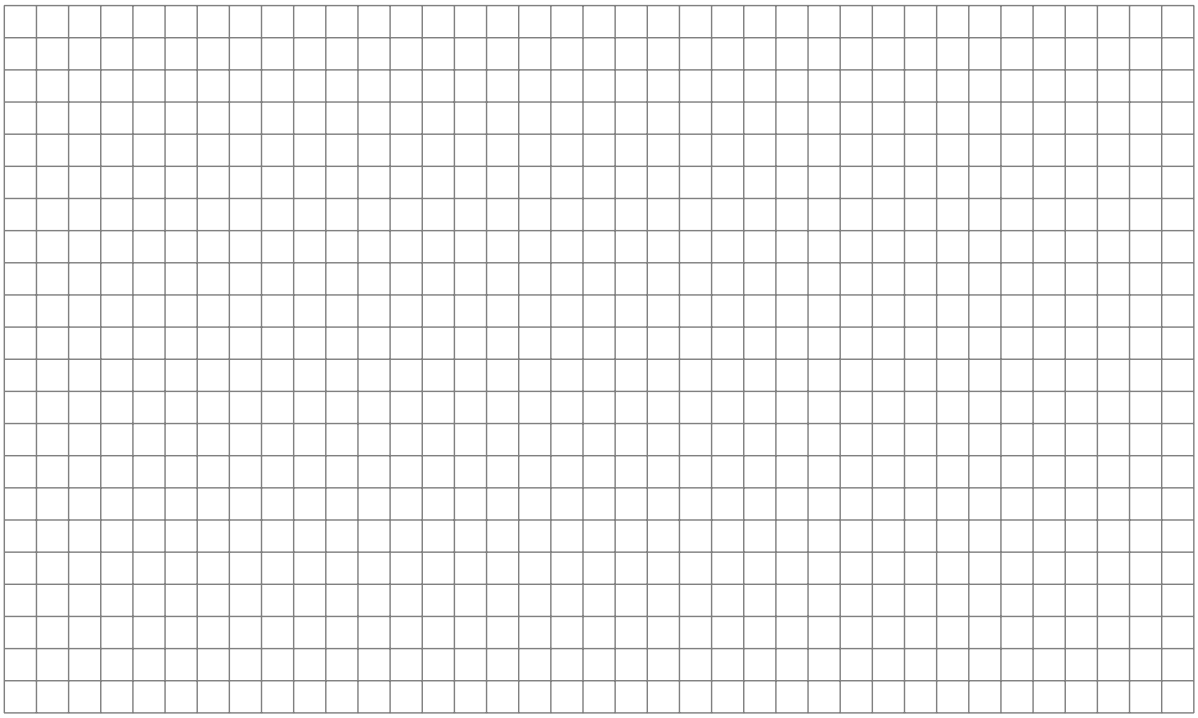


Seal kit order code		
Seal	PRDM2	PRDM3
V	SK-PRDM2-V	SK-PRDM3-V



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Notes



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The pilot operated pressure relief valves from the Parker Manapak series PRM are in sandwich design for easy configuration of stack systems. The reducing function is located in port P except for size NG10 (PRM3 AA and BB, see ordering code).
The pressure reduction for the desired connecting port is achieved by internal connections of the pilot and drain lines with the corresponding channels.



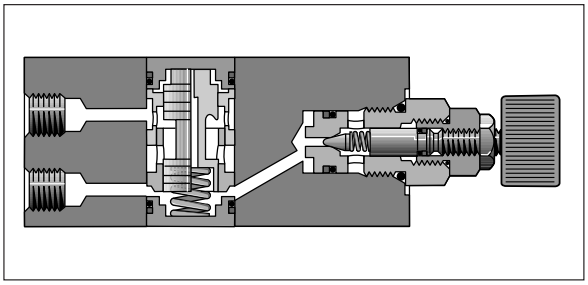
PRM3PP



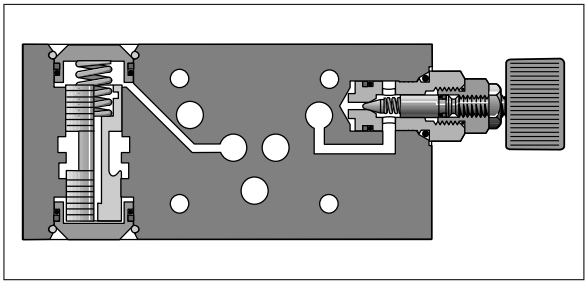
PRM6

Features

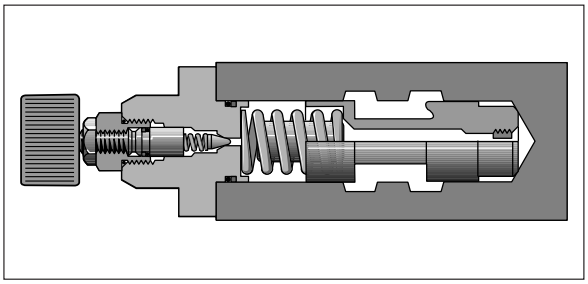
- The valve bodies of the Parker Manapak valve series PRM are made of steel.
- The control pressure range can be set by slotted head screw, knob, or knob with Key lock.
- Pressure gauge/measuring connections are available in the valve body.
- Piloting results in a flat p/Q performance curve.
- PRM3 - NG10 (CETOP 5)
  PRM4 - NG16 (CETOP 7)
  PRM6 - NG25 (CETOP 8)



PRM3PP



PRM3AA or PRM3BB



PRM4 and PRM6

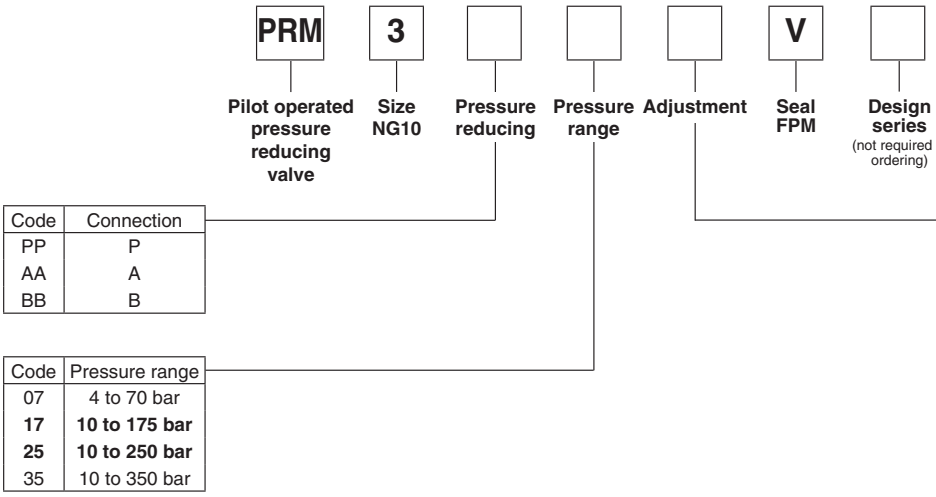
Technical data

		NG10	NG16	NG25
Port size				
Mounting pattern		ISO 4401		
Series		PRM3	PRM4	PRM6
Max. operating pressure	[bar]	350	350	250
Pressure reduction in channel		P, A, B	P	P, A
Weight	[kg]	2.7	5.0	5.6

7

Ordering Code

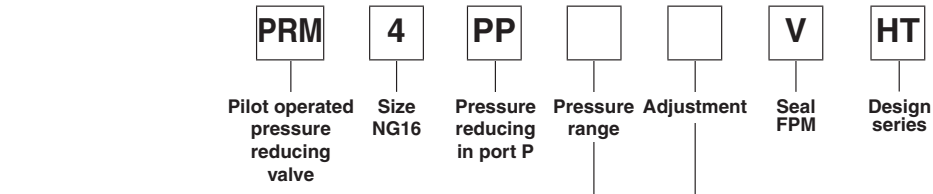
Series PRM



Code	Connection
PP	P
AA	A
BB	B

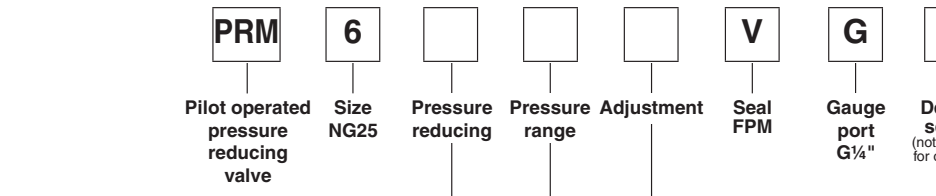
Code	Pressure range
07	4 to 70 bar
17	**10 to 175 bar**
25	**10 to 250 bar**
35	10 to 350 bar

Code	Adjustment
S	**Slotted head screw with lock nut**
L	Key lock
K	Turning knob



Code	Pressure range
07	4 to 70 bar
25	**10 to 250 bar**
35	10 to 350 bar

Code	Adjustment
S	**Slotted head screw with lock nut**
K	Turning knob



Code	Connection
PA	P
AP	A

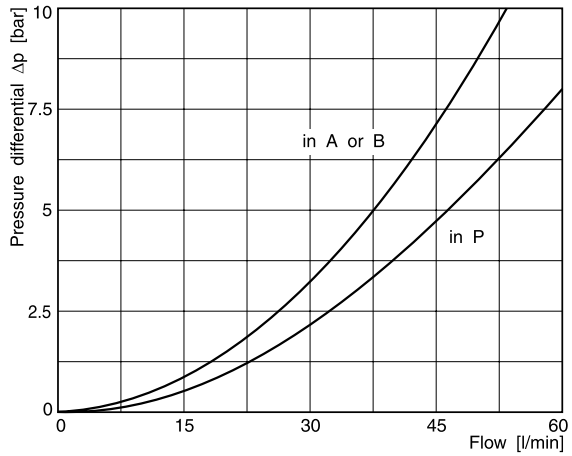
Code	Pressure range
07	10 to 70 bar
17	**10 to 175 bar**
25	**10 to 250 bar**

Code	Adjustment
L	Key lock
K	Turning knob

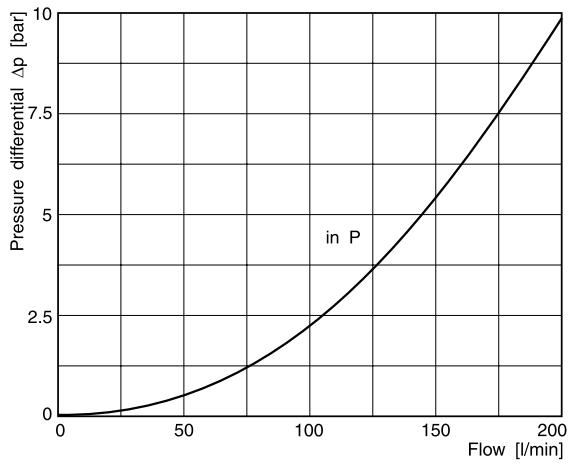
Bold letters =
Short-term availability

Δp/Q performance curves

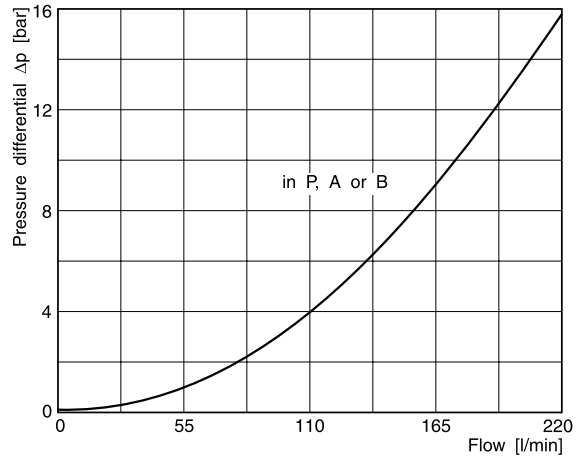
PRM3



PRM4

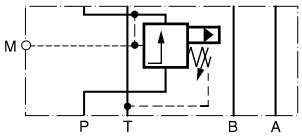


PRM6

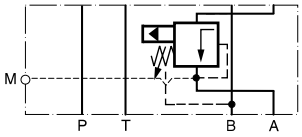


Schematics

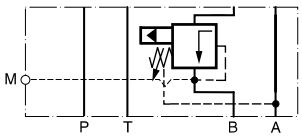
PRM3PP



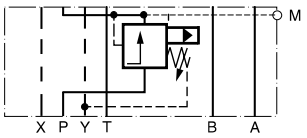
PRM3AA



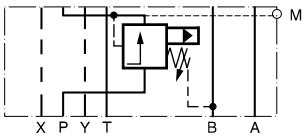
PRM3BB



PRM4PP
PRM6PA

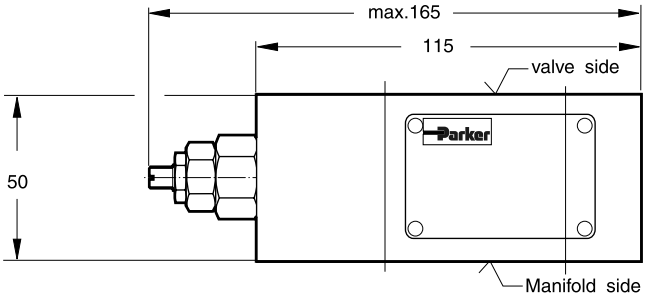


PRM6AP

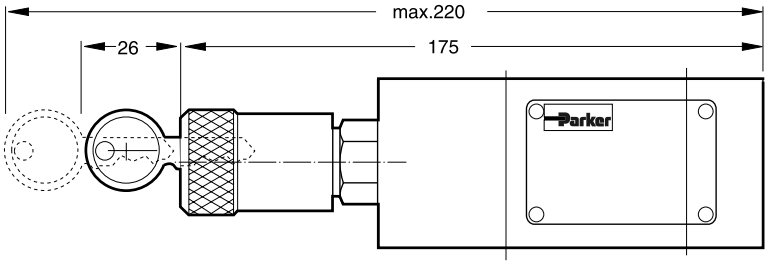


7

PRM3PP
Adjustment code S

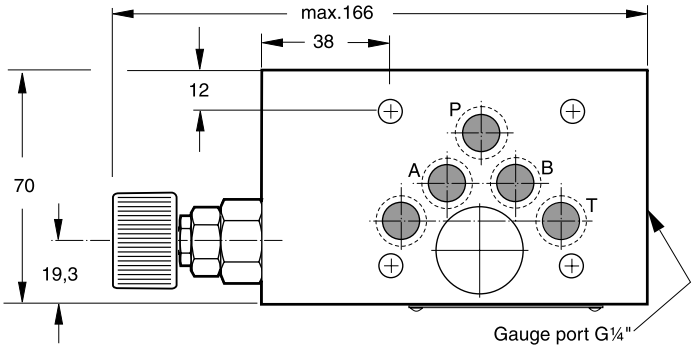


Adjustment code L



7

Adjustment code K



Seal kit PRM3PP	
Seal	Order code
V	SK-PRM3-V-30

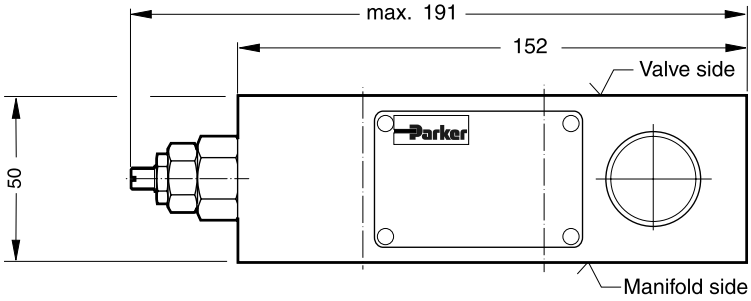
Note:
The O-rings for sealing the connecting surface of the manifold side are included. The O-rings and the positioning pins are always mounted on the manifold side.

PRM_UK.INDD RH_10.03.08

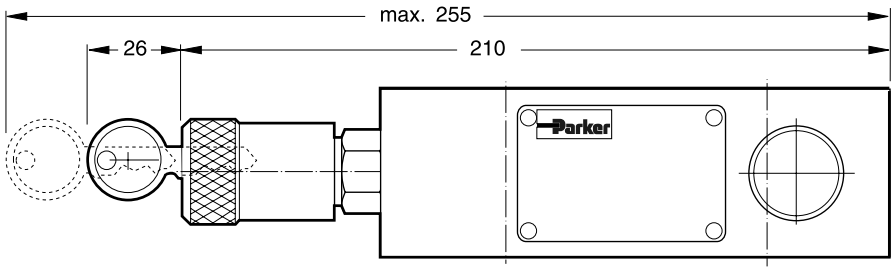
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Kaarst, Germany

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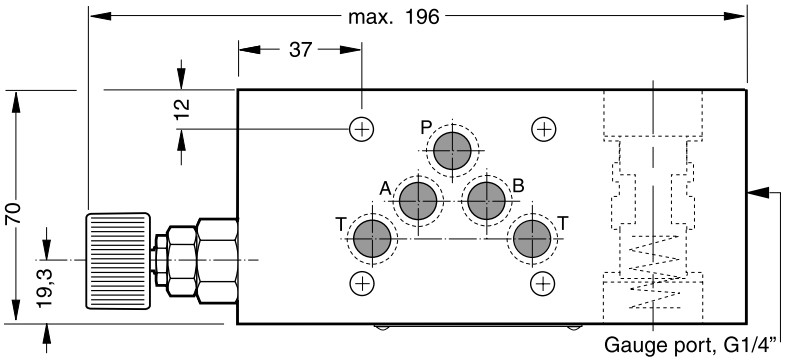
PRM3AA
Adjustment code S



Adjustment code L



Adjustment code K



Seal kit PRM3AA	
Seal	Order code
V	SK-PRM3-V-11

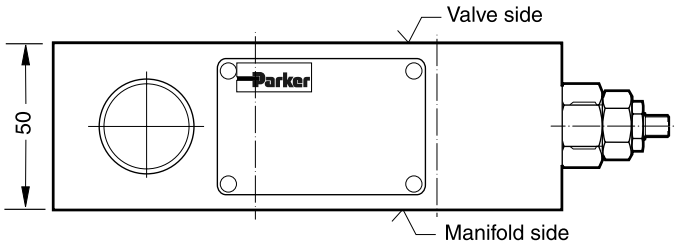
Note:
The O-rings for sealing the connecting surface of the manifold side are included. The O-rings and the positioning pins are always mounted on the manifold side.

PRM_UK.INDD RH_10.03.08

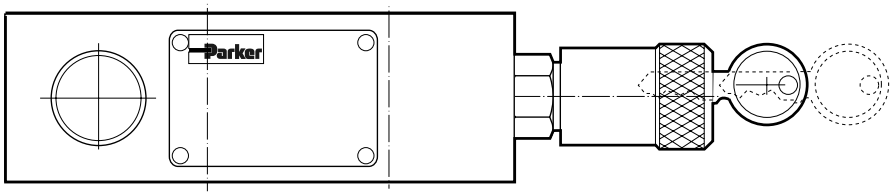
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Hydraulic Controls Division
Kaarst, Germany

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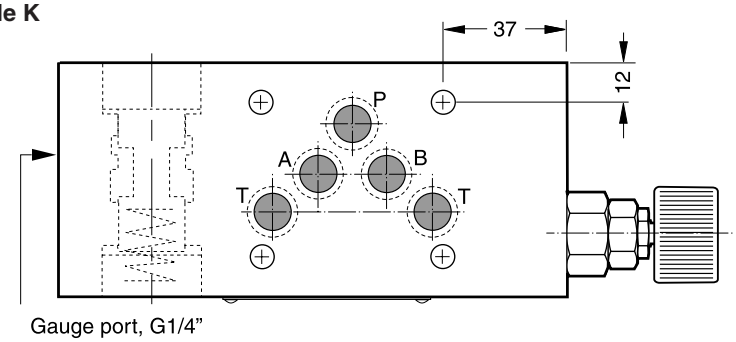
PRM3BB
Adjustment code S



Adjustment code L



Adjustment code K



7

Seal kit PRM3BB	
Seal	Order code
V	SK-PRM3-V-11

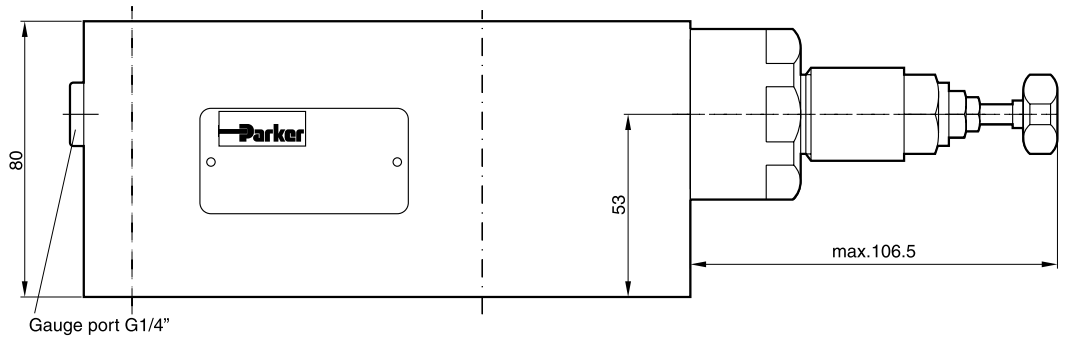
Note:
The O-rings for sealing the connecting surface of the manifold side are included. The O-rings and the positioning pins are always mounted on the manifold side.

PRM_UK.INDD RH_10.03.08

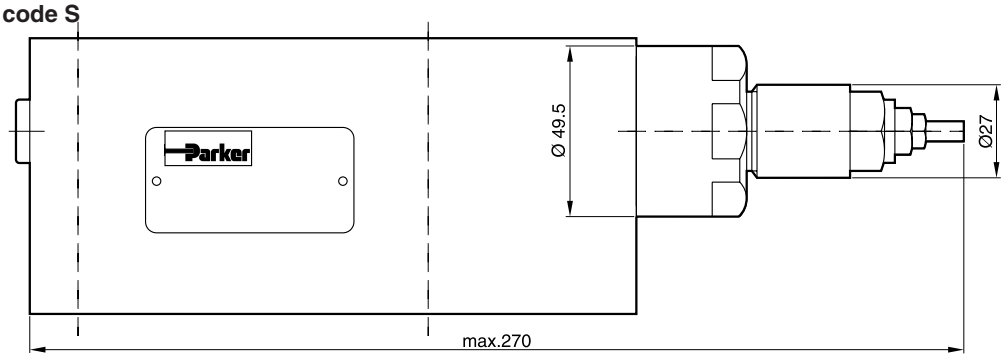
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Kaarst, Germany

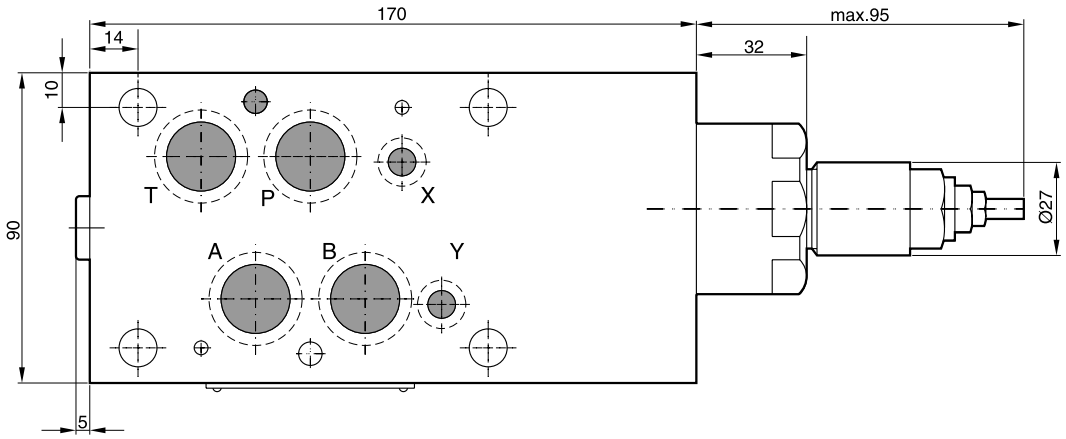
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PRM4PP
Adjustment code K



Adjustment code S





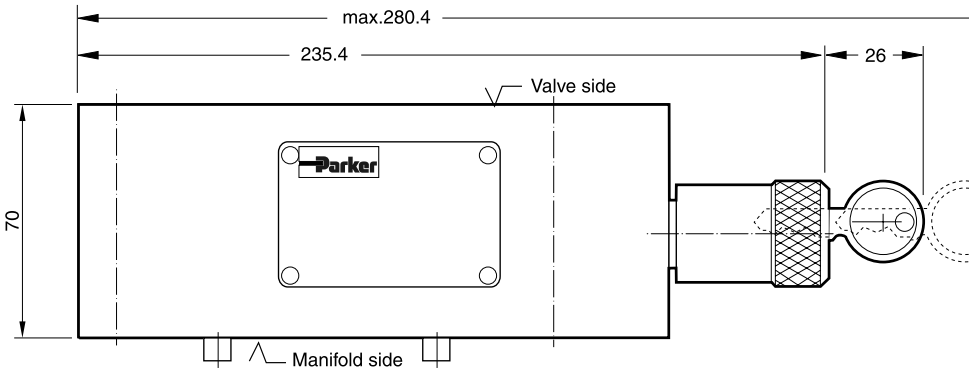
Seal kit PRM4	
Seal	Order code
V	SK-PRM4-V-10

Note:
The O-rings for sealing the connecting surface of the manifold side are included. The O-rings and the positioning pins are always mounted on the manifold side.

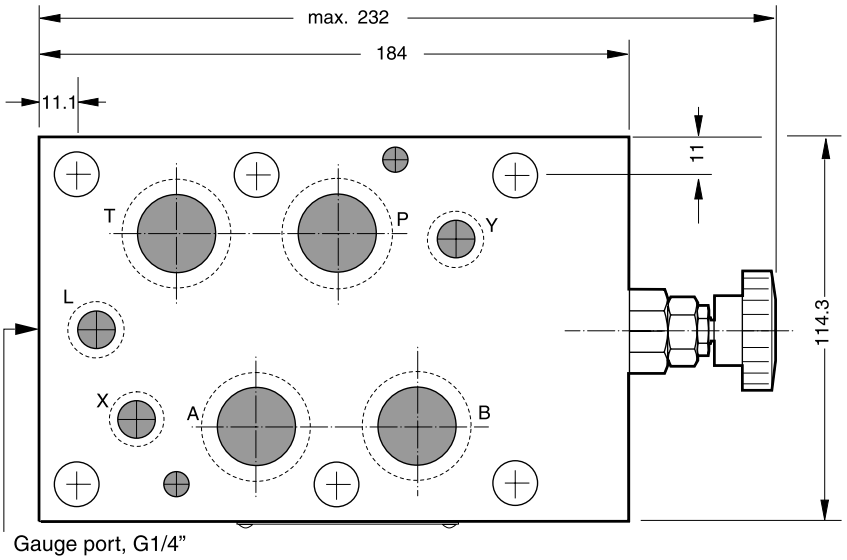
7

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PRM6
Adjustment code L



Adjustment code K



7

Seal kit PRM6	
Seal	Order code
V	SK-PRM6-V-25

Note:
The O-rings for sealing the connecting surface of the manifold side are included. The O-rings and the positioning pins are always mounted on the manifold side.

PRM_UK.INDD RH_10.03.08

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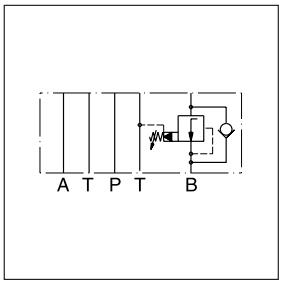
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Pilot operated pressure reducing valves series ZDR are designed for maximum flow rates.

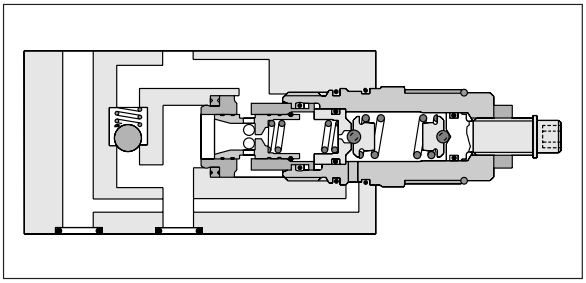
The reducing function can be located in the ports P, A or B. The sizes NG06 and NG10 are equipped with an integral return flow check valve (reducing function in A or B).



ZDR-P01



ZDR-B02



ZDR-B02

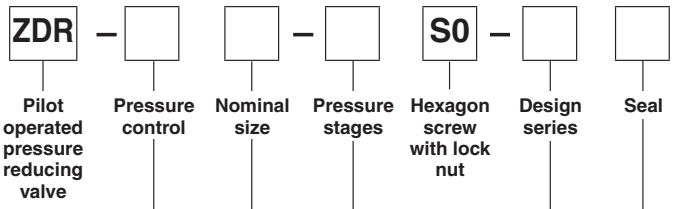
Features

- High flow capacity
- Pressure function in P, A or B
- With integral return flow check valve
- Sizes
  - ZDR01 - NG06 / CETOP3
  - ZDR02 - NG10 / CETOP5
  - ZDR03 - NG16 / CETOP7

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Technical data

General					
Size			**06**	**10**	**16**
Mounting interface			DIN 24340 A6 ISO 4401 NFPA D03	DIN 24340 A10 ISO 4401 NFPA D05	DIN 24340 A16 ISO 4401 NFPA D08
Mounting position			CETOP RP 121 unrestricted		
Ambient temperature		[°C]	-20...+50		
Weight	ZDR-P	[kg]	1.6	2.9	8.65
	ZDR-AR / BR	[kg]	1.8	3.0	8.65
Hydraulic					
Max. operating pressure		[bar]	up to 350 (ZDR-AR / BR and size 10 up to 315)		
Nominal flow		[l/min]	80	120	250
Pilot oil		[l/min]	0.3	0.3	0.7
Fluid			Hydraulic oil as per DIN 51524...525		
Fluid temperature		[°C]	-20...+80		
Viscosity permitted		[cSt]/[mm²/s]	10...650		
Viscosity recommended		[cSt]/[mm²/s]	30		
Filtration			ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)		



Code	Size	Press. control
P	06/10/16	Pressure reducing in P with pressure gauge port M
AR	06/10	Pressure reducing in A with check valve
BR	06/10	Pressure reducing in B with check valve
A	16	Pressure reducing in A
B	16	Pressure reducing in B

Code	Seal
1	NBR
5	FPM

Code	Design series
C	16
D	06/10

Code	Press. stages
1	up to 70 bar
5 [1)]	up to 350 bar

[1)] Code AR and BR and size 10 up to 315 bar

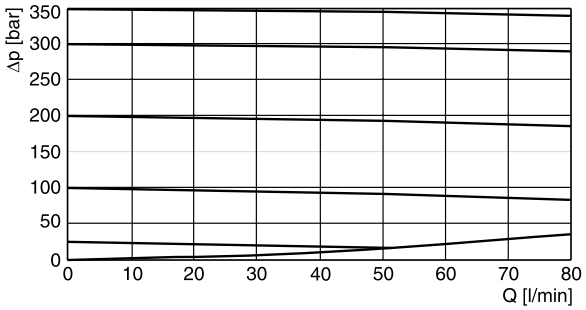
Code	Nominal size
01	NG06
02	NG10
03	NG16

7

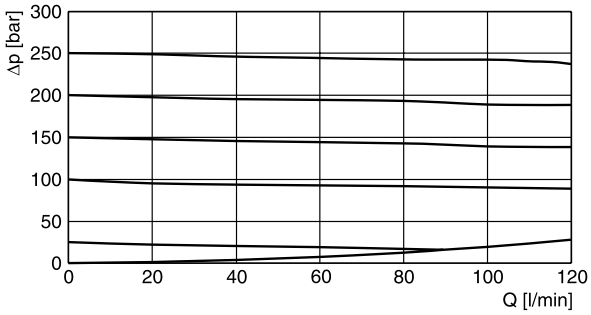
Ordering code details see end of chapter.

p/Q performance curves

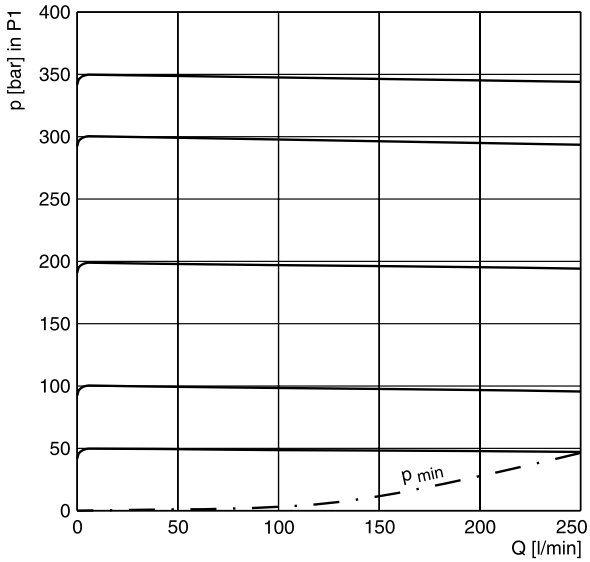
ZDR-P/AR/BR01



ZDR-P/AR/BR02



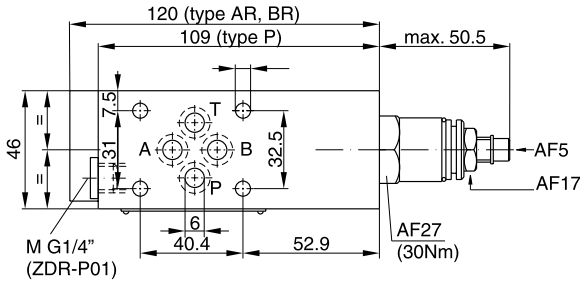
ZDR-P03-5 (at p = 0 bar in Y)

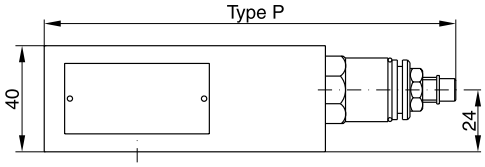


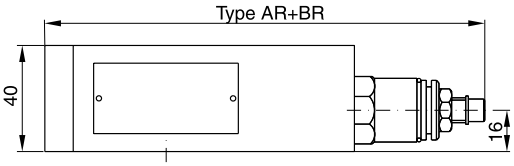
Fluid viscosity 30 cSt at 50°C

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ZDR01

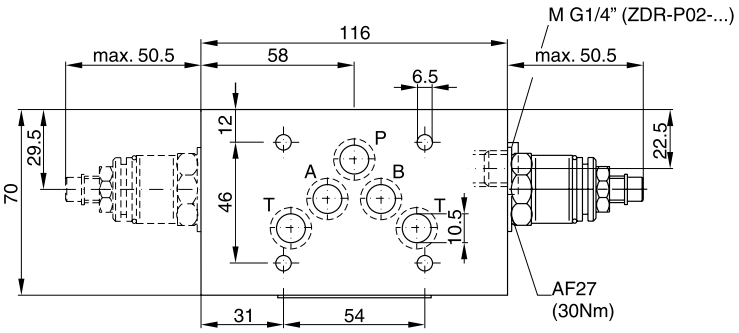


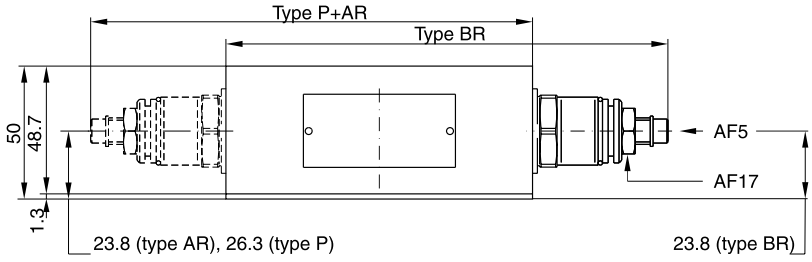




Seal kit	
Seal	Order code
1	098-91184-0
5	098-91185-0
Complete cartridge	
Seal	Order code
1	098-91102-0
5	098-91103-0

ZDR02

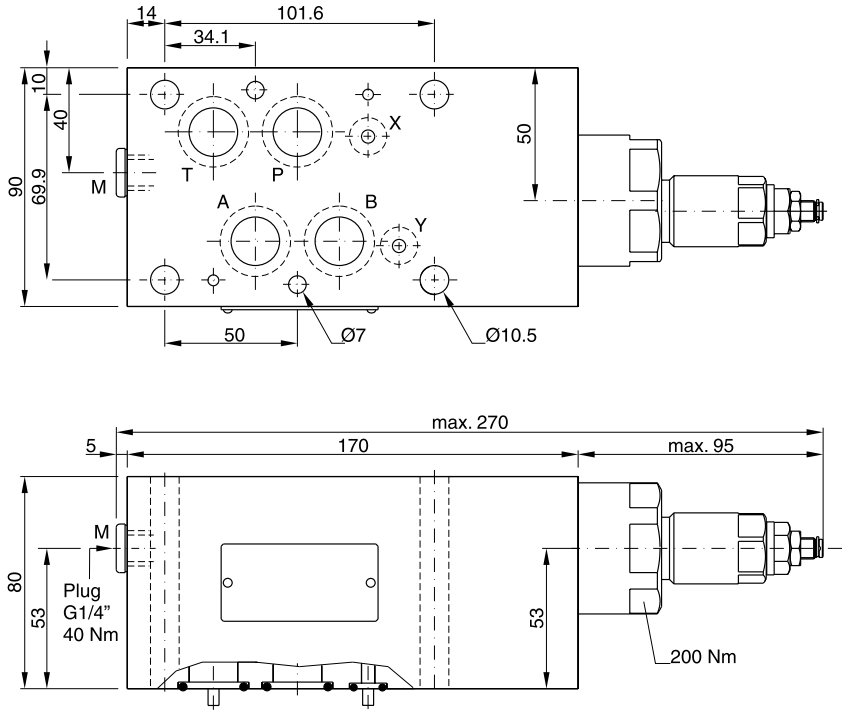




Seal kit	
Seal	Order code
1	098-91082-0
5	098-91083-0
Complete cartridge	
Seal	Order code
1	098-91102-0
5	098-91103-0

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ZDR03



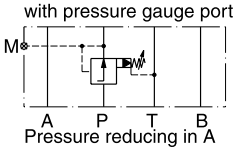
Seal kit	
Seal	Order code
1	098-91439-0
5	098-91440-0
Complete cartridge	
Seal	Order code
1	098-91437-0
5	098-91438-0

7

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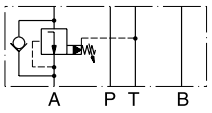
ZDR01

Pressure reducing in P
with pressure gauge port M



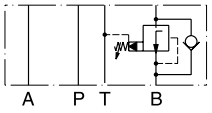
Series	Order No.
ZDR-P01-1-S0-D1	098-91179-0
ZDR-P01-5-S0-D1	098-91211-0

Pressure reducing in A
with check valve



Series	Order No.
ZDR-AR01-1-S0-D1	098-91212-0
ZDR-AR01-5-S0-D1	098-91213-0

Pressure reducing in B
with check valve

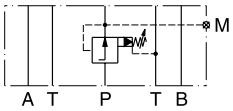


Series	Order No.
ZDR-BR01-1-S0-D1	098-91214-0
ZDR-BR01-5-S0-D1	098-91215-0

1 = 7 … 70 bar
5 = 7 … 315 bar

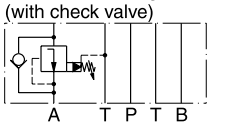
ZDR02

Pressure reducing at P
(with pressure gauge port M)



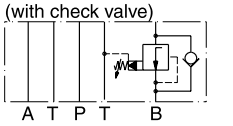
Series	Order No.
ZDR-P02-1-S0-D1	098-91050-0
ZDR-P02-5-S0-D1	098-91051-0

Pressure reducing at A
(with check valve)



Series	Order No.
ZDR-AR02-1-S0-D1	098-91052-0
ZDR-AR02-5-S0-D1	098-91053-0

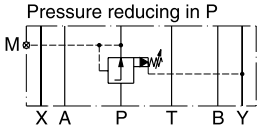
Pressure reducing at B
(with check valve)



Series	Order No.
ZDR-BR02-1-S0-D1	098-91054-0
ZDR-BR02-5-S0-D1	098-91055-0

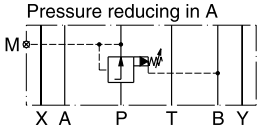
ZDR03

Pressure reducing in P



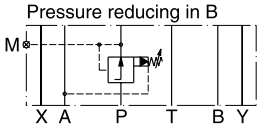
Series	Order No.
ZDR-P03-1-S0-C1	098-91409-0
ZDR-P03-5-S0-C1	098-91410-0

Pressure reducing in A



Series	Order No.
ZDR-A03-1-S0-C1	098-91412-0
ZDR-A03-5-S0-C1	098-91429-0

Pressure reducing in B



Series	Order No.
ZDR-B03-1-S0-C1	098-91430-0
ZDR-B03-5-S0-C1	098-91414-0

7

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Proportional pressure reducing valves keep a constant pressure p_{red} on the secondary side - independent of pressure fluctuations on the primary side. The integrated pressure relief function obviates the need for an additional pressure relief valve on the secondary side and reliefs to tank, if p_{red} rises above the setting pressure.

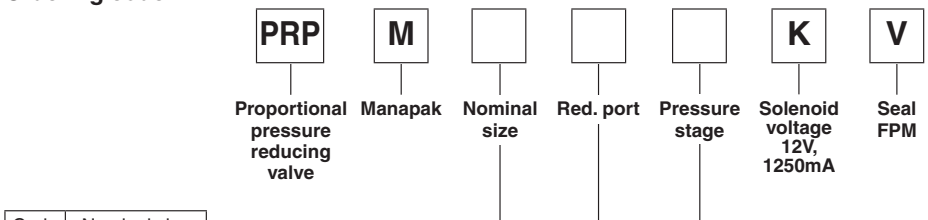
The proportional pressure reducing valve reduces the pressure in output port p_{red} in proportion to the solenoid current. The PRPM works practically independent of the inlet pressure p_E. In non-activated mode, the connection to the tank is fully open with a min. pressure corresponding to the spring force.

The gauge port is connected to the secondary side. Types A and B have an integrated bypass check valve. The PRPM provides optimum performance in combination with a digital amplifier module PCD00A-400.

Technical data

General			
Design		pilot operated proportional pressure reducing valve	
Construction		sandwich type	
Operation		proportional solenoid	
Size	acc. to ISO 4401	nom. size NG06	nom. size NG10
Mounting		4 holes for socket cap screws M5 (NG10: M6) or studs M5 (NG10: M6)	
Port		sandwich valve	
Mounting position		unrestricted	
Ambient temperature	[°C]	-20 ... +50	
Fastening torque	[Nm]	M_D = 5.5 (qual. 8.8) for socket cap screws M_D = 50 for cartridges	M_D = 9.5 (qual. 8.8) for socket cap screws M_D = 50 for cartridges
Weight	[kg]	2	3.2
Hydraulic			
Fluid		mineral oil (other fluid on request)	
Fluid temperature	[°C]	-20 ... +80	
Viscosity range ν	[cSt]/[mm²/s]	12 to 320	
Max. operating pressure	[bar]	400	
Reduced nom. pressure	[bar]	100; 200; 350	
Max. flow	[l/min]	0...60	
Pilot flow		see performance curves	
Max. contamination level		ISO 1406, class 16/13, to be achieved with $\beta_{6...10} > 75$	
Resolution	[mA]	1 mA	
Repeatability	[%]	≤1 (with optimal dither signal)	
Hysteresis	[%]	≤3 (with optimal dither signal)	
Electrical			
Solenoid		proportional solenoid, wet-pin push type, pressure tight	
Duty ratio	[%]	100 ED	
Protection class		IP 65 in accordance with EN 60529	
Supply voltage	[V]	12 (1250mA) / 24 (680mA)	
Solenoid connection		Connector as per EN 175301-803	
Amplifier		PCD00A-400	

Ordering code

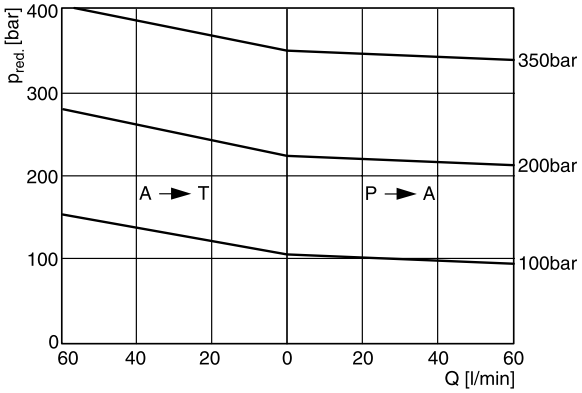


Code	Nominal size
2	NG06
3	NG10

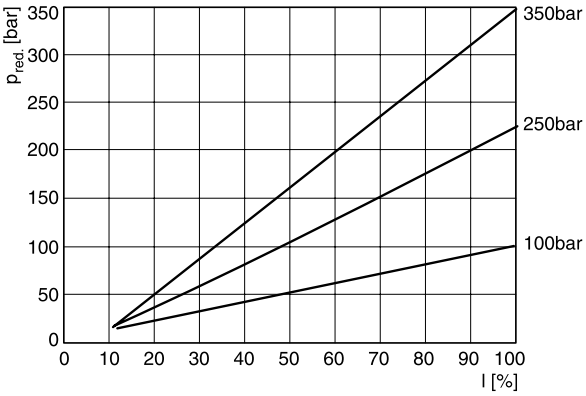
Code	Port
AA	A
BB	B
PP	P

Code	Press. stage [bar]
10	100
20	200
35	350

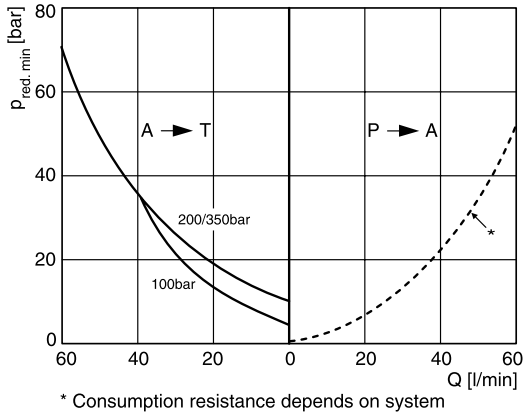
Pressure/flow NG06/NG10 $p_{red} = f(Q)$



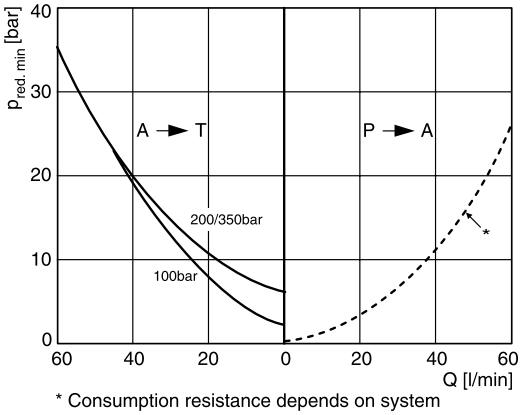
Pressure/adjustment $p_{red} = f(I)$, at Q=0l/min (static)



Pressure/flow NG06 (min. adjustable) $p_{red} = f(Q)$

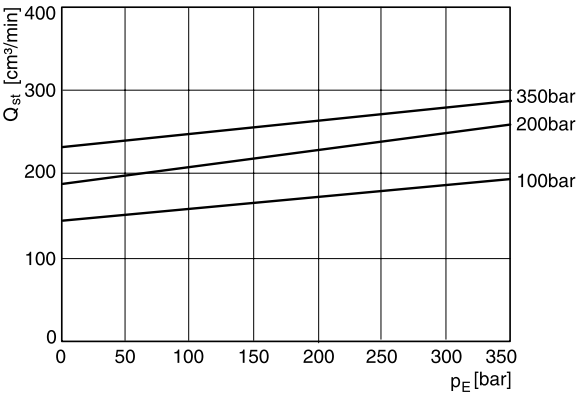


* Consumption resistance depends on system

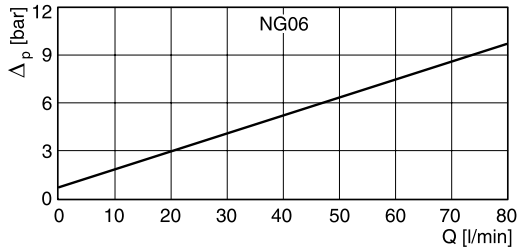


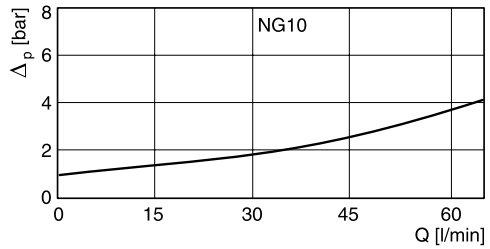
* Consumption resistance depends on system

Pilot flow NG06/NG10 $p_{red} = f(Q)$



Pressure drop/flow over check valve





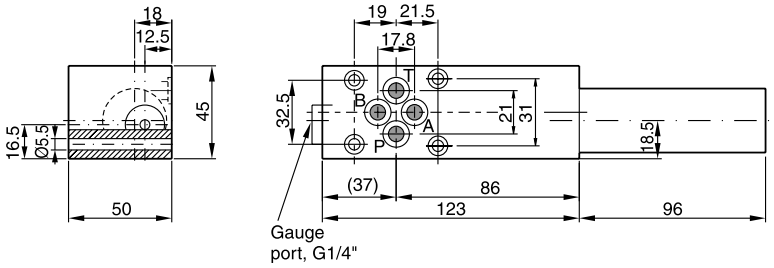
All measures taken at viscosity υ = 30mm²/s .

7

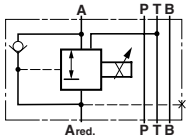
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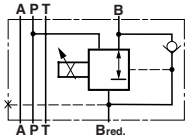
PRPM2A* ,B*



Symbol PRPM2A*

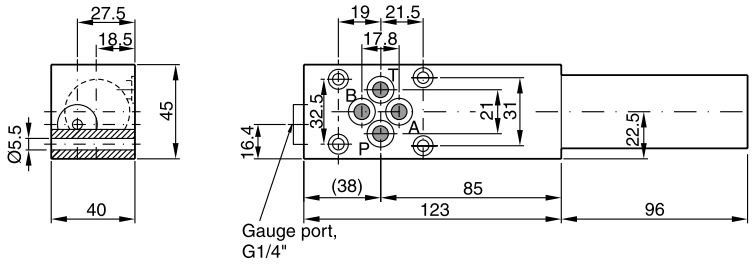


Symbol PRPM2B*

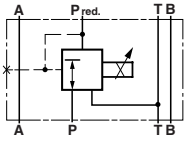


Sandwich type: Presse reduction code B is located on cartridge side B.

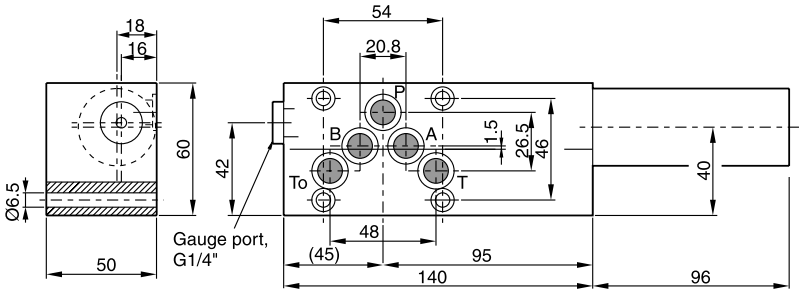
PRPM2P*



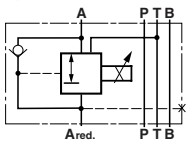
Symbol PRPM2P*



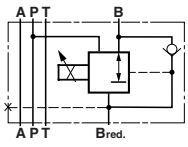
PRPM3A* ,B*



Symbol PRPM3A*

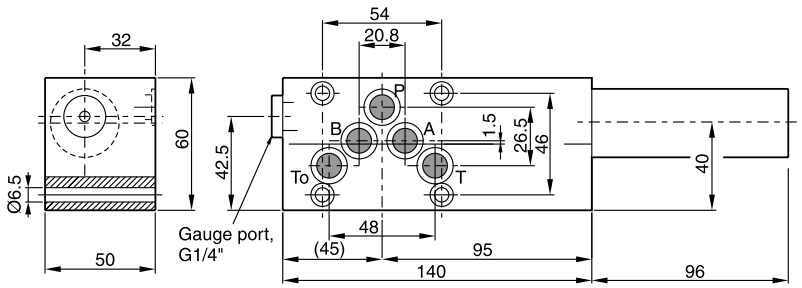


Symbol PRPM3B*

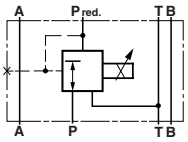


Sandwich type: Presse reduction code B is located on cartridge side B.

PRPM3P*

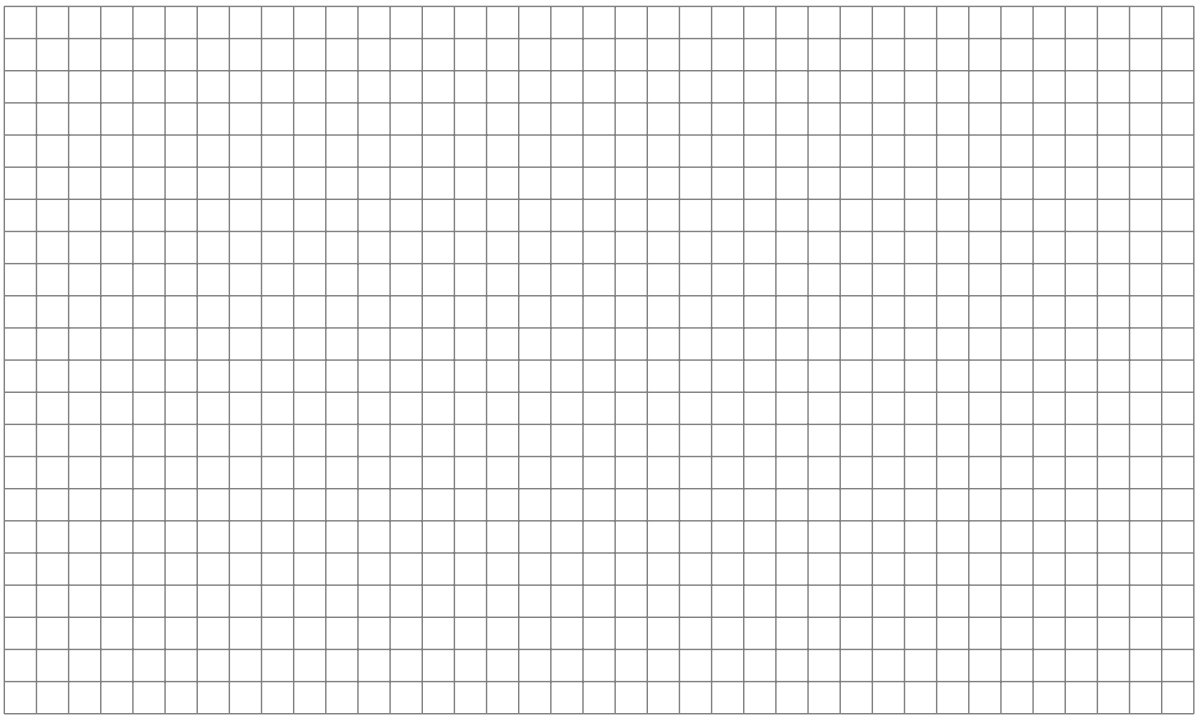


Symbol PRPM3P*



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Notes



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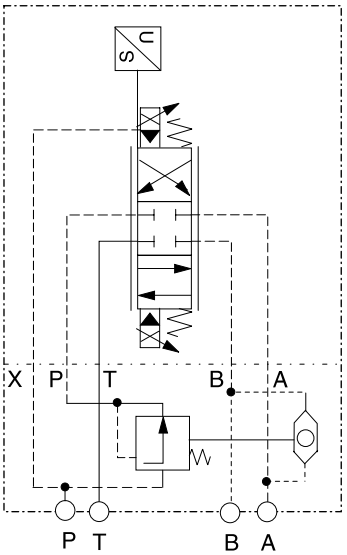
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2-way pressure compensators series LCM are sandwich plate valves designed for stacking beneath a proportional directional control valve with a standardised mounting pattern.
The valve maintains a constant pressure differential between ports P and A or P and B across the directional valve. When the cross sectional opening of the directional valves is held steady, a constant flow rate is achieved, regardless of consumer load fluctuations.
The control pressure applied to the spring side of the compensator spool is supplied from port A or B via a shuttle valve. Flow rate regulation is automatically effective in the port with the highest pressure.

Technical data

Series		LCM2	LCM3
Port size		NG06	NG10
Mounting pattern		NFPA D03 CETOP 3	NFPA D05 CETOP 5
Max. operating pressure	[bar]	350	350
Pressure differential	[bar]	10	10

Application example



Proportional DC valve model D31FS with 2 way pressure compensator LCM3 maintains a constant flow rate.
The diagram shows the design according to code X.

7

Ordering Code

LCM		PP		02	V	
Pressure compensator	Size	Control connection	Pilot oil	Differential pressure 10 bar	Seal FPM	Design series (not required for ordering)

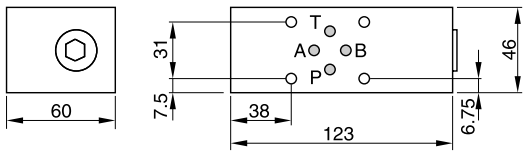
Code	Size
2	NG06
3	NG10

Code	Pilot oil
omit	internal
X[1)]	external

[1)] NG10 only

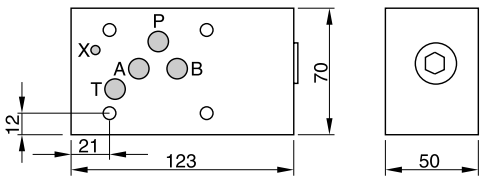
Dimensions

LCM2



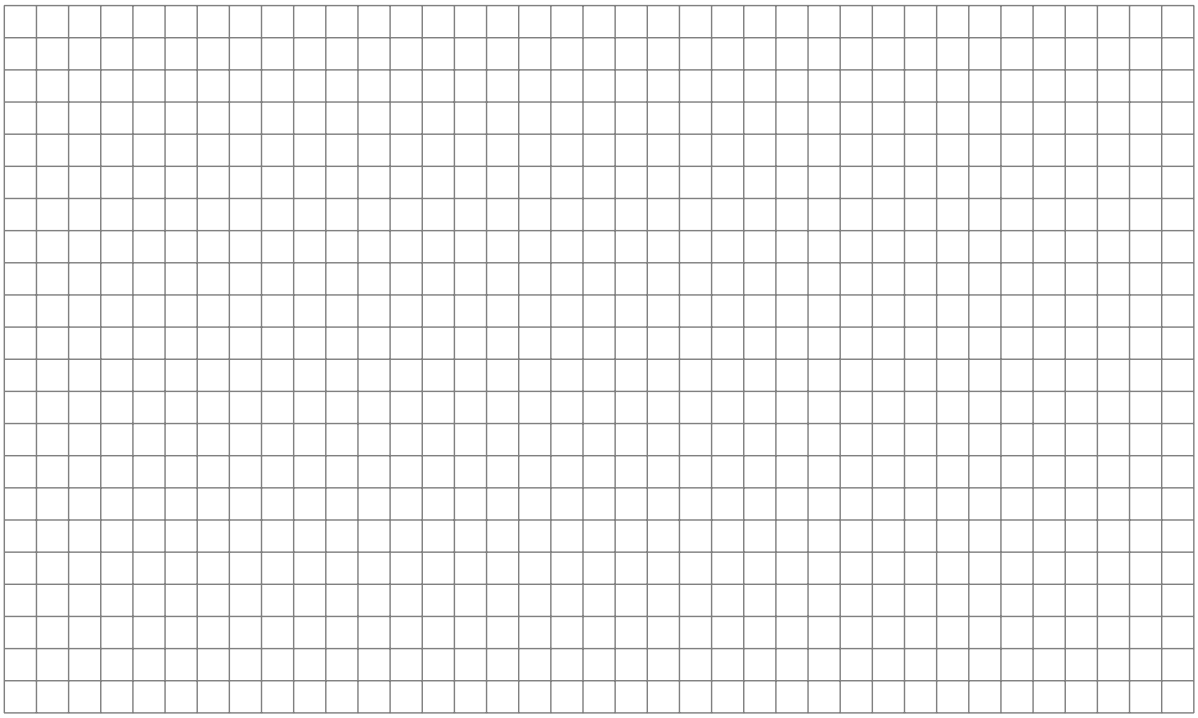
Mounting screws: BK 403 (4 x M5 x 90)
For mounting screws connected with the directional valves D1 or D31.

LCM3



Mounting screws: BK 412 (4 x M6x 90)
The views show the mounting surface for the directional valve.

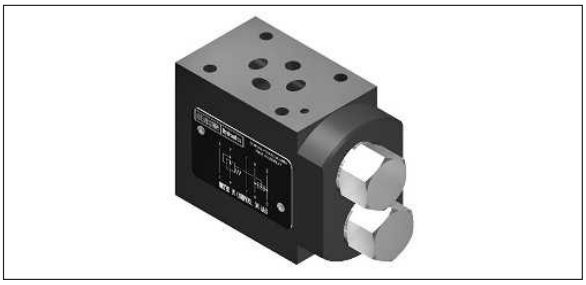
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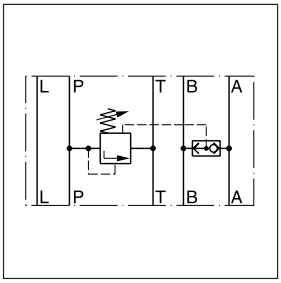
The sandwich type pressure compensators series SPC are typically used in combination with proportional directional control valves. The compensator keeps the pressure drop over the directional valve constant and thus provides load-independent flow to the actuator.



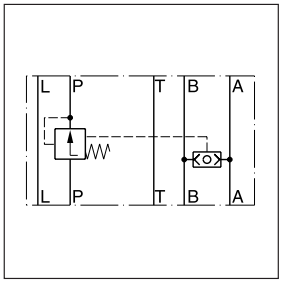
SPC*11 (2-way)

Features

- 2-way or 3-way pressure compensators
- Standard pressure differential 5 bar
- Adjustable differential (2...5 bar) and 10 bar - optional
- Sizes:
  NG06 / CETOP 3 SPC01
  NG10 / CETOP 5 SPC02
  NG16 / CETOP 7 upon request
  NG25 / CETOP 8 upon request



SPC*01 (3-way)

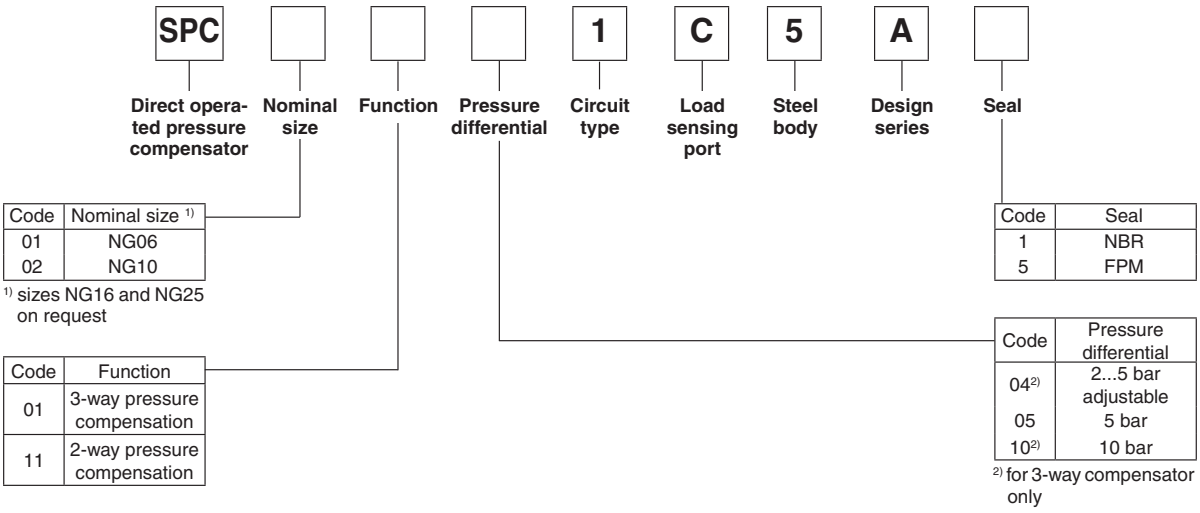


SPC*11 (2-way)

7

Technical data

General				
Design			Direct operated pressure compensator	
Size			**06**	**10**
Mounting interface			DIN 24340 A10 ISO 4401 NFPA D05 CETOP 03	DIN 24340 A16 ISO 4401 NFPA D07 CETOP 05
Mounting position			unrestricted	
Ambient temperature		[°C]	-20...+50	
Weight	2-way pressure compensator	[kg]	1.5	3.1
	3-way pressure compensator	[kg]	1.6	3.5
Hydraulic				
Max. operating pressure	drain port L connected	[bar]	P, A, B: 350; T: 210; L: 10	P, A, B: 315; T: 210; L: 10
	without drain port	[bar]	P, A, B: 350; T: 160; L: 160	P, A, B: 315; T: 210; L: 210
Nominal flow		[l/min]	30	80
Fluid			Hydraulic oil as per DIN 51524...525	
Fluid temperature		[°C]	-20...+80	
Viscosity permitted		[cSt]/[mm²/s]	10...650	
Viscosity recommended		[cSt]/[mm²/s]	30	
Filtration			ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)	



Code	Nominal size [1]
01	NG06
02	NG10

[1] sizes NG16 and NG25 on request

Code	Function
01	3-way pressure compensation
11	2-way pressure compensation

Code	Seal
1	NBR
5	FPM

Code	Pressure differential
04[2]	2...5 bar adjustable
05	5 bar
10[2]	10 bar

[2] for 3-way compensator only

7

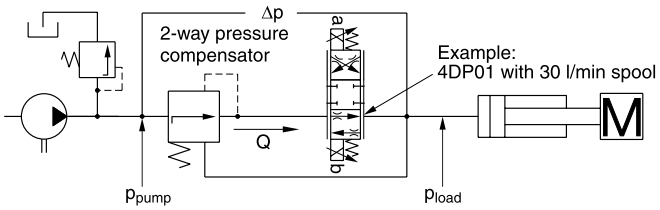
SPC01

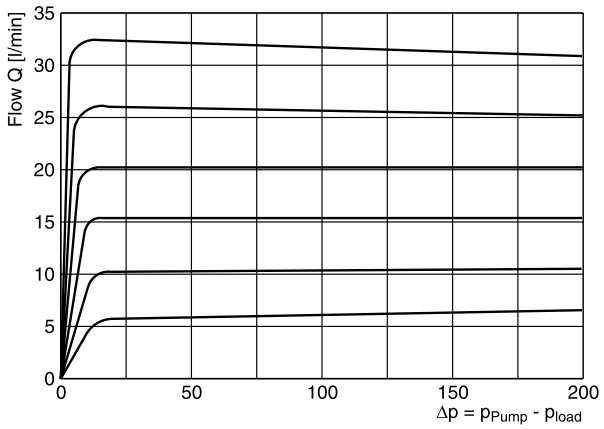
Type	Model no.	Order no.
3-way compensators with shuttle valve P-A/B	SPC 01 01 041C5A	026-42583-0
	SPC 01 01 051C5A	026-42584-0
	SPC 01 01 101C5A	026-42585-0
2-way compensators with shuttle valve P-A/B	SPC 01 11 051C5A	026-42560-0

SPC02

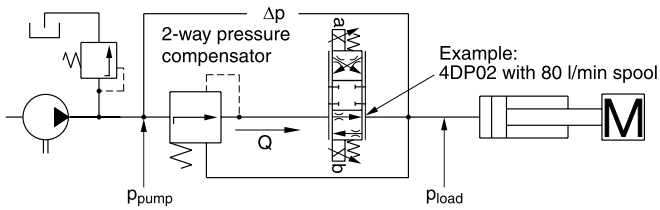
Type	Model no.	Order no.
3-way compensators with shuttle valve P-A/B	SPC 02 01 041C5A	026-42589-0
	SPC 02 01 051C5A	026-42590-0
	SPC 02 01 101C5A	026-42591-0
2-way compensators with shuttle valve P-A/B	SPC 02 11 051C5A	026-42566-0

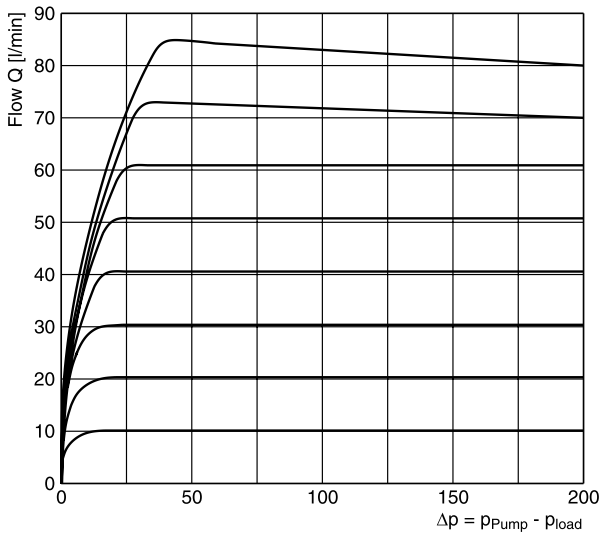
SPC01
Flow regulation example: 2-way pressure compensator





SPC02
Flow regulation example: 2-way pressure compensator

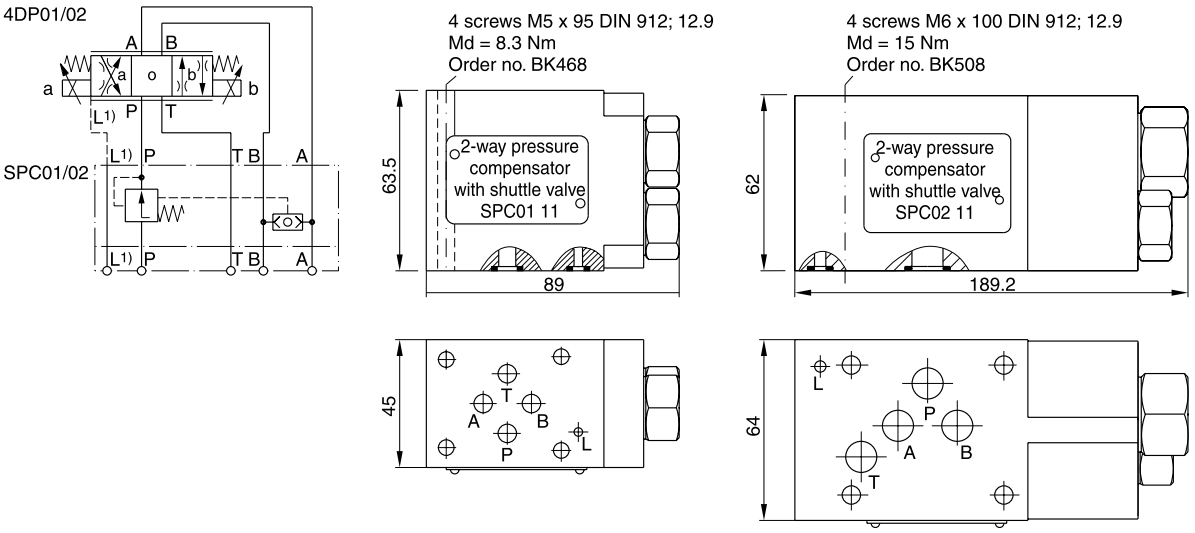




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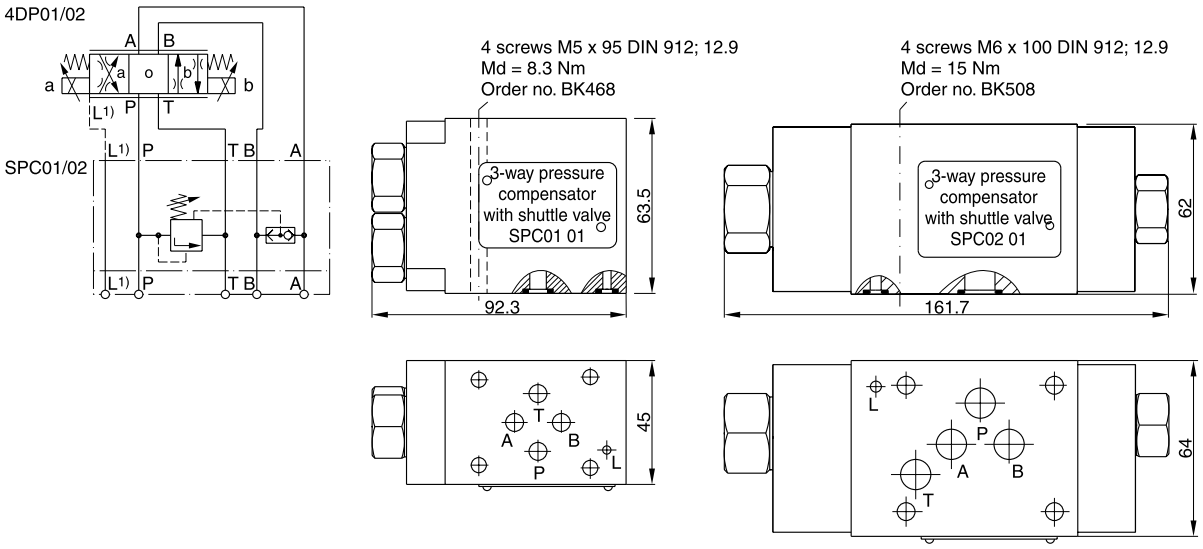
2-way pressure compensator



[1] Always connect L to tank when
SPC01 T > 160bar
SPC02 T > 210bar

7

3-way pressure compensator



[1] Always connect L to tank when
SPC01 T > 160bar
SPC02 T > 210bar

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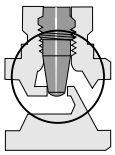
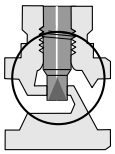
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FM	☐	DD	☐	☐	V	☐
Throttle valve	Valve size	Throttle check valve in the working port A and B	Needle design	Adjustment	Seal FPM	Design series (not required for ordering)

Code	Size
2	**NG06**
3	**NG10**

Code	Adjustment
K	**Knob**
S	**Hex. socket**

Code	Needle
omit	**Standard conical**
D	**Fine, cylindrical** Hollow bored with V notch

	A two-stage needle provides fine adjustment in the lower flow range with 3 adjustment rotations. After 3 more rotations, the valve is completely open.
	Design "D" A cylindrical needle with a V notch allows the fine adjustment over the entire setting range.

7

FM	4	DD	☐	V	HT
Throttle valve	Valve size NG16	Throttle check valve in the working port A and B	Meter-out / meter-in throttling	Seal FPM	Design series

Code	Description
T	Meter-in
F	Meter-out

FM	6	DD	K	V	☐
Throttle valve	Valve size NG25	Throttle check valve in the working port A and B	Adjusting knob	Seal FPM	Design series (not required for ordering)

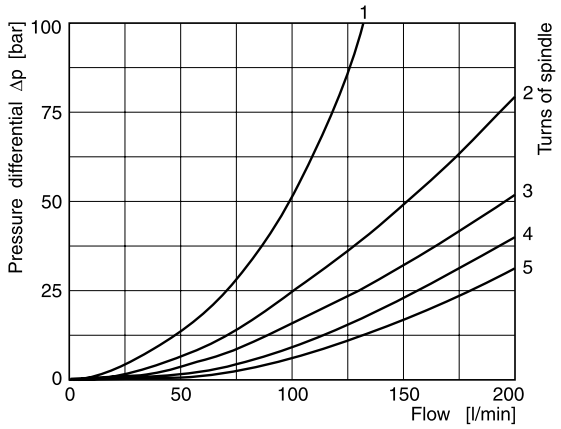
Bold letters =
Short-term availability

FM_UK.INDD RH_21.11.07

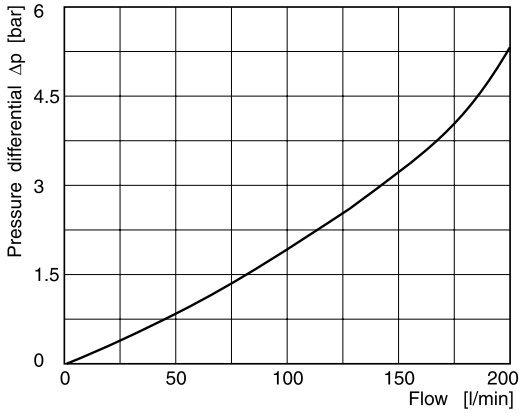
Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

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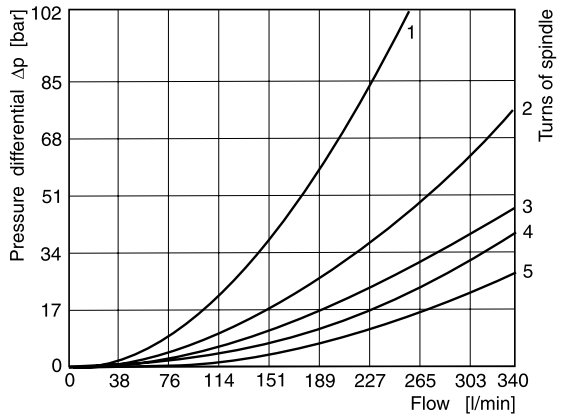
FM4 with standard needle
1 to 5 number of needle rotations



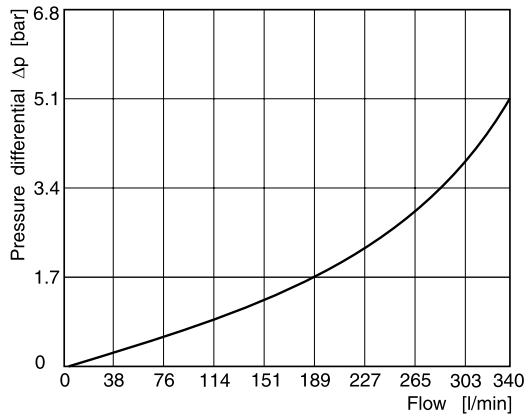
FM4 flow, check valve



FM6 with standard needle
1 to 5 number of needle rotations



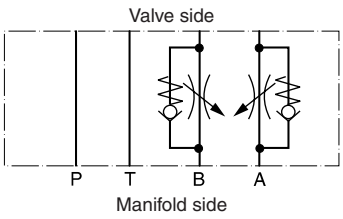
FM6 flow, check valve

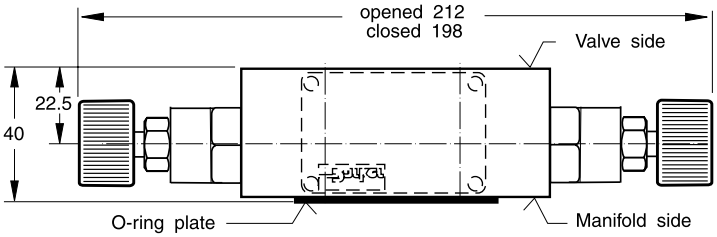


7

FM2

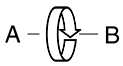
Meter-in

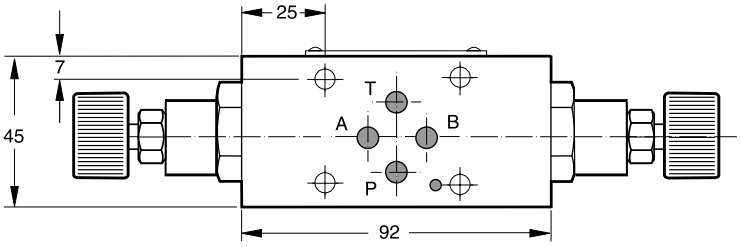




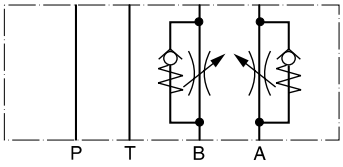
Meter-in or meter-out

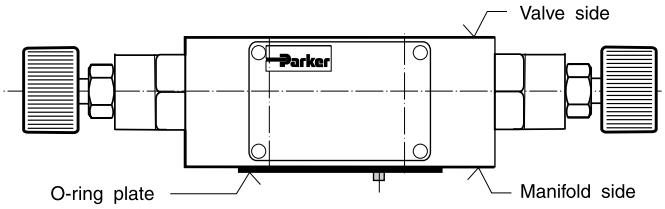
A functional change is achieved by rotating the mounting position of the valve 180° about the longitudinal axis (A-B).





Meter-out





Seal kit FM2	
Seal	Order code
V	SK-FM2-V-20

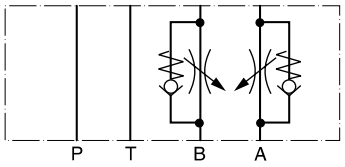
Note:
The O-ring plate (with O-rings) for sealing the connecting surface of the manifold side is included. The O-ring and positioning pin are always mounted on the manifold side.

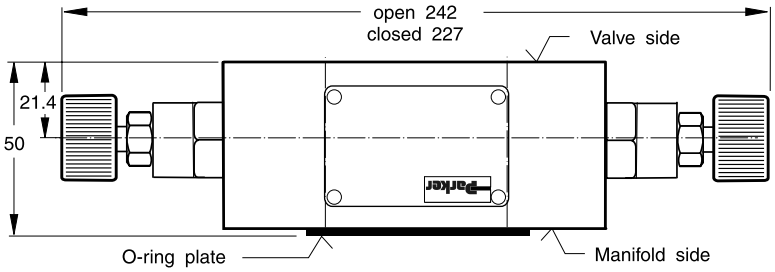
7

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FM3

Meter-in

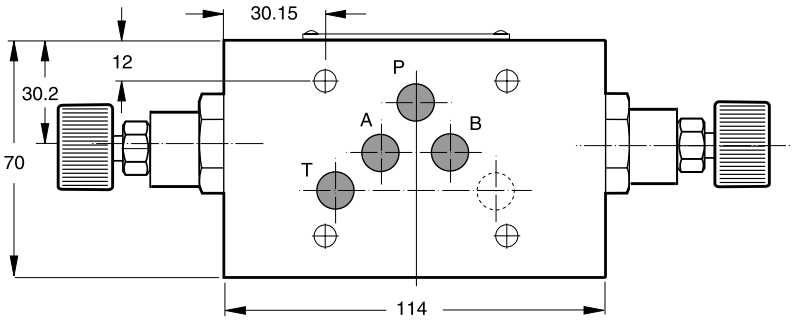




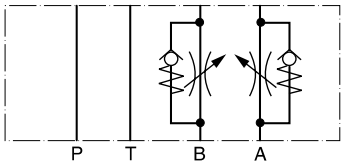
Meter-in or meter-out

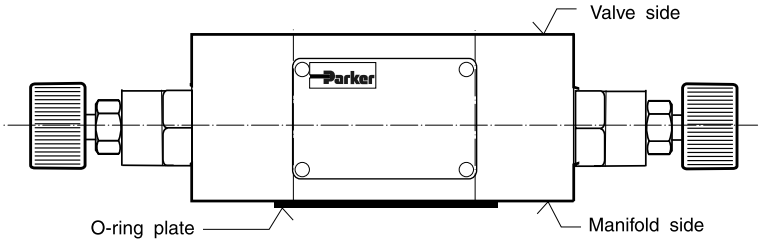
A functional change is achieved by rotating the mounting position of the valve 180º about the transverse axis (P).





Meter-out





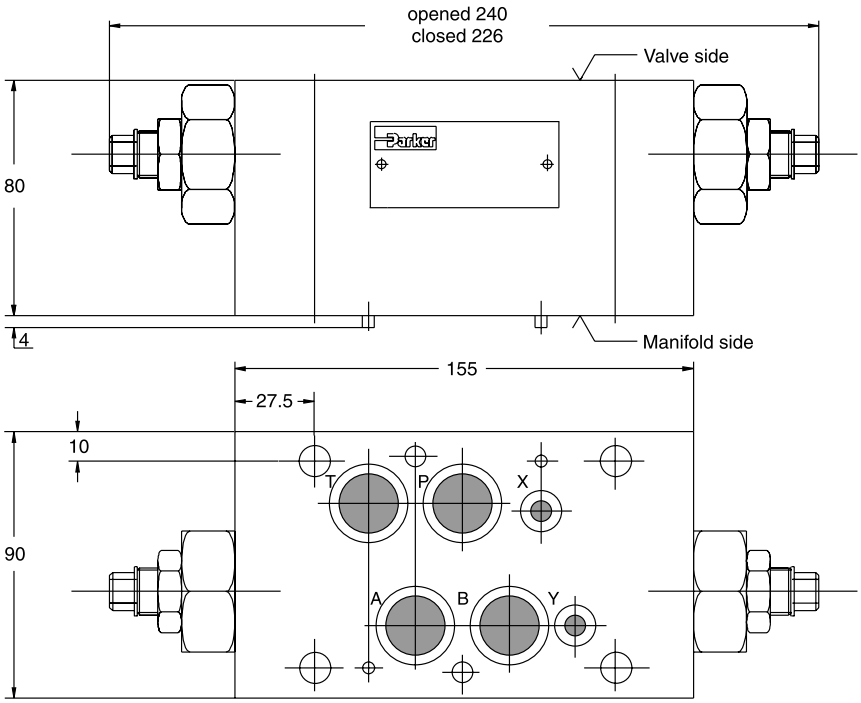
Seal kit FM3	
Seal	Order code
V	SK-FM3-V-20

Note:
The O-ring plate (with O-rings) for sealing the connecting surface of the manifold side is included. The O-ring and positioning pin are always mounted on the manifold side.

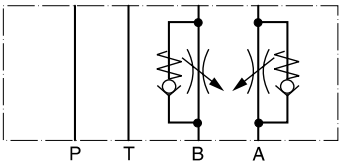
7

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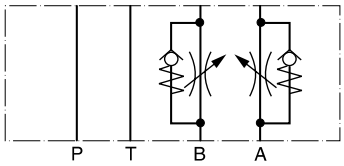
FM4



Meter-in



Meter-out

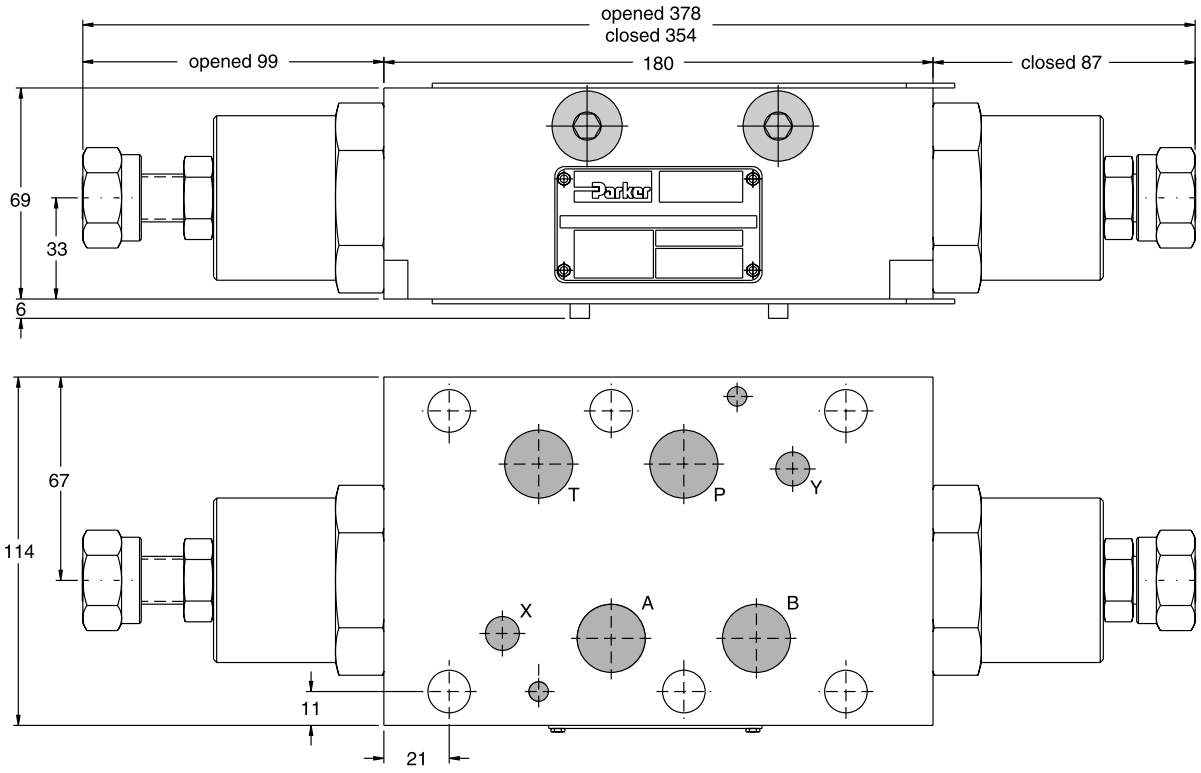


Seal kit FM4	
Seal	Order code
V	SK-FM4VHT

7

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FM6

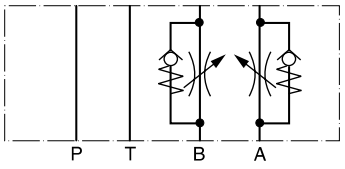


7

Meter-out

Adjustment: knob

Meter-in is not available for FM6



Seal kit FM6	
Seal	Order code
V	SK-FM6-V-12

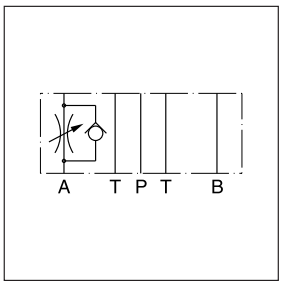
Throttle check valves series ZRD are designed for maximum flow rates.

The throttle check function can be located in port A or B as well as in A + B. Meter-in or meter-out functionality can be selected by model code.

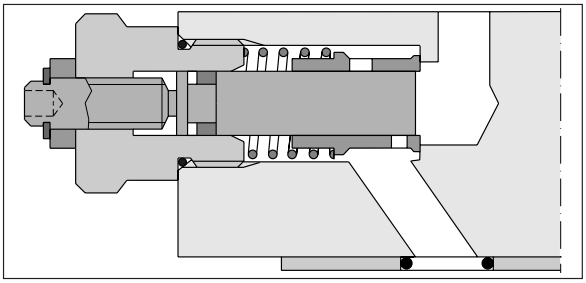
A low flow / high resolution version in NG06 for sensitive shifting time adjustment of pilot operated directional control valves is available on request.



ZRD-ABZ01



ZRD-AA02



ZRD-AA02

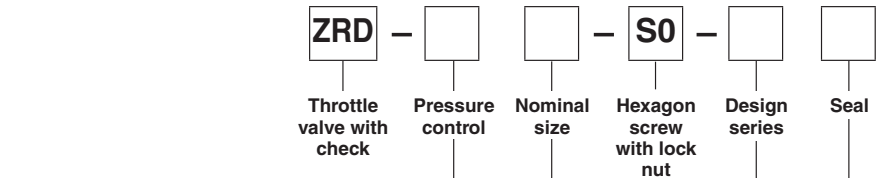
Features

- High flow capacity
- Various functional arrangements
- Sizes
  - ZRD01 - NG06 / CETOP3
  - ZRD02 - NG10 / CETOP5
  - ZRD03 - NG16 / CETOP7

7

Technical data

General					
Size			**06**	**10**	**16**
Mounting interface			DIN 24340 A6 ISO 4401 NFPA D03	DIN 24340 A10 ISO 4401 NFPA D05	DIN 24340 A16 ISO 4401 NFPA D08
Mounting position			CETOP RP 121 unrestricted		
Ambient temperature		[°C]	-20...+50		
Weight	1 cartridge	[kg]	1.2	2.8	7.4
	2 cartridges	[kg]	1.3	2.9	7.7
Hydraulic					
Max. operating pressure		[bar]	up to 350 (size 10 up to 315)		
Nominal flow		[cSt]/[l/min]	80	160	260
Leakage		[cSt]/[l/min]	—	—	0.3...0.5 (at closed throttle)
Cracking pressure		[bar]	—	—	0.8
Fluid			Hydraulic oil as per DIN 51524...525		
Fluid temperature		[°C]	-20...+80		
Viscosity permitted		[cSt]/[mm²/s]	10...650		
Viscosity recommended		[cSt]/[mm²/s]	30		
Filtration			ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)		



Code	Press. control
AA	Meter-out control in A
AZ	Meter-in control in A
BA	Meter-out control in B
BZ	Meter-in control in B
ABA	Meter-out control in A and B
ABZ	Meter-in control in A and B

Code	Seal
1	NBR
5	FPM

Code	Option
C	16
D	06/10

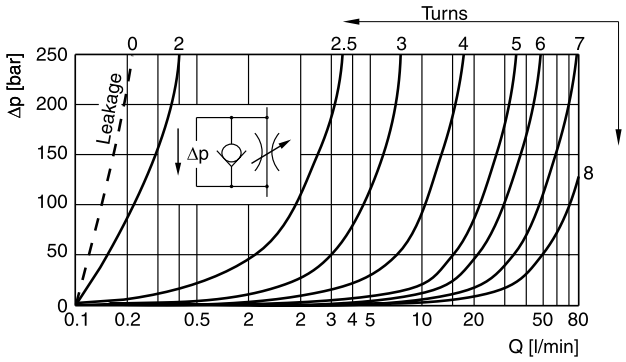
Code	Nominal size
01	NG06
02	NG10
03	NG16

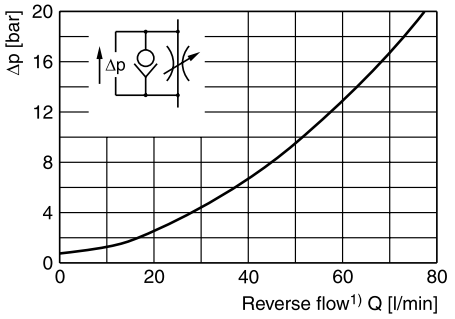
Ordering code details see end of chapter.

7

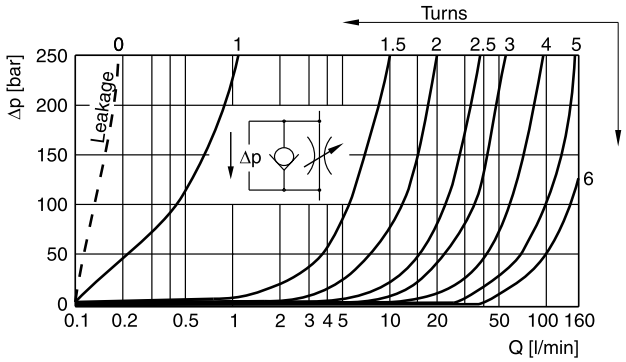
p/Q performance curves

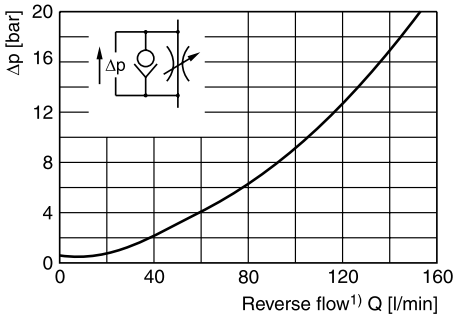
ZRD*01



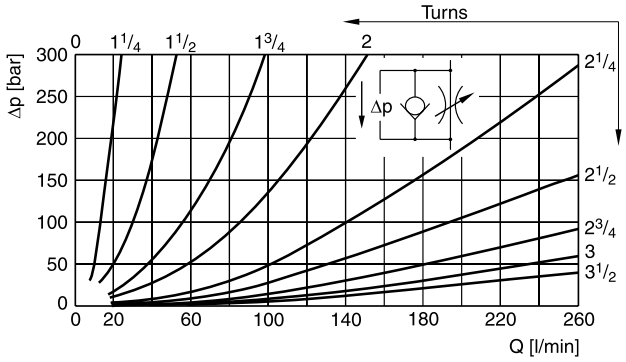


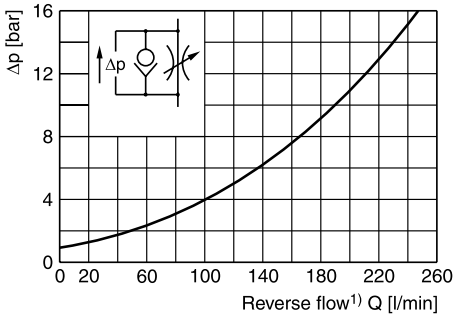
ZRD*02





ZRD*03





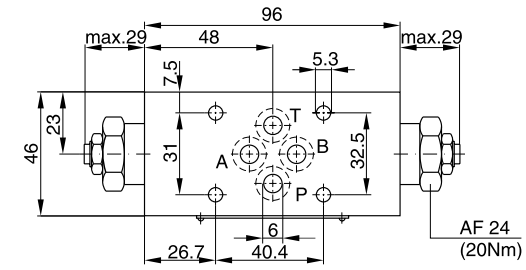
1) Throttle closed

Fluid viscosity 30 cSt at 50°C

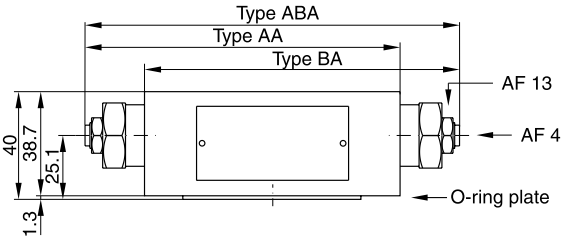
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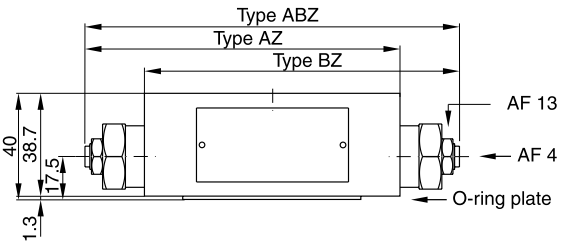
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ZRD*01



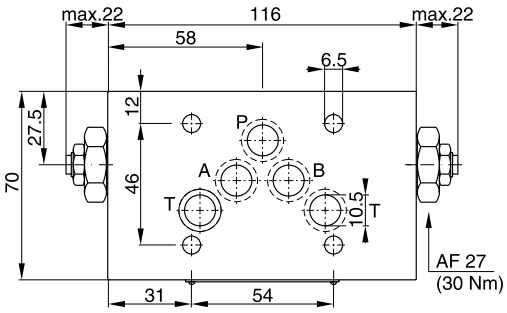
Seal kit	
Seal	Order code
1	098-91096-0
5	098-91097-0
Complete cartridge Order code	098-91119-0
O-ring plate Order code	S26-27553-0



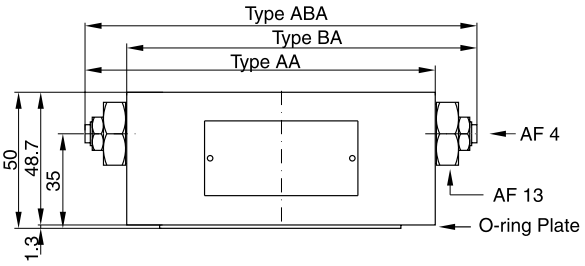


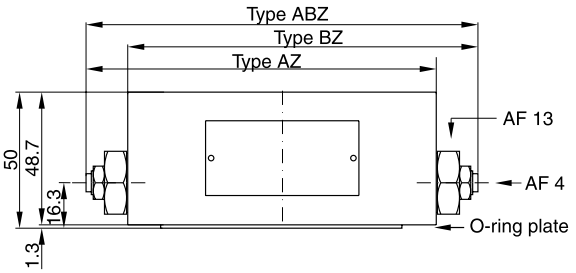
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ZRD*02

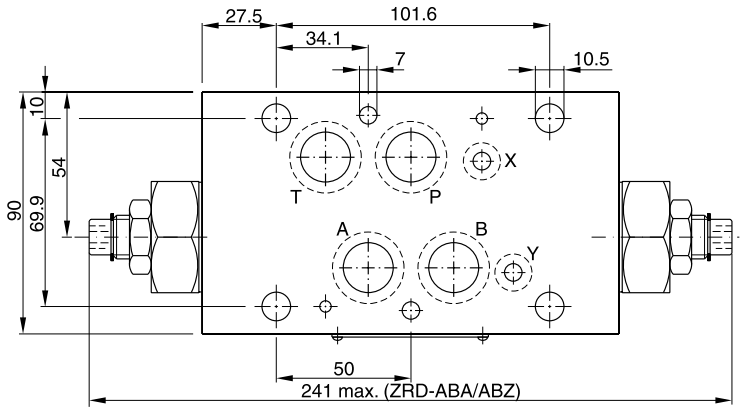


Seal kit	
Seal	Order code
1	098-91098-0
5	098-91099-0
Complete cartridge Order code	098-91120-0
O-ring plate Order code	S16-85742-0

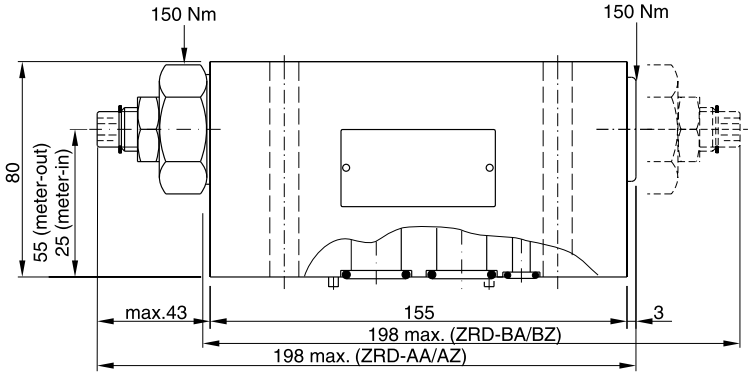




ZRD*03



Seal kit	
Seal	Order code
1	098-91442-0
5	098-91443-0
Complete cartridge Order code 098-91441-0	

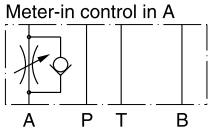


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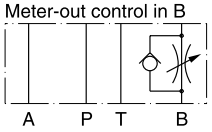
ZRD*01

Meter-in control in A



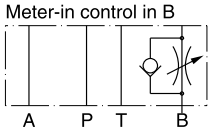
Series ZRD-AZ01-S0-D1 — Order No. 098-91056-0

Meter-out control in B



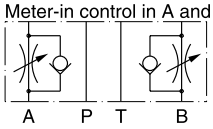
Series ZRD-BA01-S0-D1 — Order No. 098-91013-0

Meter-in control in B



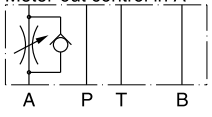
Series ZRD-BZ01-S0-D1 — Order No. 098-91057-0

Meter-in control in A and B



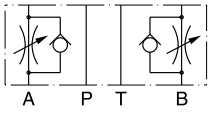
Series ZRD-ABZ01-S0-D1 — Order No. 098-91058-0

Meter-out control in A



Series ZRD-AA01-S0-D1 — Order No. 098-91012-0

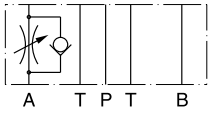
Meter-out control in A and B



Series ZRD-ABA01-S0-D1 — Order No. 098-91014-0

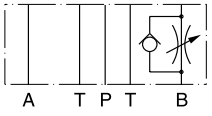
ZRD*02

Meter-in control in A



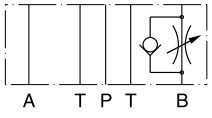
Series ZRD-AZ02-S0-D1 — Order No. 098-91059-0

Meter-out control in B



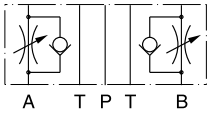
Series ZRD-BA02-S0-D1 — Order no. 098-91016-0

Meter-in control in B



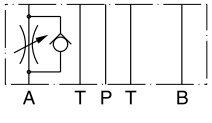
Series ZRD-BZ02-S0-D1 — Order No. 098-91060-0

Meter-in control in A and B



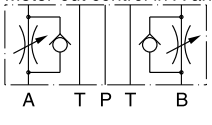
Series ZRD-BAZ02-S0-D1 — Order no. 098-91061-0

Meter-out control in A



Series ZRD-AA02-S0-D1 — Order no. 098-91015-0

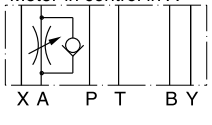
Meter-out control in A and B



Series ZRD-ABA02-S0-D1 — Order no. 098-91017-0

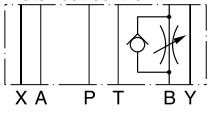
ZRD*03

Meter-in control in A



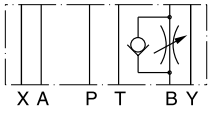
Series ZRD-AZ03-S0-C1 — Order no. 098-91422-0

Meter-out control in B



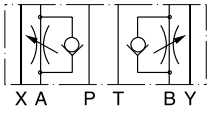
Series ZRD-BA03-S0-C1 — Order no. 098-91423-0

Meter-in control in B



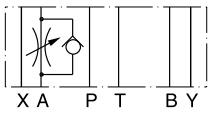
Series ZRD-BZ03-S0-C1 — Order no. 098-91424-0

Meter-in control in A and B



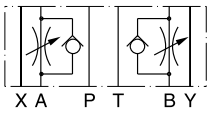
Series ZRD-ABZ03-S0-C1 — Order no. 098-91421-0

Meter-out control in A



Series ZRD-AA03-S0-C1 — Order no. 098-91419-0

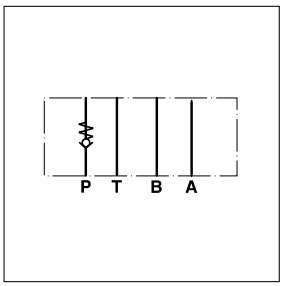
Meter-out control in A and B

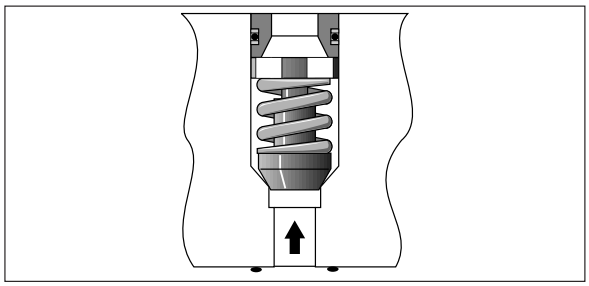


Series ZRD-ABA03-S0-C1 — Order no. 098-91420-0

Check valves from the Parker Manapak series CM are in sandwich design for easy configuration of stack systems. Depending on the function required, one or two check valves are arranged in ports P, T, A, and B. Number and flow direction can be selected from the ordering code.







Features

- The valve bodies of the Parker Manapak valve series CM are made of steel.
- Eight options for the arrangement of the check valve in the body offer a multitude of uses for hydraulic switching.
- The function can be changed by turning the valve.
- CM2 - NG06 (CETOP3)
  CM3 - NG10 (CETOP5)

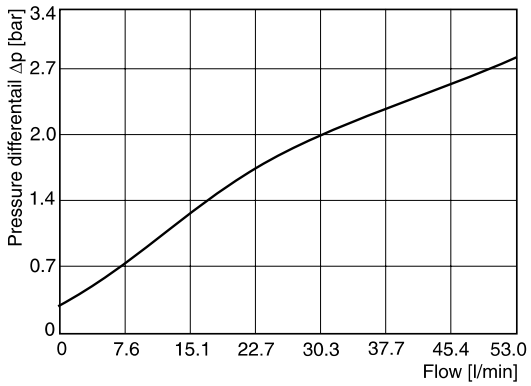
Technical data

Series		CM2	CM3
Mounting pattern		ISO 4401-03-02-0-94	ISO 4401-05-04-0-94
Max. operating pressure	[bar]	350	350
Max. flow	[l/min]	53	76
Opening pressure	[bar]	0.3	0.3
Mounting position		unrestricted	unrestricted
Ambient temperature	[°C]	max. +50	max. +50
Fluid temperature	[°C]	max. +70	max. +70
Weight	[kg]	0.9	1.7

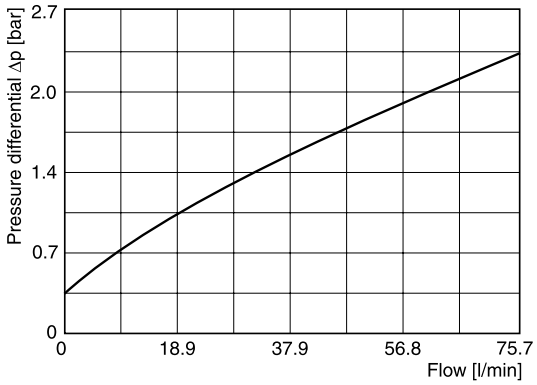
7

Δp/Q performance curves

CM2



CM3



CM			V	
Check valve	Valve size	Port	Seal FPM	Design series (not required for ordering)

Code	Description
2	**Intermediate plate DIN NG06**
3	**Intermediate plate DIN NG10**

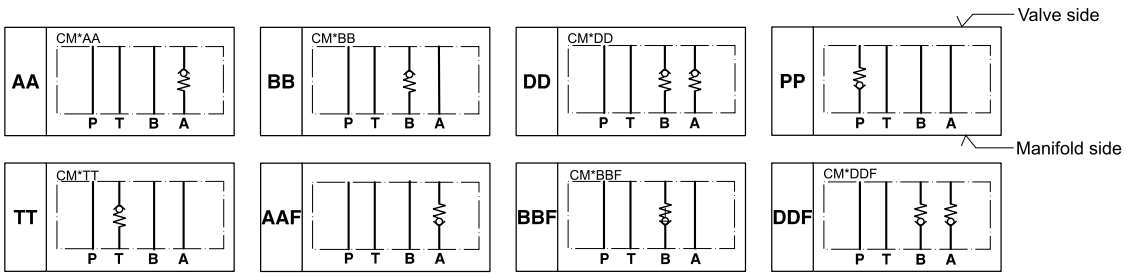
Code	Free flow polarity	Check valve in channel:
AA	**From directional valve to manifold**	**A**
BB	**From directional valve to manifold**	**B**
DD	**From directional valve to manifold**	**A a. B**
PP	**From manifold to directional valve**	**P**
TT	**From directional valve to manifold**	**T**
AAF	From manifold to directional valve	A
BBF	From manifold to directional valve	B
DDF	From manifold to directional valve	A a. B

Bold letters =
Short-term availability

7

Schematics

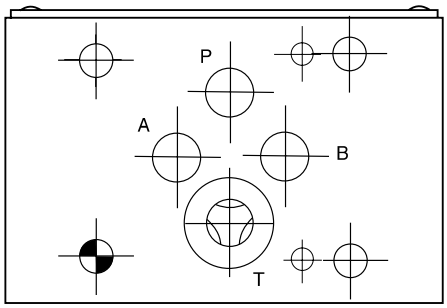
The valve side is shown at the top of the symbols, the manifold side with channel designation is shown on the bottom.



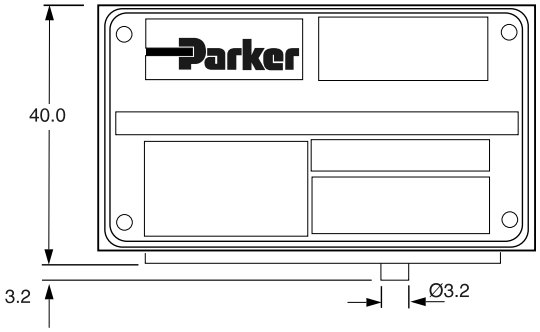
CM2

Bottom view*

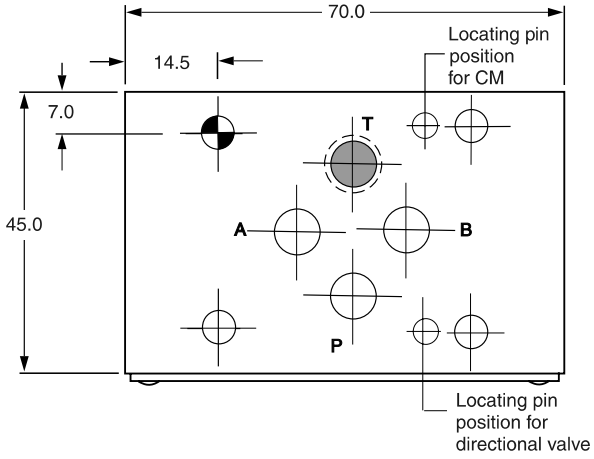
(manifold side)
*O-Ring plate is not shown!
This view shows the TT model.



Front side



Top view



Seal kit CM2	
Seal	Order code
V	SK-CM2-V

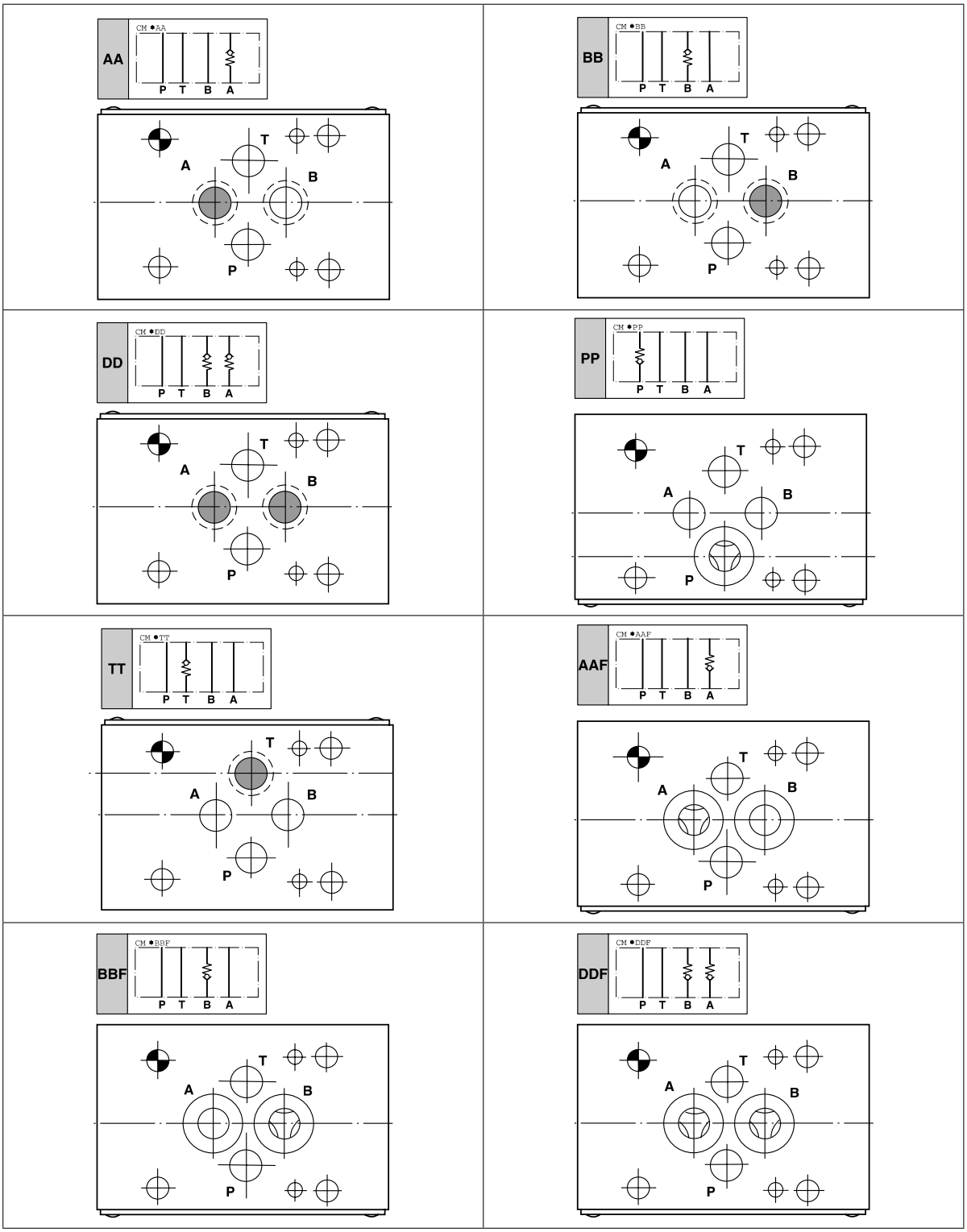
Note:
The O-ring plate for sealing the connecting surface of the manifold side is included. The O-ring plate and the positioning pin are always mounted on the manifold side.

CM_UK.INDD RH_10.03.08

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Kaarst, Germany

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CM2 top views (from directional valve side)



7

CM_UK.INDD RH_10.03.08

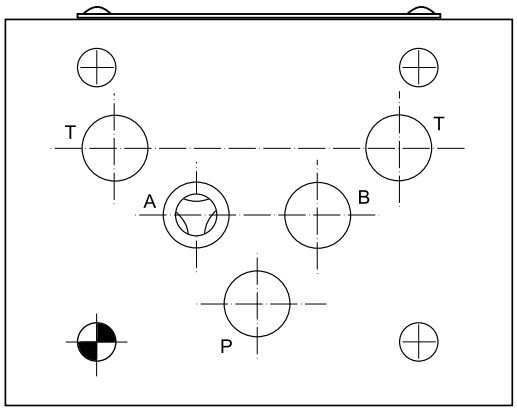
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Hydraulic Controls Division
Kaarst, Germany

Tel: +45 63 12 83 00 | Email: ps@hymatik.com | www.hymatik.com | Hvidkaervej 27a, DK-5250 Odense SV, Denmark

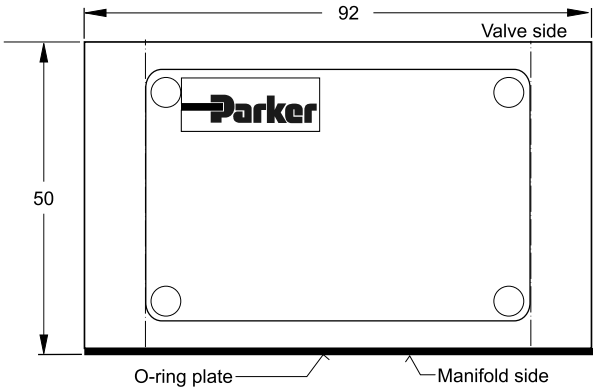
CM3

Bottom view*

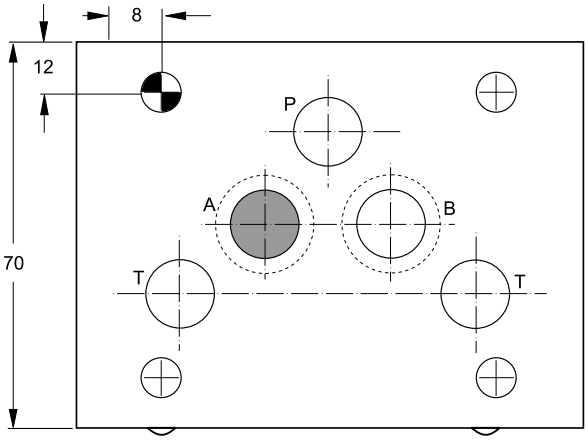
(manifold side)
*O-Ring plate is not shown!
This view shows the AA model.



Front side



Top view



Seal kit CM3	
Seal	Order code
V	SK-CM3-V

Note:
The O-ring plate for sealing the connecting surface of the manifold side is included. The O-ring plate is always mounted on the manifold side.

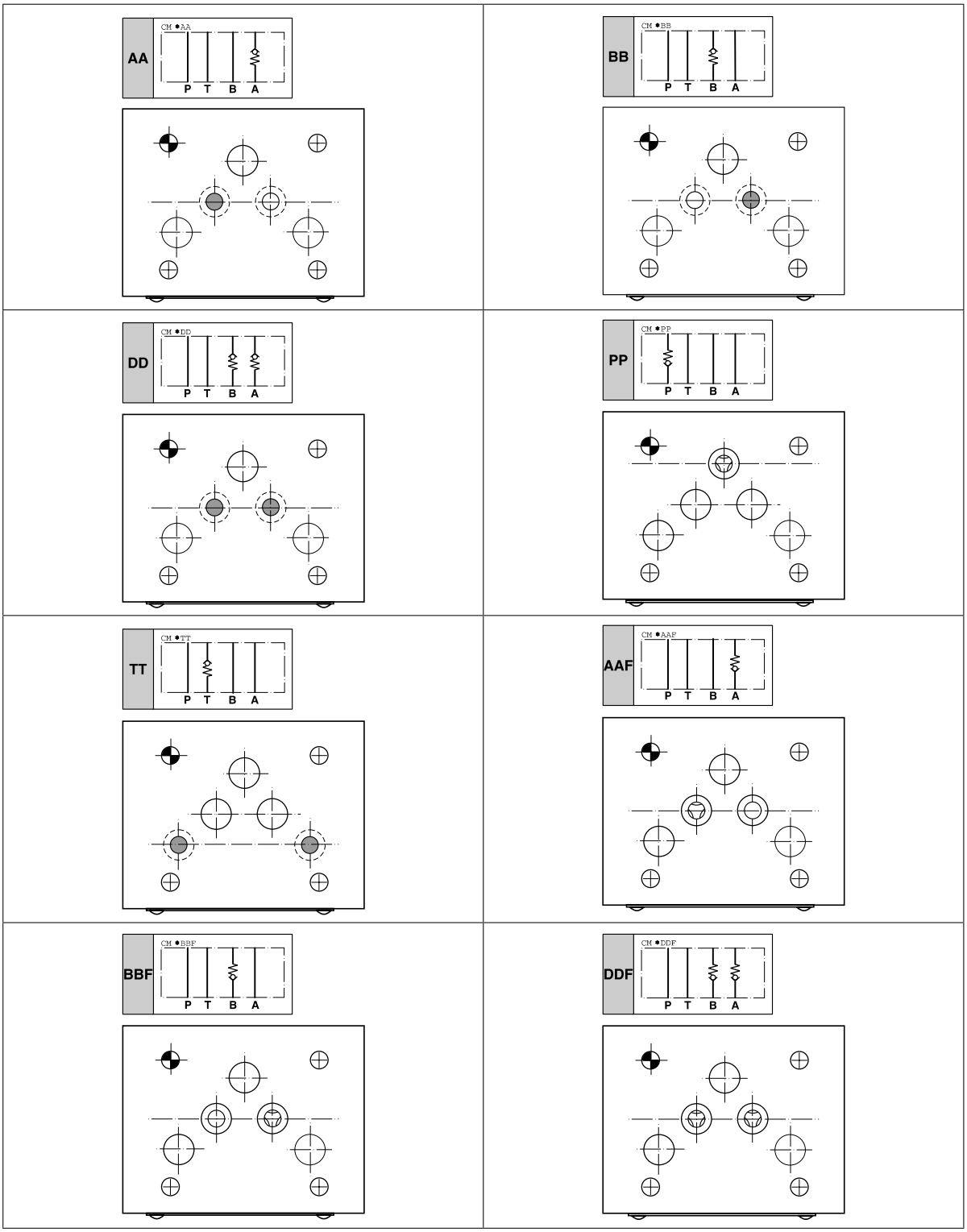
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CM_UK.INDD RH_10.03.08

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CM3 top views (from directional valve side)



7

CM_UK.INDD RH_10.03.08

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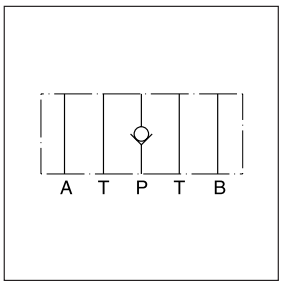
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Direct operated check valves series ZRV have a cartridge type insert to provide zero leakage and high life time.

The check function can be located in the P- or in the T-port.



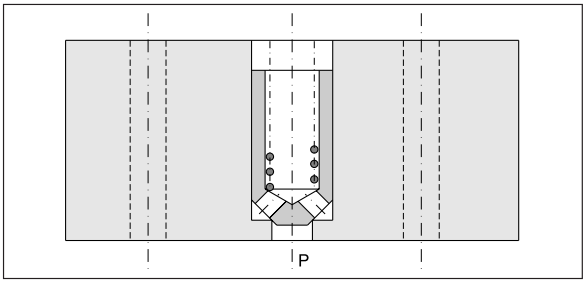
ZRV-P02



ZRV-P02

Features

- Leakage-free seat
- High life time
- Cracking pressure 0.5 bar
- Sizes
  - ZRV01 - NG06 / CETOP3
  - ZRV02 - NG10 / CETOP5

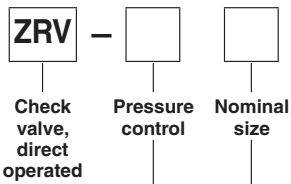


ZRV-P02

Technical data

General			
Size		**06**	**10**
Mounting interface		DIN 24340 A6 ISO 4401 NFPA D03	DIN 24340 A10 ISO 4401 NFPA D05
		CETOP RP 121	
Mounting position		unrestricted	
Ambient temperature	[°C]	-20...+50	
Weight	[kg]	0.7	2.0
Hydraulic			
Max. operating pressure	[bar]	350	up to 315
Nominal flow	[l/min]	40	100
Cracking pressure	[bar]	0.5	0.5
Fluid		Hydraulic oil as per DIN 51524...525	
Fluid temperature	[°C]	-20...+80	
Viscosity permitted	[mm²/s]	10...650	
Viscosity recommended	[mm²/s]	30	
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)	

Ordering code



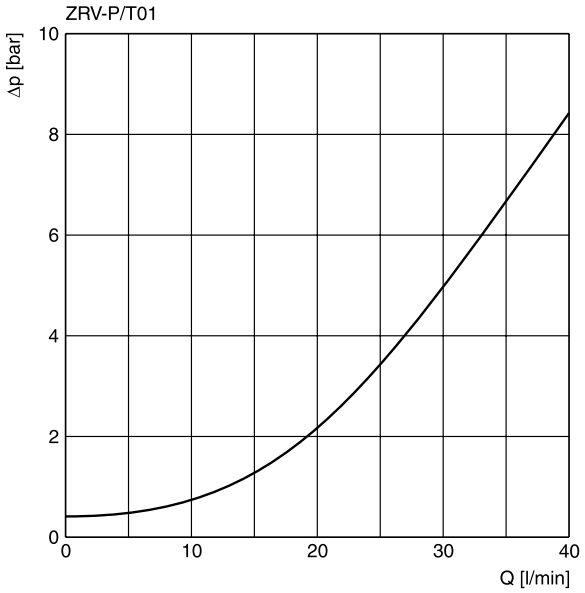
Code	Press. control
P	Blocked in P
T	Blocked in T

Code	Nominal size
01	NG06
02	NG10

Ordering code details see end of chapter.

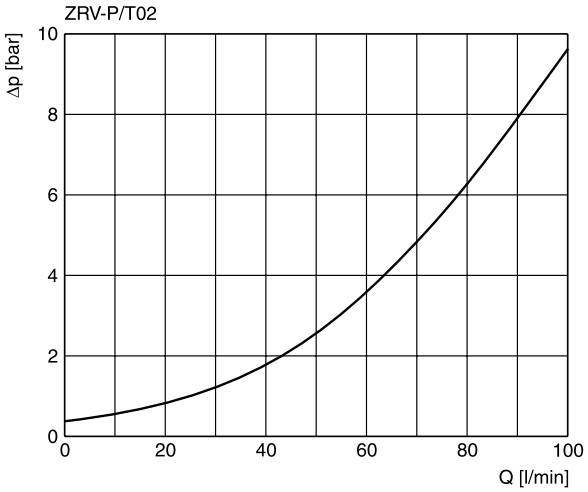
p/Q performance curves

ZRV*01



7

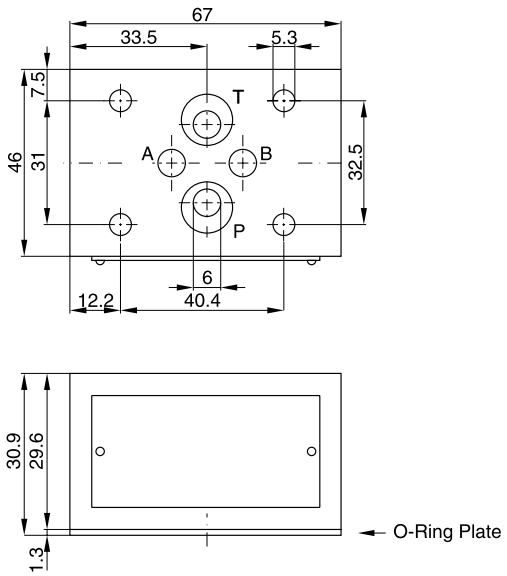
ZRV*02



Fluid viscosity 30 cSt at 50°C

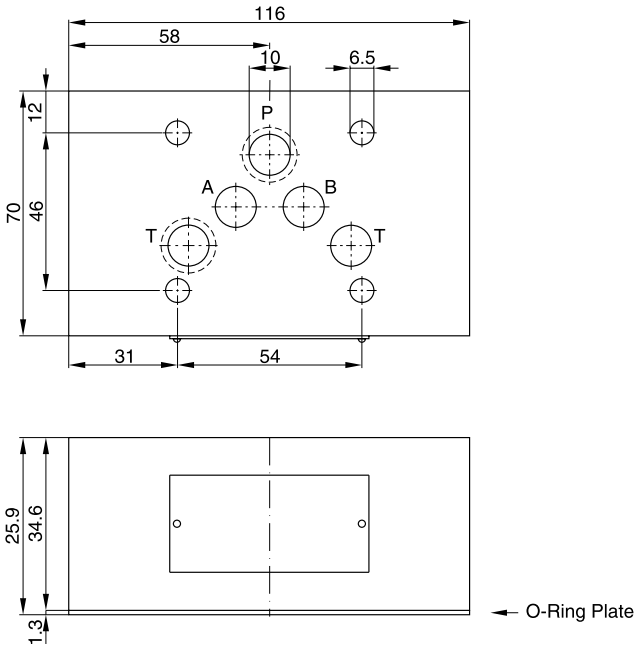
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ZRV01



Seal kit	
Seal	Order code
NBR	SK-CM2-10
FPM	SK-CM2-V-10

ZRV02

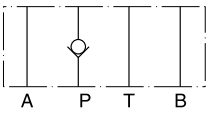


Seal kit	
Seal	Order code
NBR	SK-CM3-10
FPM	SK-CM3-V-50

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ZRV01

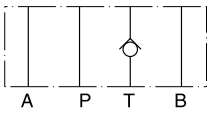
blocked in P



Series ZRV-P01

Order No. 098-90025-0

blocked in T

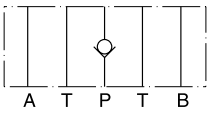


Series ZRV-T01

Order No. 098-90026-0

ZRV02

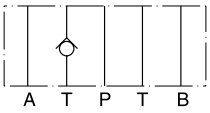
blocked in P



Series ZRV-P02

Order No. 098-90043-0

blocked in T



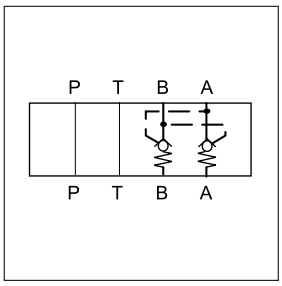
Series ZRV-T02

Order No. 098-90044-0

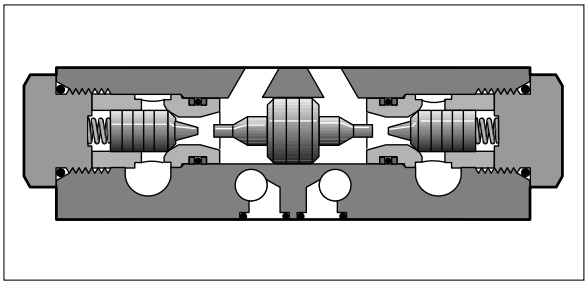
7

Pilot operated check valves from the Parker Manapak series CPOM are in sandwich design for easy configuration of stack systems. Depending on the function required, one or two pilot operated check valves are arranged in the ports A and/or B. The free flow direction is always from the valve side to the manifold side.





CPOM3



Function

The check valves open when flowing to the consumer side, where the opposing check valve is hydraulically-mechanically pilot operated simultaneously by a control spool, and thus the return flow is enabled from other consumer sides.

Features

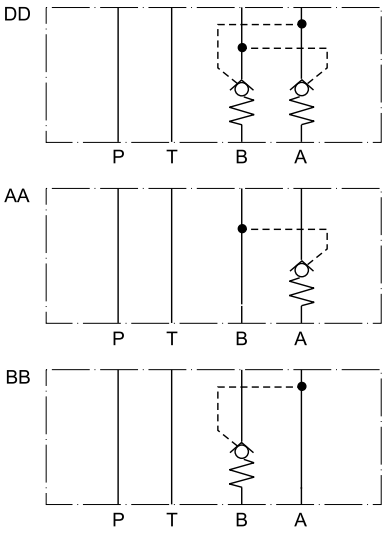
- The valve bodies of the Parker Manapak valve series CPOM are made of steel.
- The valve poppet is precisely guided into the steel sleeve and ensures a good seal on the seat.
- When the valve poppet is open, the large cross-section allows high flow rates at low differential pressure.
- Different control ratios can be chosen with the NG6 and NG10 valves.
- Pre-opening for CPOM*HT to achieve smooth opening.

Technical data

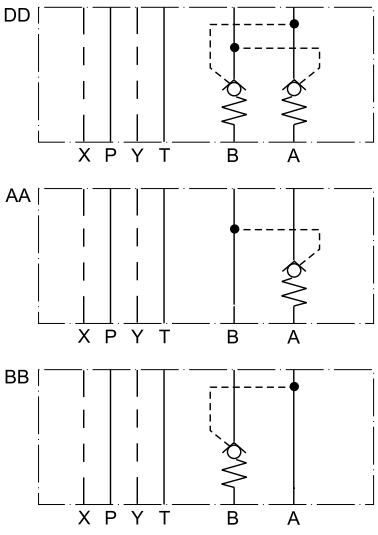
Port size	DIN	NG06	NG10	NG16	NG25
Mounting pattern		ISO 4401			
Series		CPOM2	CPOM3	CPOM4	CPOM6
Working pressure	[bar]	350	350	350	210
Opening pressure	[bar]	1.0	0.8	2.0	0.4
Control ratio		1 : 3 or 1 : 7	1 : 3 or 1 : 6.5	1 : 13	1 : 3
Weight	[kg]	1.8	4.0	7.65	9.5

7

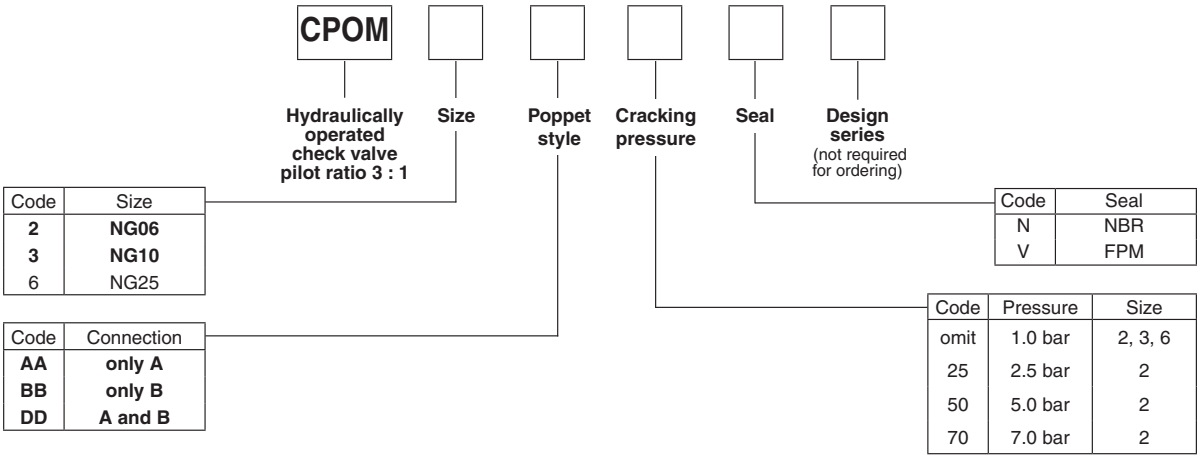
CPOM2 / CPOM3



CPOM4 / CPOM6



Without pre-opening



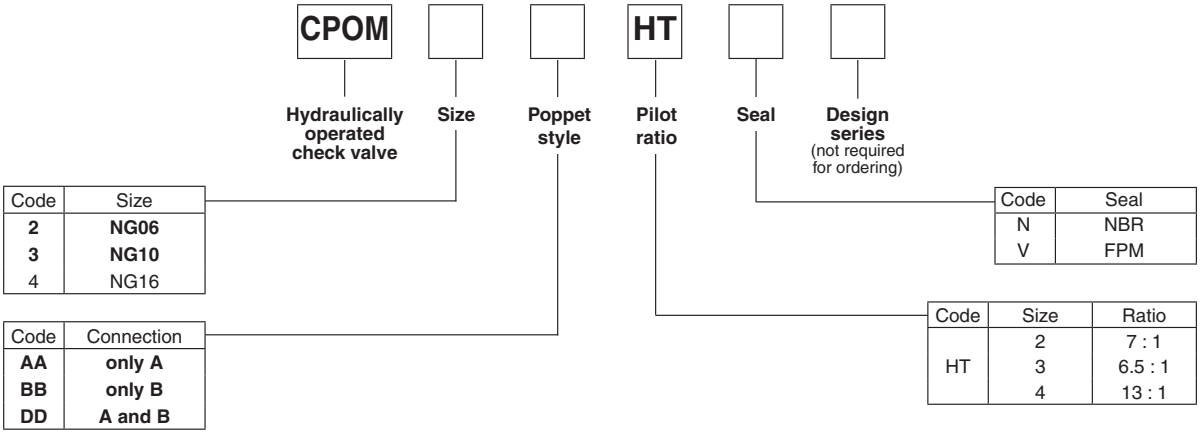
Code	Size
2	**NG06**
3	**NG10**
6	NG25

Code	Connection
AA	**only A**
BB	**only B**
DD	**A and B**

Code	Seal
N	NBR
V	FPM

Code	Pressure	Size
omit	1.0 bar	2, 3, 6
25	2.5 bar	2
50	5.0 bar	2
70	7.0 bar	2

With pre-opening



Code	Size
2	**NG06**
3	**NG10**
4	NG16

Code	Connection
AA	**only A**
BB	**only B**
DD	**A and B**

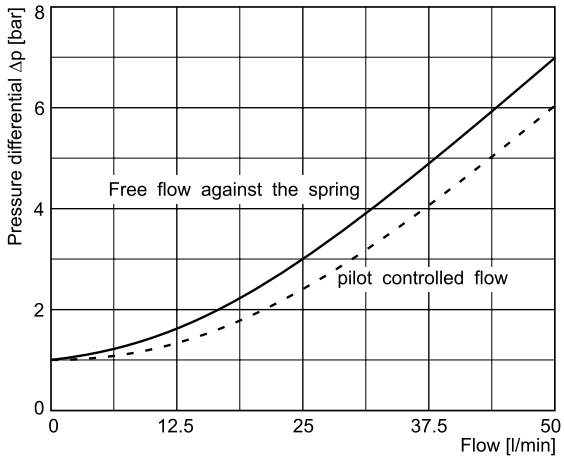
Code	Seal
N	NBR
V	FPM

Code	Size	Ratio
HT	2	7 : 1
	3	6.5 : 1
	4	13 : 1

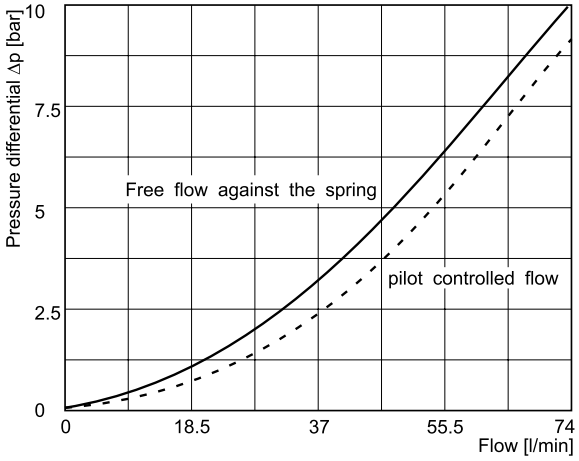
Bold letters =
Short-term availability

Δp/Q performance curves

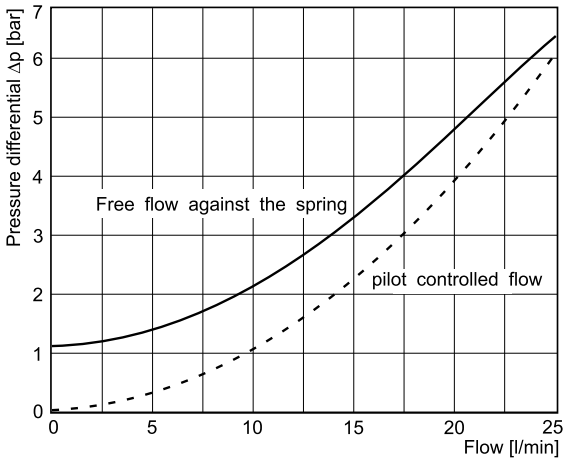
CPOM2



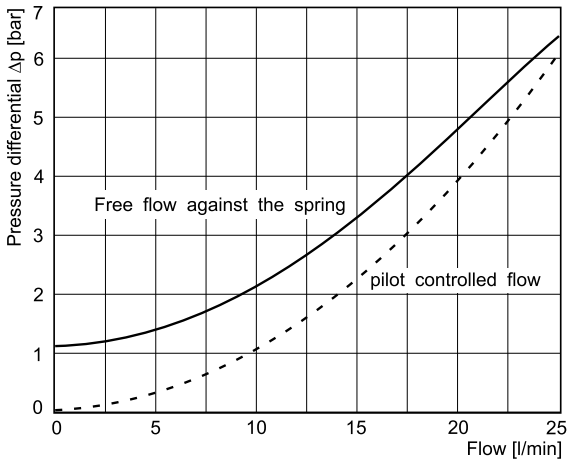
CPOM3



CPOM2 (type HT)



CPOM3 (type HT)

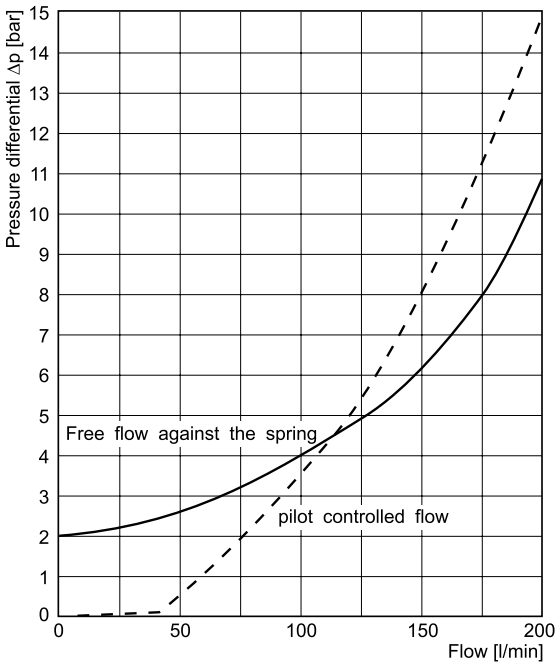


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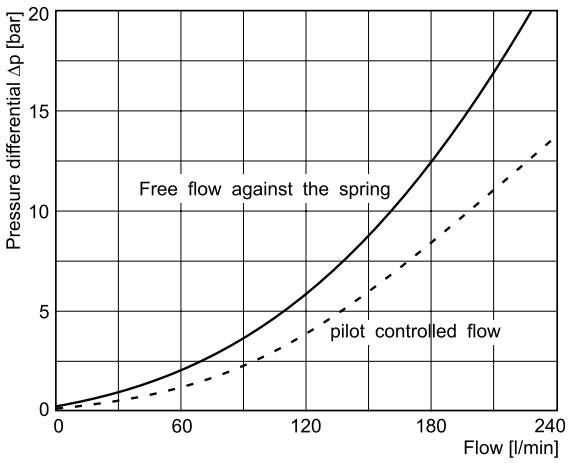
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Δp/Q performance curves

CPOM4 (type HT)

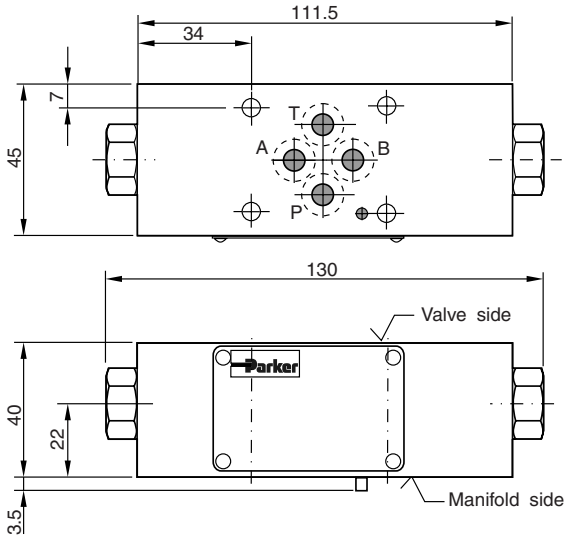


CPOM6



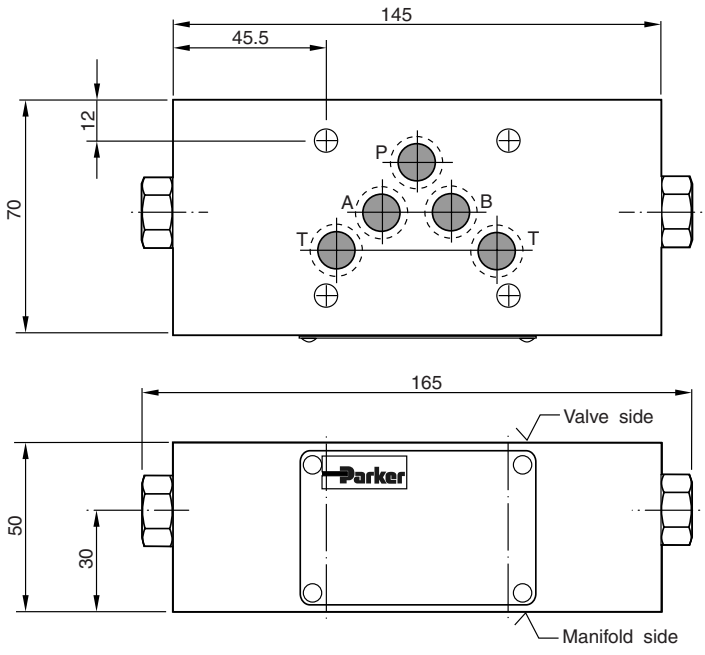
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CPOM2



Seal kit CPOM2	
Seal	Order code
V	SK-CPOM2-V-11

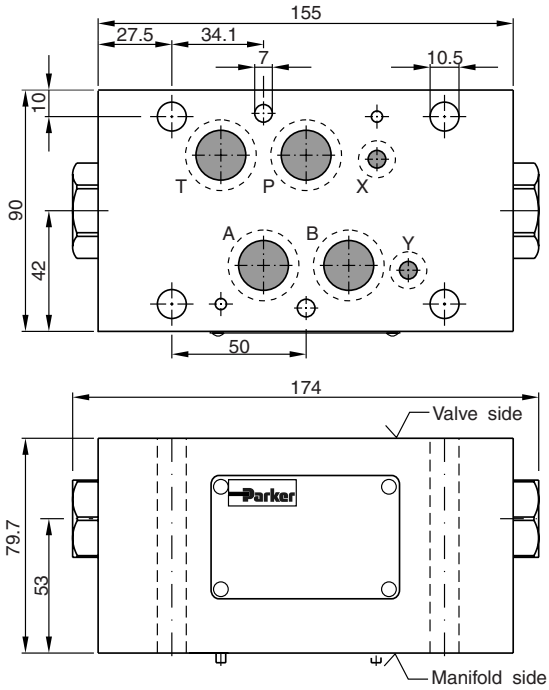
CPOM3



Seal kit CPOM3	
Seal	Order code
V	SK-CPOM3-V-11

Note:
The O-ring plate for sealing the connecting surface of the manifold side is included. The O-ring plate and the positioning pin are always mounted on the manifold side.

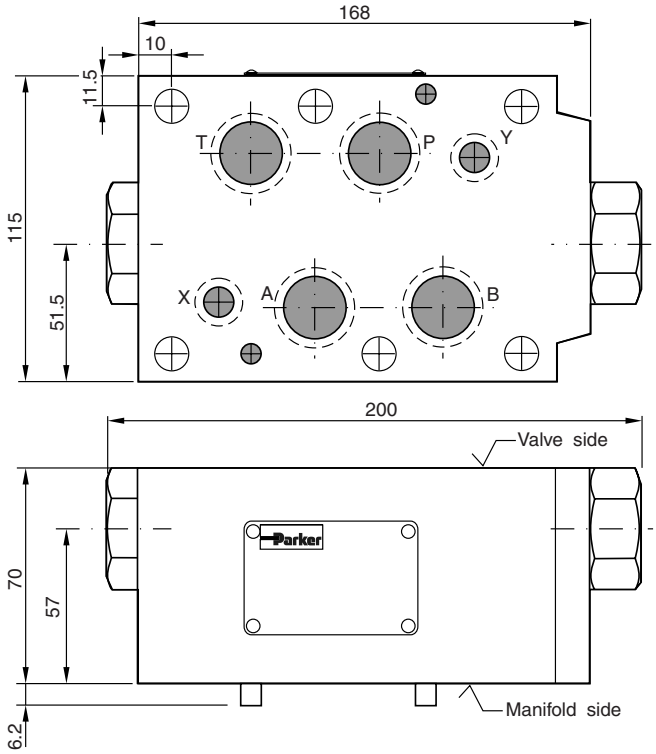
CPOM4



Seal kit CPOM4	
Seal	Order code
V	SK-CPOM4HTV

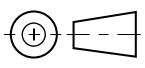
7

CPOM6



Seal kit CPOM6	
Seal	Order code
V	SK-CPOM6-V-20

Note:
The O-ring plate for sealing the connecting surface of the manifold side is included. The O-ring plate and the positioning pin are always mounted on the manifold side.



CPOM_UK.INDD RH_22.11.07

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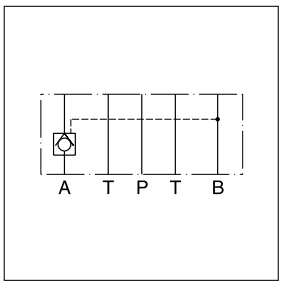
Pilot operated check valves series ZRE are designed for maximum flow rates and long life time.

The valves are typically used in combination with spool type directional control valves to ensure leak free positioning of the actuator.

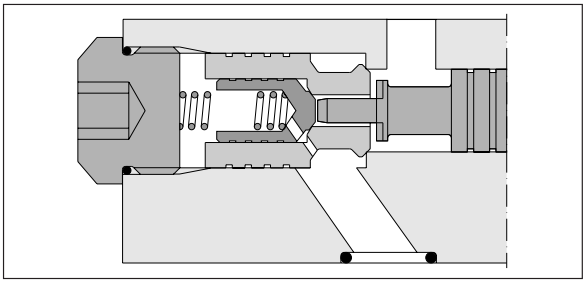
The inlet flow is free while the outlet flow is blocked. Pressure in the inlet line opens the check valve and allows free outlet flow.



ZRE-B01



ZRE-A02



ZRE-A02

Features

- High flow capacity
- High life time
- Check function in A, B or A + B
- Sizes
  - ZRE01 - NG06 / CETOP3
  - ZRE02 - NG10 / CETOP5
  - ZRE03 - NG16 / CETOP7

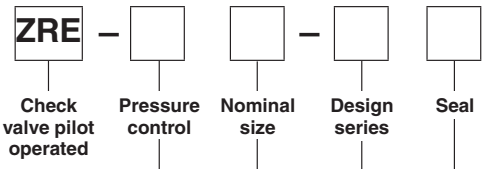
7

Technical data

General				
Size		**06**	**10**	**16**
Mounting interface		DIN 24340 A6 ISO 4401 NFPA D03	DIN 24340 A10 ISO 4401 NFPA D05	DIN 24340 A16 ISO 4401 NFPA D08
Mounting position		CETOP RP 121 unrestricted		
Ambient temperature	[°C]	-20...+50		
Weight	[kg]	1.2	3.1	7.65
Hydraulic				
Max. operating pressure	[bar]	up to 350 (size 10 up to 315)		
Nominal flow	[l/min]	60	120	300
Opening ratio (pilot cone / main cone)		1:6	1:6	1:13
Cracking pressure	[bar]	1.2	2.0	2.0
Fluid		Hydraulic oil as per DIN 51524...525		
Fluid temperature	[°C]	-20...+80		
Viscosity permitted	[cSt]/[mm²/s]	10...650		
Viscosity recommended	[cSt]/[mm²/s]	30		
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)		

Ordering Code

Series ZRE (Denison)



Code	Size
A	Blocked in A
B	Blocked in B
AB	Blocked in A and B

Code	Nominal size
01	NG06
02	NG10
03	NG16

Code	Seal
1	NBR
5	FPM

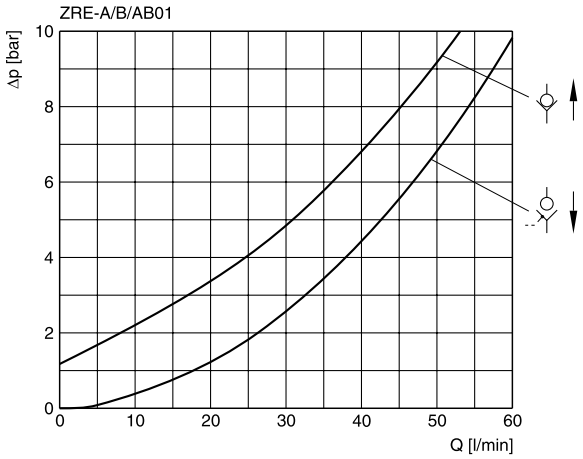
Code	Size
C	16
D	06
E	10

Ordering code details see end of chapter.

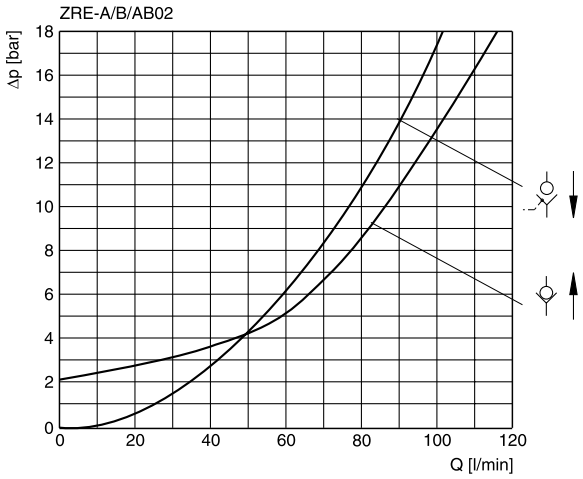
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p/Q performance curves

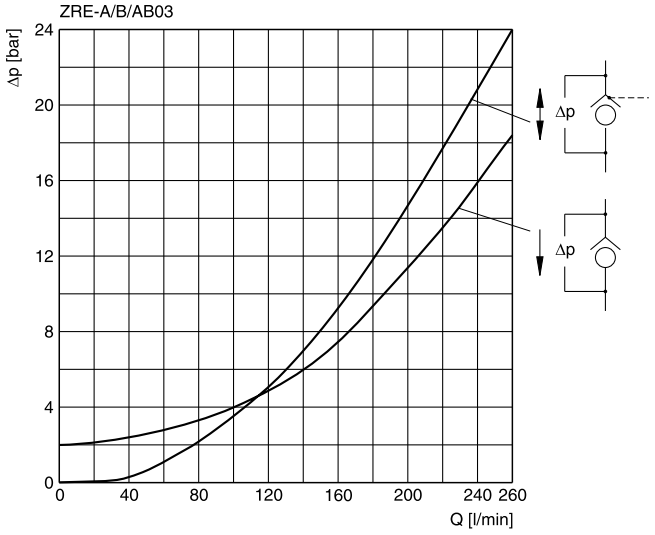
ZRE*01



ZRE*02



ZRE*03



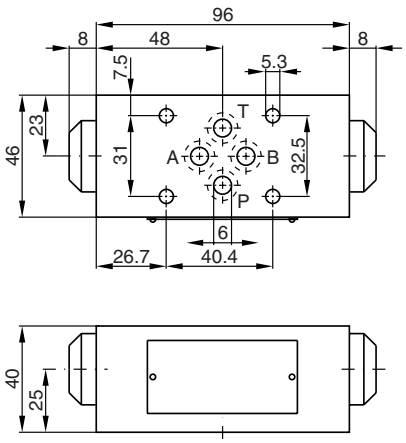
Fluid viscosity 30 cSt at 50°C

ZRE_UK.INDD RH_18.01.08

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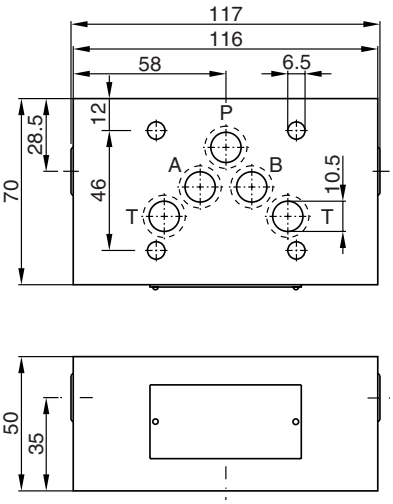
ZRE*01



Seal kit	
Seal	Order code
1	098-91088-0
5	098-91089-0

7

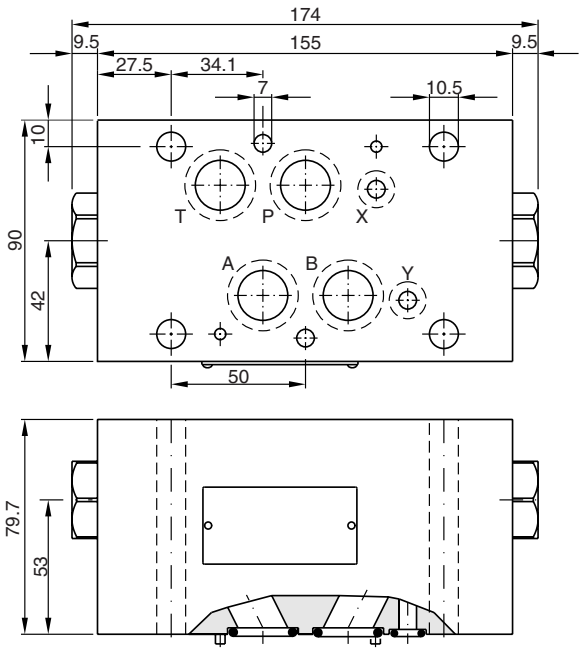
ZRE*02



Seal kit	
Seal	Order code
1	098-91090-0
5	098-91091-0

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ZRE*03



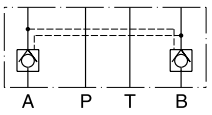
Seal kit	
Seal	Order code
1	098-91444-0
5	098-91445-0

7

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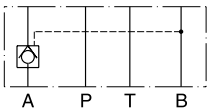
ZRE*01

blocked in A and B



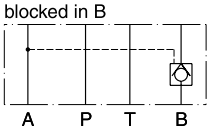
Series ZRE-AB01-D1 — Order No. 098-91020-0

blocked in A



Series ZRE-A01-D1 — Order No. 098-91018-0

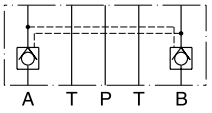
blocked in B



Series ZRE-B01-D1 — Order No. 098-91019-0

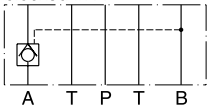
ZRE*02

blocked in A and B



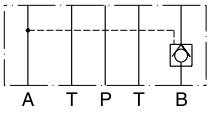
Series ZRE-AB02-E1 — Order No. 098-91300-0

blocked in A



Series ZRE-A02-E1 — Order No. 098-91298-0

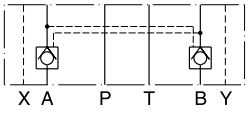
blocked in B



Series ZRE-B02-E1 — Order No. 098-91304-0

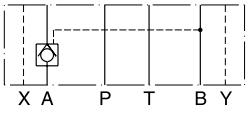
ZRE*03

blocked in A and B



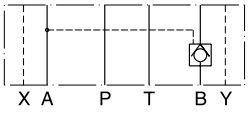
Series ZRE-AB03-C1 — Order No. 098-91426-0

blocked in A



Series ZRE-A03-C1 — Order No. 098-91425-0

blocked in B

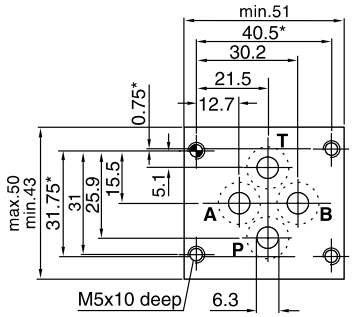


Series ZRE-B03-C1 — Order No. 098-91428-0

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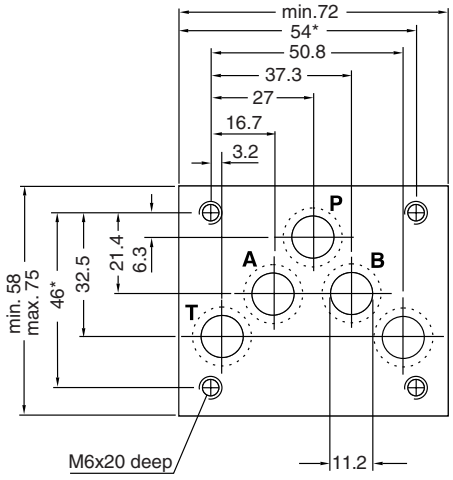
NG06

Code: ISO 4401-03-02-0-94



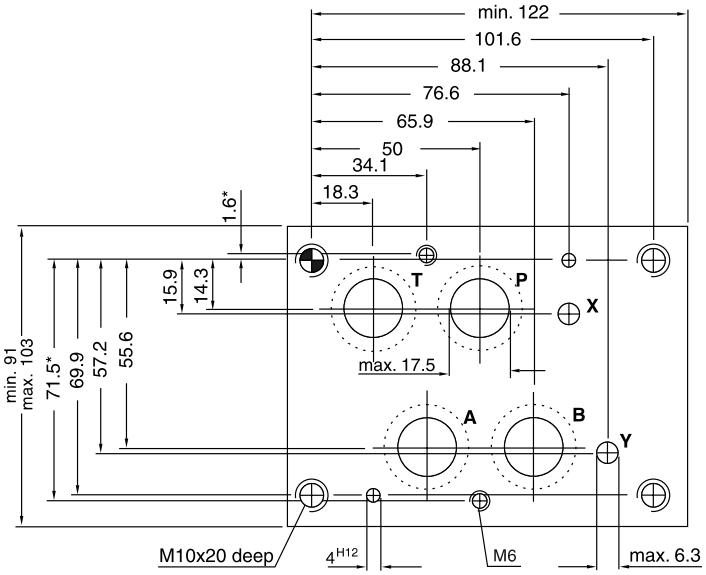
NG10

Code: ISO 4401-05-05-0-94



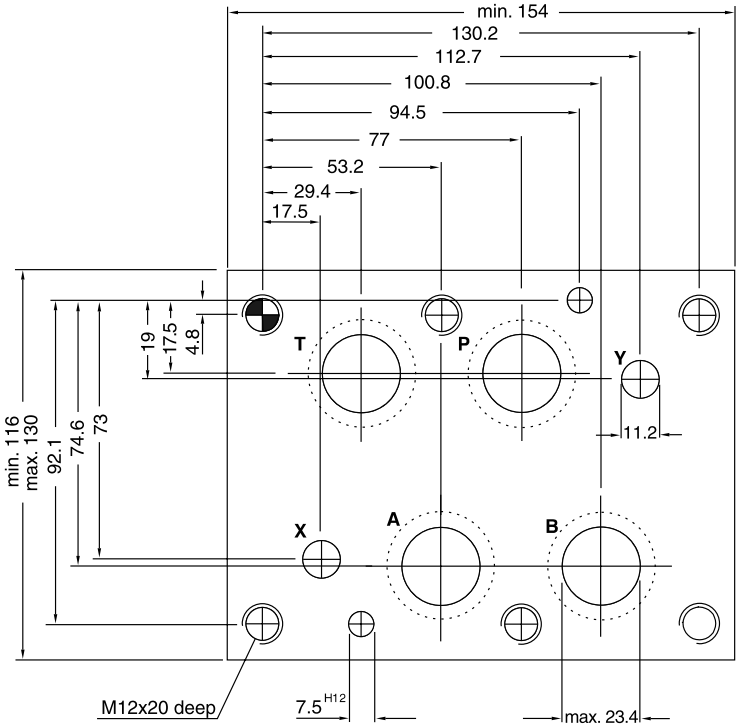
NG16

Code: ISO 4401-07-06-0-94



NG25

Code: ISO 4401-08-07-0-94 (Port diameter acc. to NFPA)



Dimensions marked with*: ± 0.1mm.
All other dimensions: ± 0.2mm.

access07.INDD RH_22.11.07

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Mounting

Parker and Denison sandwich valves can be installed as desired. Each has a mounting pattern, whose dimensions correspond to the following standards.

ISO 4401
DIN 24430
CETOP RP121
NFPA

Mounting screws

Cylinder head bolts as per DIN 912/12.9, or studs as per DIN 835 10.9 with cylindrical nuts are used to mount the height stacking Manapak sandwich valves.

Bolt kits and tie rods see chapter 12, "Accessories".

Length of the mounting screws

The screw length is the sum of the engagement depth plus the stacking length. The stud length is the sum of the stacking length plus the thread depth of the nut.

Torques

The mounting screws or studs must be tightened with the prescribed tightening torque so that safety and proper seal are ensured.

See chapter 12 “Accessories“ for BK bolt kits and TK tie rod kits.

Threads length

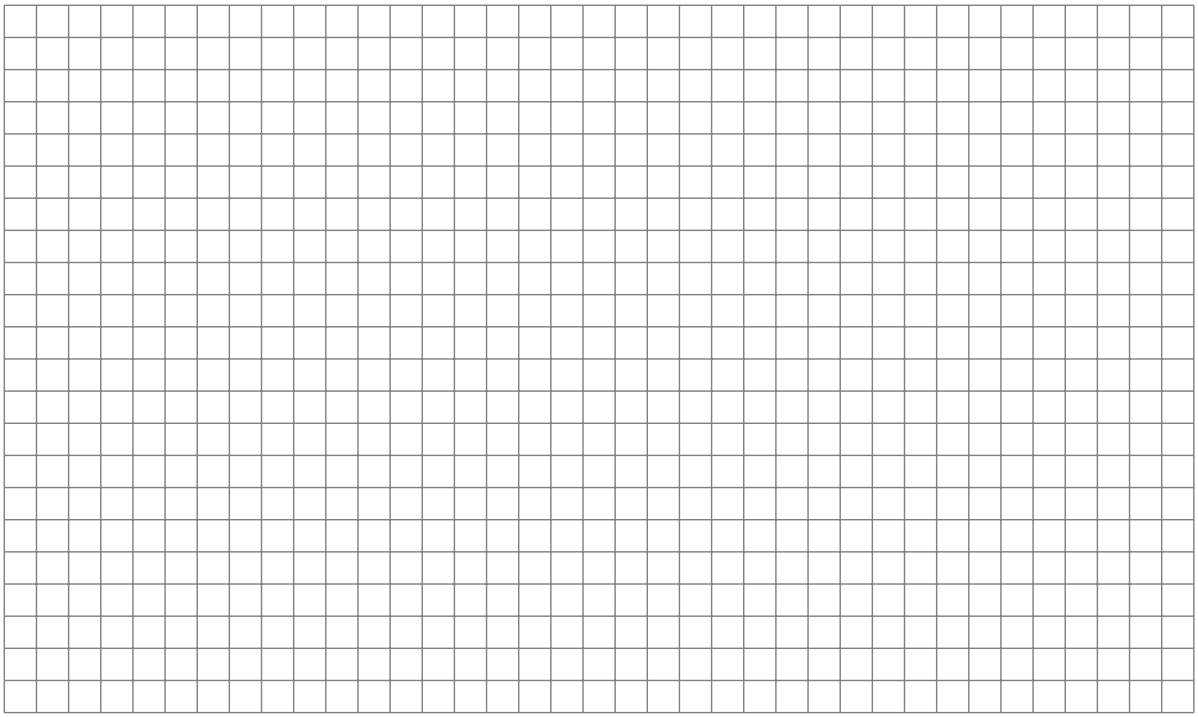
Threads	M5	M6	M10	M12
thread length	1.5 x Ø thread			

Series	Description	Size								Page
	DIN / ISO	16	25	32	40	50	63	80	100	
	2 way slip-in cartridge valves									
	Introduction, hydraulic symbols, installation dimensions									8-3
CE	2 way cartridge	•	•	•	•	•	•	•	•	8-5
C*A	Cover without auxilary function	•	•	•	•	•	•	•	•	8-8
C*B	Cover without stroke limiter	•	•	•	•	•	•	•	•	8-9
C*C	Cover for pilot system mounting	•	•	•	•	•	•	•	•	8-11
C*D	Cover for pressure relief function	•	•	•						8-14
C*E	Cover for pressure relief function plus pilot mounting	•	•	•						8-15
	Accessories									
	Pilot valves									8-16
	Cover-, Sandwich-, Adaptor plates									8-21
	Spare parts, seal kits									8-23
	Orifice diagram, orifice kits									8-24
	Extracting tools									8-25
	Complete valves and combination examples, pressure function									
R / RS*E	Pressure relief valves, manual adjustment	•	•	•	•	•				8-27
RE*E*W	Pressure relief valves, proportional adjustment	•	•	•	•	•				8-33
RE*E*T	Pressure relief valves, proportional adjustment, OBE	•	•	•	•	•				8-37
UR / US*E	Pressure unloading valves	•	•	•	•	•				8-41
	Combination examples, pressure function	•	•	•	•	•				8-47
	Complete valves, flow function									
TEH	Throttle valve, manual, with shut-off valve			•	•	•	•	•	•	8-65
TDA	Throttle valve, proportional	•	•	•	•	•	•	•	•	8-69
TEA	Throttle valve, prop., with shut-off valve			•	•	•	•	•	•	8-73
TDL	Throttle valve, prop., with LVDT and OBE				•	•	•	•	•	8-77
	Complete valves and combination examples, 2-way and check function									
C1DB	Direct operated check valve	•	•	•	•	•	•	•	•	8-83
SVLB	Pilot operated check valve	•	•	•	•	•				8-85
	Combination examples 2 way and check functions	•	•	•	•	•	•	•	•	8-89
	Complete valves, directional function with position control									
C10D*C		•	•	•	•	•	•	•	•	8-95
	Complete valves, active cartridges									
C18D*C	2 way, with position control		•	•	•	•	•			8-99
C18DB107	2 way, without auxilary functions		•	•	•	•	•			8-103
C18DB112	2 way, with stroke limiter		•	•	•					8-103
C18DB121	2 way, with pilot valve			•	•					8-103

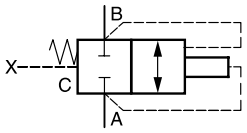
8

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Notes



Port identifications - graphics



Description

Depending on valve function and design, power ports A and B can be used for inlet or outlet.

The control port C is the connection between cover and cartridge unit.

Further control ports

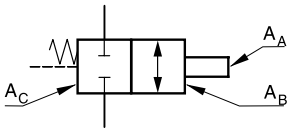
X control oil connection, inlet

Y control oil connection, outlet

Z_1 control oil connection, preferred inlet

Z_2 control oil connection, preferred outlet

Control surfaces - graphics



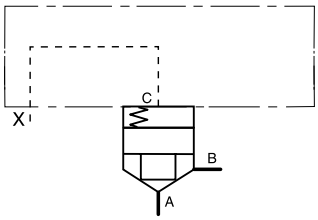
Description

A_A Area, which is subjected to the pressure at port A

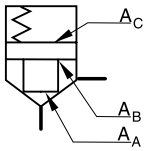
A_B Area, which is subjected to the pressure at port B

A_C Area, which is subjected to the pressure at port C

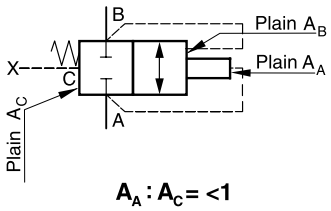
Port identifications - schematics



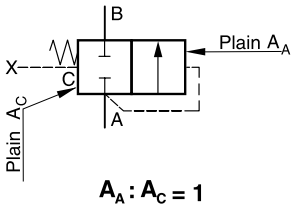
Control surfaces - schematics



Area representation

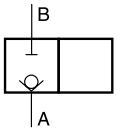


$A_A : A_C = <1$

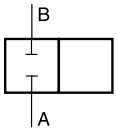


$A_A : A_C = 1$

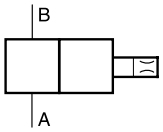
Design representation



Seat design

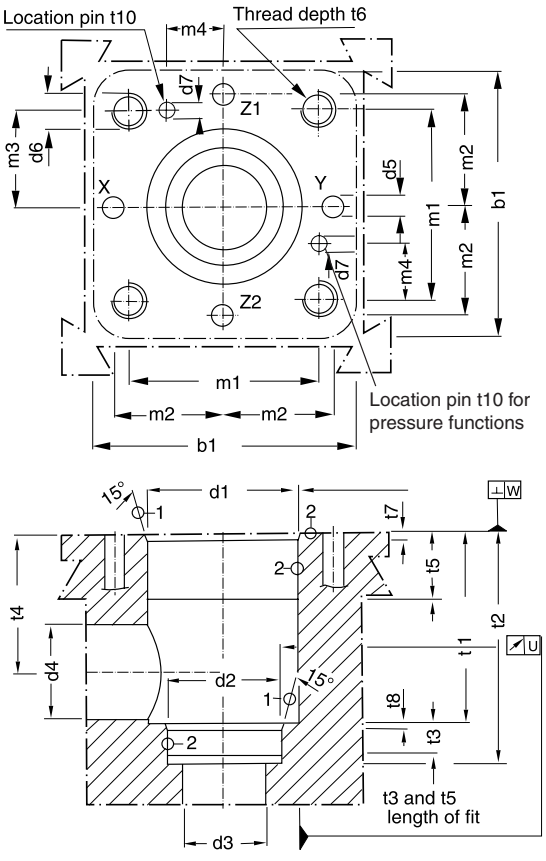


Spool design

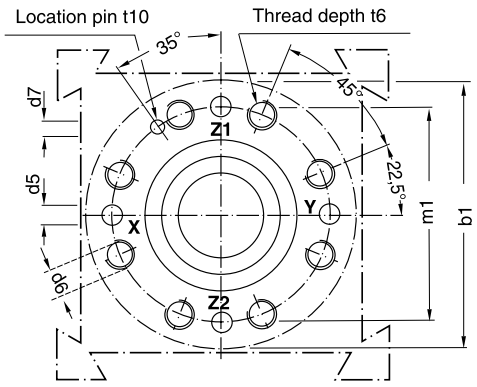


Dampening poppet

Code: ISO 7368-B*-*-2-A/B
NG 16 to NG 63



Code: ISO 7368-B*-*-2-A
NG 80 to NG 100



Hole and mounting pattern acording ISO 7368

Required surface finish:

① = $\sqrt{R_{max}16}$, ② = $\sqrt{R_{max}8}$

Cartridge manifold block series CB see chapter 12.

8

Nom. size	b1	d1 H7	d2 H7	d3	d3 max	d4	d4 max*	d5 max	d6	d7 H13	m1±0.2	m2±0.2	m3±0.2
16	65	32	25	16	18	16	25	4	M 8	4	46	25	23
25	85	45	34	25	25.5	25	32	6	M 12	6	58	33	29
32	102	60	45	32	36	32	40	8	M 16	6	70	41	35
40	125	75	55	40	43	40	50	10	M 20	6	85	50	42.5
50	140	90	68	50	56	50	63	10	M 20	8	100	58	50
63	180	120	90	63	74	63	80	12	M 30	8	125	75	62.5
80	250	145	110	80	93	80	100	16	M 24	10	200	-	-
100	300	180	135	100	115	100	125	20	M 30	10	245	-	-

Nom. size	m4±0.2	t1+0.1	t2+0.1	t3	t4	t4 max*	t5	t6	t7	t8	t10	U	W
16	10.5	43	56	11	34	29.5	20	20	2	2	10	0.03	0.05
25	16	58	72	12	44	40.5	30	25	2.5	2.5	10	0.03	0.05
32	17	70	85	13	52	48.0	30	35	2.5	2.5	10	0.03	0.1
40	23	87	105	15	64	59.0	30	45	3	3	10	0.05	0.1
50	30	100	122	17	72	65.5	35	45	4	3	10	0.05	0.1
63	38	130	155	20	95	86.5	40	65	4	4	10	0.05	0.2
80	-	175	205	25	130	120	40	50	5	5	10	0.05	0.2
100	-	210	245	29	155	142	50	53	5	5	10	0.05	0.2

* only together with $d4_{max}$ and $t4_{max}$

2 way slip-in cartridge valves are hydraulically controlled seat valves that are designed for compact block installation. Slip-in cartridge, cover, and pilot system are valve elements that permit single and combined functions.

Features

- Installation cavity and mounting pattern according to ISO 7368
- One sleeve only for all poppets
- 5 poppet shapes
- 5 poppet springs
- Optional seal between ports B and C
- Cover with adjustable stroke limitation for poppet
- Cover with mounting pattern for pilot valve assembly
- Combinations for complex functions
- Normally open cartridge (CE*F04)
- 8 nominal sizes NG16...NG100

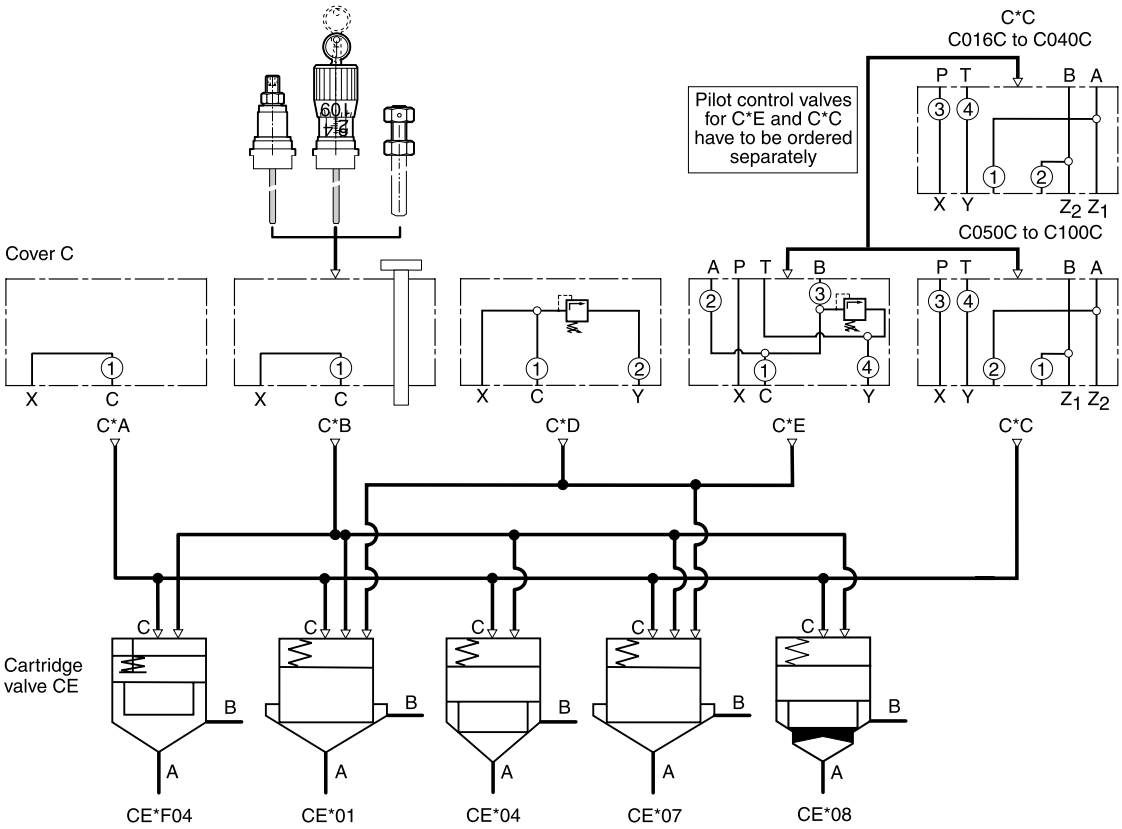

CE


C*B


C*A


C*C

Pilot control



8

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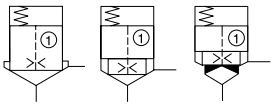
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CE	□	□	□	□	□	□	□
Cartridge	Nominal size	Design	Poppet area ratio	Spring	Orifice	Seal	Design series (not required for ordering)

Code	Size
016	**NG16**
025	**NG25**
032	**NG32**
040	**NG40**
050	**NG50**
063	**NG63**
080	**NG80**
100	**NG100**

Code	Seal
N	**NBR**
V	FPM

Code	Orifice
99	**Without orifice, open**
00	**Plug**



Orifice position

Code	Normal pos.	Description
C	**Closed**	**No poppet sealing**
S[1]	Closed	With poppet sealing
F[2]	Open	No poppet sealing

[1] Only for spring S, T and U. Not for poppet code 01 (NG16 to NG63).
[2] Only with spring code L

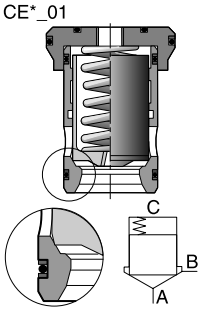
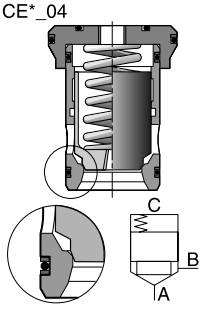
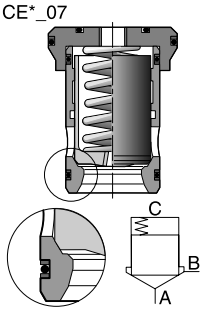
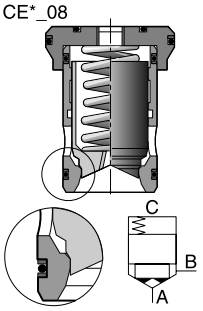
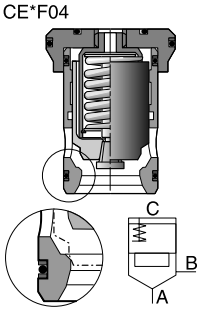
Code	Spring
L	Opening press. 0.1 bar
N	Opening press. 0.5 bar
S	**Opening press. 1.6 bar**
T	Opening press. 2.5 bar
U	Opening press. 4.0 bar

Code	Poppet area ratio
01	**$A_A = A_C$**
04	**$A_A = 0.6A_C$, $A_B = 0.4A_C$**
07 [3]	$A_A = 0.96A_C$
08	**$A_A = 0.6A_C$, $A_B = 0.4A_C$ with dampening**

[3] Not for NG80 and NG100

For spare parts see "Accessories" in this chapter.
For orifice recommendations see "Combination Examples" in this chapter.

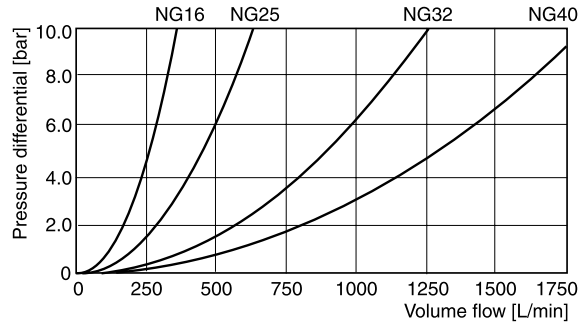
Bold letters =
Short-term availability

CE*_01	CE*_04	CE*_07	CE*_08	CE*F04
				
1 : 1 $A_A = A_C$	1 : 1.67 $A_A = 0.6\ A_C$ $A_B = 0.4\ A_C$	1 : 1.04 $A_A = 0.96\ A_C$	1 : 1.67 $A_A = 0.6\ A_C$ $A_B = 0.4\ A_C$ dampening poppet	1 : 1.67 $A_A = 0.6\ A_C$ $A_B = 0.4\ A_C$ normally open

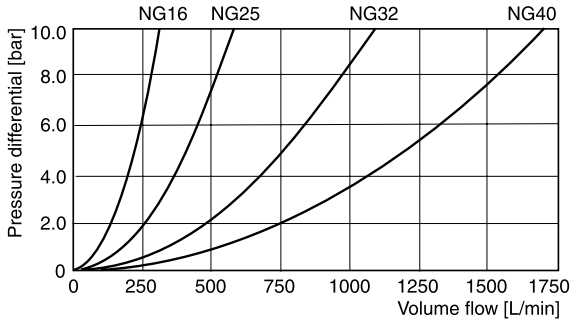
General										
Design type			2 way slip-in cartridge valves according to ISO 7368							
Operation			Hydraulic							
Mounting position			unrestricted							
Ambient temperature		[C°]	-40....+60							
Nominal size			**16**	**25**	**32**	**40**	**50**	**63**	**80**	**100**
Weight	cartridge	[kg]	0.3	0.6	1.1	1.7	3.7	7.1	12.8	27
Hydraulic										
Fluid			Hydraulic fluid according to DIN 51 524...525							
Viscosity	recommended	[mm2/s]	30...80							
	max. permitted	[mm2/s]	20...380							
Fluid temperature		[C°]	-20...+60							
Max. contamination			ISO 4406 : 1999 ; 18/16/13							
Operating pressure	without pilot valve	[bar]	420							
	port A, B, X, Z1, Z2	[bar]	350, 420 (depending on p_{max} of pilot valves)							
	port Y	[bar]	According to pilot system, max. 350 (depending on p_{max} of pilot valves)							
Nominal flow at Δp 5 bar	poppet 01, 04, 07	[l/min]	250	450	900	1350	1800	3600	5250	8000
	poppet 08		230	400	800	1250	1625	3400	5000	7500
Pilot volume requirement	at poppet 01	[cm³]	2.0	6.5	10.2	17.4	34.5	77.4	190.1	342.6
	at poppet 04		2.0	6.5	12.2	20.3	39.4	94.6	190.1	363.4
	at poppet 07		2.0	6.5	10.2	17.4	34.5	77.4	—	—
	at poppet 08		2.0	7.4	15.3	23.2	49.2	111.8	217.3	415.3
Opening pressure	flow direction A → B	[bar]	Poppet 01 / 07	spring:	L = 0.1	N = 0.5	S = 1.6	T = 2.5	U = 4.0	
			Poppet 04 / 08	spring:	L = 0.2	N = 0.9	S = 2.7	T = 4	U = 6.6	
	flow direction B → A		Poppet 01 / 07	not possible						
			Poppet 04 / 08	spring:	L = 0.3	N = 1.3	S = 4.0	T = 6.3	U = 10.0	

Performance curves (without spring and poppet seal, C-chamber unloaded)

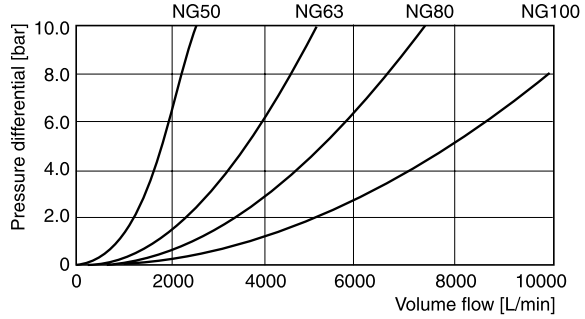
Poppet 01, 04, 07



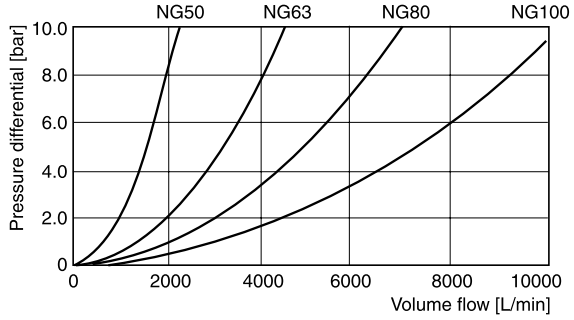
Poppet 08



Poppet 01, 04, 07



Poppet 08



8

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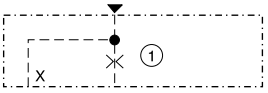
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C		A	A			
Cover	Nominal size	Cover with X-connection and gauge port G¼"	Without auxilliary function	Orifice	Seal	Design series (not required for ordering)

Code	Size
016	**NG16**
025	**NG25**
032	**NG32**
040	**NG40**
050	**NG50**
063	**NG63**
080	**NG80**
100	**NG100**

Code	Seal
N	**NBR**
V	FPM

Code	Orifice
99	**Without orifice, open**



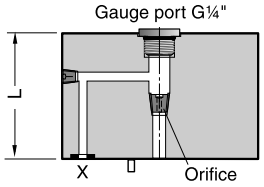
Orifice position

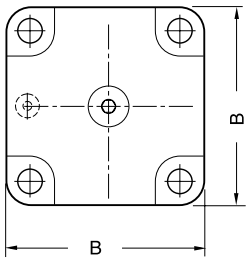
For orifice recommendations, bolt and seal kits see "Accessories" in this chapter.

Bold letters =
Short-term availability

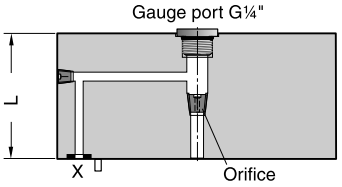
Dimensions

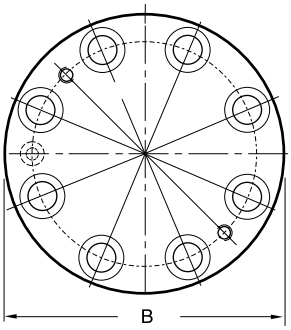
NG16 to NG63



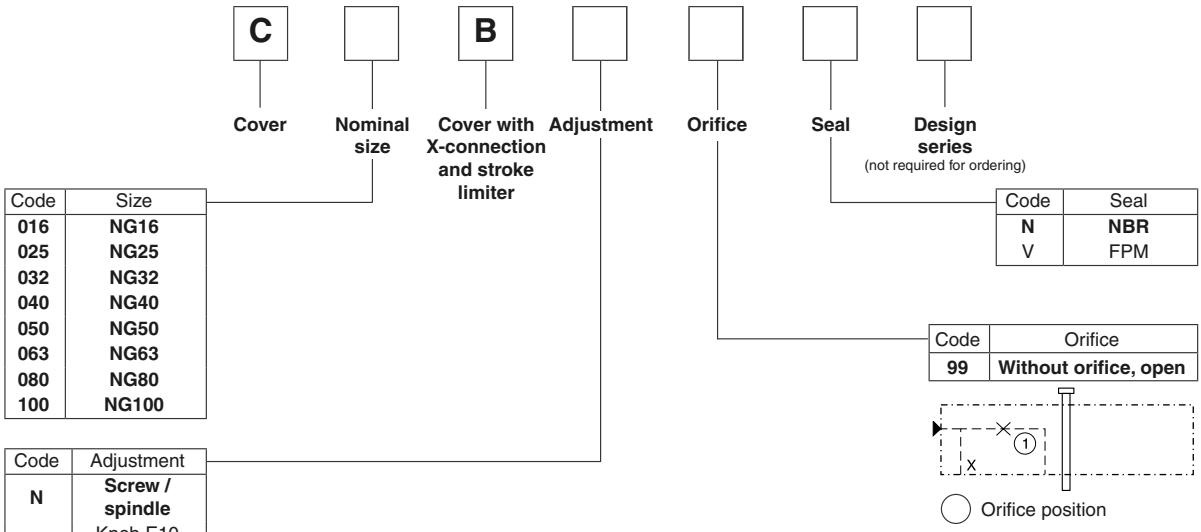


NG80 to NG100





Size	B	L	Orifice thread	Weight [kg]
NG16	65	36	1/16 NPT	0.9
NG25	85	45	1/16 NPT	1.9
NG32	102	50	1/16 NPT	2.9
NG40	125	60	1/8 NPT	5.3
NG50	140	70	1/8 NPT	8.5
NG63	180	85	1/8 NPT	15.5
NG80	Ø250	105	1/8 NPT	34
NG100	Ø300	120	1/8 NPT	58



Code	Size
016	**NG16**
025	**NG25**
032	**NG32**
040	**NG40**
050	**NG50**
063	**NG63**
080	**NG80**
100	**NG100**

Code	Seal
N	**NBR**
V	FPM

Code	Orifice
99	**Without orifice, open**

Code	Adjustment
N	**Screw / spindle**
Y	Knob E10 lock, only NG16-NG50

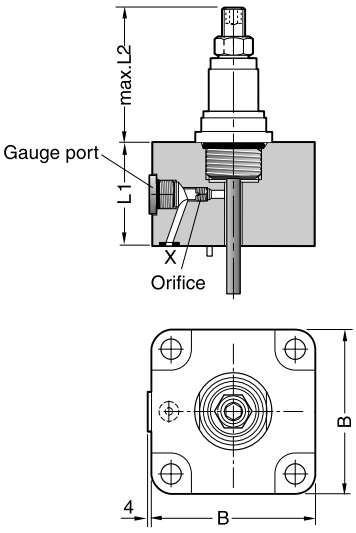
For orifice recommendations, bolt and seal kits see "Accessories" in this chapter.

Bold letters =
Short-term availability

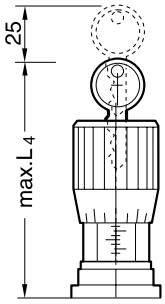
8

Dimensions NG16 - NG25

Adjustment N



Adjustment Y



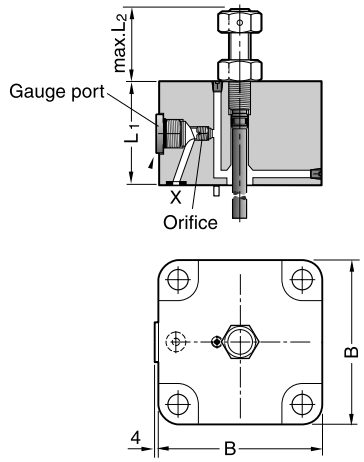
Size	B	L1	L2 max.	L4 max.	Gauge port	Orifice thread	Weight [kg]
NG16	65	36	72	100	G 1/4"	M6	0.9
NG25	85	45	72	100			1.9

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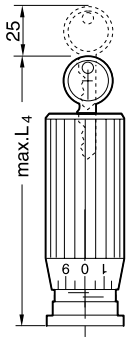
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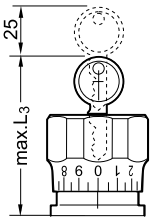
Dimensions NG32 - NG50
Adjustment N



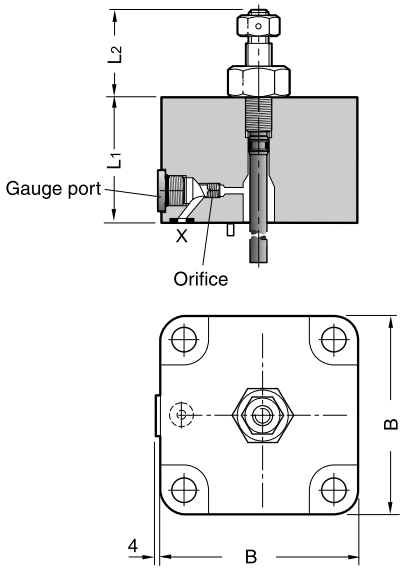
Adjustment Y (NG32)



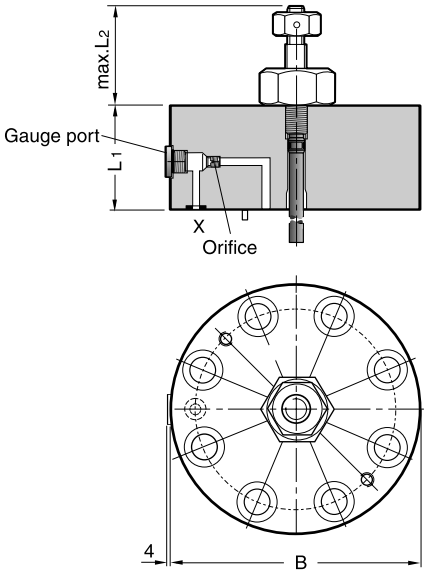
Adjustment Y (NG40/50)



Dimensions NG63
Adjustment N



Dimensions NG80-100
Adjustment N

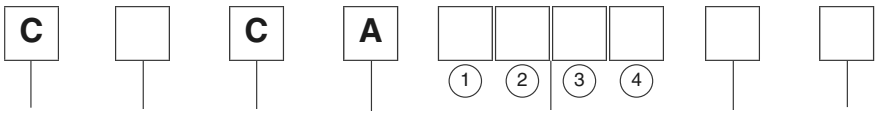


Size	B	L1	L2 max.	L3	L4 max.	Gauge port	Orifice thread	Weight [kg]
NG32	102	50	48	—	141	G¼"	1/16 NPT	2.91
NG40	125	60	50	123	—		1/16 NPT	5.39
NG50	140	70	50	127	—		1/16 NPT	8.41
NG63	180	85	65	—	—		1/8 NPT	15.1
NG80	Ø250	105	95	—	—		1/8 NPT	34.0
NG100	Ø300	120	120	—	—		1/8 NPT	60.0

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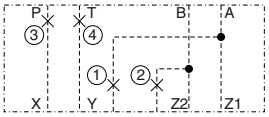


Code	Size
016	**NG16**
025	**NG25**
032	**NG32**
040	**NG40**
050	**NG50**
063	**NG63**
080	**NG80**
100	**NG100**

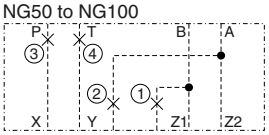
Code	Seal
N	**NBR**
V	FPM

Code	Orifice
99	**Without orifice, open**
00	**Plug**

NG16 to NG40



NG50 to NG100



◯ Orifice position

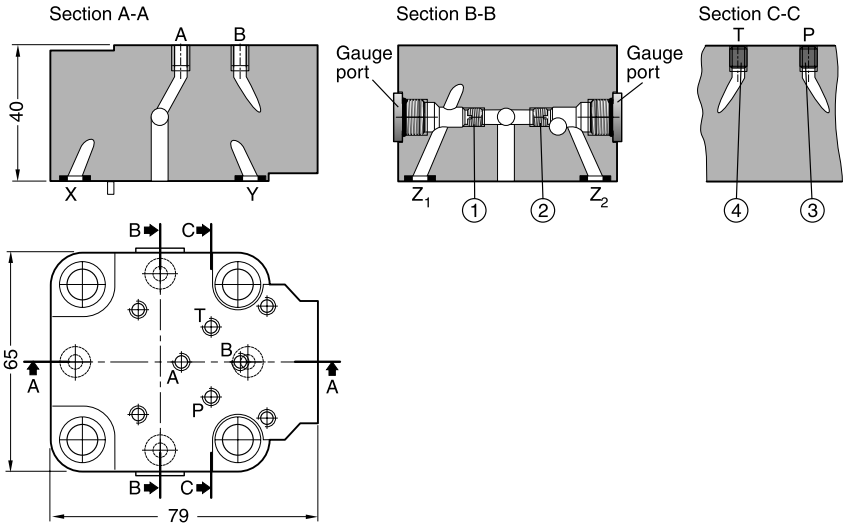
Attention:
For NG50 and larger:
If pilot system NG06 is used, mount adapter plate PADA 1007/A-B/B-A or PADA 1007/A-A/B-B (NG10 to NG06) on cover, complete type see chapter 12.

For orifice recommendations, bolt and seal kits see "Accessories" in this chapter.

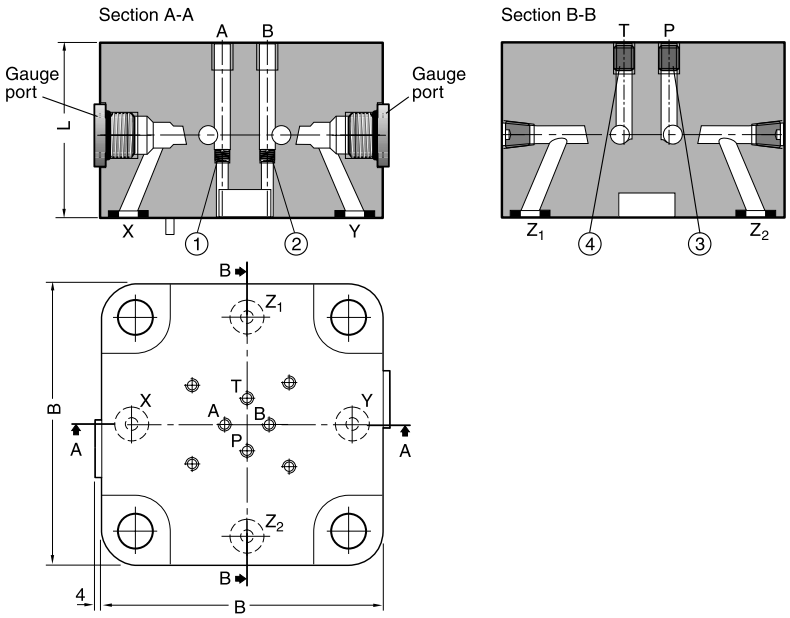
Bold letters =
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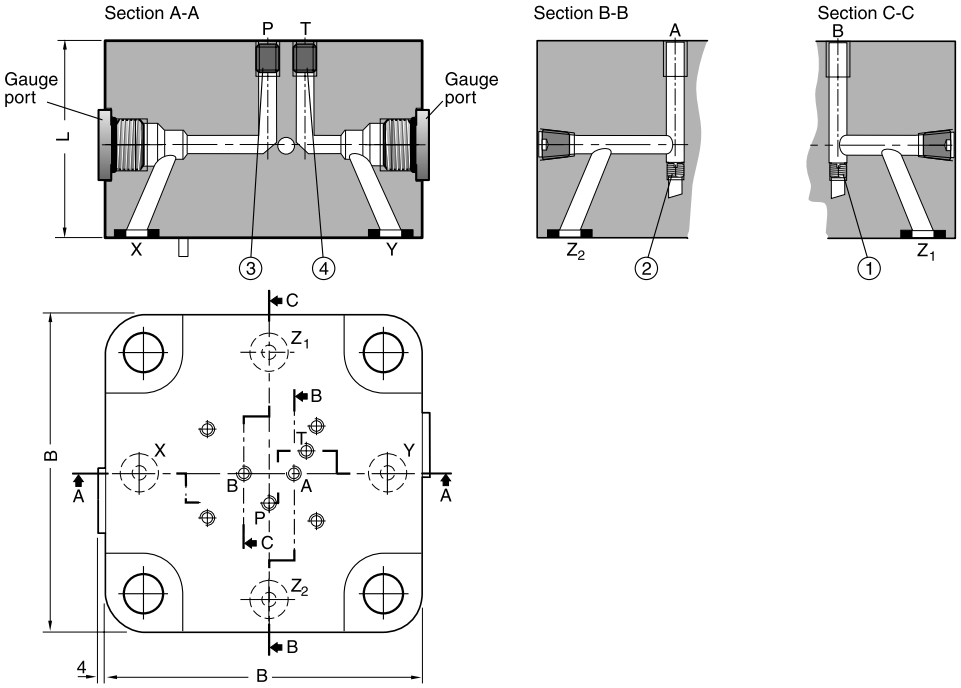
Dimensions NG16



Dimensions NG25 to NG40

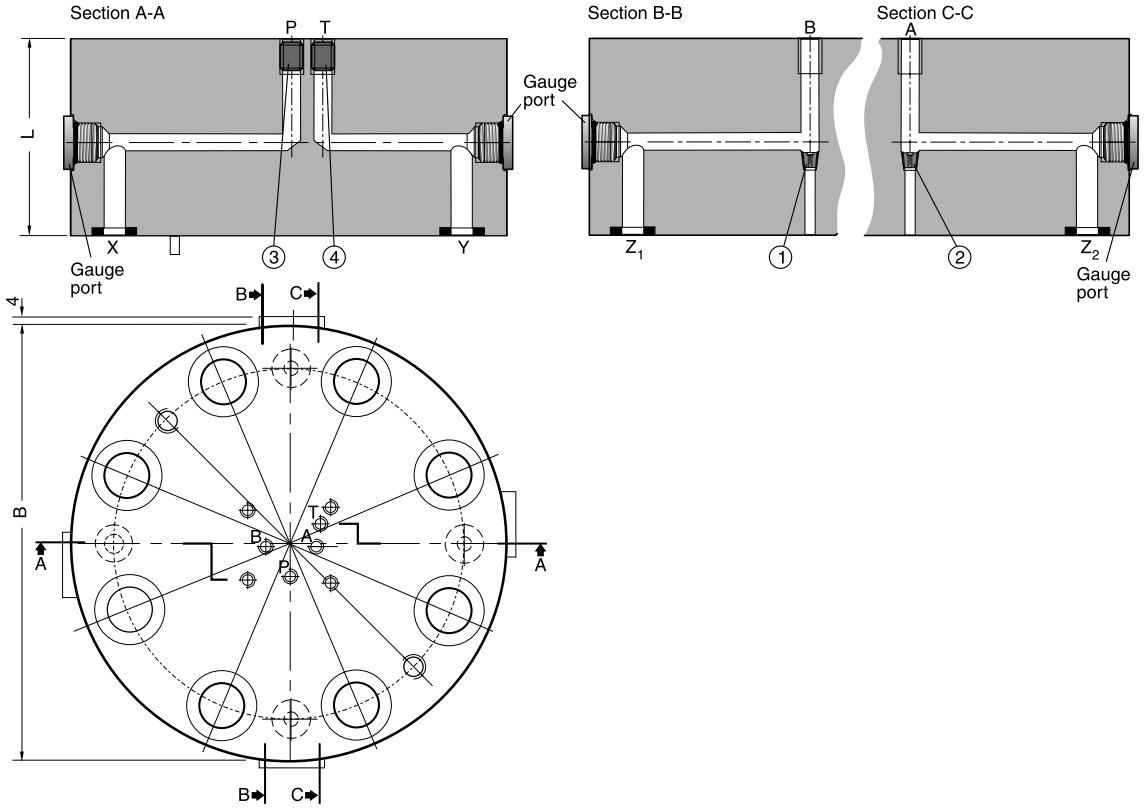


Dimensions NG50 to NG63



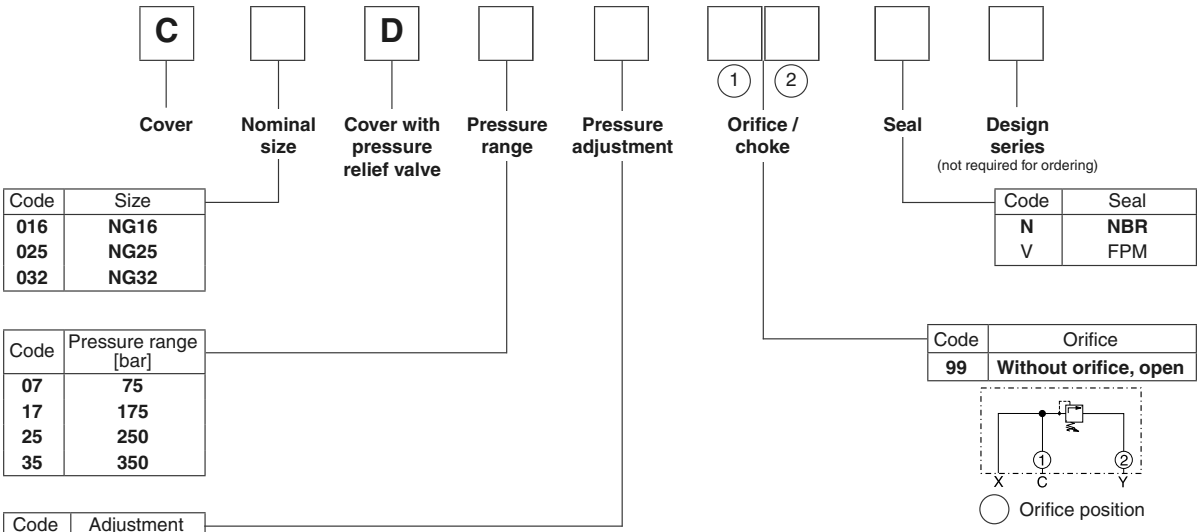
8

Dimensions NG80 to NG100



Size	B	L	Gauge port	Weight [kg]	Orifice thread			
					①	②	③	④
NG16	79 [1]	40	G¼"	1.0	M5	M5	M5	M5
NG25	85	45		1.9	M5	M5	M6	M6
NG32	102	50		2.9	M5	M5	M6	M6
NG40	125	60		5.3	M5	M5	M6	M6
NG50	140	70		8.5	M6	M6	M8	M8
NG63	180	85		15.3	M6	M6	M8	M8
NG80	Ø250	105		34	1/16 NPT	1/16 NPT	1/8 NPT	1/8 NPT
NG100	Ø300	120		60	1/16 NPT	1/16 NPT	1/8 NPT	1/8 NPT

[1] Width 65mm



Code	Size
016	**NG16**
025	**NG25**
032	**NG32**

Code	Seal
N	**NBR**
V	FPM

Code	Pressure range [bar]
07	**75**
17	**175**
25	**250**
35	**350**

Code	Orifice
99	**Without orifice, open**

Orifice position

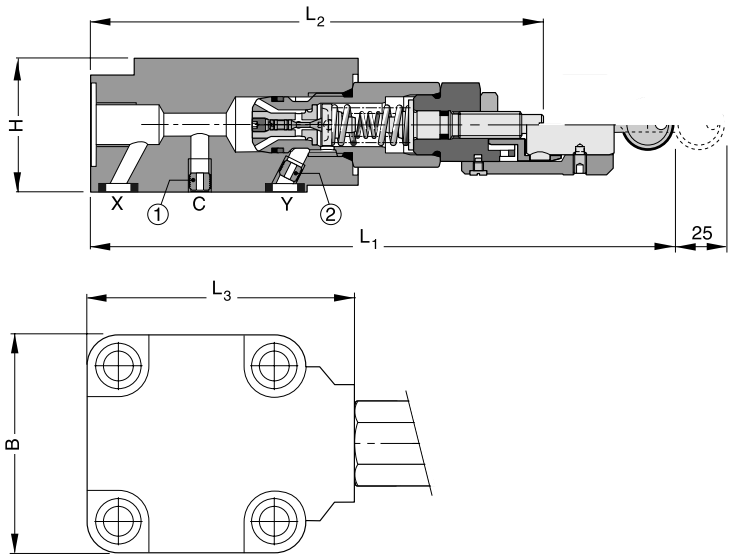
Code	Adjustment
S	**Screw with lock nut**
L	Knob E10 lock

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For orifice recommendations, bolt and seal kits see "Accessories" in this chapter.

8

Dimensions

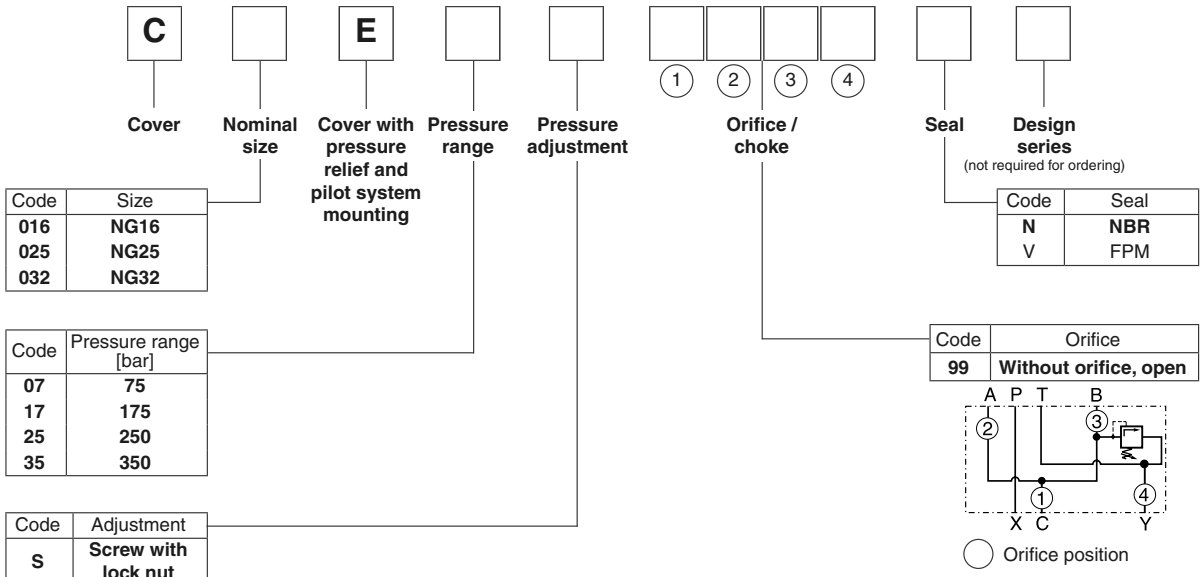


Size	B	H	L1 max.	L2 max.	L3 max.	Orifice thread ①	Orifice thread ②
NG16	65	40	160	125	82	M5	M5
NG25	85	45	166	132	88	M5	M6
NG32	102	50	183	152	105	M5	M6

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Code	Size
016	**NG16**
025	**NG25**
032	**NG32**

Code	Seal
N	**NBR**
V	FPM

Code	Pressure range [bar]
07	**75**
17	**175**
25	**250**
35	**350**

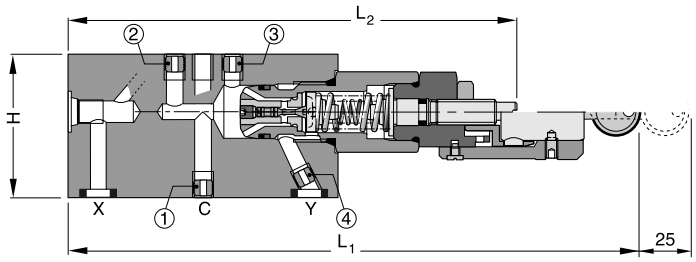
Code	Orifice
99	**Without orifice, open**

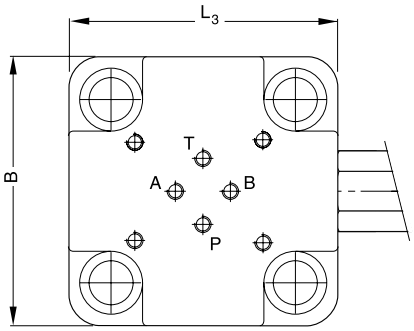
Code	Adjustment
S	**Screw with lock nut**
L	Knob E10 lock

For orifice recommendations, bolt and seal kits see "Accessories" in this chapter.

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Dimensions





Size	B	H	L1 max.	L2 max.	L3 max.	Orifice thread			
						①	②	③	④
NG16	65	40	160	125	82	M5	M5	M5	M5
NG25	85	45	166	132	88	M5	M5	M6	M6
NG32	102	50	183	152	105	M5	M5	M6	M6

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Pressure relief valve DSD*P*, subplate mounting NG06

V-DSDA100 [ ] **P07** [ ]

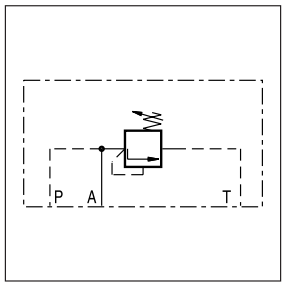
Pressure adjustment

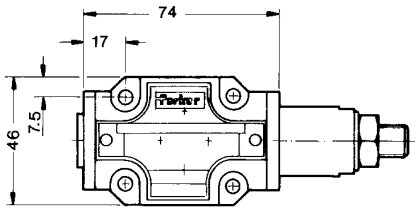
Code	Adjustment
2	**Hexagon screw with lock nut**
61	Knob E10 lock

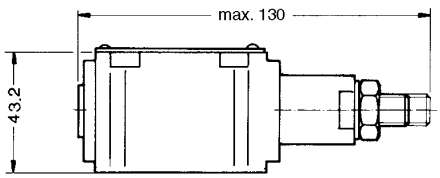
Pressure range

Code	Pressure range [bar]
E	**175**
K	**350**









Pressure relief valve ZUD*AT*Z*, sandwich plate NG06

V-ZUDB1AT [ ] **Z07** [ ]

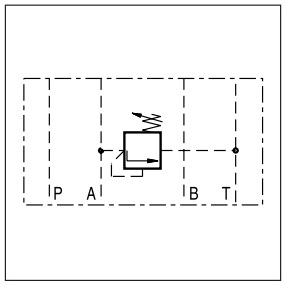
Pressure adjustment

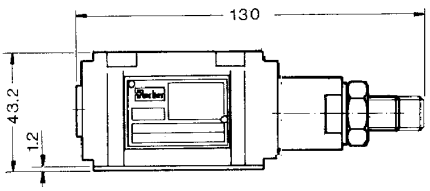
Code	Adjustment
2	**Hexagon screw with lock nut**
61	Knob E10 lock

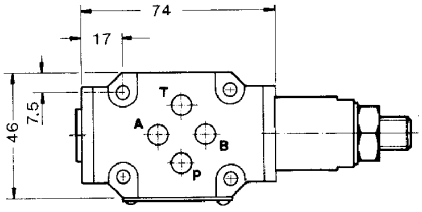
Pressure range

Code	Pressure range [bar]
E	**175**
K	**350**









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Pressure relief valve ZUD*PT*Z*, sandwich plate mounting NG06

V-ZUDB1PT [ ] **Z07** [ ]

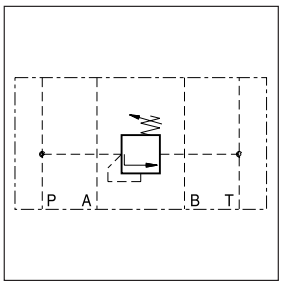
Pressure adjustment

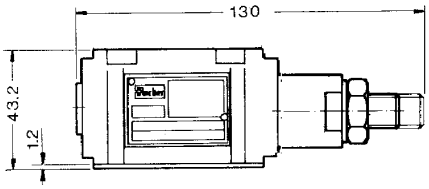
Code	Adjustment
2	**Hexagon screw with lock nut**
61	Knob E10 lock

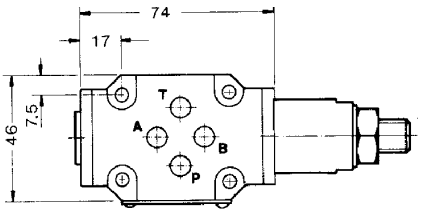
Pressure range

Code	Pressure range [bar]
E	**175**
K	**350**









Preload valve DSB*P*, subplate mounting NG06

V-DSBA100 [ ] **P07** [ ]

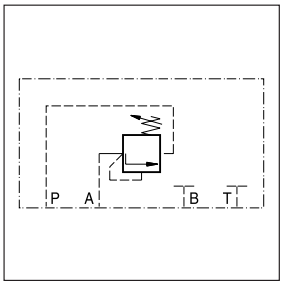
Pressure adjustment

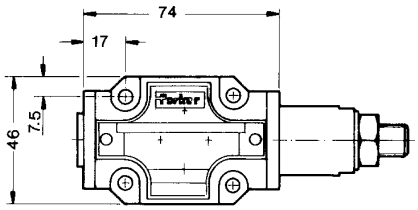
Code	Adjustment
2	**Hexagon screw with lock nut**
61	Knob E10 lock

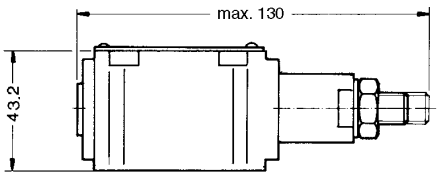
Pressure range

Code	Pressure range [bar]
B	**70**









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Preload valve DSB*Z*, sandwich plate mounting NG06

V-DSBA100 [ ] **Z07** [ ]

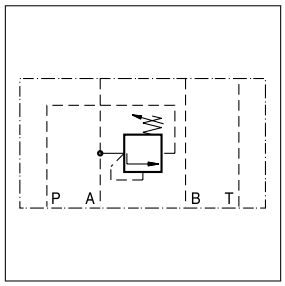
Pressure adjustment

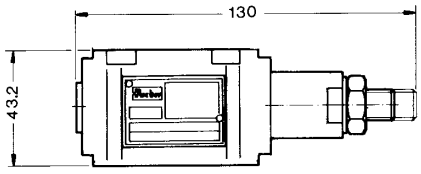
Code	Adjustment
2	**Hexagon screw with lock nut**
61	Knob E10 lock

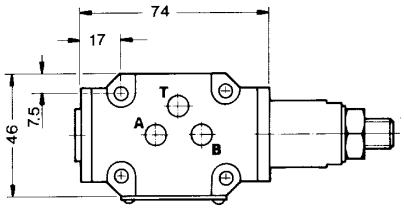
Pressure range

Code	Pressure range [bar]
B	**70**









Unloading valve DAF*P*, subplate mounting NG06

V-DAFA100 [ ] **P07** [ ]

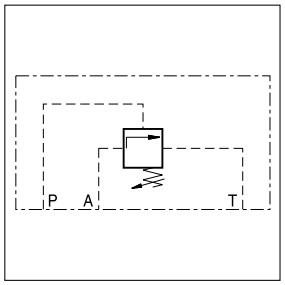
Pressure adjustment

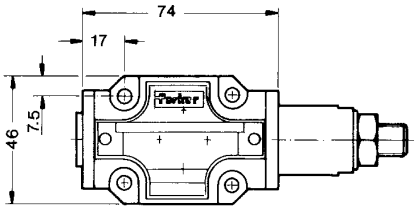
Code	Adjustment
2	**Hexagon screw with lock nut**
61	Knob E10 lock

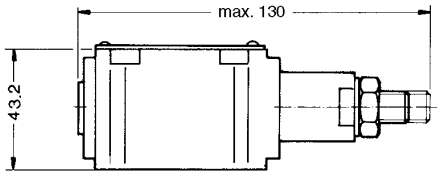
Pressure range

Code	Pressure range [bar]
E	**175**
K	**350**





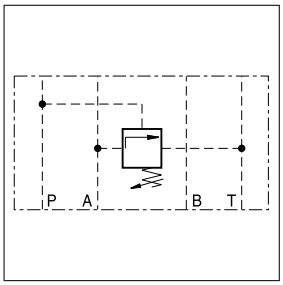




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Unloading valve DAF*Z*, sandwich plate mounting NG06





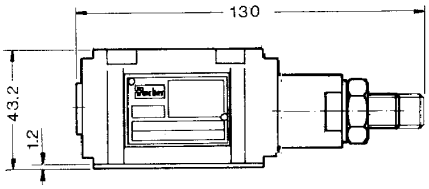
V-DAFA100 [ ] **Z07** [ ]

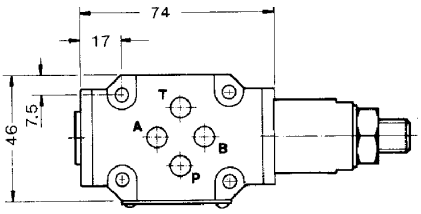
Pressure adjustment

Code	Adjustment
2	**Hexagon screw with lock nut**
61	Knob E10 lock

Pressure range

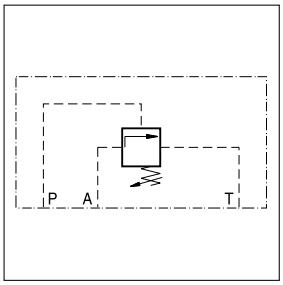
Code	Pressure range [bar]
E	**175**
K	**350**





Pressure sequence valve DNL*P*, subplate mounting NG06





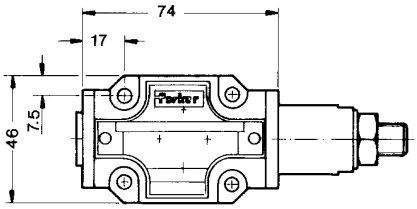
V-DNLA100 [ ] **P07** [ ]

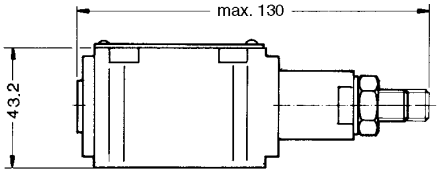
Pressure adjustment

Code	Adjustment
2	**Hexagon screw with lock nut**
61	Knob E10 lock

Pressure range

Code	Pressure range [bar]
E	**175**
K	**350**





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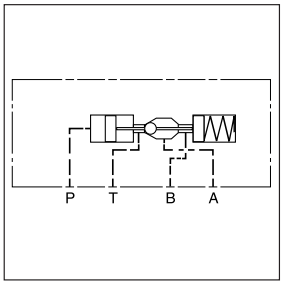
Tel: +45 63 12 83 00 | Email: ps@hymatik.com | www.hymatik.com | Hvidkaervej 27a, DK-5250 Odense SV, Denmark

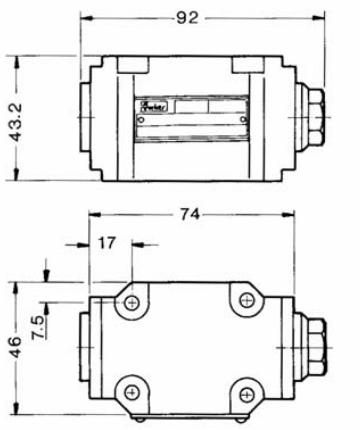
Check valve, hydraulically pilot operated NG06
Size NG6 with pilot control, for subplate assembly

Ordering code

SVLA1006P07





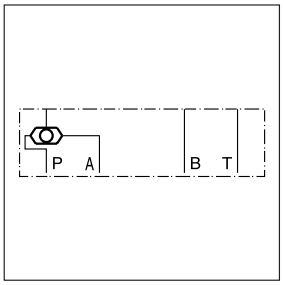


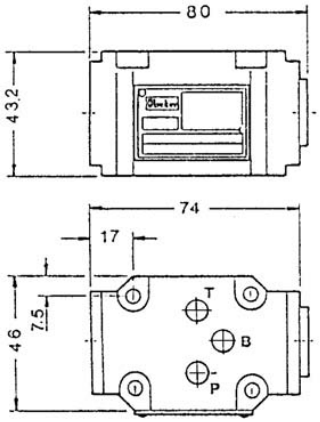
Shuttle valve - sandwich plate NG06
Size NG6, sandwich plate assembly

Ordering code

ZSRA1PP0Z07





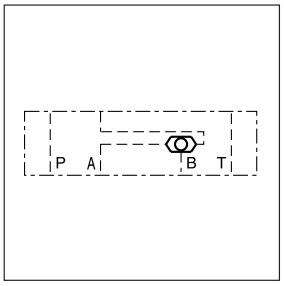


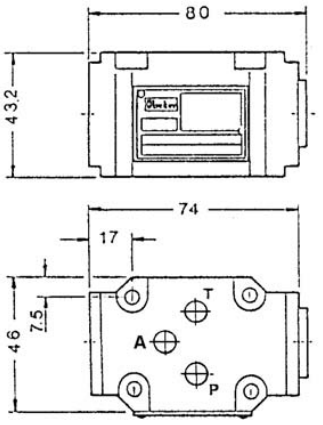
Shuttle valve - sandwich plate NG06
Size NG6, sandwich plate assembly

Ordering code

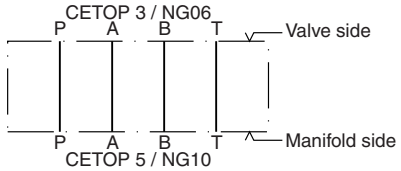
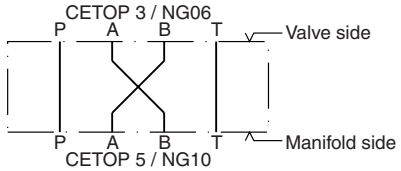
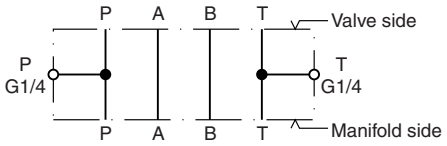
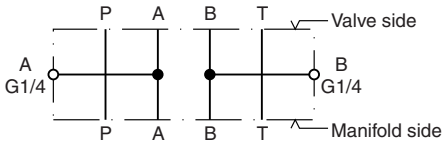
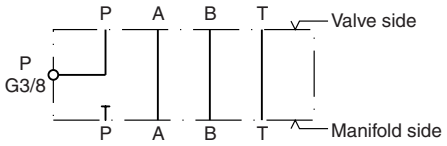
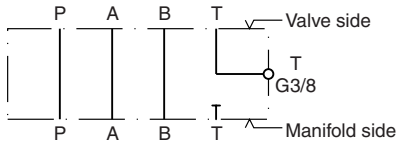
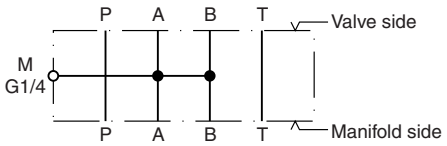
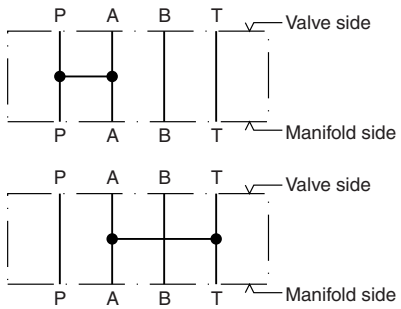
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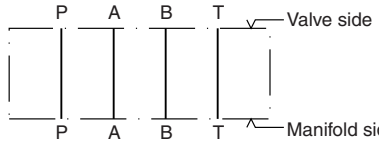
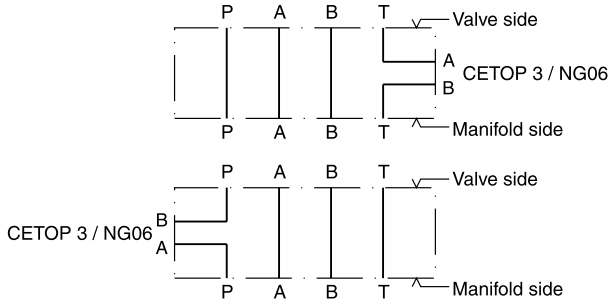
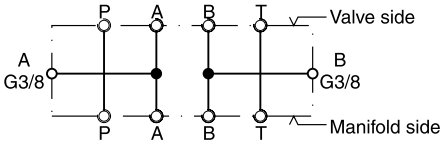
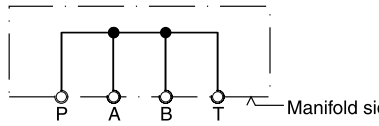
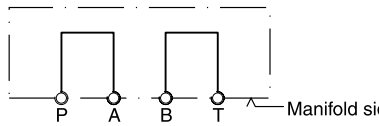
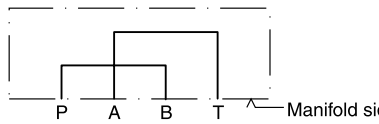
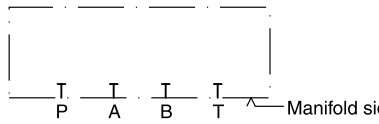
Symbol	Type	Size	Hight
	**PADA 1007-AA-BB**	NG10-NG06	—
	**PADA 1007/A-B/B-A**	NG10-NG06	—
	H06-1044	NG06	30
	**H06-1039**	NG06	30
	**H06-504**	NG06	30
	**H06-711**	NG06	30
	H06-1274	NG06	30
	**H06-1040**	NG06	30

Attention:
Details for cover-, sandwich- and adaptor plates see chapter 12.

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Kaarst, Germany

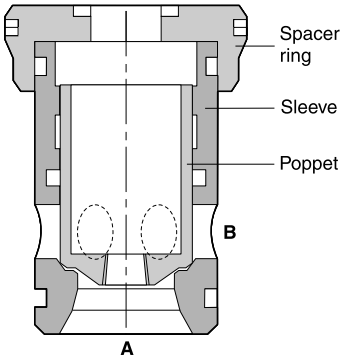
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Symbol	Type	Size	Hight
	**H06DO-1291**	NG06	10
	H06DU-814	NG06	71.3
 All ports can be equiped with orifices or plugs (1/16NPT)	CS06040N	NG06	40
 All ports can be equiped with orifices or plugs (1/16NPT)	CS06082N	NG06	—
 All ports can be equiped with orifices or plugs (1/16NPT)	CS06080N	NG06	—
	**D51DC071D**	NG06	—
	**D51VP071C** **D51VP101D**	NG06 NG10	—

Attention:
Details for cover-, sandwich- and adaptor plates see chapter 12.

Bold letters =
Short-term availability

Poppets, cages, spacer rings



Size	16	25	32	40	50	63	80	100
Poppet 01	RK-45036369	RK-45036379	RK-45036392	RK-45036409	RK-45036421	RK-45036437	RK-35036449	RK-35036467
Poppet 04	RK-45036370	RK-45036380	RK-45036395	RK-45036406	RK-45036422	RK-45036436	RK-35036460	RK-35036468
Poppet 07	RK-35037531	RK-45036964	RK-45036965	RK-45036966	RK-45036967	RK-45036968	—	—
Poppet 08	RK-45036368	RK-45036381	RK-45036391	RK-45036408	RK-45036424	RK-45036438	RK-35036459	RK-35036469
Sleeve	RK-35038871	RK-35038872	RK-35038873	RK-35036403	RK-35036417	RK-35036432	RK-25036452	RK-25036470
Spacer ring	RK-35036364	RK-35036375	RK-35036393	RK-35036402	RK-35036416	RK-35036435	RK-25036453	RK-25036471

Springs, seals, fitting bolts

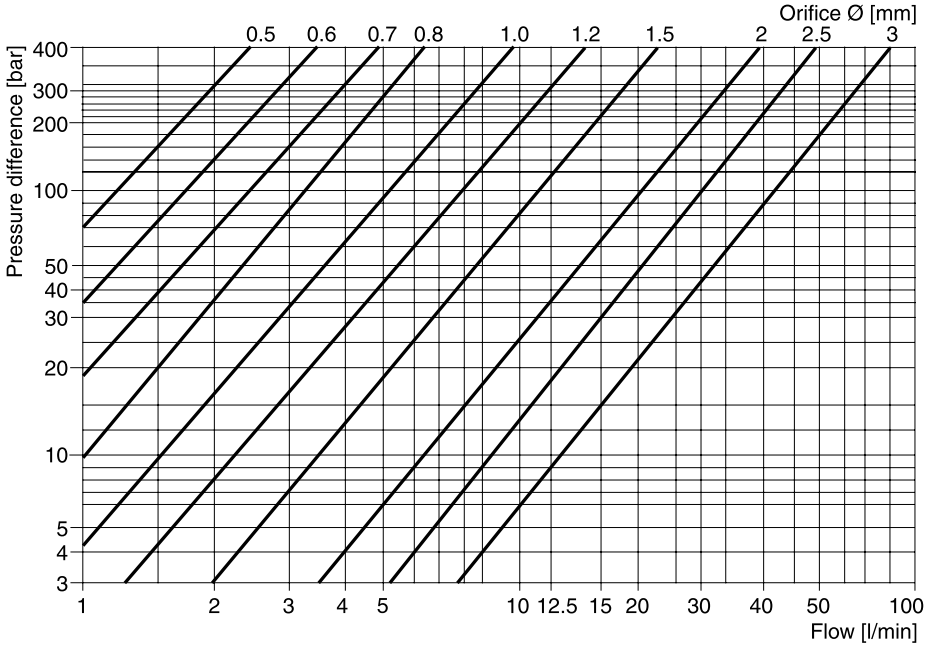
Size	16	25	32	40	50	63	80	100
Spring [3]								
Type L; 0.1 bar [1]	FK-CE016-L	FK-CE025-L	FK-CE032-L	FK-CE040-L	FK-CE050-L	FK-CE063-L	FK-CE080-L	FK-CE100-L
Type N; 0.5 bar [1]	FK-CE016-N	FK-CE025-N	FK-CE032-N	FK-CE040-N	FK-CE050-N	FK-CE063-N	FK-CE080-N	FK-CE100-N
Type P; 0.8 bar [2]	FK-CE016-P	FK-CE025-P	FK-CE032-P	—	—	—	—	—
Type S; 1.6 bar [1]	FK-CE016-S	FK-CE025-S	FK-CE032-S	FK-CE040-S	FK-CE050-S	FK-CE063-S	FK-CE080-S	FK-CE100-S
Type U; 4.0 bar [1]	FK-CE016-U	FK-CE025-U	FK-CE032-U	FK-CE040-U	FK-CE050-U	FK-CE063-U	FK-CE080-U	FK-CE100-U
Seal kits FPM NBR	 SK-CBE160V SK-CBE160	 SK-CBE250V SK-CBE250	 SK-CBE320V SK-CBE320	 SK-CBE400V SK-CBE400	 SK-CBE500V SK-CBE500	 SK-CBE630V SK-CBE630	 SK-CBE800V SK-CBE800	 SK-CBE1000V SK-CBE1000
Bolt kits (DIN 912 12.9)	BK414 4x M8x40	BK391 4x M12x50	BK415 4x M16x55	BK416 4x M20x70	BK417 4x M20x75	BK418 4x M30x100	BK419 8x M24x120	BK509 8x M30x130
Recommended torque [Nm]	27	94	234	460	460	1570	790	1570

[1] not for poppet 02
[2] only for poppet 02
[3] 1 spring kit contains 10 springs.
Ordering code example:
FK-CE016-U ⇒ 10 pcs., spring for NG16, type U

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Diagram to choose the orifice Ø



Orifices

Values measured at a viscosity of 40 cST and a temperature of 50°C.

There are different orifices available to realize different opening / closing velocities.
The control volume of each nominal valve size can be found at the CE series.

8

Orifice kits, sorted by thread with different diameters

Orifice kit	Orifice kit, sorted by thread with different diameters, consisting of 2 pieces of each marked diameter												
Ø	0.0	0.8	0.9	1.0	1.1	1.2	1.3	1.5	1.8	2.0	2.2	2.5	3.0
DK-M4	x	x	x	x	x	x	x	x	-	x	-	-	-
DK-M5	x	x	x	x	x	x	x	x	-	x	-	-	-
DK-M6	x	x	x	x	x	x	x	x	-	x	-	-	-
DK-M8	x	-	-	x	-	x	-	x	x	x	x	x	-
DK-M10x1	x	-	-	x	-	x	-	x	x	x	-	x	x
DK-1/16NPT	x	x	x	x	x	x	x	x	-	x	-	-	-
DK-1/8NPT	x	-	-	x	-	x	-	x	x	x	-	x	x

Orifice kits, thread with one defined diameter 20pcs per box

Orifice kits of one size:

Ordering Code Examples

DK-M4-08 ⇒ 20 pcs, orifice size 0.8mm

DK-M5-10 ⇒ 20 pcs, orifice size 1.0mm

DK-M8-12 ⇒ 20 pcs, orifice size 1.2mm

Orifice gauge: Order no. DK-05-30

Removal CE016 to CE063

The extracting tools consist of tee bar, slide hammer, support handle, and expanding collet (fig. 1).

At first the spacer ring is removed. Next, spring and poppet are withdrawn. Finally, the expanding collet is inserted into the sleeve and braced by means of the tee bar. Using the slide hammer, collet and sleeve are extracted from the cavity.



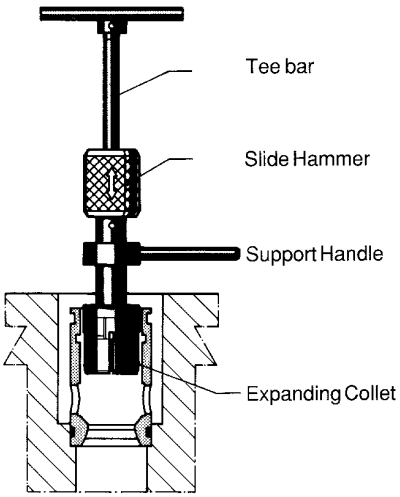


Figure 1

Ordering Code

Valve size	Order no.:
CE016	090 4600 09779
CE025	090 4600 09780
CE032	090 4600 09781
CE040	090 4600 09782
CE050	090 4600 09783
CE063	090 4600 09784
CE016 to CE063	090 4600 09785

8

Removal CE080 toCE100

The extracting tools consist of spacer ring puller (fig. 4), puller (fig. 3), and puller thrust plate. At first the spacer ring is removed. Next the puller is inserted into the sleeve and aligned by the puller thrust plate. Tightening the nut then extracts the sleeve from the cavity.

Ordering Code

Valve size	Order no.:
CE080	090 4600 10628
CE100	090 4600 10629

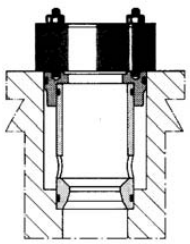


Figure 2

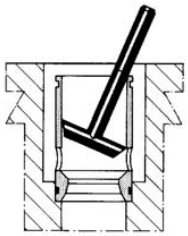


Figure 3

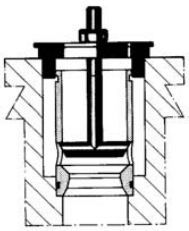
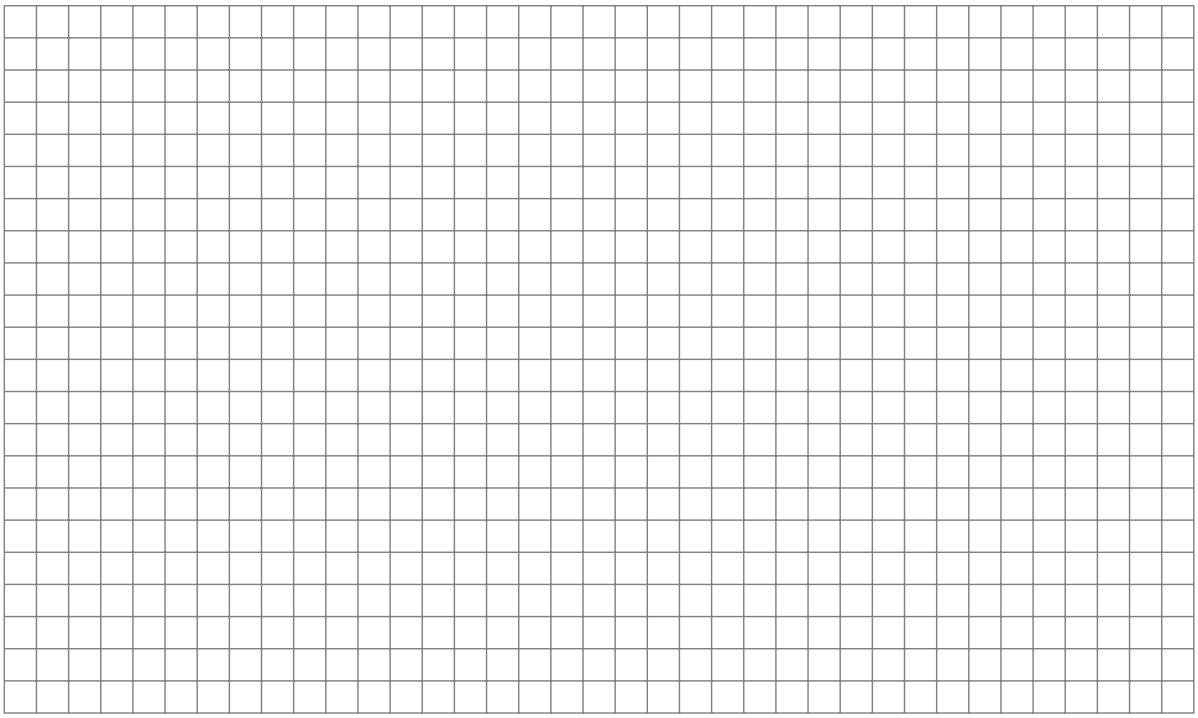


Figure 4

Notes



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The pressure relief valve series R consists of a manual adjustment pilot stage and a cartridge main stage.

The pressure relief valve series RS consists of a manual adjusted pilot stage with a directional valve for an electrically controlled vent function and a cartridge main part.

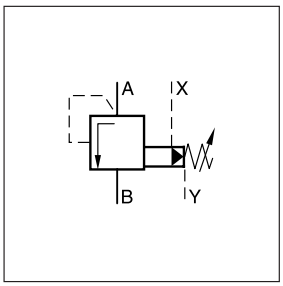
The R/RS*E model codes embrace the pilot valves, covers and cartridges that are also offered as seperate items. See combination examples for details.

Features

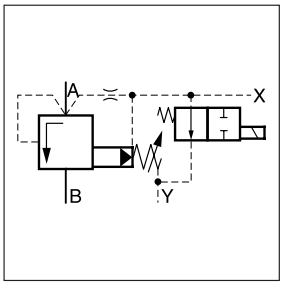
- Pilot operated with manual adjustment
- Cavity and mounting pattern according to ISO 7368
- 4 pressure stages
- 2 switching types (series RS*E)
- 2 adjustment modes
  - Hexagon screw with lock nut
  - Key lock
- Remote control via port X
- 6 sizes, NG16 to NG63



RS*E

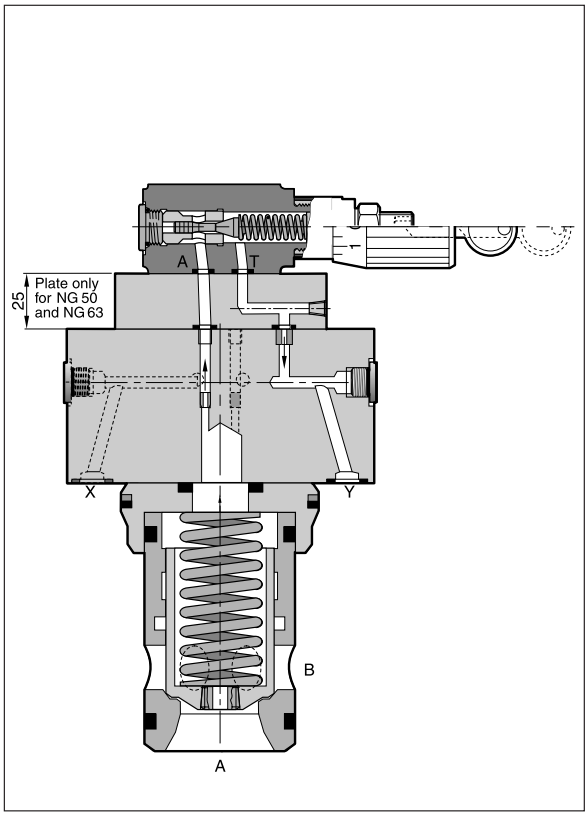


R*E

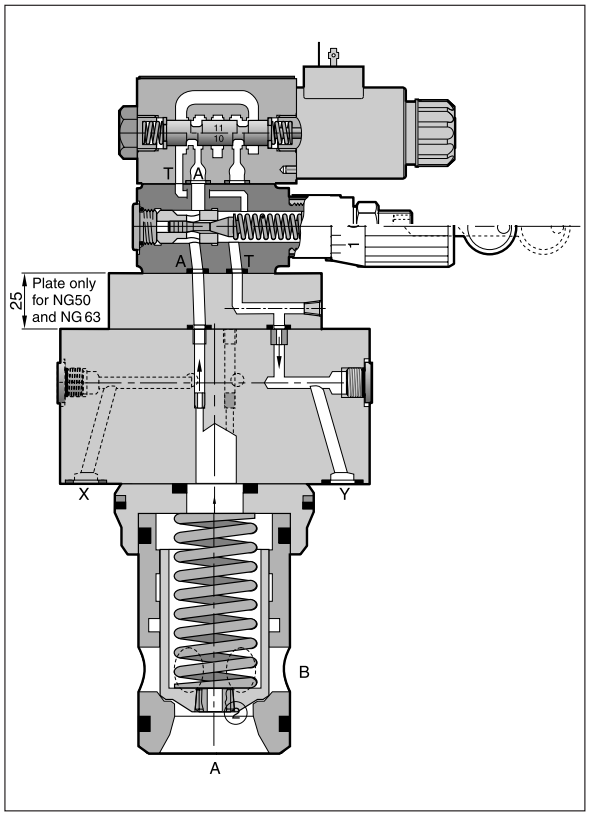


RS*E

R*E



RS*E



8

R-RS_E_UK.INDD RH_23.01.08

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R*E

R		E			1	S			
Pressure relief valve	Nominal size	Slip-in mounting ISO 7368	Pressure stages	Adjustment	Pilot oil Pilot int., Drain ext.	Poppet spring	Seal	Design series (not required for ordering)	Spool type

Code	Nominal size
16	NG16
25	NG25
32	NG32
40	NG40
50	NG50
63	NG63

Code	Pressure stages
07	up to 70 bar
17	up to 175 bar
25	up to 250 bar
35	up to 350 bar

Code	Spool type
omit	Standart
S07	with poppet seals

Code	Seal
N	NBR
V	FPM

Code	Adjustment
S	Hexagon screw with lock nut
L	Key lock

RS*E

RS		E			1	S			W				
Pressure relief valve w. elec. unloading	Nominal size	Slip-in mounting ISO 7368	Pressure stages	Adjustment	Pilot oil Pilot int., Drain ext.	Poppet spring	Seal	Switching type	Solenoid	Without plug	Options	Design series (not required for ordering)	Spool type

Code	Nominal size
16	NG16
25	NG25
32	NG32
40	NG40
50	NG50
63	NG63

Code	Pressure stages
07	up to 70 bar
17	up to 175 bar
25	up to 250 bar
35	up to 350 bar

Code	Adjustment
S	Hexagon screw with lock nut
L	Key lock

Code	Seal
N	NBR
V	FPM

Code	Spool type
omit	Standard
S07	with poppet seals

Code	Options
omit	Standart
S	with slow unloading

Code	Solenoid [1]
K	12V
J	24V
U	98V
G	205V

[1] use plug with rectifier at AC

Code	Switching type
1	Solenoid not activ, unpress. circulation
9	Solenoid activated, unpress. circulation

8

R*E

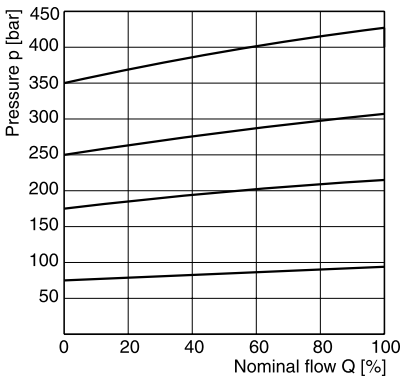
General							
Nominal size		**16**	**25**	**32**	**40**	**50**	**63**
Interface		Slip-in mounting acc. ISO 7368					
Mounting position		as desired, horizontal mounting prefered					
Ambient temperature	[°C]	-20...+80					
Weight	[kg]	2.2	3.5	4.9	8.0	13.7	22.8
Hydraulic							
Max. operating pressure	[bar]	Ports A and X up to 350, Ports B and Y depressurized					
Pressure stages	[bar]	75, 175, 250, 350					
Nominal flow	[l/min]	220	500	950	1400	2300	4000
Fluid		Hydraulic oil according to DIN 51524 ... 525					
Viscosity, recommended	[cSt] / [mm²/s]	30 ... 50					
permitted	[cSt] / [mm²/s]	20 ... 380					
Fluid temperature	[°C]	-20 ... +70					
Filtration		ISO 4406 - (1999) ; 18/16/13					

RS*E

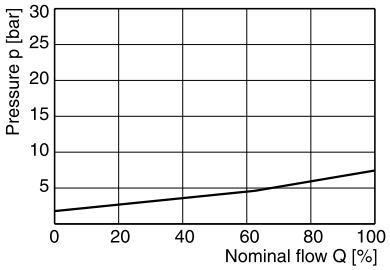
General							
Nominal size		**16**	**25**	**32**	**40**	**50**	**63**
Interface		Slip-in mounting acc. ISO 7368					
Mounting position		as desired, horizontal mounting prefered					
Ambient temperature	[°C]	-20...+80					
Weight	[kg]	2.7	5.2	6.4	9.5	15.2	24.3
Hydraulic							
Max. operating pressure	[bar]	Ports A and X 350, ports B and Y depressurized					
Pressure stages	[bar]	75, 175, 250, 350					
Nominal flow	[l/min]	220	500	950	1400	2300	4000
Fluid		Hydraulic oil according to DIN 51524 ... 525					
Viscosity, recommended	[cSt] / [mm²/s]	30 ... 50					
permitted	[cSt] / [mm²/s]	20 ... 380					
Fluid temperature	[°C]	-20 ... +70					
Filtration		ISO 4406 - (1999) ; 18/16/13					
Electrical (solenoid)							
Duty ratio	[%]	100 ED; CAUTION: coil temperature up to 180 °C possible					
Max. switching frequency	[1/h]	16000					
Protection class		IP 65 in according with EN 60529 (plugged and mounted)					
Direct current	Code	K	J	U	G		
Supply voltage	[V]	12	24	98	205		
Power	[W]	31	31	31	31		
Current	[A]	2.5	1.25	0.31	0.15		
Solenoid connection		Connector as per EN 175301-803					
Wiring min.	[mm²]	3 x 1.5 recommended					
Wiring length max.	[m]	50 recommended					

8

p/Q performance curve [1)]

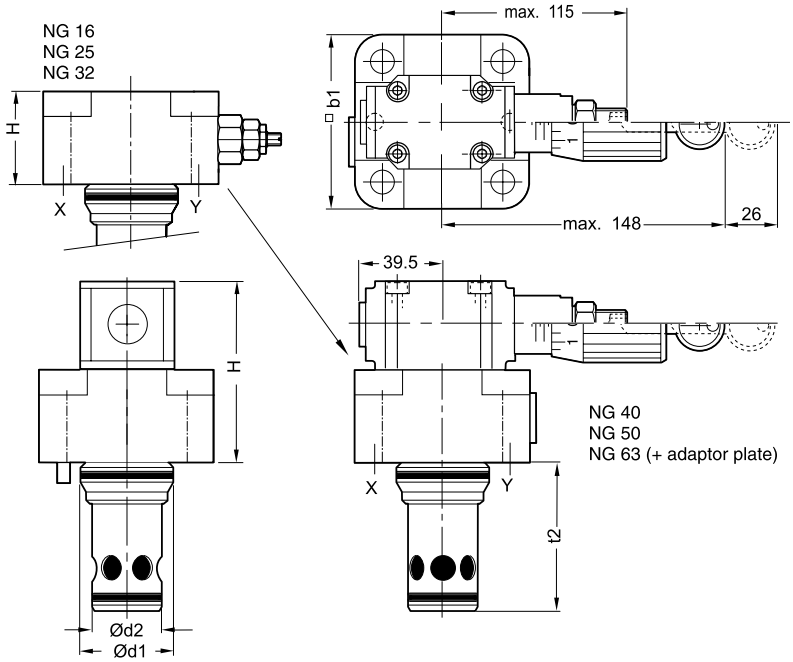


Minimum pressure curve



[1)] The performance curves are measured with external drain. For internal drain the tank pressure has to be added to curve.

Dimensions R*E

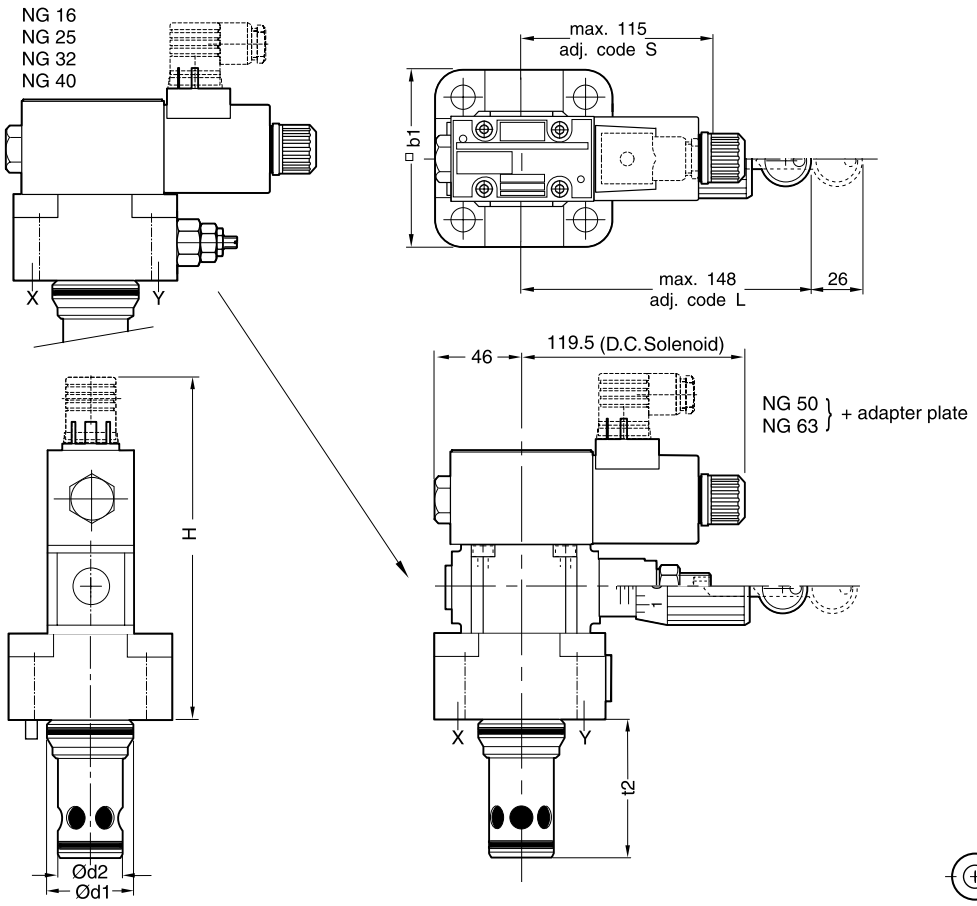


Size	H	b_1	d_1	d_2	t_2
NG16	40	79 [1)]	32	25	58
NG25	45	85	45	34	72
NG32	50	102	60	45	85
NG40	103	125	75	55	105
NG50	138	140	90	68	122
NG63	153	180	120	90	155

[1)] width 65mm

NG	Bolt kit - DIN912 12.9	[Nm]	Kit NBR	Kit FPM
16	BK-M8x50-4pcs	33	SK-R16E	SK-R16EV
25	BK-M12x50-4pcs	115	SK-R25E	SK-R25EV
32	BK-M16x55-4pcs	281	SK-R32E	SK-R32EV
40	BK-M20x70-4pcs	553	SK-R40E	SK-R40EV
50	BK-M20x75-4pcs	553	SK-R50E	SK-R50EV
63	BK-M30x100-4pcs	1910	SK-R63E	SK-R63EV

RS*E



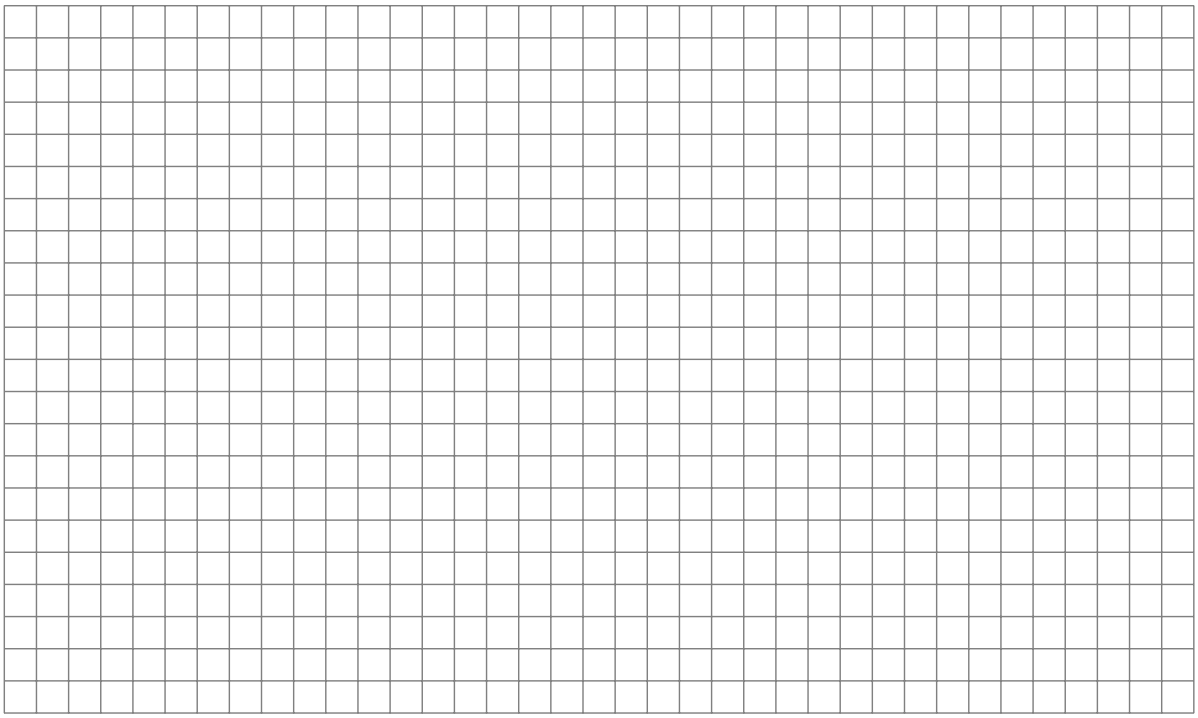
Size	H	b_1	d_1	d_2	t_2
NG16	135	79 [1]	32	25	56
NG25	140	85	45	34	72
NG32	145	102	60	45	85
NG40	196	125	75	55	105
NG50	231	140	90	68	122
NG63	246	180	120	90	155

[1] width 65mm

NG	Bolt kit - DIN912 12.9	[Nm]	Kit NBR	Kit FPM
16	BK-M8x50-4pcs	33	SK-RS16E	SK-RS16EV
25	BK-M12x50-4pcs	115	SK-RS25E	SK-RS25EV
32	BK-M16x55-4pcs	281	SK-RS32E	SK-RS32EV
40	BK-M20x70-4pcs	553	SK-RS40E	SK-RS40EV
50	BK-M20x75-4pcs	553	SK-RS50E	SK-RS50EV
63	BK-M30x100-4pcs	1910	SK-RS63E	SK-RS63EV

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Notes



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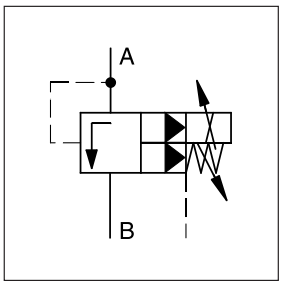
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The proportional pressure relief valve series RE*E*W consists of a proportional pilot stage and a slip-in cartridge main stage. A mechanical maximum pressure stage is optionally available. For sizes NG25 and NG32 a screw-in cartridge is used, for sizes NG40, NG50 and NG63 an additional sandwich unit.

The RE*W model code embraces the pilot valves, covers and cartridges that are also offered as separate items. See combination examples for details.

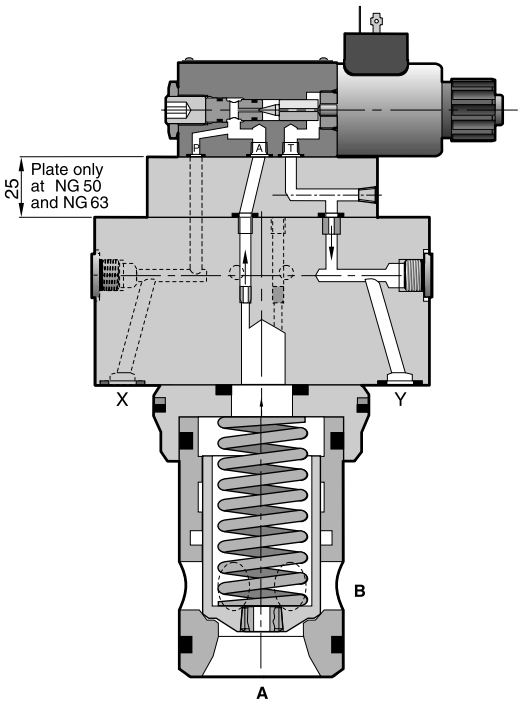
In combination with the digital power amplifier PC-D00A-400 the valve parameters can be saved, changed and duplicated.





Features

- Pilot operated with proportional solenoid
- Continuous adjustment by proportional solenoid
- Optional mechanical max. pressure stage
- Cavity and mounting pattern according to ISO 7368
- 4 pressure stages
- 6 sizes, NG16 to NG63



8

Ordering code

RE		E		W	1	S		1		W			
Prop. pressure relief valve	**Nominal size**	**Slip-in mounting ISO 7368**	**Pressure stages**	**Off-board electronics**	**Pilot oil** Pilot int., Drain ext.	**Poppet spring**	**Seal**	**Normaly open**	**Solenoid**	**Without plug**	**Options**	**Design series**	**Spool type**

Code	Nominal size
16	NG16
25	NG25
32	NG32
40	NG40
50	NG50
63	NG63

Code	Pressure stages
10	up to 105 bar
17	up to 175 bar
25	up to 250 bar
35	up to 350 bar

Code	Spool type
omit	Standard
S07	with poppet seals

Code	Options
omit	Standard
M	Mech. max. adjustment

Code	Solenoid
K	12V, 2.3A
X	16V, 1.3A

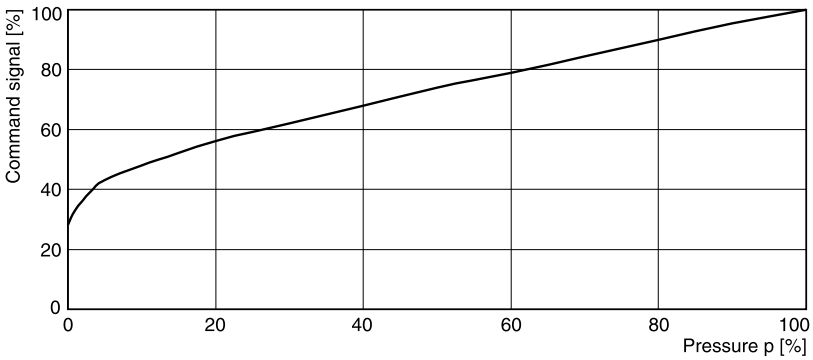
Code	Seal
N	NBR
V	FPM

Technical data

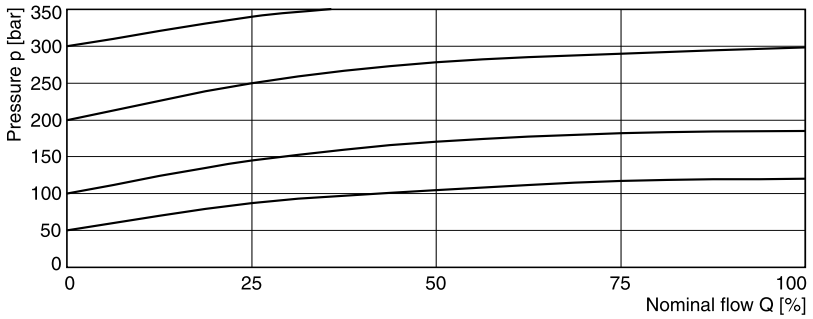
8

General							
Nominal size		**16**	**25**	**32**	**40**	**50**	**63**
Interface		Slip-in mounting acc. ISO 7368					
Mounting position		as desired, horizontal mounting prefered					
Ambient temperature	[°C]	-20...+80					
Weight	[kg]	2.7	5.2	6.4	9.5	15.2	24.3
Hydraulic							
Max. operating pressure	[bar]	Ports A and X 350, ports B and Y depressurized					
Pressure stages	[bar]	105, 175, 250, 350					
Nominal flow	[l/min]	220	500	950	1400	2300	4000
Fluid		Hydraulic oil according to DIN 51524 ... 525					
Viscosity, recommended	[cSt] / [mm²/s]	30 ... 50					
permitted	[cSt] / [mm²/s]	20 ... 380					
Fluid temperature	[°C]	-20 ... +70					
Filtration		ISO 4406 - (1999) ; 18/16/13					
Electrical (prop. solenoid)							
Duty ratio	[%]	100 ED					
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)					
Nominal voltage	[V]	12 (max. current 2.3A), 16 (max. current 1.3A)					
Coil resistance	[Ohm]	4 at 20°C					
Solenoid connectors		Connector as per EN 175301-803					
Power amplifier, recommended		PCD00A-400					

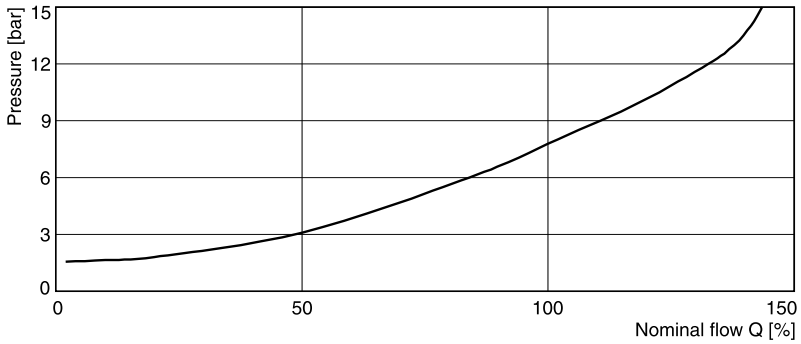
Signal/pressure curve



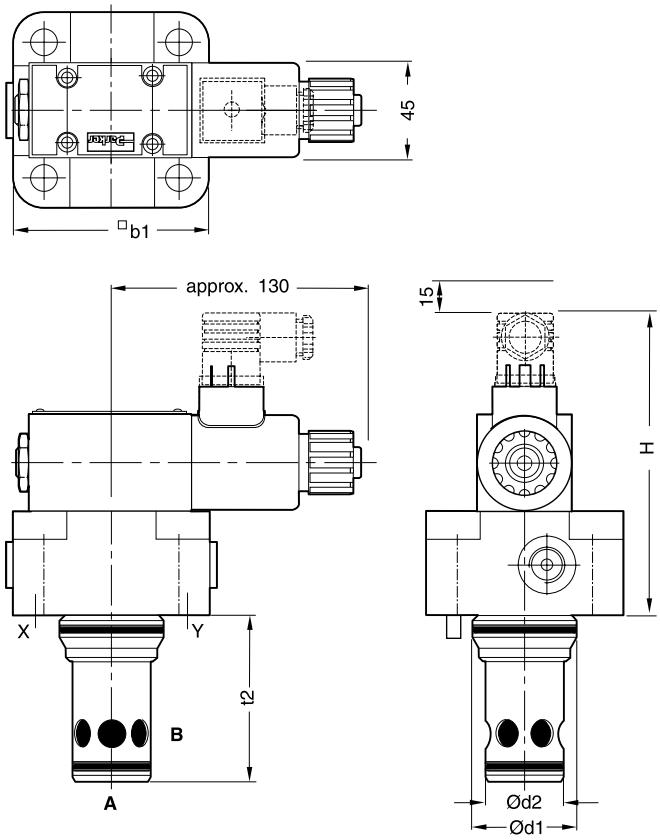
p/Q performance curve



Minimum pressure curve



The performance curves are measured with external drain. For internal drain the tank pressure has to be added to curve.



8

NG	H	b_1	d_1	d_2	t_2
16	135	79 [1]	32	25	56
25	140	85	45	34	72
32	145	102	60	45	85
40	137 (179) [2]	125	75	55	105
50	172 (214) [2]	140	90	68	122
63	187 (229) [2]	180	120	90	155

[1] width 65mm
[2] with mech. max. adjustment

NG	Bolt kit - DIN912 12.9	[Nm]	Kit NBR	Kit FPM
16	BK-M8x50-4pcs	33	SK-RE16E	SK-RE16EV
25	BK-M12x50-4pcs	115	SK-RE25E	SK-RE25EV
32	BK-M16x55-4pcs	281	SK-RE32E	SK-RE32EV
40	BK-M20x70-4pcs	553	SK-RE40E	SK-RE40EV
50	BK-M20x75-4pcs	553	SK-RE50E	SK-RE50EV
63	BK-M30x100-4pcs	1910	SK-RE63E	SK-RE63EV

RE_E_W_UK.INDD RH_23.01.08

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Hydraulic Controls Division
Kaarst, Germany

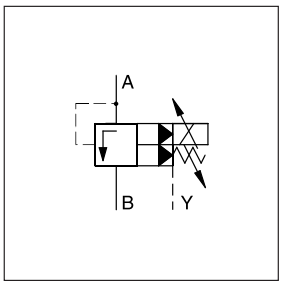
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The proportional pressure relief valve series RE*E*T consists of a proportional pilot stage with onboard electronics and a slip-in cartridge main stage. A mechanical maximum pressure stage is optionally available. For sizes NG25 and NG32 a screw-in cartridge is used, for sizes NG40, NG50 and NG63 an additional sandwich unit.

The valve comes factory set with linearized characteristics.

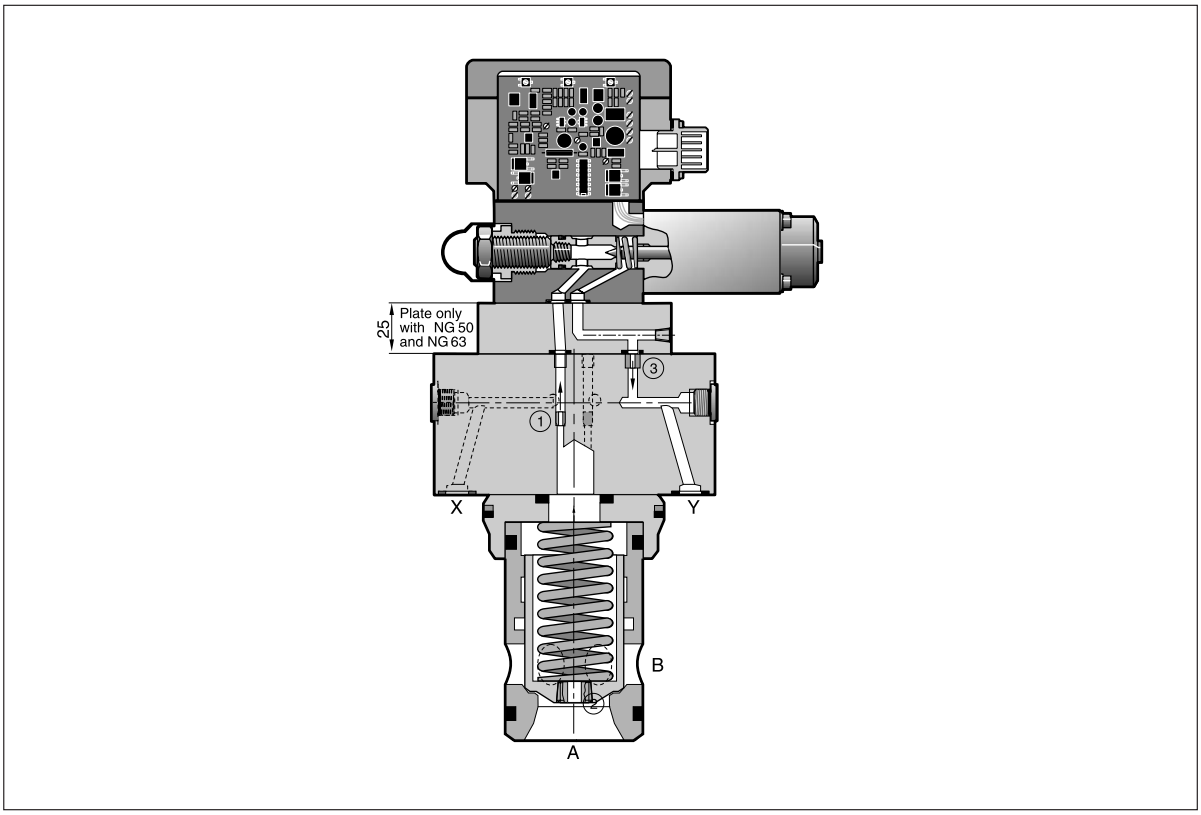
The RE*T model code embraces the pilot valves, covers and cartridges that are also offered as separate items. The pilot valve with onboard electronics (RE06M*T) is not shown in the combination examples.





Features

- Pilot operated pressure relief valve
- Onboard electronics
- Optional mechanical max. pressure stage
- Factory setting
- Ramp time adjustment
- Linearized characteristics
- 4 pressure stages
- Cavity and mounting pattern according to ISO 7368
- 6 sizes, NG16 to NG63



8

Ordering code

RE		E		T	1	S		1		0				
Prop. pressure relief valve w. elec. unloading	Nominal size	Slip-in mounting ISO 7368	Pressure stages	On-board electronics	Pilot oil Pilot int., Drain ext.	Poppet spring	Seal	Normaly open	Command signal	Electr. attachments	Options	Design series	Spool type

Code	Nominal size
16	NG16
25	NG25
32	NG32
40	NG40
50	NG50
63	NG63

Code	Pressure stages
10	up to 105 bar
17	up to 175 bar
25	up to 250 bar
35	up to 350 bar

Code	Seal
N	NBR
V	FPM

Code	Spool type
omit	Standard
S07 [1]	with poppet seals

[1] not for NG16

Code	Options
omit	Standart
M	Mech. max. adjustment

Code	Com. signal
F	Voltage input 0...+10V with ref. output +10V
R	Current input 4...20mA

Technical data

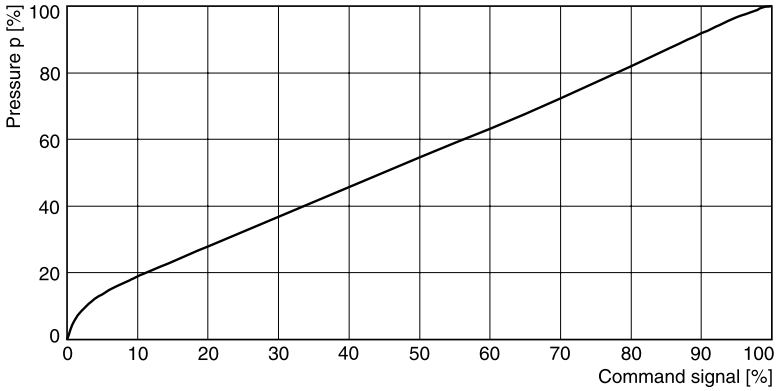
General							
Nominal size		**16**	**25**	**32**	**40**	**50**	**63**
Interface		Slip-in mounting acc. ISO 7368					
Mounting position		as desired, horizontal mounting prefered					
Ambient temperature	[°C]	-20...+80					
Weight	[kg]	2.7	5.2	6.4	9.5	15.2	24.3
Hydraulic							
Max. operating pressure	[bar]	Ports A and X 350, ports B and Y depressurized					
Pressure stages	[bar]	105, 175, 250, 350					
Nominal flow	[l/min]	220	500	950	1400	2300	4000
Fluid		Hydraulic oil according to DIN 51524 ... 525					
Viscosity, recommended	[cSt] / [mm²/s]	30 ... 50					
permitted	[cSt] / [mm²/s]	20 ... 380					
Fluid temperature	[°C]	-20 ... +70					
Filtration		ISO 4406 - (1999) ; 18/16/13					
Electrical (prop. solenoid)							
Duty ratio	[%]	100 ED					
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)					
Supply voltage	[V]	14.5...30					
Ripple in supply voltage	[%]	max. 5					
Current consumption	[A]	max. 2.8					
Input range							
voltage input	[V]	0...+10 max. / 10kOhm					
current input	[mA]	0...+20 / 500Ohm					
Adjustment range of ramp time	[s]	0...5					
Installation cross-section	[mm²]	Min. 1, shielded					
cable length	[m]	Max. 50					
Electrical connection		No. 5004072; 6pole + PE / connector EN 175201-804 / cable ~ 8...10mm					

RE_E_T_UK.INDD RH_23.01.08

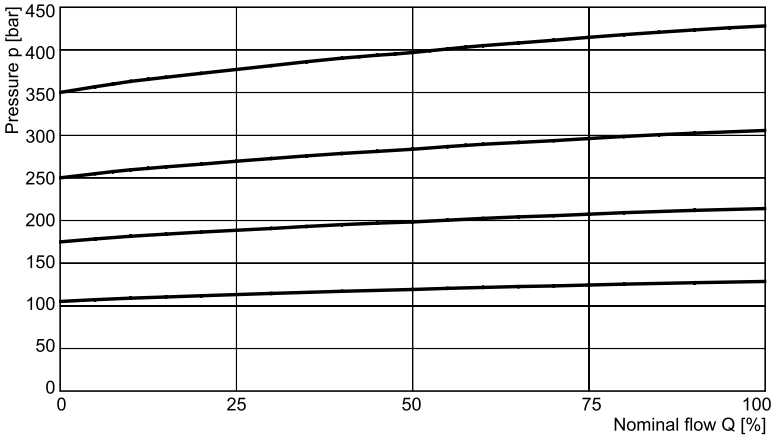
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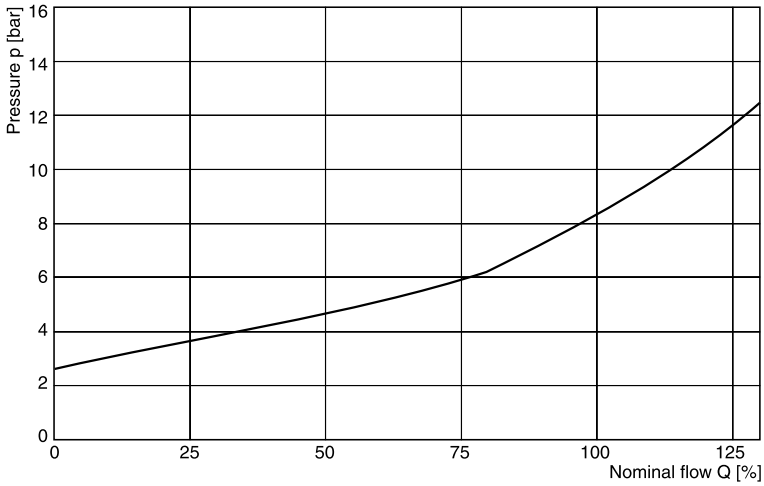
Command pressure curve RE*E*T



p/Q performance curve RE*E*T



Minimum pressure curve RE*E*T

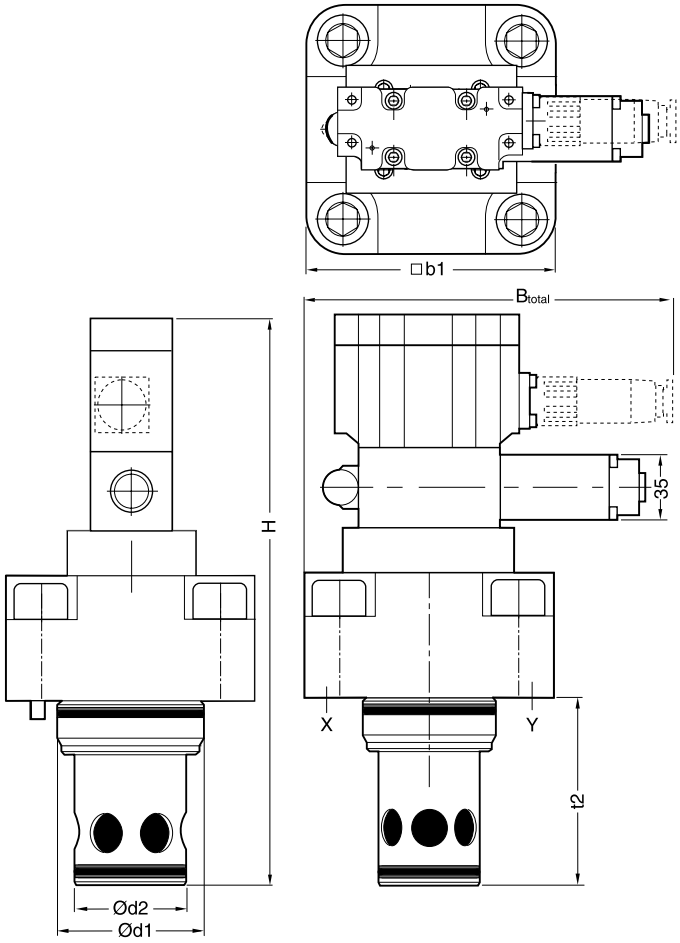


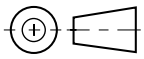
The performance curves are measured with external drain. For internal drain the tank pressure has to be added to curve.

RE_E_T_UK.INDD RH_23.01.08

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NG	H	b_1	d_1	d_2	t_2
16	177	79 [1]	32	25	56
25	122	85	45	34	72
32	127	102	60	45	85
40	137 (179) [2]	125	75	55	105
50	172 (214) [2]	140	90	68	122
63	187 (229) [2]	180	120	90	155

[1] width 65mm
[2] with mech. max. adjustment

NG	Bolt kit - DIN912 12.9	[Nm]	Kit NBR	Kit FPM
16	BK-M8x50-4pcs	33	SK-RE16E	SK-RE16EV
25	BK-M12x50-4pcs	115	SK-RE25E	SK-RE25EV
32	BK-M16x55-4pcs	281	SK-RE32E	SK-RE32EV
40	BK-M20x70-4pcs	553	SK-RE40E	SK-RE40EV
50	BK-M20x75-4pcs	553	SK-RE50E	SK-RE50EV
63	BK-M30x100-4pcs	1910	SK-RE63E	SK-RE63EV

RE_E_T_UK.INDD RH_23.01.08

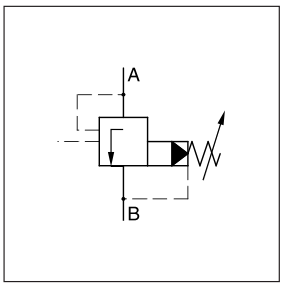
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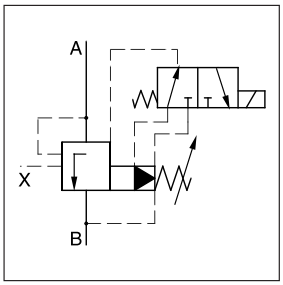
The unloading valve series UR*E consists of a mechanical pilot stage and a slip-in cartridge main stage. These valves are used to unload a circuit at low pressure. The mechanically adjustable pressure signal to unload the main stage has to be applied to port X. The pressure differential between opening and closing is 13%.
In addition the series US*E is vented by electrical operation. The UR*E/US*E model codes embrace the pilot valves, covers and cartridges that are also offered as separate items. See combination examples for details.



US*E



UR*E



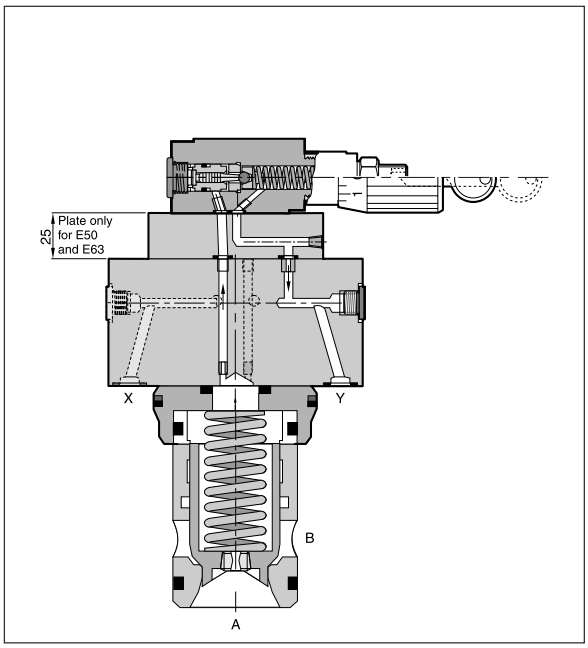
US*E

Features

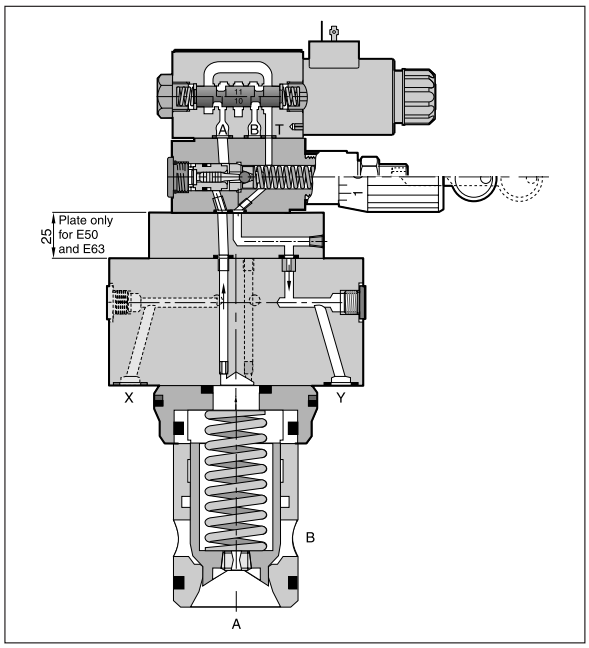
- Pilot operated unloading valve
- Cavity and mounting pattern according to ISO 7368
- 4 pressure stages
- 2 switching types (series US*E)
- 2 adjustment modes
  - hexagon screw with lock nut
  - Key lock
- 6 sizes NG16 to NG63

8

UR*E



US*E



URE-USE_UK.INDD RH_23.01.08

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UR*E

UR		E			1	S			S08
Unloading valve	Nominal size	Slip-in mounting ISO 7368	Pressure stages	Adjustment	Pilot oil Pilot int., Drain ext.	Poppet spring	Seal	Design series (not required for ordering)	Spool type

Code	Nominal size
16	NG16
25	NG25
32	NG32
40	NG40
50	NG50
63	NG63

Code	Pressure stages
07	up to 70 bar
17	up to 175 bar
25	up to 250 bar
35	up to 350 bar

Code	Seal
N	NBR
V	FPM

Code	Adjustment
L	Key lock
S	Hexagon screw with lock nut

US*E

US		E			1	S				W			S08
Unloading valve with elec. unloading	Nominal size	Slip-in mounting ISO 7368	Pressure stages	Adjustment	Pilot oil Pilot int., Drain ext.	Poppet spring	Seal	Switching type	Solenoid	Without plug	Options	Design series (not required for ordering)	Spool type

Code	Nominal size
16	NG16
25	NG25
32	NG32
40	NG40
50	NG50
63	NG63

Code	Pressure stages
07	up to 70 bar
17	up to 175 bar
25	up to 250 bar
35	up to 350 bar

Code	Adjustment
L	Key lock
S	Hexagon screw with lock nut

Code	Seal
N	NBR
V	FPM

Code	Options
omit	Standard
S	with slow unloading

Code	Solenoid [1]
K	12V
J	24V
U	98V
G	205V

[1] use plug with rectifier at AC

Code	Switching type
1	Solenoid not activ, unpress. circulation
9	Solenoid activated, unpress. circulation

8

URE-USE_UK.INDD RH_23.01.08

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UR*E

General							
Nominal size		**16**	**25**	**32**	**40**	**50**	**63**
Interface		Slip-in mounting acc. ISO 7368					
Mounting position		as desired, horizontal mounting prefered					
Ambient temperature	[°C]	-20...+80					
Weight	[kg]	2.2	3.5	4.9	8.0	13.7	22.8
Hydraulic							
Max. operating pressure	[bar]	Ports A and X up to 350, Port B and Y depressurized					
Pressure stages	[bar]	75, 175, 250, 350					
Pressure differential	[%]	13					
Nominal flow	[l/min]	220	500	950	1400	2300	4000
Fluid		Hydraulic oil according to DIN 51524 ... 525					
Viscosity, recommended	[cSt] / [mm²/s]	30 ... 50					
permitted	[cSt] / [mm²/s]	20 ... 380					
Fluid temperature	[°C]	-20 ... +70					
Filtration		ISO 4406 - (1999) ; 18/16/13					

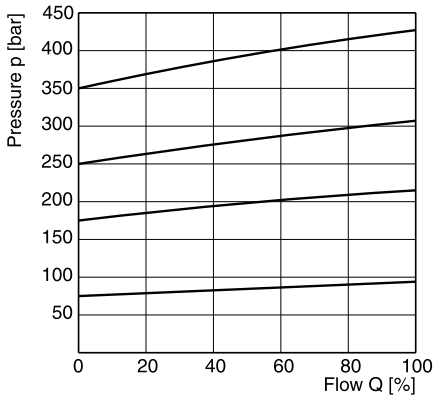
US*E

General							
Nominal size		**16**	**25**	**32**	**40**	**50**	**63**
Interface		Slip-in mounting acc. ISO 7368					
Mounting position		as desired, horizontal mounting prefered					
Ambient temperature	[°C]	-20...+80					
Weight	[kg]	2.7	5.2	6.4	9.5	15.2	24.3
Hydraulic							
Max. operating pressure	[bar]	Ports A and X 350, port B and Y depressurized					
Pressure stages	[bar]	75, 175, 250, 350					
Pressure differential	[%]	13					
Nominal flow	[l/min]	220	500	950	1400	2300	4000
Fluid		Hydraulic oil according to DIN 51524 ... 525					
Viscosity, recommended	[cSt] / [mm²/s]	30 ... 50					
permitted	[cSt] / [mm²/s]	20 ... 380					
Fluid temperature	[°C]	-20 ... +70					
Filtration		ISO 4406 - (1999) ; 18/16/13					
Electrical (solenoid)							
Duty ratio	[%]	100 ED; CAUTION: coil temperature up to 180 °C possible					
Max. switching frequency	[1/h]	16000					
Protection class		IP 65 in according with EN 60529 (plugged and mounted)					
Direct current	Code	K	J	U	G		
Supply voltage	[V]	12	24	98	205		
Power	[W]	31	31	31	31		
Current	[A]	2.5	1.25	0.31	0.15		
Solenoid connection		Connector as per EN 175301-803					
Wiring min.	[mm²]	3 x 1.5 recommended					
Wiring length max.	[m]	50 recommended					

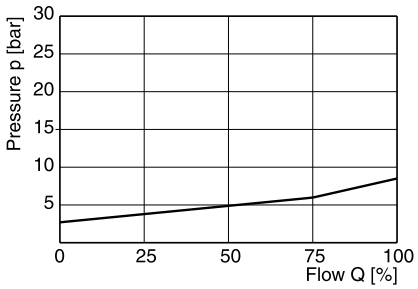
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p/Q performance curve
Series UR/US*E [1)]



Minimum pressure curve



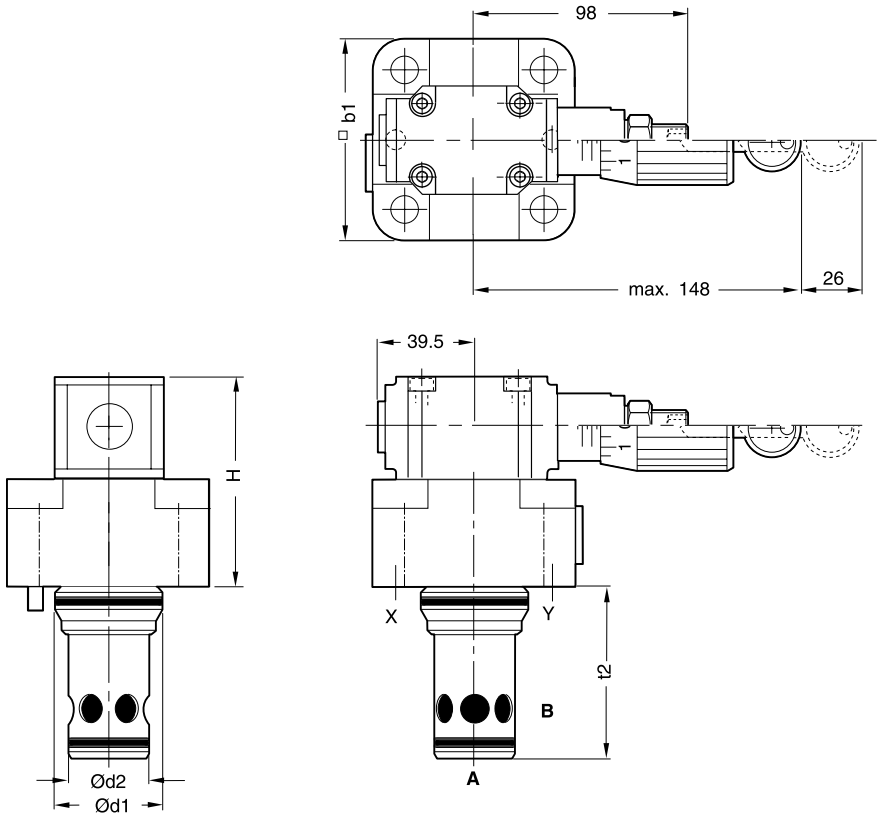
[1)] The performance curves are measured with external drain.
For internal drain the tank pressure has to be added to curve.

8

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UR*E



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NG	H	b_1	d_1	d_2	t_2
16	40	79 [1]	32	25	58
25	45	85	45	34	72
32	50	102	60	45	85
40	103	125	75	55	105
50	138	140	90	68	122
63	153	180	120	90	155

[1] width 65mm

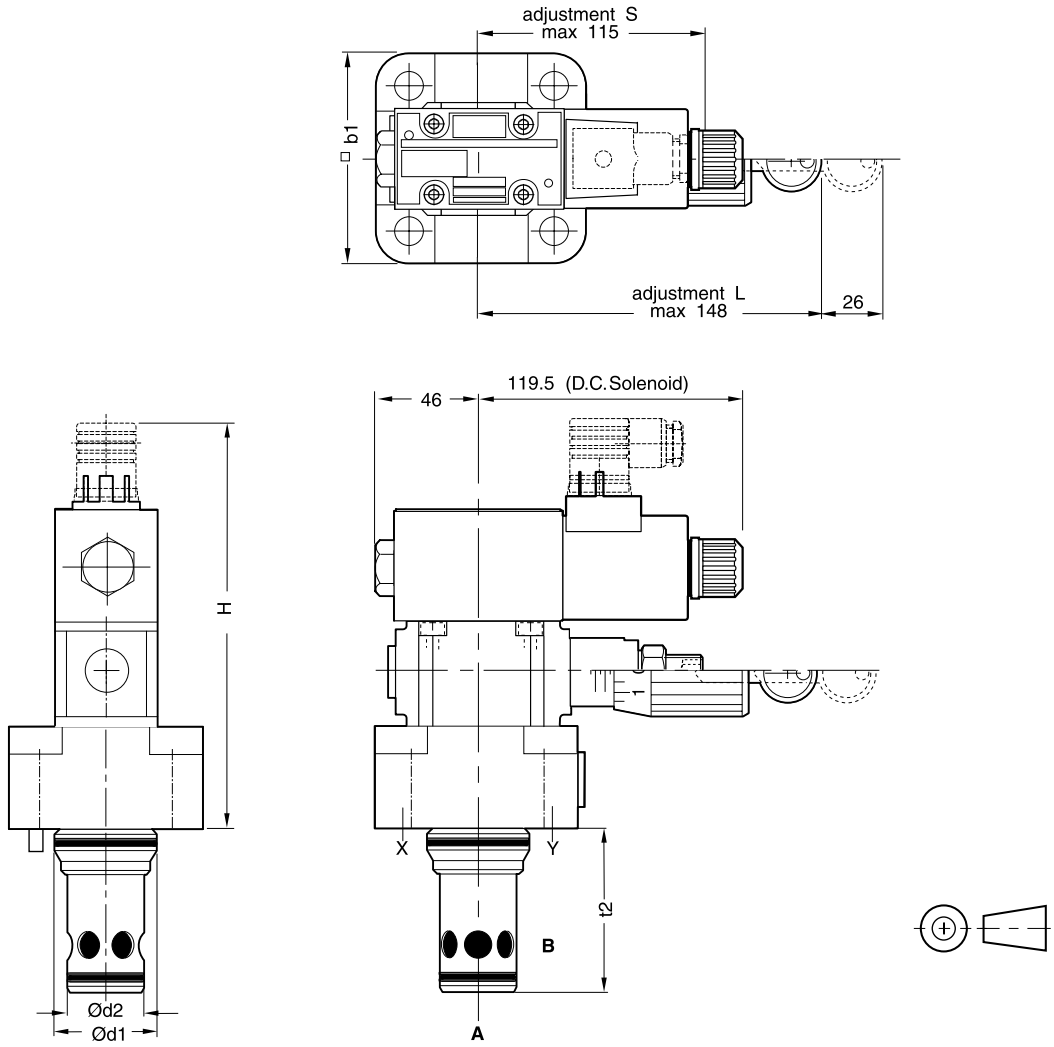
NG	Bolt kit - DIN912 12.9	[Nm]	Kit NBR	Kit FPM
16	BK-M8x50-4pcs	33	SK-R16E	SK-R16EV
25	BK-M12x50-4pcs	115	SK-R25E	SK-R25EV
32	BK-M16x55-4pcs	281	SK-R32E	SK-R32EV
40	BK-M20x70-4pcs	553	SK-R40E	SK-R40EV
50	BK-M20x75-4pcs	553	SK-R50E	SK-R50EV
63	BK-M30x100-4pcs	1910	SK-R63E	SK-R63EV

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US*E



NG	H	b_1	d_1	d_2	t_2
16	177	79 [1]	32	25	56
25	181	85	45	34	72
32	186	102	60	45	85
40	196	125	75	55	105
50	231	140	90	68	122
63	246	180	120	90	155

[1] width 65mm

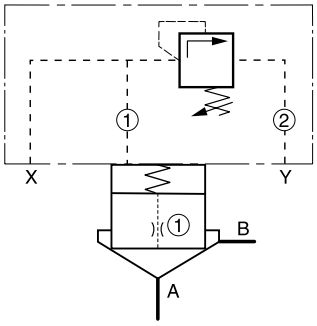
NG	Bolt kit - DIN912 12.9	[Nm]	Kit NBR	Kit FPM
16	BK-M8x50-4pcs	33	SK-RS16E	SK-RS16EV
25	BK-M12x50-4pcs	115	SK-RS25E	SK-RS25EV
32	BK-M16x55-4pcs	281	SK-RS32E	SK-RS32EV
40	BK-M20x70-4pcs	553	SK-RS40E	SK-RS40EV
50	BK-M20x75-4pcs	553	SK-RS50E	SK-RS50EV
63	BK-M30x100-4pcs	1910	SK-RS63E	SK-RS63EV

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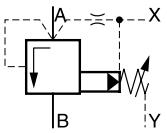
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Pressure relief valve with screw-in cartridge within the control cover



NG16 - NG32



Adaptor plates see chapter 12

Description	Type NG16	NG25	NG32
Cover incl. pressure valve [1]	C016Dxx9999x	C025Dxx9999x	C032Dxx9999x
Cover orifice ①	M5xØ1.0	M5xØ1.1	M5xØ1.2
Cover orifice ②	M5xØ1.2	M6xØ1.3	M5xØ1.4
Cartridge [2]	CE016C01*	CE025C01*	CE032C01*
Poppet orifice ①	1/16NPT x Ø0.8	1/16NPT x Ø0.9	1/16NPT x Ø1.0
Spring	1.6 bar, type S (order no. see spare parts)		
Bolt kit cover	BK-M8x40-4pcs	BK-M12x50-4pcs	BK-M16x55-4pcs

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see ordering code C*D
[2] Complete type see ordering code CE*

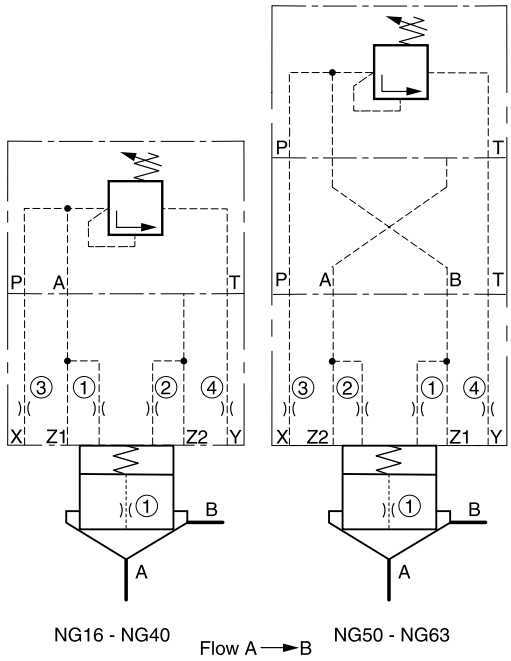
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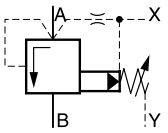
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Pressure relief valve with separate pilot





8

Adaptor plates see chapter 12

Description		Type NG16	NG25	NG32	NG40	NG50	NG63
Pressure valve [1]		V-DSDA100xP07x					
Adaptor plate [2]		without				PADA1007/A-B/B-A	
Cover [3]		C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover orifice	①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover orifice	②	M5xØ00				M6xØ00	
Cover orifice	③	M5xØ99	M6xØ99			M8xØ99	
Cover orifice	④	M5xØ1.3	M6xØ1.5	M6xØ1.7	M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge [4]		CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet orifice	①	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	1/16NPT x Ø1.5
Spring		1.6 bar, type S (order no. see spare parts)					
Bolt kit cover		BK-M8x40-4pcs	BK-M12x50-4pcs	BK-M16x55-4pcs	BK-M20x70-4pcs	BK-M20x75-4pcs	BK-M30x100-4pcs
Bolt kit pilot		BK-M5x45-4pcs					

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

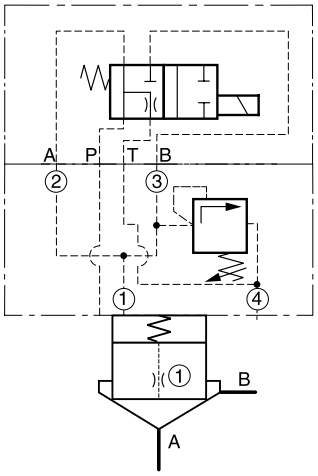
[1] Complete type see pilot valves
[2] Included O-rings and mounting bolts
[3] Complete type see ordering code C*C
[4] Complete type see ordering code CE*

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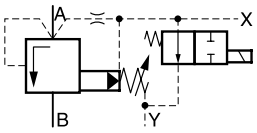
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Pressure relief valve with electrical vent function, normally open and screw-in cartridge within control cover



NG16 - NG32

Flow A → B



Adaptor plates see chapter 12

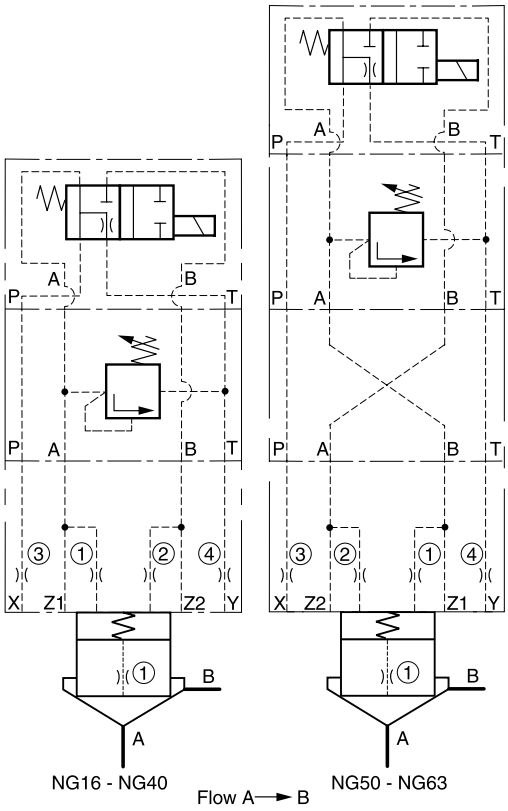
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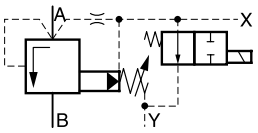
Description	Type NG16	NG25	NG32
4/2 DC valve [1]	D1VW104K*		
Cover incl. pressure valve [2]	C016Exx99999999x	C025Exx99999999x	C032Exx99999999x
Cover orifice ①	M5xØ1.0	M5xØ1.1	M5xØ1.2
Cover orifice ②	M5xØ99	M6xØ99	
Cover orifice ③	M5xØ00	M6xØ00	
Cover orifice ④	M5xØ1.2	M6xØ1.3	M6xØ1.4
Cartridge [3]	CE016C01*	CE025C01*	CE032C01*
Poppet orifice ①	1/16NPT x Ø0.8	1/16NPT x Ø0.8	1/16NPT x Ø1.0
Spring	1.6 bar, type S (order no. see spare parts)		
Bolt kit cover	BK-M8x40-4pcs	BK-M12x50-4pcs	BK-M16x55-4pcs
Bolt kit 4/2 DC valve	BK-M5x30-4pcs		

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see chapter "Directional Control Valves", series D1VW.
[2] Complete type see ordering code C*E
[3] Complete type see ordering code CE*

Pressure relief valve with electrical vent function, normally open and pilot in sandwich design





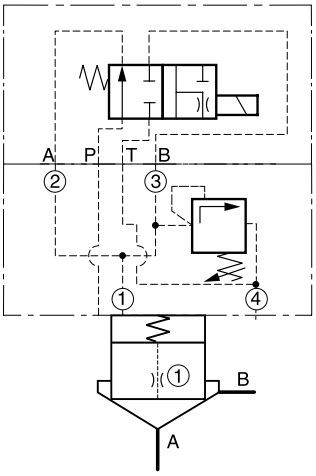
Adaptor plates see chapter 12

Description	Type NG16	NG25	NG32	NG40	NG50	NG63
4/2 DC valve [1]	D1VW104K*					
Pressure valve [2]	V-ZUDB1ATxZ07x					
Adaptor plate [3] NG10-NG06	without				PADA1007/A-B/B-A	
Cover [4]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover orifice ②	M5xØ00				M6xØ00	
Cover orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover orifice ④	M5xØ1.3	M6xØ1.5	M6xØ1.5	M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge [5]	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	1/16NPT x Ø1.5
Spring	1.6 bar, type S (order no. see spare parts)					
Bolt kit cover	BK-M8x40-4pcs	BK-M12x50-4pcs	BK-M16x55-4pcs	BK-M20x70-4pcs	BK-M20x75-4pcs	BK-M30x100-4pcs
Bolt kit pilot	TK1482					

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

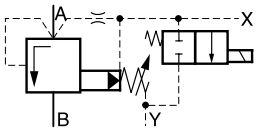
[1] Complete type see chapter "Directional Control Valves", series D1VW.
[2] Complete types see pilot valves
[3] Included O-rings and mounting bolts
[4] Complete type see ordering code C*C
[5] Complete type see ordering code CE*

Pressure relief valve with electrical vent function, normally closed and screw-in cartridge within control cover



NG16 - NG32

Flow A → B



Adaptor plates see chapter 12

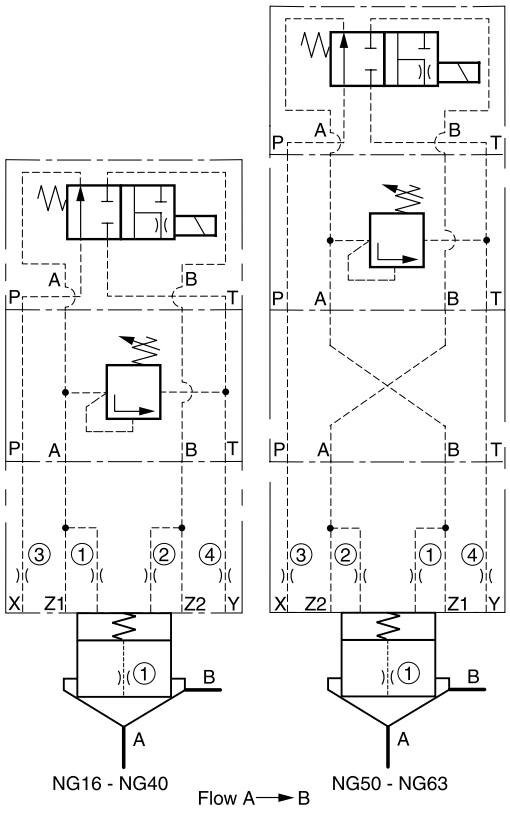
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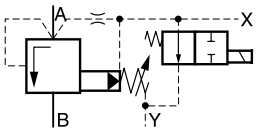
Description		Type NG16	NG25	NG32
4/2 DC valve [1]		D1VW105K*		
Cover incl. pressure valve [2]		C016Exx99999999x	C025Exx99999999x	C032Exx99999999x
Cover orifice	①	M5xØ1.0	M5xØ1.1	M5xØ1.4
Cover orifice	②	M5xØ99	M6xØ99	
Cover orifice	③	M5xØ00	M6xØ00	
Cover orifice	④	M5xØ1.2	M6xØ1.3	M6xØ1.4
Cartridge [3]		CE016C01*	CE025C01*	CE032C01*
Poppet orifice	①	1/16NPT x Ø0.8	1/16NPT x Ø0.8	1/16NPT x Ø1.0
Spring		1.6 bar, type S (order no. see spare parts)		
Bolt kit cover		BK-M8x40-4pcs	BK-M12x50-4pcs	BK-M16x55-4pcs
Bolt kit 4/2 DC valve		BK-M5x30-4pcs		

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see chapter "Directional Control Valves", series D1VW.
[2] Complete type see ordering code C*E
[3] Complete type see ordering code CE*

Pressure relief valve with electrical vent function, normally closed and pilot in sandwich design





Adaptor plates see chapter 12

Description		Type NG16	NG25	NG32	NG40	NG50	NG63
4/2 DC valve [1]		D1VW105K*					
Pressure valve [2]		V-ZUDB1ATxZ07x					
Adaptor plate [3]		without				PADA1007/A-B/B-A	
Cover [4]		C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover orifice	①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover orifice	②	M5xØ00				M6xØ00	
Cover orifice	③	M5xØ99	M6xØ99			M8xØ99	
Cover orifice	④	M5xØ1.3	M6xØ1.5	M6xØ1.7	M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge [5]		CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet orifice	①	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	1/16NPT x Ø1.5
Spring		1.6 bar, type S (order no. see spare parts)					
Bolt kit cover		BK-M8x40-4pcs	BK-M12x50-4pcs	BK-M16x55-4pcs	BK-M20x70-4pcs	BK-M20x75-4pcs	BK-M30x100-4pcs
Bolt kit pilot		TK1482					

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

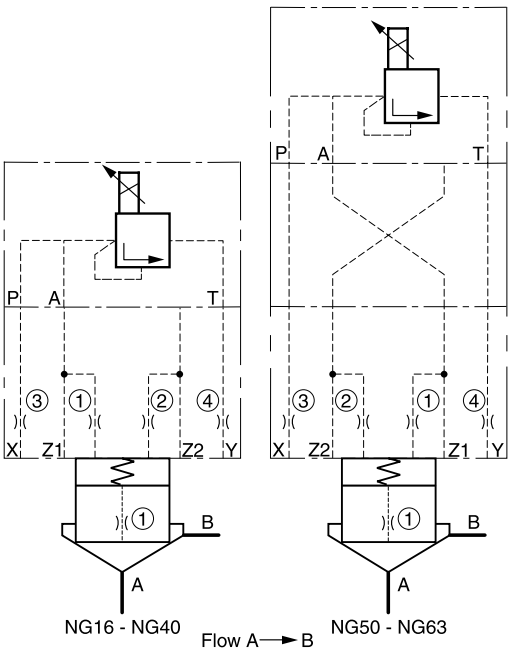
[1] Complete type see chapter "Directional Control Valves", series D1VW.
[2] Complete types see pilot valves
[3] Included O-rings and mounting bolts
[4] Complete type see ordering code C*C
[5] Complete type see ordering code CE*

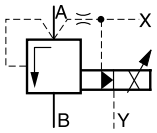
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Proportional pressure relief valve





Adaptor plates see chapter 12

8

Description		Type NG16	NG25	NG32	NG40	NG50	NG63
Pressure valve [1]		RE06MxW2V1KW					
Adaptor plate [2]		without				PADA1007/A-B/B-A	
Cover [3]		C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover orifice	①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.4	M6xØ1.5	
Cover orifice	②	M5xØ00				M6xØ00	
Cover orifice	③	M5xØ99	M6xØ99			M8xØ99	
Cover orifice	④	M5xØ1.2	M6xØ1.4	M6xØ1.5	M6xØ1.5	M8xØ1.6	
Cartridge [4]		CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet orifice	①	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	
Spring		0.5 bar, type S (order no. see spare parts)					
Bolt kit cover		BK-M8x40-4pcs	BK-M12x50-4pcs	BK-M16x55-4pcs	BK-M20x70-4pcs	BK-M20x75-4pcs	BK-M30x100-4pcs
Bolt kit pilot		BK-M5x30-4pcs					

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

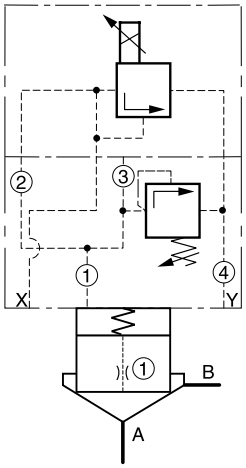
[1] Complete type see chapter "Pressure Valves", series RE06M*W.
[2] Inclusive O-Ringe and mounting bolts
[3] Complete type see ordering code C*C
[4] Complete type see ordering code CE*

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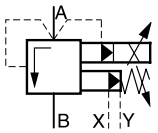
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Proportional pressure relief valve with mechanical maximum pressure protection (screw-in cartridge within control cover)



Flow A → B



8

Adaptor plates see chapter 12

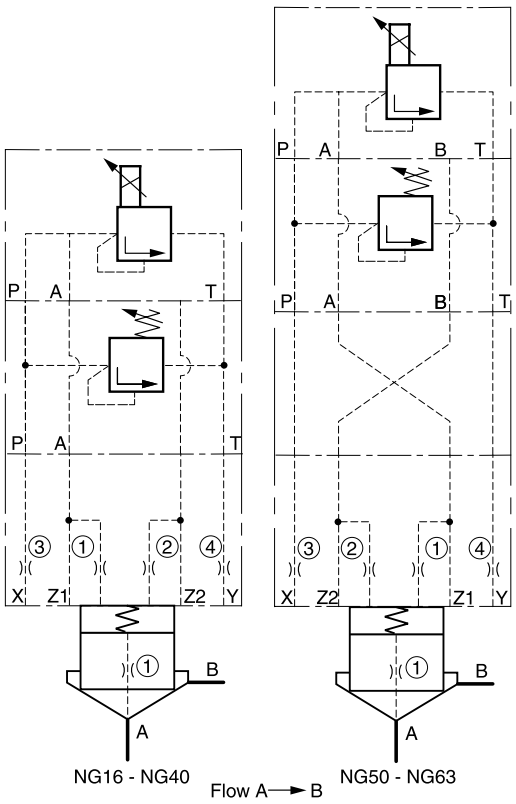
Description		Type NG16	NG25	NG32
Prop. DC valve [1]		RE06MxW2V1xW		
Cover incl. pressure valve [2]		C016Exx99999999x	C025Exx99999999x	C032Exx99999999x
Cover orifice	①	M5xØ1.0	M5xØ1.1	M5xØ1.4
Cover orifice	②	M5xØ99		
Cover orifice	③	M5xØ00		
Cover orifice	④	M5xØ1.2	M6xØ1.3	M6xØ1.7
Cartridge [3]		CE016C01*	CE025C01*	CE032C01*
Poppet orifice	①	1/16NPT x Ø0.8	1/16NPT x Ø0.9	1/16NPT x Ø1.2
Spring		1.6 bar, type S (order no. see spare parts)		
Bolt kit cover		BK-M8x40-4pcs	BK-M12x50-4pcs	BK-M16x55-4pcs
Bolt kit 4/2 DC valve		BK-M5x30-4pcs		

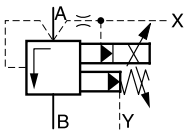
Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see chapter “Pressure Valves“, series RE06M*W.
[2] Complete type see ordering code C*C
[3] Complete type see ordering code CE*

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Proportional pressure relief valve with mechanical maximum pressure protection in sandwich design





Adaptor plates see chapter 12

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Description		Type NG16	NG25	NG32	NG40	NG50	NG63
Pressure valve [1]		RE06MxW2V1KW					
Max. pressure valve [2]		V-ZUDB1PTxZ07x					
Adaptor plate [3] NG10-NG06		without				PADA1007/A-B/B-A	
Cover [4]		C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover orifice	①	M5xØ1.1	M5xØ1.3		M5xØ1.4	M6xØ1.6	
Cover orifice	②	M5xØ00				M6xØ00	
Cover orifice	③	M5xØ99	M6xØ99			M8xØ99	
Cover orifice	④	M5xØ1.2	M6xØ1.4		M6xØ1.5	M8xØ1.6	
Cartridge [5]		CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet orifice	①	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	
Spring		0.5 bar, type N (order no. see spare parts)					
Bolt kit cover		BK-M8x40-4pcs	BK-M12x50-4pcs	BK-M16x55-4pcs	BK-M20x70-4pcs	BK-M20x75-4pcs	BK-M30x100-4pcs
Bolt kit pilot		TK1482					

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

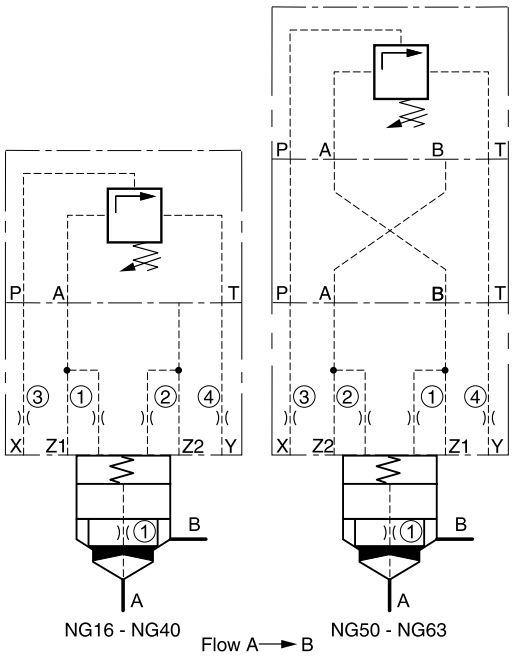
[1] Complete type see chapter “Pressure Valves“, series RE06*W.
[2] Complete types see pilot valves
[3] Included O-rings and mounting bolts
[4] Complete type see ordering code C*C
[5] Complete type see ordering code CE*

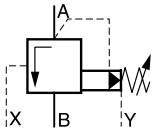
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Unloading valve





8

Adaptor plates see chapter 12

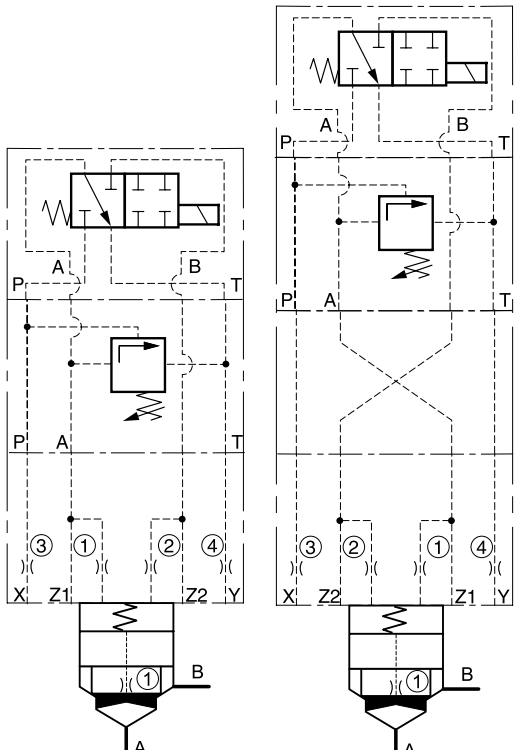
Description	Type NG16	NG25	NG32	NG40	NG50	NG63
Unloading valve [1]	V-DAFA100xP07					
Adaptor plate [2] NG10-NG06	without				PADA1007/A-B/B-A	
Cover [3]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover orifice ①	M5xØ1.4	M5xØ1.5	M5xØ1.6	M5xØ1.7	M6xØ1.8	M6xØ1.9
Cover orifice ②	M5xØ00				M6xØ00	
Cover orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover orifice ④	M5xØ1.5	M6xØ1.6	M6xØ1.7	M6xØ1.8	M8xØ1.9	M8xØ2.0
Cartridge [4]	CE016C08*	CE025C08*	CE032C08*	CE040C08*	CE050C08*	CE063C08*
Poppet orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.0	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4
Spring	1.6 bar, type S (order no. see spare parts)					
Bolt kit cover	BK-M8x40-4pcs	BK-M12x50-4pcs	BK-M16x55-4pcs	BK-M20x70-4pcs	BK-M20x75-4pcs	BK-M30x100-4pcs
Bolt kit pilot	BK-M5x45-4pcs					

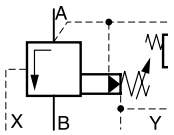
Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete types see pilot valves
[2] Included O-rings and mounting bolts
[3] Complete type see ordering code C*C
[4] Complete type see ordering code CE*

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Unloading valve with electrical vent function, normally open





Adaptor plates see chapter 12

8

Description	Type NG16	NG25	NG32	NG40	NG50	NG63
4/2 DC valve [1]	D1VW76K*					
Pressure valve [2]	V-DAFA100xZ07x					
Adaptor plate [3] NG10-NG06	without				PADA1007/A-B/B-A	
Cover [4]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover orifice ①	M5xØ1.4	M5xØ1.5	M5xØ1.6	M5xØ1.7	M6xØ1.8	M6xØ1.9
Cover orifice ②	M5xØ00				M6xØ00	
Cover orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover orifice ④	M5xØ1.5	M6xØ1.6	M6xØ1.7	M6xØ1.8	M8xØ1.9	M8xØ2.2
Cartridge [5]	CE016C08*	CE025C08*	CE032C08*	CE040C08*	CE050C08*	CE063C08*
Poppet orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.0	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4
Spring	1.6 bar, type S (order no. see spare parts)					
Bolt kit cover	BK-M8x40-4pcs	BK-M12x50-4pcs	BK-M16x55-4pcs	BK-M20x70-4pcs	BK-M20x75-4pcs	BK-M30x100-4pcs
Bolt kit pilot	BK-M5x75-4pcs					

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

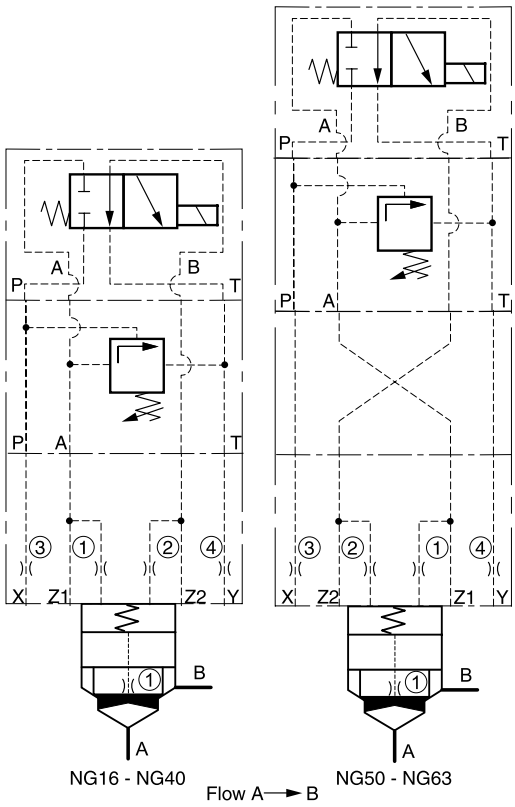
[1] Complete type see chapter “Directional Control Valves“, series D1VW.
[2] Complete types see pilot valves
[3] Included O-rings and mounting bolts
[4] Complete type see ordering code C*C
[5] Complete type see ordering code CE*

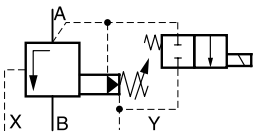
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Unloading valve with electrical vent function, normally closed





Adaptor plates see chapter 12

Description	Type NG16	NG25	NG32	NG40	NG50	NG63
4/2 DC valve [1]	D1VW78K*					
Pressure valve [2]	DAFA100xZ07x					
Adaptor plate [3] NG10-NG06	without				PADA1007/A-B/B-A	
Cover [4]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover orifice ①	M5xØ1.4	M5xØ1.5	M5xØ1.6	M5xØ1.7	M6xØ1.8	M6xØ1.9
Cover orifice ②	M5xØ00				M6xØ00	
Cover orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover orifice ④	M5xØ1.5	M6xØ1.6	M6xØ1.7	M6xØ1.8	M8xØ1.9	M8xØ2.2
Cartridge [5]	CE016C08*	CE025C08*	CE032C08*	CE040C08*	CE050C08*	CE063C08*
Poppet orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.0	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4
Spring	1.6 bar, type S (order no. see spare parts)					
Bolt kit cover	BK-M8x40-4pcs	BK-M12x50-4pcs	BK-M16x55-4pcs	BK-M20x70-4pcs	BK-M20x75-4pcs	BK-M30x100-4pcs
Bolt kit pilot	BK-M5x75-4pcs					

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

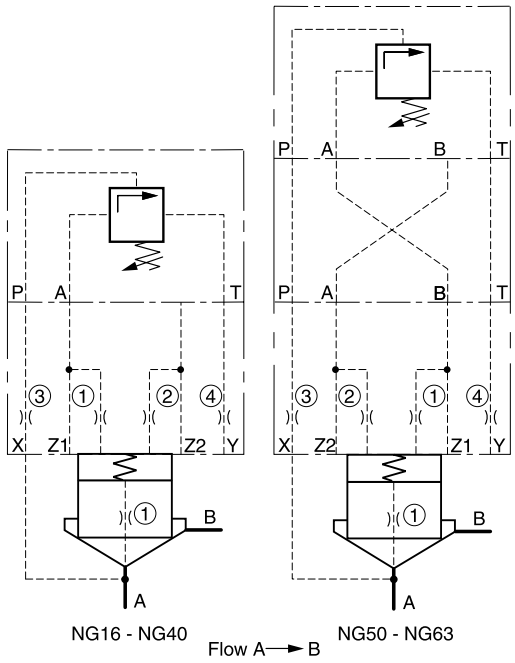
[1] Complete type see chapter "Directional Control Valves", series D1VW.
[2] Complete types see pilot valves
[3] Included O-rings and mounting bolts
[4] Complete type see ordering code C*C
[5] Complete type see ordering code CE*

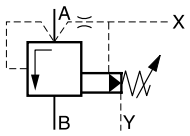
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Pressure sequence valve





Adaptor plates see chapter 12

8

Description	Type NG16	NG25	NG32	NG40	NG50	NG63
Press. sequ. valve [1]	DNLA100xP07x					
Adaptor plate [2] NG10-NG06	without				PADA1007/A-B/B-A	
Cover [3]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover orifice ②	M5xØ00				M6xØ00	
Cover orifice ③	M5xØ0.9	M6xØ1.1	M6xØ1.2	M6xØ1.3	M8xØ1.4	M8xØ1.5
Cover orifice ④	M5xØ1.3	M6xØ1.5	M6xØ1.7	M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge [4]	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet orifice ①	1/16NPT x Ø00					
Spring	1.6 bar, type S (order no. see spare parts)					
Bolt kit cover	BK-M8x40-4pcs	BK-M12x50-4pcs	BK-M16x55-4pcs	BK-M20x70-4pcs	BK-M20x75-4pcs	BK-M30x100-4pcs
Bolt kit pilot	BK-M5x45-4pcs					

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

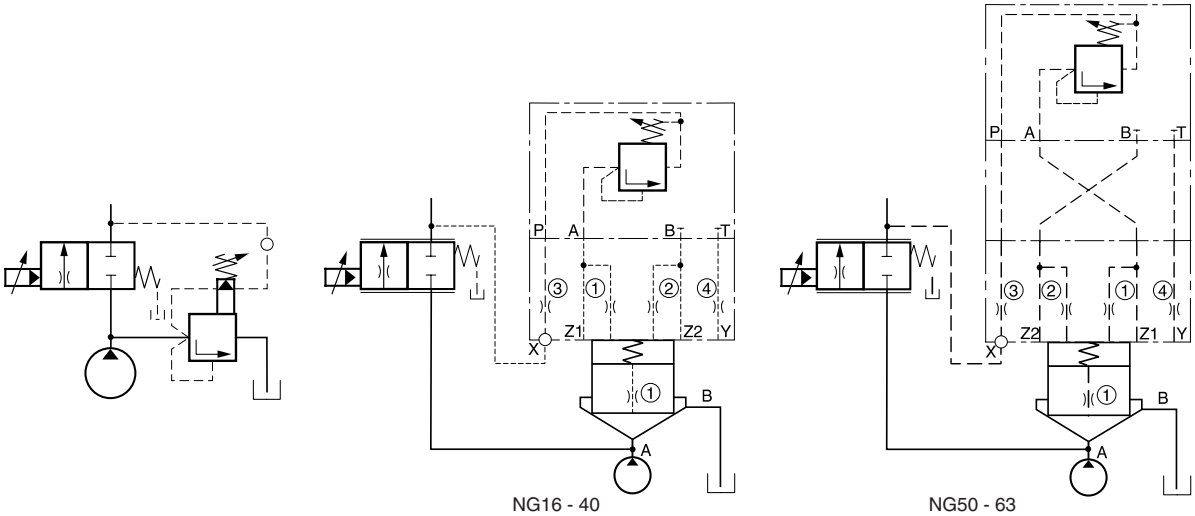
[1] Complete types see pilot valves
[2] Included O-rings and mounting bolts
[3] Complete type see ordering code C*C
[4] Complete type see ordering code CE*

comb-pressure.INDD RH_23.01.08

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3 way compensator (in combination with proportional throttle valve)



8

Adaptor plates see chapter 12

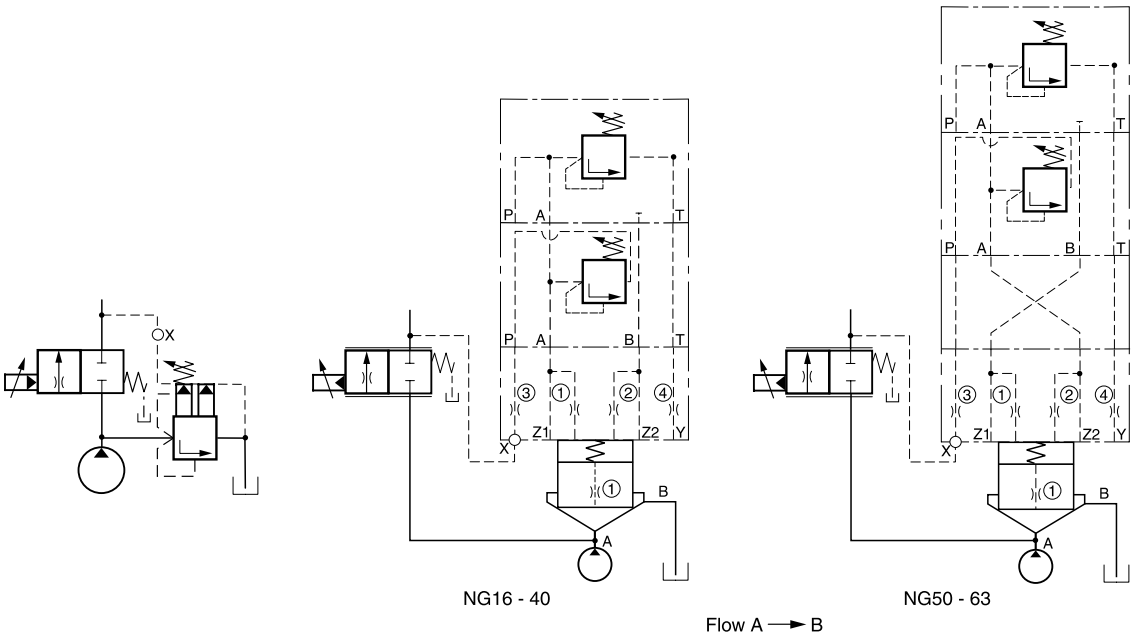
Description	Type NG16	NG25	NG32	NG40	NG50	NG63
Preload valve [1]	DSBA100xP07x					
Adaptor plate [2] NG10-NG06	without				PADA1007/A-B/B-A	
Cover [3]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover orifice ②	M5xØ00				M6xØ00	
Cover orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover orifice ④	M5xØ1.3	M6xØ1.5	M6xØ1.7	M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge [4]	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	1/16NPT x Ø1.5
Spring	1.6 bar, type S (order no. see spare parts)					
Bolt kit cover	BK-M8x40-4pcs	BK-M12x50-4pcs	BK-M16x55-4pcs	BK-M20x70-4pcs	BK-M20x75-4pcs	BK-M30x100-4pcs
Bolt kit pilot	BK-M5x45-4pcs					

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see pilot valves
[2] Included O-rings and mounting bolts
[3] Complete type see ordering code C*C
[4] Complete type see ordering code CE*

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3 way compensator with mechanical maximum pressure protection (in combination with proportional throttle valve)



Adaptor plates see chapter 12

8

Description	Type NG16	NG25	NG32	NG40	NG50	NG63
Pressure valve [1]	DSDA100xP07x					
Preload valve [1]	DSBA100xZ07x					
Adaptor plate [2] NG10-NG06	without				PADA1007/A-B/B-A	
Cover [3]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover orifice ②	M5xØ00				M6xØ00	
Cover orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover orifice ④	M5xØ1.3	M6xØ1.5	M6xØ1.7	M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge [4]	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	1/16NPT x Ø1.5
Spring	1.6 bar, type S (order no. see spare parts)					
Bolt kit cover	BK-M8x40-4pcs	BK-M12x50-4pcs	BK-M16x55-4pcs	BK-M20x70-4pcs	BK-M20x75-4pcs	BK-M30x100-4pcs
Bolt kit pilot	TK1482					

Shown orifice Ø and springs are recommendations.
xxØ00 = plug

xxØ99 = open

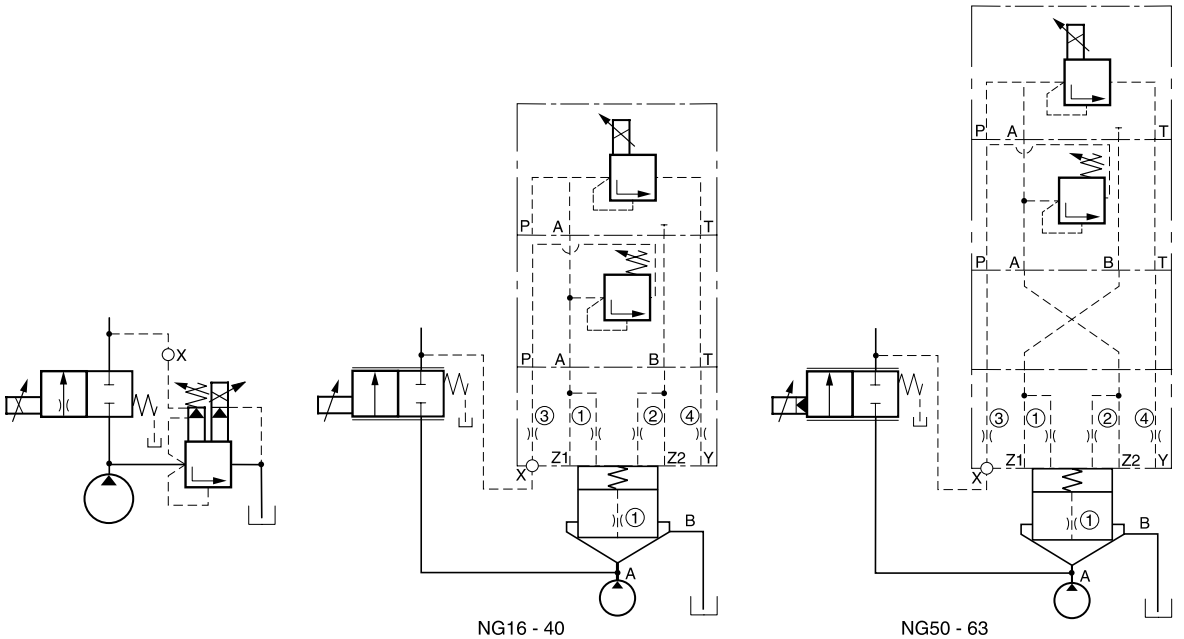
[1] Complete type see examples pilot valve
[2] Included O-rings and mounting bolts
[3] Complete type see ordering code C*C
[4] Complete type see ordering code CE*

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3 way compensator with proportional pressure relief function (in combination with proportional throttle valve)



NG16 - 40 NG50 - 63

Flow A → B

Adaptor plates see chapter 12

Description	Type NG16	NG25	NG32	NG40	NG50	NG63
Prop. press. valve [1]	RE06MxW2V1KW*					
Preload valve [2]	DSBA100xZ07x					
Adaptor plate [3] NG10-NG06	without				PADA1007/A-B/B-A	
Cover [4]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover orifice ②	M5xØ00				M6xØ00	
Cover orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover orifice ④	M5xØ1.3	M6xØ1.5	M6xØ1.7	M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge [5]	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	1/16NPT x Ø1.5
Spring	1.6 bar, type S (order no. see spare parts)					
Bolt kit cover	BK-M8x40-4pcs	BK-M12x50-4pcs	BK-M16x55-4pcs	BK-M20x70-4pcs	BK-M20x75-4pcs	BK-M30x100-4pcs
Bolt kit pilot	TK1482					

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

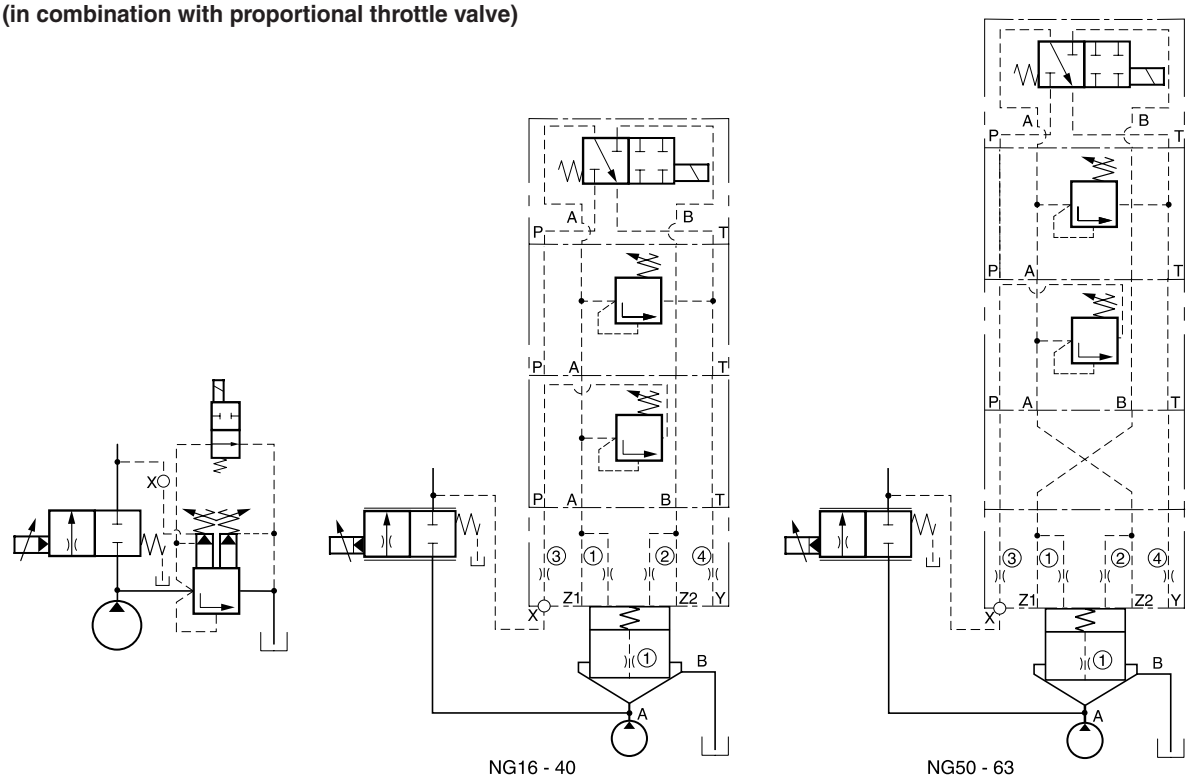
[1] Complete type see chapter “Pressure Valves“, series RE06W.
[2] Complete type see pilot valves
[3] Included O-rings and mounting bolts
[4] Complete type see ordering code C*C
[5] Complete type see ordering code CE*

comb-pressure.INDD RH_23.01.08

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3 way compensator with mechanical max. pressure protection and electrical vent function, normally open (in combination with proportional throttle valve)



NG16 - 40

NG50 - 63

Flow A → B

Adaptor plates see chapter 12

8

Description	Type					
	NG16	NG25	NG32	NG40	NG50	NG63
4/2 DC valve [1]	D1VW76K*					
Press. valve [2]	ZUDB1ATxZ07x					
Preload valve [2]	DSBA100xZ07x					
Adaptor plate [3] NG10-NG06	without				PADA1007/A-B/B-A	
Cover [4]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover orifice ②	M5xØ00				M6xØ00	
Cover orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover orifice ④	M5xØ1.3	M6xØ1.5	M6xØ1.7	M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge [5]	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	1/16NPT x Ø1.5
Spring	1.6 bar, type S (order no. see spare parts)					
Bolt kit cover	BK-M8x40-4pcs	BK-M12x50-4pcs	BK-M16x55-4pcs	BK-M20x70-4pcs	BK-M20x75-4pcs	BK-M30x100-4pcs
Bolt kit pilot	TK1473					

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

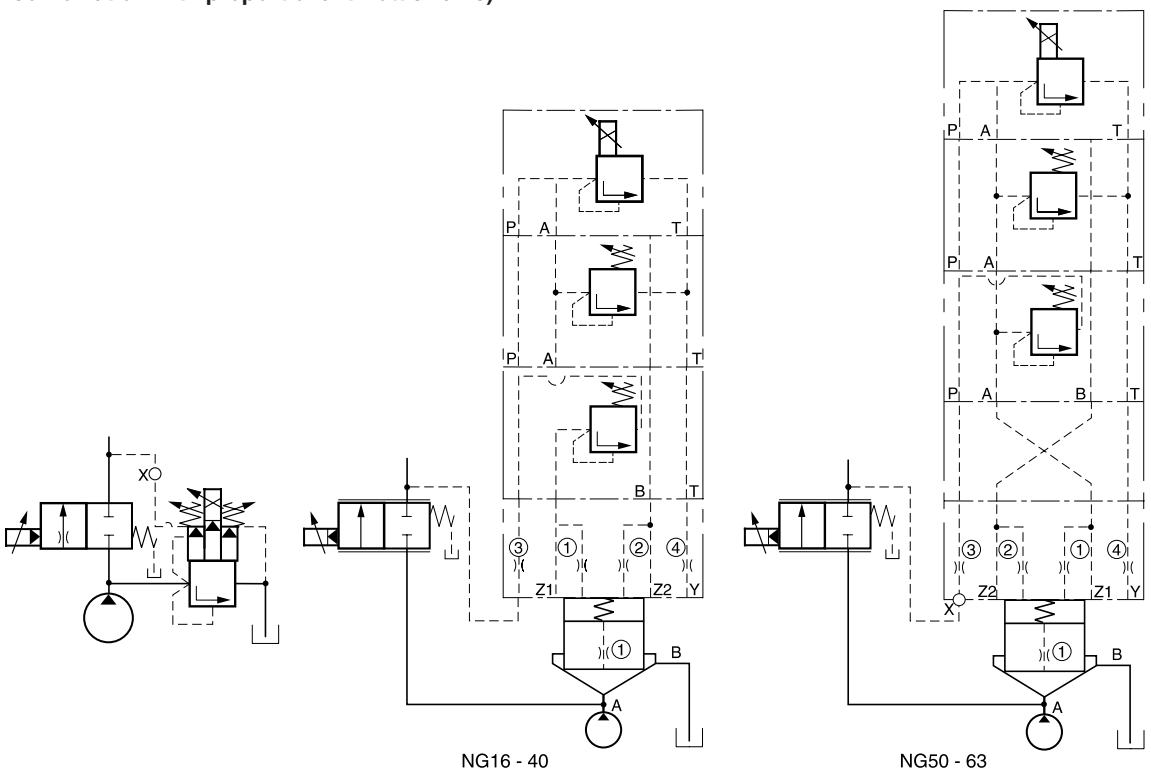
[1] Complete type see chapter "Directional Control Valves", series D1VW.
[2] Complete type see pilot valves
[3] Included O-rings and mounting bolts
[4] Complete type see ordering code C*C
[5] Complete type see ordering code CE*

comb-pressure.INDD RH_23.01.08

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3 way compensator with proportional pressure relief function and mechanical maximum pressure protection (in combination with proportional throttle valve)



Adaptor plates see chapter 12

Description	Type NG16	NG25	NG32	NG40	NG50	NG63
Prop. press. valve [1]	RE06MxW2V1KW*					
Press. valve [2]	ZUDB1ATxZ07x					
Preload valve [2]	DSBA100xZ07x					
Adaptor plate [3] NG10-NG06	without				PADA1007/A-B/B-A	
Cover [4]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover orifice ②	M5xØ00				M6xØ00	
Cover orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover orifice ④	M5xØ1.3	M6xØ1.5	M6xØ1.7	M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge [5]	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	1/16NPT x Ø1.5
Spring	1.6 bar, type S (order no. see spare parts)					
Bolt kit cover	BK-M8x40-4pcs	BK-M12x50-4pcs	BK-M16x55-4pcs	BK-M20x70-4pcs	BK-M20x75-4pcs	BK-M30x100-4pcs
Bolt kit pilot	TK1473					

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see chapter "Pressure Valves", series RE06W*.
[2] Complete type see pilot valves
[3] Included O-rings and mounting bolts
[4] Complete type see ordering code C*C
[5] Complete type see ordering code CE*

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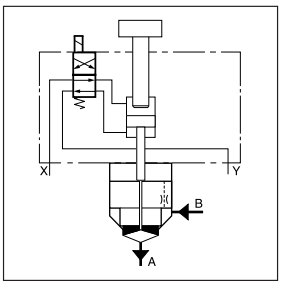
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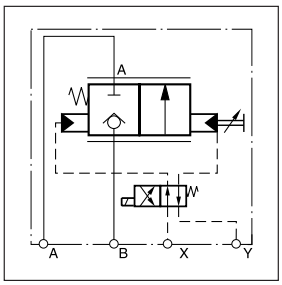
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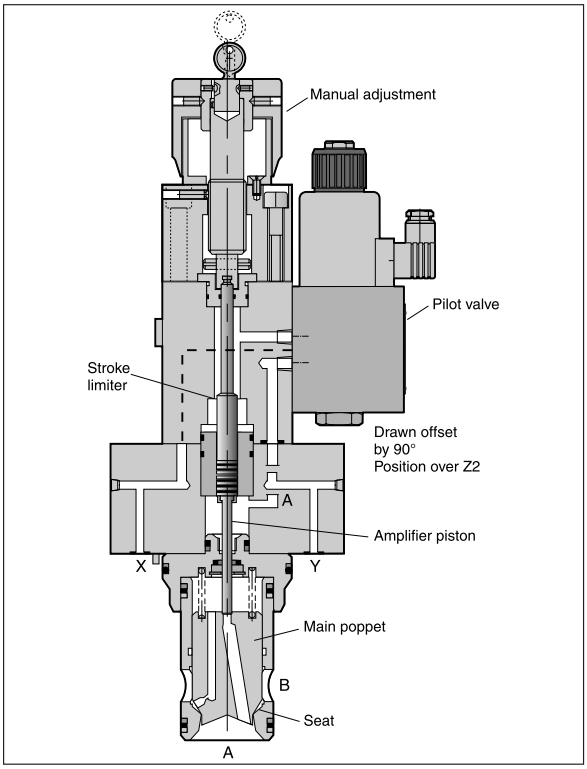
Accumulator discharge valves are preferably used in hydraulic systems where high volume flow rates are discharged from accumulators over a short operating period (in the range of milliseconds).

Typical applications are injection moulding and die casting machines as well as hydraulic presses.

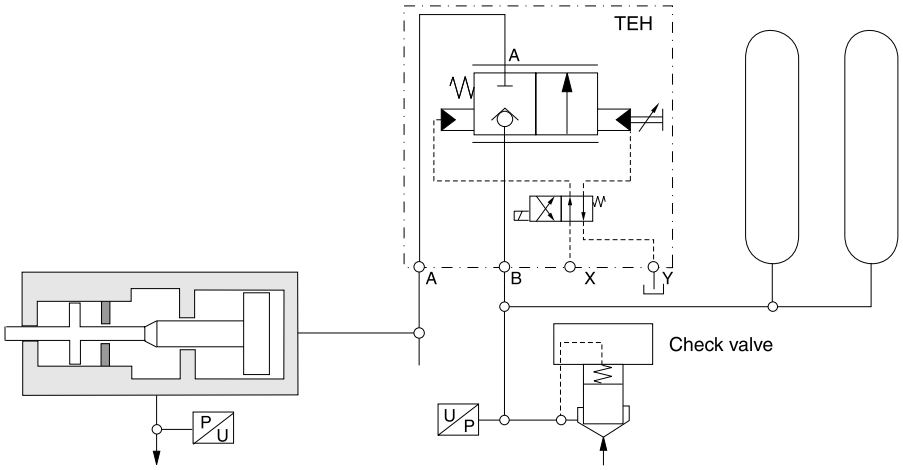
The amplifier piston is pressed down onto the main poppet by pilot pressure in the X-line and pushes the main poppet into the seat. By switching the pilot valve the pilot pressure pushes the amplifier piston against the manual adjusted stroke limiter. The main poppet is forced by pressure in the B-line to follow the amplifier piston immediately and opens the adjusted area for flow from B to A. In the neutral position, the flow from B to A is blocked. With pilot pressure in X flow from A to B is blocked as well. Without pilot pressure oil can pass from A to B through the orifice in the poppet.







Example accumulator system for an injection cylinder



TEH_UK.INDD RH_13.03.08

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Ordering code

TEH		E	L	0	9		2		W		
Throttle valve with shut-off function	Nominal size	Cartridge valve ISO 7368	Manual adjustment with DIN-lock	Spool form	Flow code	Flow direction	Pilot oil guide external/ external	Seals	Plug socket without plug	Solenoid voltage	Design series (not required for ordering)

Code	Nominal size
032	NG32
040	**NG40**
050	**NG50**
063	**NG63**
080	NG80
100	NG100

Code	Solenoid
J	**24V= / 1.25A**
U	98V= / 0.31A*
G	205V= / 0.15A*

* For 110V 50Hz or 220V 50Hz use plug with rectifier.

Code	Flow direction
A	A to B
B	**B to A**

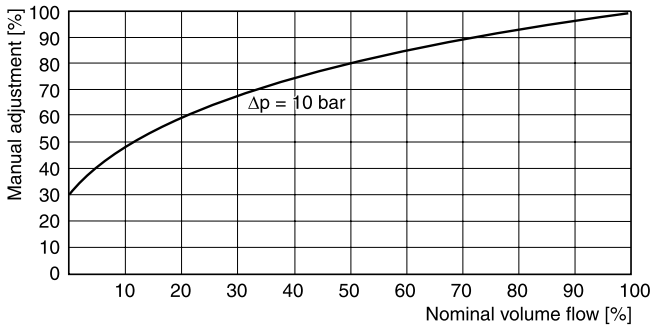
Code	Seal
N	**NBR**
V	FPM

Bold letters =
Short-term availability

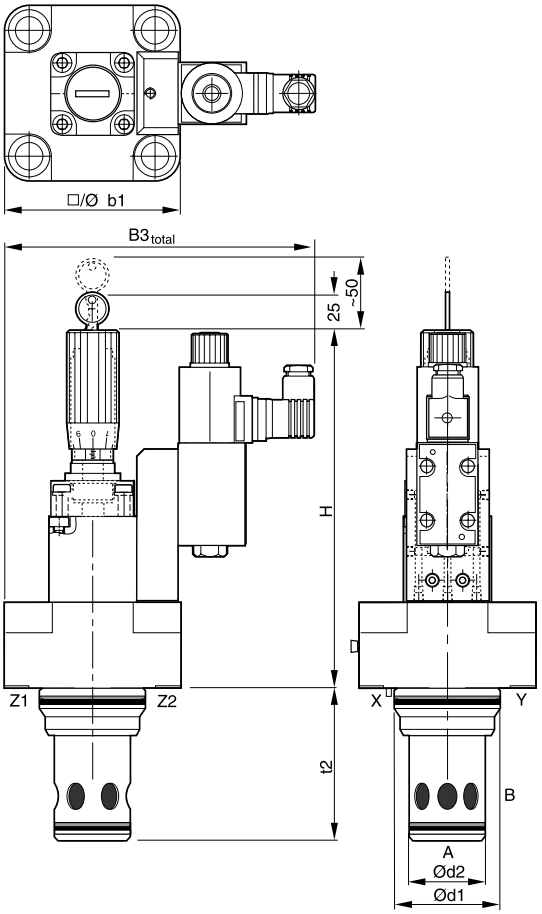
Technical data

General							
Design		Throttle valve, slip-in cartridge according to ISO 7368					
Nominal size		**NG32**	**NG40**	**NG50**	**NG63**	**NG80**	**NG100**
Mounting position		unrestricted					
Ambient temperature	[°C]	-20...+80					
Weight	[kg]	9	13	22	38	62	85
Extracting tools		See accessories					
Hydraulics							
Max. operating pressure	[bar]	Ports A, B and X up to 350, port Y: max. 10					
Fluid		Hydraulic oil as per DIN 51 524...525					
Fluid temperature	[°C]	0...60					
Viscosity, recommended permitted	[cSt]/[mm²/s] [cSt]/[mm²/s]	30...80 20...380					
Filtration		ISO 4406 : 1999; 18/16/13					
Nominal flow Δp= 10 bar	[l/min]	950	1400	2300	4000	6000	9500
Pilot valve		4/2 flow control valve, see chapter 2					
		Type D1DW			Type D3W		

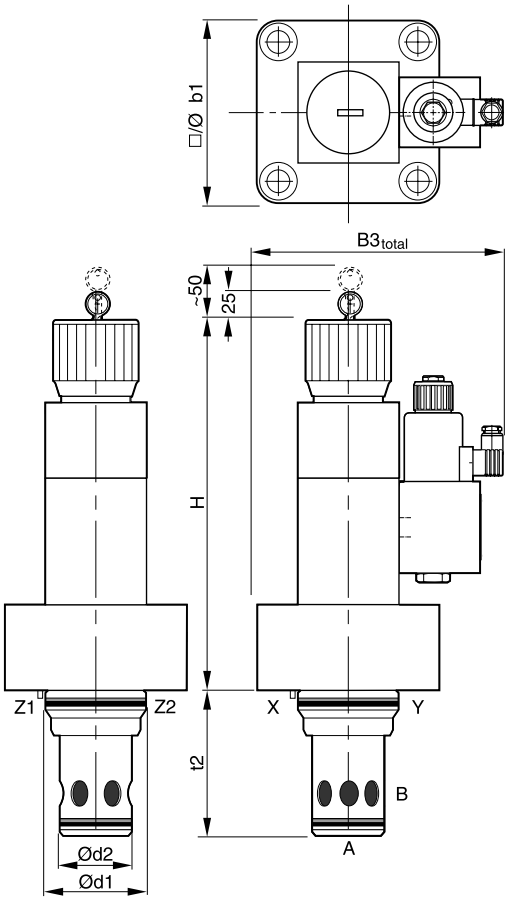
Characteristic curve

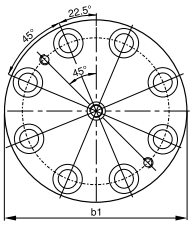


TEH NG32...50



TEH NG63...100

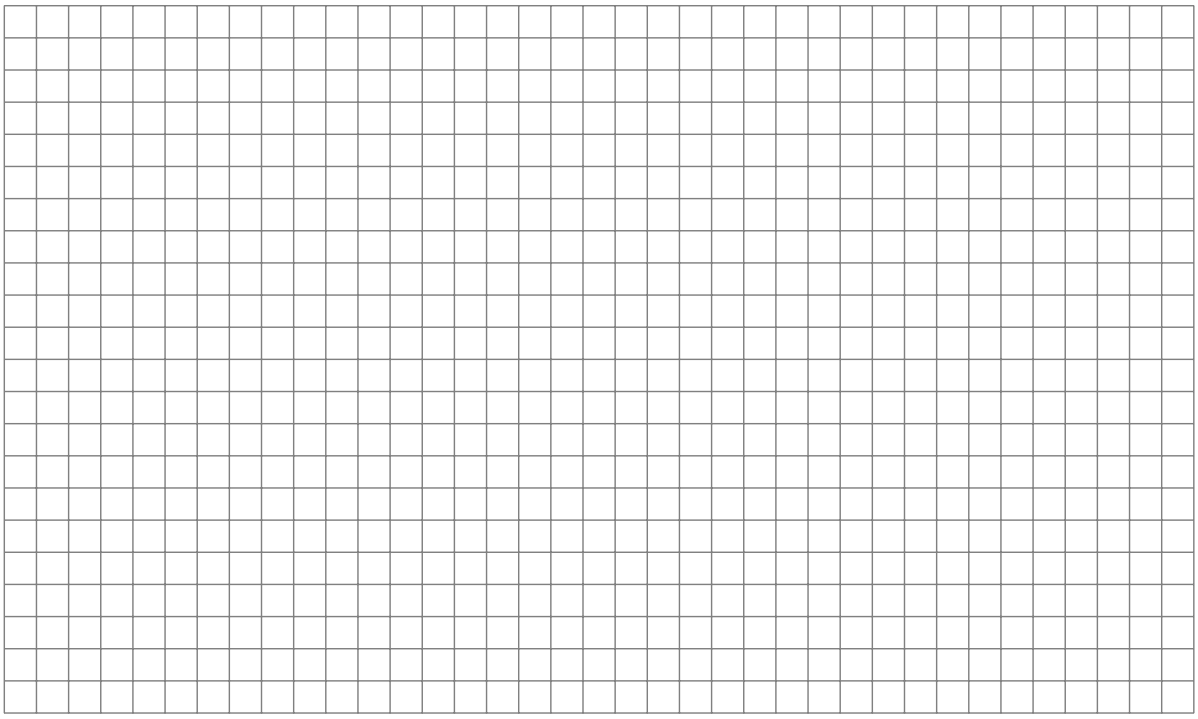




Size	32	40	50	63	80	100
H	255	265	275	407	427	442
b1	102	125	140	180	Ø250	Ø300
$d1^{H7}$	60	75	90	120	145	180
$d2^{H7}$	45	55	68	90	110	135
$t2^{+0.1}$	85	105	122	155	205	245
$B3_{total}$	205	216	224	255	290	315

NG	Bolt kit - DIN912 12.9		Kit NBR	Kit FPM
32	BK-M16x55-4pcs	281 Nm	SK-TEH032EN-20	SK-TEH032EV-20
40	BK-M16x55-4pcs	553 Nm	SK-TEH040EN-20	SK-TEH040EV-20
50	BK-M20x75-4pcs	553 Nm	SK-TEH050EN-20	SK-TEH050EV-20
63	BK-M30x100-4pcs	1910 Nm	SK-TEH063EN-20	SK-TEH063EV-20
80	BK-M24x120-8pcs	935 Nm	SK-TEH080EN-20	SK-TEH080EV-20
100	BK-M30x140-8pcs	1910 Nm	SK-TEH100EN-20	SK-TEH100EV-20

Notes



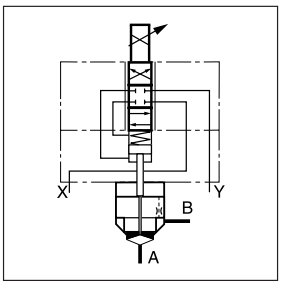
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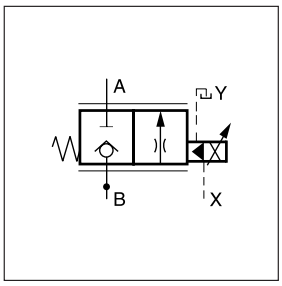
The 2/2 way proportional throttle valves series TDA are used to control large oil flows.

Features

- Cavity and mounting pattern according to ISO 7368
- Fail-safe function at power failure
- Leak-free from port B to A
- Pressure differential up to 350 bar possible
- 8 sizes NG16 up to NG100



Function symbol

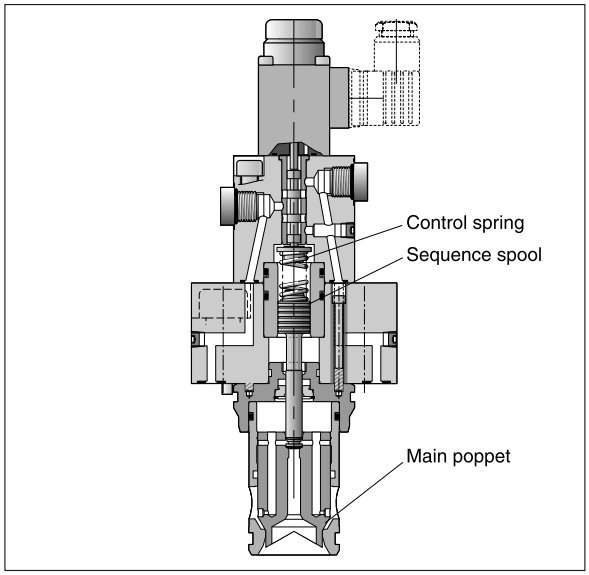


Short symbol

Function

The TDA valve has a 3-stage design consisting of the first solenoid operated pilot stage with a spool in sleeve design, the second pilot stage with the control spring and the sequence spool and as main stage the poppet in the sleeve. The proportional solenoid operates the pilot spool against the feedback of the control spring and controls the position of the sequence spool. The main poppet follows the position of the sequence spool and provides an open area for flow from B to A (optional A to B) in proportion to the solenoid current. The poppet is positioned independent of the differential pressure, which can become as high as the maximum working pressure.

In combination with the digital power amplifier PC-D00A-400 the valve parameters can be saved, changed and duplicated.



8

Ordering Code

TDA		E	W	0	9		2				W	
Proportional throttle valve	Nominal size	Slip-in valve DIN ISO 7368	Design	Poppet shape	Nominal flow	Flow direction	Piloting	Seal	Solenoid voltage	Plug socket without plug	Design series (not required for ordering)	

Code	Nominal size
016	NG16
025	**NG25**
032	**NG32**
040	**NG40**
050	**NG50**
063	NG63
080	NG80
100	NG100

Code	Solenoid voltage
X	**16 VDC**
L	6 VDC

Code	Seal
N	**NBR**
V	FPM

Code	Flow direction
A	A to B
B	**B to A**

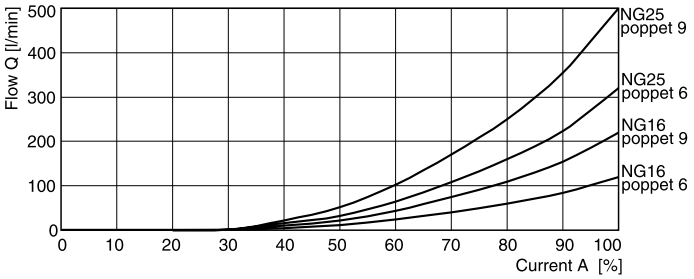
Bold letters =
Short-term availability

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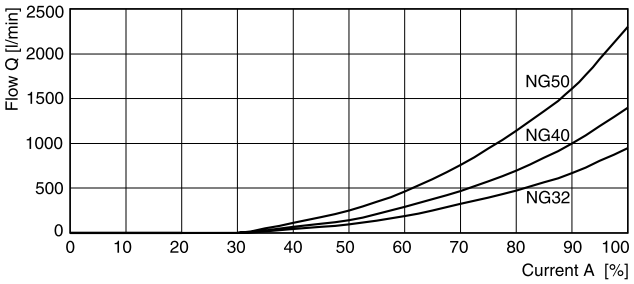
General									
Design			Proportional throttle valve, slip-in cartridge according to ISO 7368						
Nominal size			**16**	**25**	**32**	**40**	**50**	**63**	**80**	**100**
Mounting position			unrestricted							
Ambient temperature		[°C]	-20...+80							
Weight		[kg]	3.1	4.3	5.8	9.2	15	33	63	87
Extracting tool			see accessories							
Hydraulics									
Max. operating pressure		[bar]	Ports A, B and X up to 350, port Y: max. 10							
Fluid			Hydraulic oil as per DIN 51524...525							
Fluid temperature		[°C]	0 ... +60							
Viscosity	recommended	[cSt]/[mm²/s]	30 ... 80							
	permitted	[cSt]/[mm²/s]	20 ... 380							
Filtration			ISO 4406: 1999; 18/16/13							
Nominal flow at Δp=10bar		[l/min]	220	500	950	1400	2300	4000	6000	9500
Flow direction			see ordering code							
Pilot pressure, min.		[bar]	> 25% of system pressure							
Min. operating pressure		[bar]	Port A → B ca. 10; Port B → A ca. 15							
Pilot oil	supply		Depending on flow direction A or B using X or external X							
	drain		External using Y max. 10bar							
Pilot oil at p = 100bar		[l/min]	Port X → Y <1.5							
Opening point			At 30% of nominal current							
Manufacturing tolerance		[%]	±5 of Qnom							
Static/dynamic									
Hysteresis		[%]	< 3							
Repeatabiltity		[%]	< 1							
Response time at px=50bar		[ms]	20	25	30	35	45	55	65	80
Electrical (proportional solenoid)									
Duty ratio			100% ED							
Protection class			IP65 according to EN 60529 (plugged and mounted)							
Solenoid		Code	**L**				**X**			
	at size		16-50		63-100		16-50		63-100	
Solenoid voltage		[V]	6				16			
Nominal current (100% ED)		[A]	2.6				1.05			
Nominal resistance		[Ohm]	2.2		2.5		11.3		14	
Power amplifier, recommended			PCD 00A-400							
Solenoid connection			Connector as per EN 175301-803							

The pilot pressure in X-line must be at least 25% (NG16-40) or 45% (NG50-100) of the pressure in the draining-off line of the cartridge to make sure that the main poppet closes safely without malfunction.

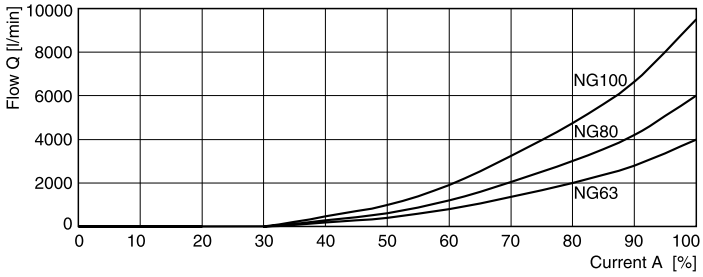
Solenoid current / flow curves
NG16-25 (Δp=10bar)



NG32-50 (Δp=10bar)

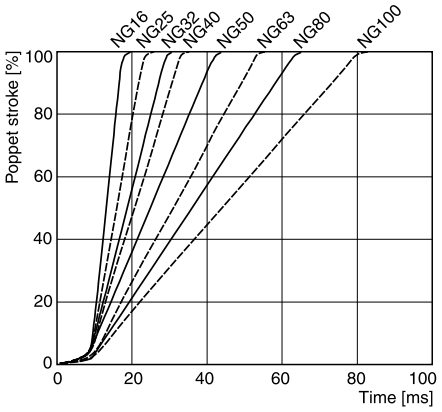


NG63-100 (Δp=10bar)



$$\Delta p_{actual} = \left(\frac{Q_{actual}}{Q_{nominal}}\right)^2 \bullet \Delta p_{nominal}$$

Poppet stroke / time curve

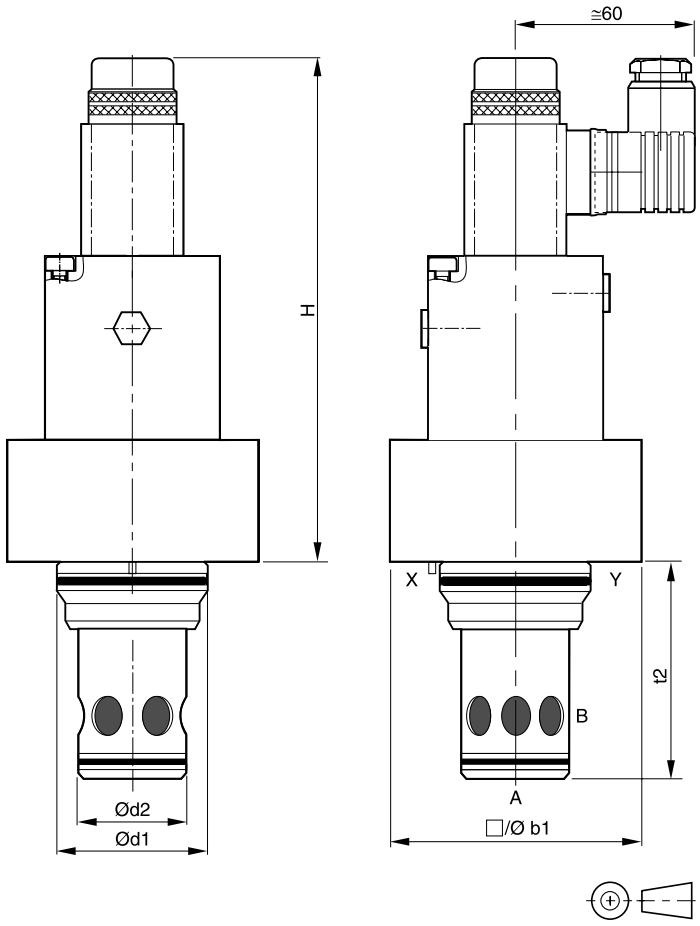


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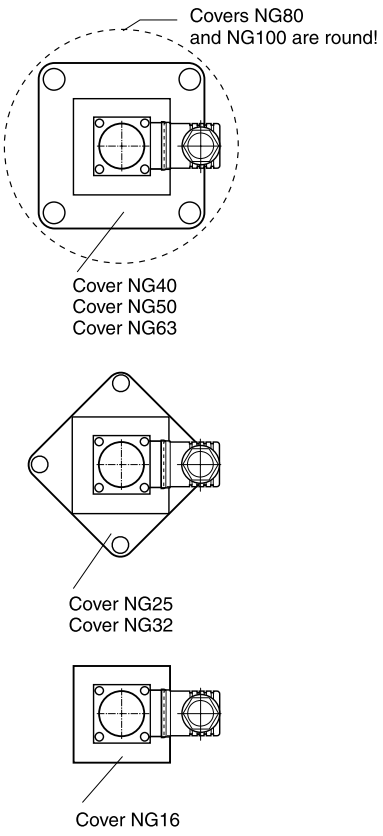
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Valves



Valve covers



8

Size	16	25	32	40	50	63	80	100
H	168	173	178	262	198	287	327	342
b1	65	85	102	125	140	180	Ø250	Ø300
$d1^{H7}$	32	45	60	75	90	120	145	180
$d2^{H7}$	25	34	45	55	68	90	110	135
$t2^{+0.1}$	56	72	85	105	122	155	205	245

NG	Bolt kit - DIN912 12.9		Kit NBR	Kit FPM
16	BK-M8x100-4pcs	33 Nm	SK-TDA016EN-20	SK-TDA016EV-20
25	BK-M12x50-4pcs	115 Nm	SK-TDA025EN-20	SK-TDA025EV-20
32	BK-M16x55-4pcs	281 Nm	SK-TDA032EN-20	SK-TDA032EV-20
40	BK-M20x70-4pcs	553 Nm	SK-TDA040EN-20	SK-TDA040EV-20
50	BK-M20x75-4pcs	553 Nm	SK-TDA050EN-20	SK-TDA050EV-20
63	BK-M30x100-4pcs	1910 Nm	SK-TDA063EN-20	SK-TDA063EV-20
80	BK-M24x120-8pcs	935 Nm	SK-TDA080EN-20	SK-TDA080EV-20
100	BK-M30x140-8pcs	1910 Nm	SK-TDA100EN-20	SK-TDA100EV-20

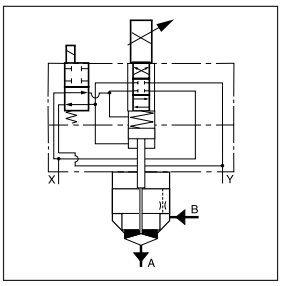
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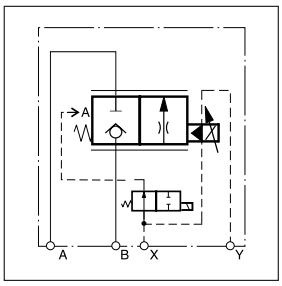
Accumulator discharge valves are preferably used in hydraulic systems where high flow rates are discharged from hydraulic accumulators over a short operating period (in the range of milliseconds).

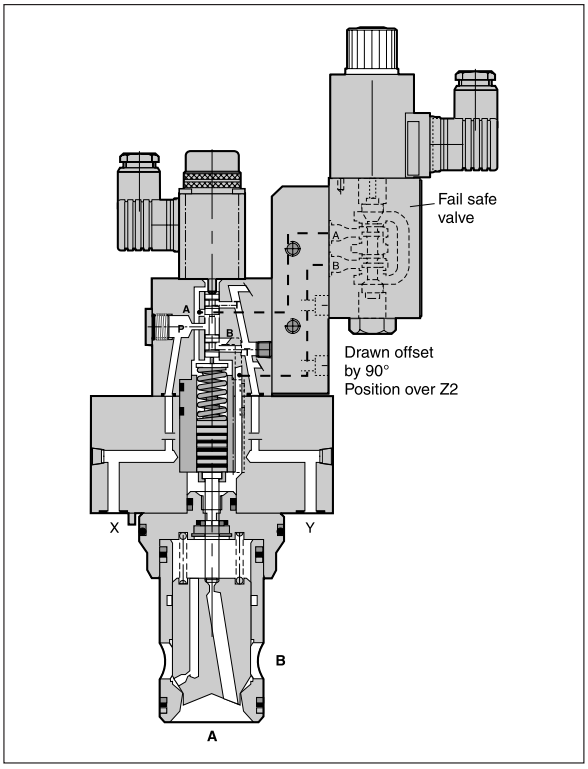
Typical applications are injection molding and die casting machines as well as hydraulic presses.

Basically the function of an accumulator discharge valve corresponds to the function of a TDA throttle valve. In addition a directional valve is integrated in the pilot circuit to meet the relevant safety regulations.

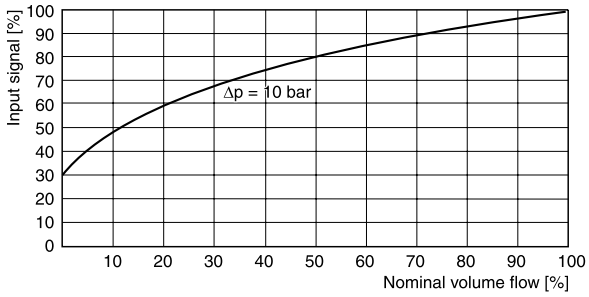
The directional valve provides the safety function. When the solenoid is deenergized and the spring is in the end position, pilot pressure from X presses the control piston into lower end position and, the main poppet is closed. As a result the flow from B to A or from the reservoir system to the machine is blocked.



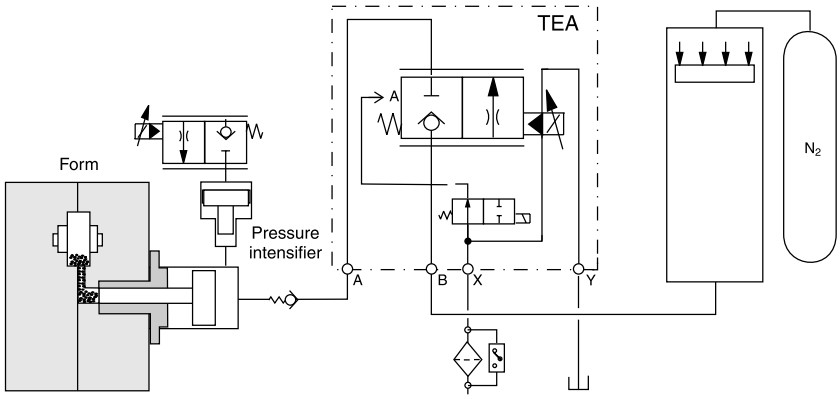




Characteristic curve



Example accumulator system in a die casting machine



TEA_UK.INDD RH_13.03.08

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Ordering code

TEA		E	W	0	9		2			W		
Prop. throttle valve with shut-off function	Nominal size	Cartridge valve ISO 7368	Design	Spool form	Flow code	Flow direction	Pilot oil guide	Seals	Prop. solenoid voltage	Plug socket without plug	Solenoid voltage	Design series (not required for ordering)

Code	Nominal size
032	NG32
040	**NG40**
050	**NG50**
063	**NG63**
080	NG80
100	NG100

Code	Flow direction
A	A to B
B	**B to A**

Bold letters =
Short-term availability

Code	Solenoid
J	**24V= / 1.25A**
U	98V= / 0.31A*
G	205V= / 0.15A*

* For 110V 50Hz or 220V 50Hz use plug with rectifier.

Code	Prop. solenoid voltage
L	6 VDC
X	16 VDC

Code	Seal
N	**NBR**
V	FPM

Technical data

General							
Design		Proportional throttle valve, slip-in cartridge according to ISO 7368					
Nominal size		**NG32**	**NG40**	**NG50**	**NG63**	**NG80**	**NG100**
Mounting position		unrestricted					
Ambient temperature	[°C]	-20...+80					
Weight	[kg]	9	13	22	38	62	85
Extracting tools		See accessories					
Hydraulics							
Max. operating pressure	[bar]	Ports A, B and X up to 350, port Y: max 10					
Fluid		Hydraulic oil as per DIN 51 524 ... 525					
Fluid temperature	[°C]	0...+60					
Viscosity, recommended	[cSt]/[mm²/s]	30...80					
permitted	[cSt]/[mm²/s]	20...380					
Filtration		ISO 4406 : 1999; 18/16/13					
Nominal flow Δp= 10 bar	[l/min]	950	1400	2300	4000	6000	9500
Pilot pressure, min.	[bar]	> 25% of system pressure					
Pilot oil	supply	Depending on flow direction A or B using X or external X					
Pilot oil at p = 100bar	[l/min]	Port X → Y <1.5					
Opening point		At 30% of nominal current					
Manufacturing tolerance	[%]	±5 of Qnom					
Hysteresis	[%]	< 3					
Repeatabiltity	[%]	< 1					
Response time at px=50bar	[ms]	30	35	45	55	65	80
Electrical (proportional solenoid)							
Duty ratio		100% ED					
Protection class		IP65 according to EN 60529 (plugged and mounted)					
Solenoid Code		**L**			**X**		
at size		16-50	63-100		16-50	63-100	
Solenoid voltage	[V]	6			16		
Nominal current (100% ED)	[A]	2.6			1.05		
Nominal resistance	[Ohm]	2.2	2.5		11.3	14	
Power amplifier, recommended		PCD 00A-400					
Solenoid connection		Connector as per EN 175301-803					
Pilot valve		4/2 flow control valve, see chapter 2					
		Type D1DW			Type D3W		

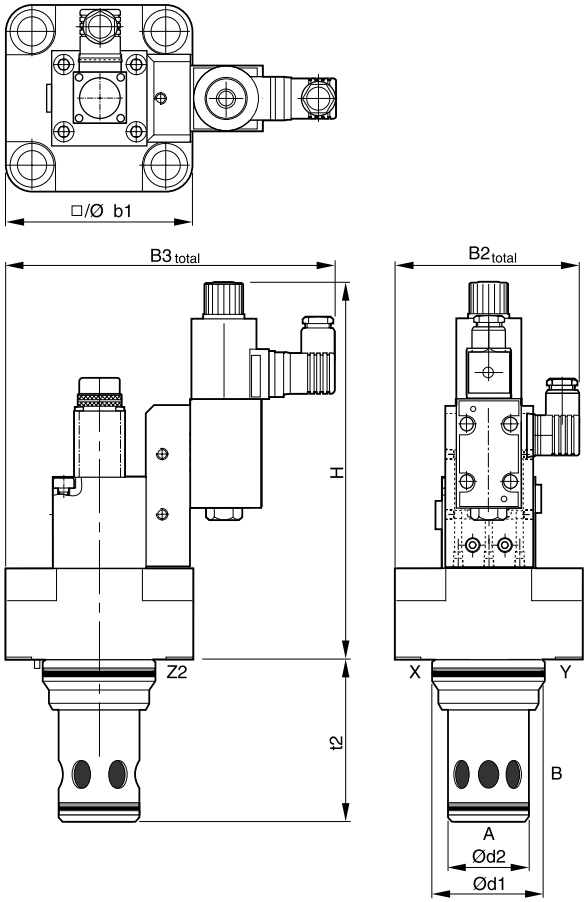
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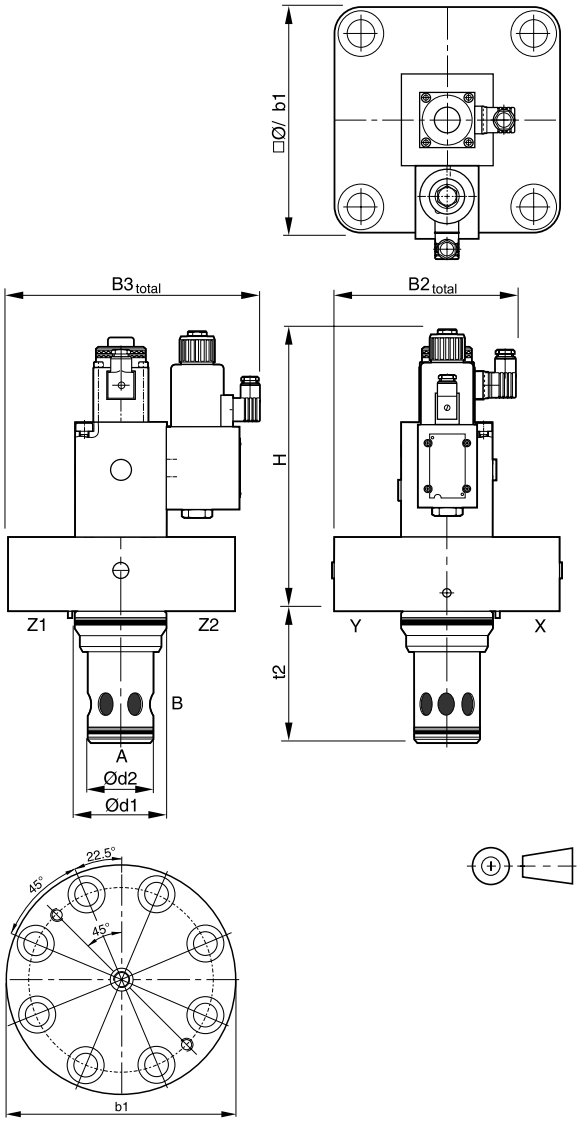
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TEA NG32...50



TEA NG63...100



Size	32	40	50	63	80	100
H	250	260	270	312	337	352
b1	102	125	140	180	Ø250	Ø300
$d1^{H7}$	60	75	90	120	145	180
$d2^{H7}$	45	55	68	90	110	135
$t2^{+0.1}$	85	105	122	155	205	245
$B2_{total}$	106	118	125	158	193	218
$B3_{total}$	205	216	224	255	290	315

NG	Bolt kit - DIN912 12.9		Kit NBR	Kit FPM
32	BK-M16x55-4pcs	281 Nm	SK-TEA032EN-20	SK-TEA032EV-20
40	BK-M16x55-4pcs	553 Nm	SK-TEA040EN-20	SK-TEA040EV-20
50	BK-M20x75-4pcs	553 Nm	SK-TEA050EN-20	SK-TEA050EV-20
63	BK-M30x100-4pcs	1910 Nm	SK-TEA063EN-20	SK-TEA063EV-20
80	BK-M24x120-8pcs	935 Nm	SK-TEA080EN-20	SK-TEA080EV-20
100	BK-M30x140-8pcs	1910 Nm	SK-TEA100EN-20	SK-TEA100EV-20

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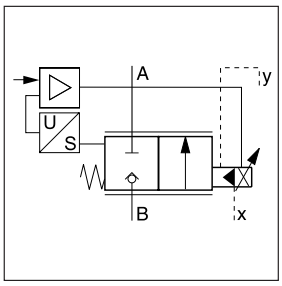
Notes

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The 2/2 way proportional throttle valves series TDL are used in applications where high flow has to be precisely controlled with a very fast response time. Typical applications are die casting, injection moulding and hydraulic presses.



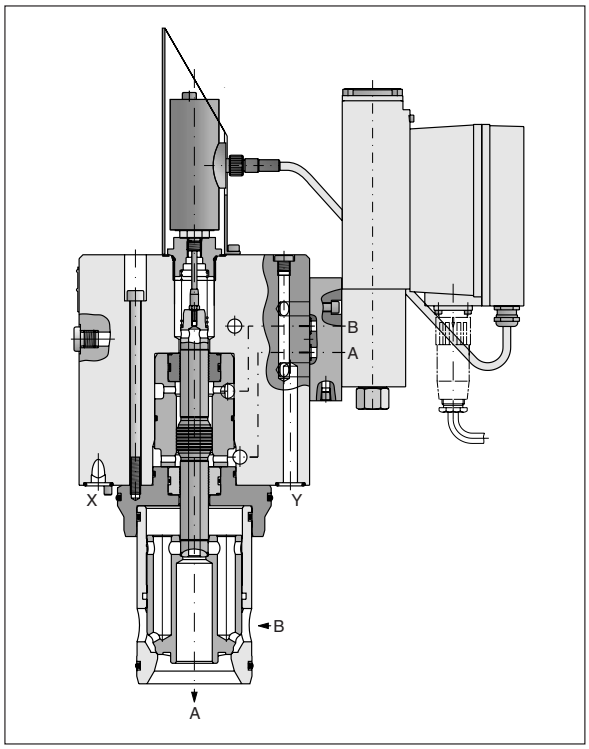


Function

The TDL valve has a 3-stage design consisting of the DFplus pilot valve, the hydraulic follow-up system with LVDT and the main stage with poppet and sleeve.

With the DFplus pilot valve the TDL achieves extremely fast response times: from 14ms (NG40) up to 22ms (NG100) with an adjustment precision of 0.5% of the nominal adjusted flow. The follow-up spool enables the poppet to be positioned independent of the differential pressure, which can become as high as the maximum working pressure.

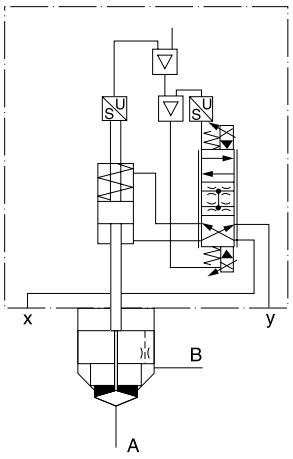
The optimum dynamics are achieved at a control pressure >50 bar. The TDL has integrated electronics controlling both the position of the follow-up piston and the spool position of the DFplus pilot valve. All this makes the TDL a completely factory set unit with minimum or no need for on-site setting.



Features

- Pilot operated 2/2 way proportional throttle valve
- Cavity and mounting pattern according to ISO 7368
- For speed and position control
- Fast step response
- Flow direction B to A
- Completely adapted unit with integrated electronics
- Fail safe position
- 5 sizes NG40 up to NG100

Function symbol



8

Ordering code

TDL		E	H	9	9	B	2			0	
Proportional throttle valve with LVDT	**Nominal size**	**Slip-in cartridge**	**Closed pilot circle, fast valve type, integrated electronics**	**Sinus poppet**	**Nominal flow**	**Flow direction B → A**	**Pilot supply external, drain external**	**Seal**	**Electronic**	**Standard electronics**	**Serial number** (not required for ordering)

Code	Nominal size
040	**NG40**
050	**NG50**
063	**NG63**
080	NG80
100	NG100

Code	Electronic
B	**Supply voltage 0...+10V**
S	Supply 4...+20mA

Code	Seal
N	**NBR**
V	FPM

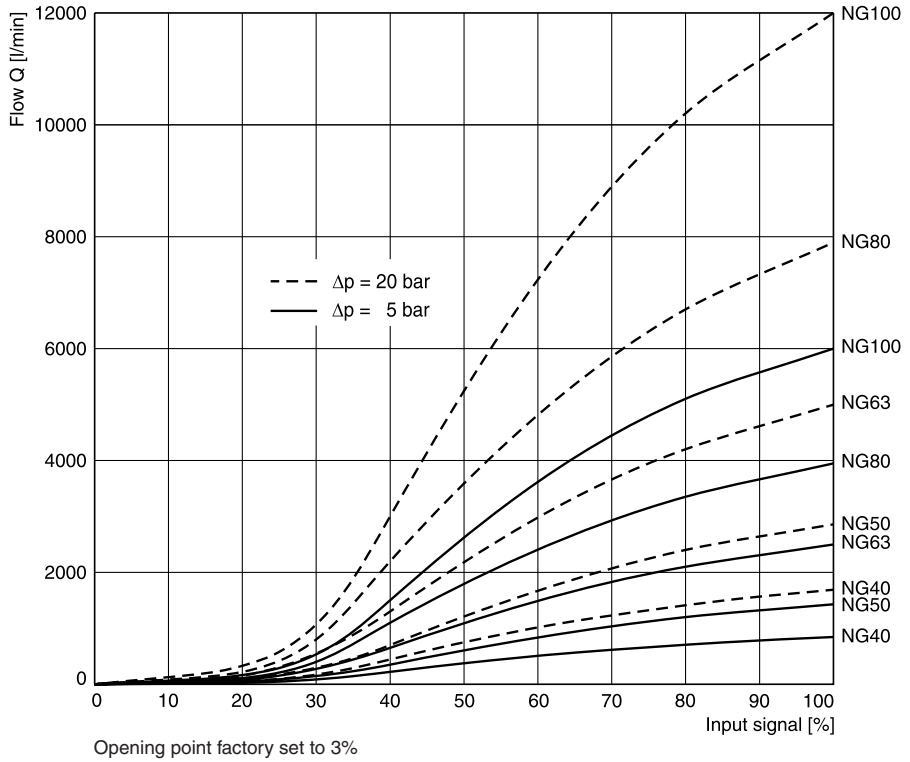
Please order plugs seperately

Bold letters =
Short-term availability

Performance curves

Characteristic flow/signal line

(Δp = 5/20 bar constant, viscosity 25mm²/s)



Opening point factory set to 3%

TDL_UK.INDD RH_13.03.08

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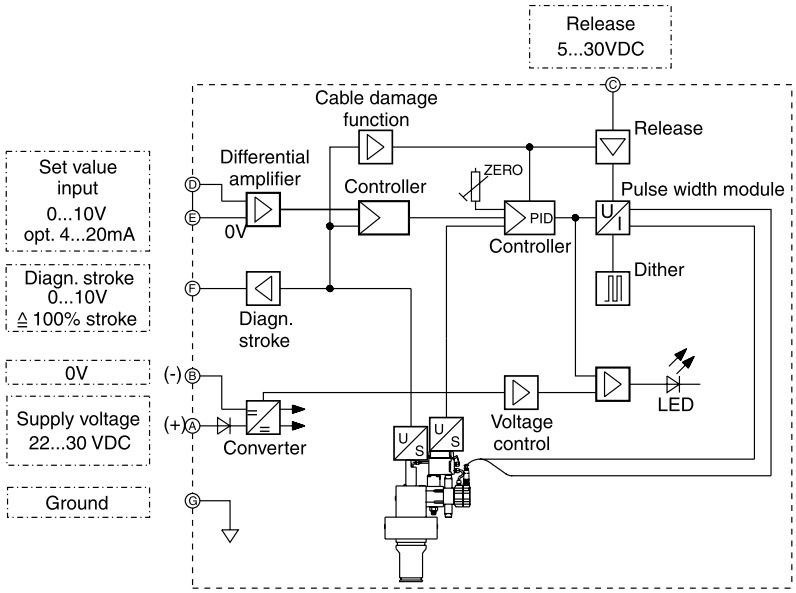
General							
Design			Proportional throttle valve, slip-in cartridge according to ISO 7368				
Nominal size		DIN	**NG40**	**NG50**	**NG63**	**NG80**	**NG100**
Mounting position			unrestricted				
Ambient temperature		[°C]	-20...+50				
Weight		[kg]	15	26	52	105	157
Extracting tool			see accessories				
Hydraulic							
Max. operating pressure		[bar]	Ports A, B and X up to 350, port Y: max. 10				
Fluid			Hydraulic oil as per DIN 51 524 ... 525				
Fluid temperature		[°C]	0 ... +60				
Viscosity	recommended	[cSt]/[mm²/s]	30 ... 80				
	permitted	[cSt]/[mm²/s]	20 ... 380				
Filtration			ISO 4406 : 1999; 18/16/13				
Nominal flow at Δp=20 bar		[l/min]	2500	4100	6800	9500	13500
Flow direction			B to A				
Pilot pressue, min.		[bar]	50% of system pressure				
Pilot oil	supply		Depending on flow direction B via X, or external X				
	drain		Always external via Y, max. 10 bar				
Leakage oil pilot control			X → Y at p = 175 bar				
Release off		[l/min]	NG40 to 63 <1.2; NG80 to 100 <2.0				
Enable on		[l/min]	NG40 to 63 <2.5; NG80 to 100 <4.0				
Min. supply pressure port B		[bar]	Approx. 5				
Max. pilot fluid flow		[l/min]	13	24	42	54	65
Static/dynamic							
Hysteresis		[%]	< 1				
Repeatabiltity		[%]	< 0.5				
Resp. time t at px > 50 bar		[ms]	12	16	20	17.5	22
Electrical							
Protection class			IP65				
Supply voltage		[V]	22...30, ripple < 5% eff., surge free				
Permitted waviness		[%]	Max. 5				
Power consumption		[A]	Max. 2.8				
Input signal range:							
Voltage input			0...+10V / 100kΩ				
Current input			12...+20mA / 250Ω				
Release input		[V]	5...30				
Installation section diameter			Min 1.0 mm² shielded				
Line length		[m]	Max. 50				

Flow at different Δp $Q_{actual} = Q_{nominal} \cdot \sqrt{\Delta p_{actual} / 20}$

8

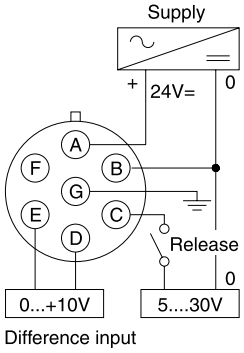
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Block circuit diagram electronics

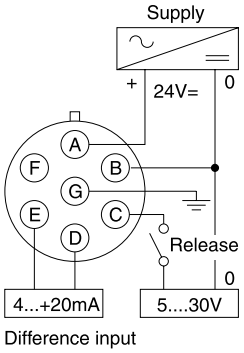


Connection diagrams

Electronics code B

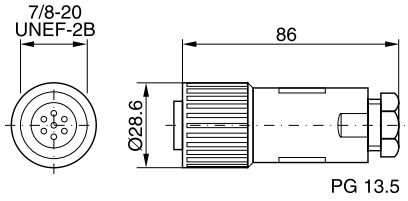


Electronics code S



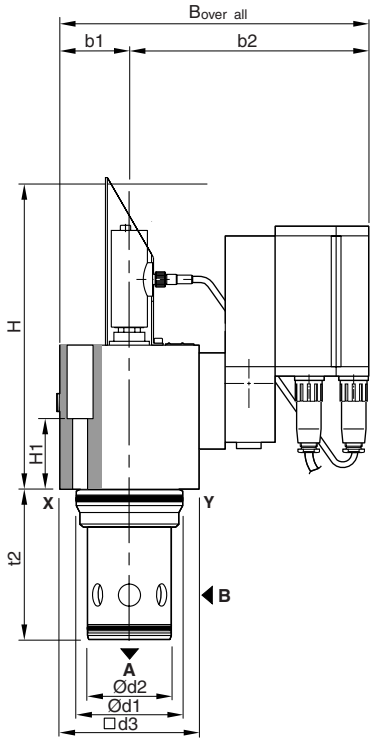
Connector

(EMV conforming)

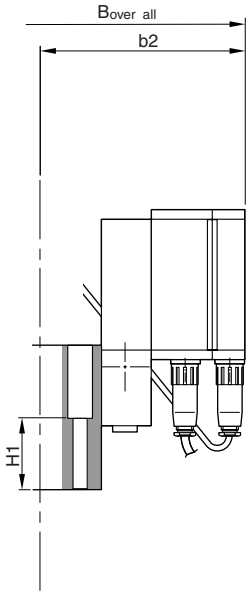


ID no. 5004072
Please order plugs seperately

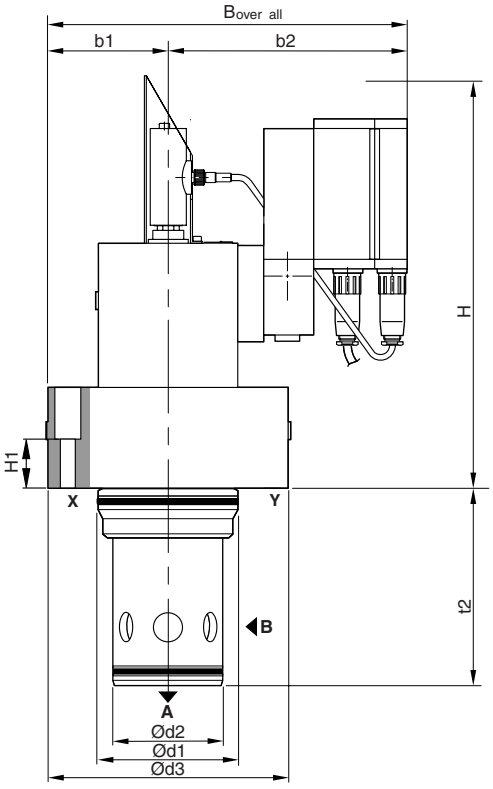
Pilot valve NG50-63

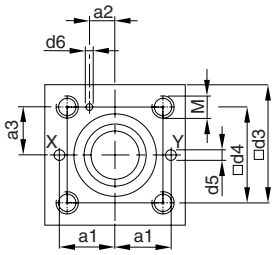


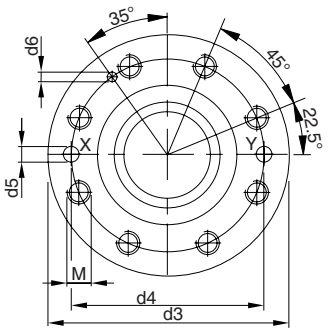
Pilot valve NG40

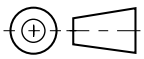


Pilot valve NG80-100









NG	Bo.a.	H	H1	t2+0.1	a1	a2	a3	b1	b2	Ød1H7	Ød2H7	d3	d4	Ød5	Ød6	M
40	275	280	90	105	50 ±0.2	23 ±0.2	42 ±0.2	62.5	210	75	55	125	85 ±0.2	max. 10	6+0.22x10	M20x45
50	355	330	130	122	58 ±0.2	30 ±0.2	50 ±0.2	70	285	90	68	140	100 ±0.2	max. 10	8+0.22x10	M20x45
63	395	325	115	155	75 ±0.2	38 ±0.2	62.5 ±0.2	90	305	120	90	180	125 ±0.2	max. 12	8+0.22x10	M30x65
80	385	425	80	205	–	–	–	125	260	145	110	250	200 ±0.2	max. 16	10+0.22x10	M24x55
100	425	440	89	245	–	–	–	150	275	180	135	300	245 ±0.2	max. 20	10+0.22x10	M30x65

NG	Bolt kit - DIN912 12.9		Kit NBR	Kit FPM
40	BK-M20x1200-4pcs	553 Nm	SK-TDL040EN-38	SK-TDL040EV-38
50	BK-M20x160-4pcs	553 Nm	SK-TDL050EN-38	SK-TDL050EV-38
63	BK-M30x180-4pcs	1910 Nm	SK-TDL063EN-38	SK-TDL063EV-38
80	BK-M24x120-8pcs	935 Nm	SK-TDL080EN-38	SK-TDL080EV-38
100	BK-M30x140-8pcs	1910 Nm	SK-TDL100EN-38	SK-TDL100EV-38

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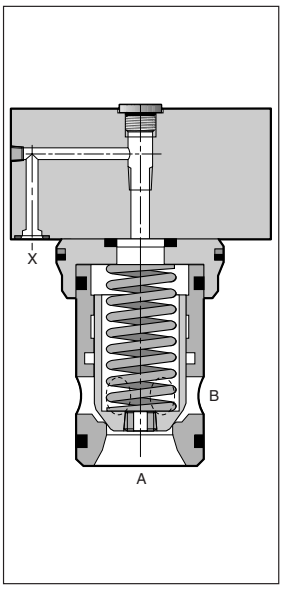
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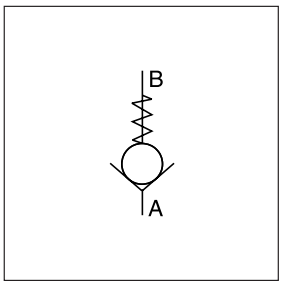
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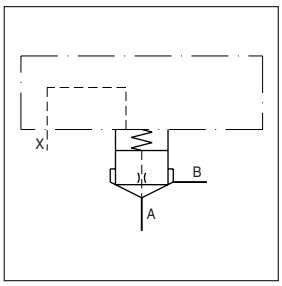
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Check valves of the series C1DB consist of a slip-in valve, that is designed for a compact block installation.







Features

- Installation hole and mounting pattern according to ISO 7368
- 4 different springs
- 8 sizes NG16 to NG100

Technical data

Design			2 way cartridge valve, according to ISO 7368 : 1989						
Actuation			Hydraulical						
Mounting position			unrestricted						
Environmental temperature		[°C]	-40 ... +60						
Nominal size		NG	**16**	**25**	**32**	**40**	**50**	**63**	**80**	**100**
Weight		[kg]	1.2	2.5	3.9	7	11.4	21.8	45	74
Hydraulics									
Flow direction			See symbols						
Pressure medium			Hydraulic oil as per DIN 51 524 ... 536						
Viscosity	recommended	[cSt]/[mm²/s]	30 ... 80						
	permitted	[cSt]/[mm²/s]	20 ... 380						
Pressure fluid temperature		[°C]	-20 ... +60						
Permissible contamination			ISO 4406 (1999); 18/16/13						
Nominal pressure		[bar]	350						
Flow		[l/min]	250	450	900	1300	1800	3600	5250	8000
Opening pressure, spring		[bar]	L = 0.1; N = 0.5; S = 1.6; U = 4.0						

Ordering code

	C1DB	101	E		/ 0		99	00
Seal	Check valve	Cover	Slip-in valve	Valve size		Design series	Closing spring		

Code	Seal
omit	**NBR**
V	FPM

Code	Size
16	**NG16**
25	**NG25**
32	**NG32**
40	**NG40**
50	**NG50**
63	**NG63**
80	NG80
100	NG100

Code	Spring
L	0.1 bar
N	0.5 bar
S	**1.6 bar**
T	2.5 bar
U	4.0 bar

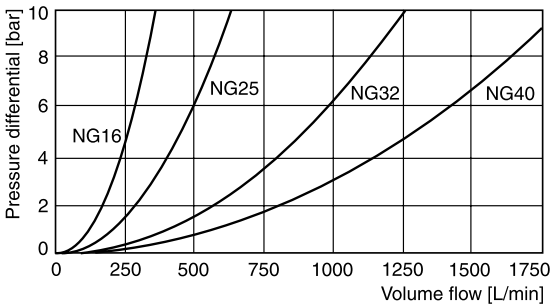
Bold letters =
Short-term availability

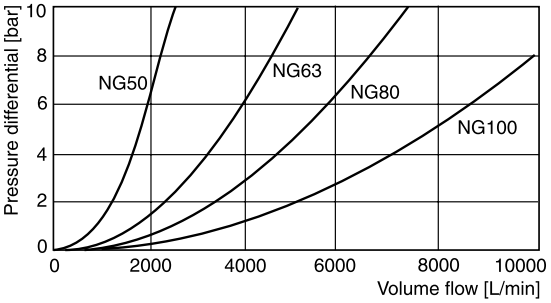
C1DB_UK.INDD RH_23.01.08

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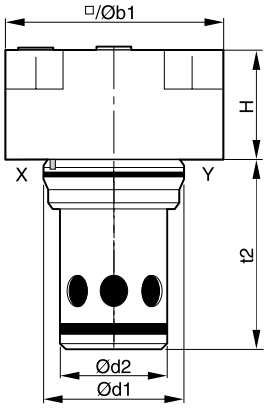
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Performance curves





Dimensions



Size	16	25	32	40	50	63	80	100
H	40	45	50	60	70	85	105	120
b1	65	85	102	125	140	180	250	300
$d1^{H7}$	32	45	60	75	90	120	145	180
$d2^{H7}$	25	34	45	56	68	90	110	135
$t2^{+0.1}$	55.5	72	85	105	122	155	205	245

NG	Bolt kit - DIN912 12.9	[Nm]	Kit NBR	Kit FPM
10	BK-M8x50-4pcs	33	SK-CB-E160	SK-CB-E160V
25	BK-M12x50-4pcs	115	SK-CB-E250	SK-CB-E250V
32	BK-M16x55-4pcs	281	SK-CB-E320	SK-CB-E320V
40	BK-M20x70-4pcs	553	SK-CB-E400	SK-CB-E400V
50	BK-M20x75-4pcs	553	SK-CB-E500	SK-CB-E500V
63	BK-M30x100-4pcs	1910	SK-CB-E630	SK-CB-E630V
80	BK-M24x120-8pcs	935Nm	SK-CB-E630	SK-CB-E630V
100	BK-M30x140-8pcs	1910Nm	SK-CB-E630	SK-CB-E630V

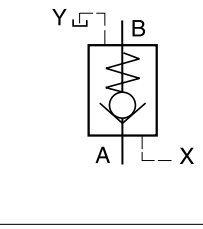
Springs

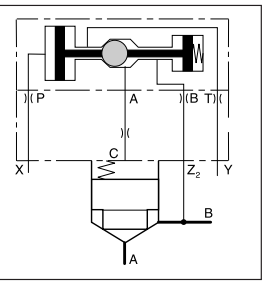
	Ordering Number							
Spring Type	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
L (0.1 bar)	45051368	45051375	45051376	45051382	45051384	45051388	45051395	45051400
N (0.5 bar)	45051369	45051374	45051377	45051381	45051385	45051389	45051396	45051401
S (1.6 bar)	45051370	45051372	45051378	45051380	45051386	45051390	45051397	45051402
U (4.0 bar)	45051371	45051373	45051379	45051383	45051387	45051391	45051398	45051403

Hydraulically pilot operated check valves allow free flow from A to B. The counter-flow direction is blocked.

When pressure is applied to control port X, the ring chamber flow from B to A is released. The pilot control ratio is 6:1.







Function

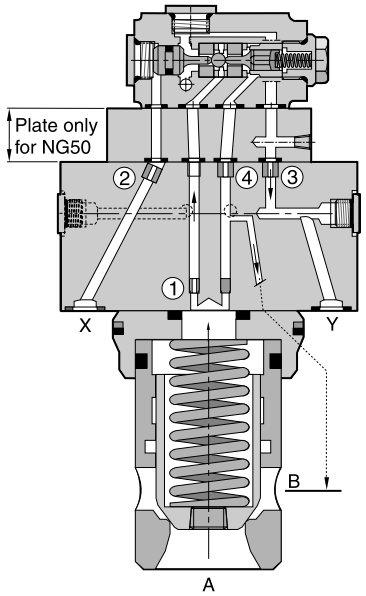
When no pressure is applied to the X-port, the flow from B to A is blocked, because the pressure in B is also effective on top of the poppet.

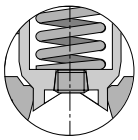
Pressurizing the X-port relieves the area on top of the poppet to the drain port and allows flow from B to A.

The seat design of the SVLB valve series provides leak-free separation of port A and B in the closed position.

Features

- Pilot operated check valve
- Cavity and mounting pattern acc. to ISO 7368
- Dampening poppet optional
- 5 sizes NG16 to NG50





Poppet C 8

8

Ordering code

	SVL	B	10		6	E			
Seal	Hydr. operated check valve	Slip-in mounting	Design style acc. to ISO 7368	Poppet type	Pilot control ratio 6:1	Slip-in cartridge valve	Valve size	Closing spring	Design series (not required for ordering)

Code	Seal
omit	**NBR**
V	FPM

Code	Poppet type
4	**04**
8 [1]	08

[1] with damping nose

Code	Spring
N	0.5 bar
S	**1.6 bar**
T	2.5 bar
U	4.0 bar

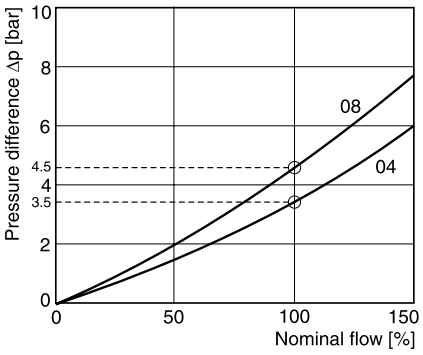
Code	Size
16	NG16
25	NG25
32	NG32
40	NG40
50	NG50

Bold letters =
Short-term availability

Technical data

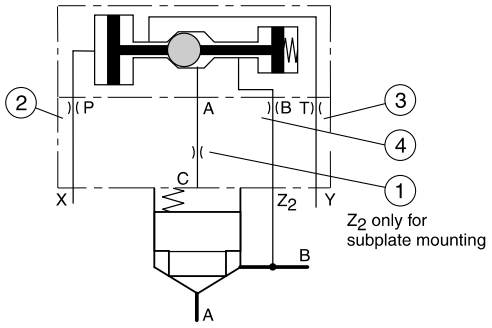
General						
Nominal size			**NG16**	**NG25**	**NG32**	**NG40**	**NG50**
Interface			Slip-in mounting acc. ISO 7368				
Mounting position			unrestricted				
Ambient temperature		[°C]	-20...+80				
Weight		[kg]	2.3	3.2	4.6	7.8	12.0
Hydraulics							
Max. operating pressure		[bar]	350				
Nominal flow		[l/min]	250	450	900	1300	1800
Fluid			Hydraulic oil acc. to DIN 51524...525				
Viscosity	recommended	[cSt]/[mm²/s]	30...50				
	permitted	[cSt]/[mm²/s]	20...380				
Fluid temperature		[C°]	-20...+70				
Filtration			ISO 4406 (1999); 18/16/13				

Δp/Q flow curve

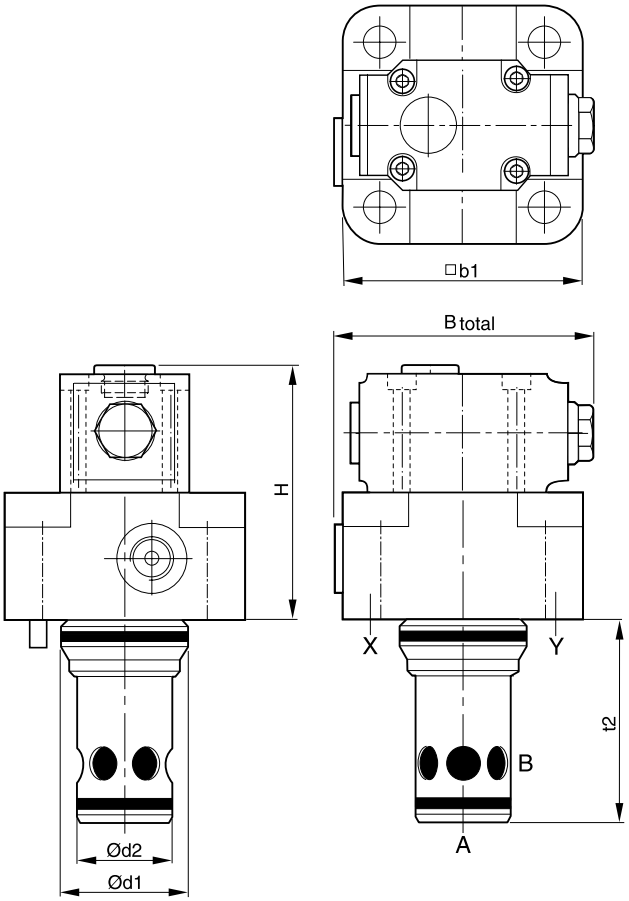


Poppet type 04, 08, without spring

Standard orifices



E16	E25	E32	E40	E50
open (M5)	open (M5)	open (M5)	open (M5)	open (M6)
Ø1.2 (M5)	Ø1.2 (M6)	Ø1.2 (M6)	Ø1.2 (M6)	Ø1.2 (M8)
open (M5)	open (M6)	open (M6)	open (M6)	open (M8)
Ø1.0 (M5)	Ø1.2 (M5)	Ø1.3 (M5)	Ø1.5 (M5)	Ø2.0 (M6)

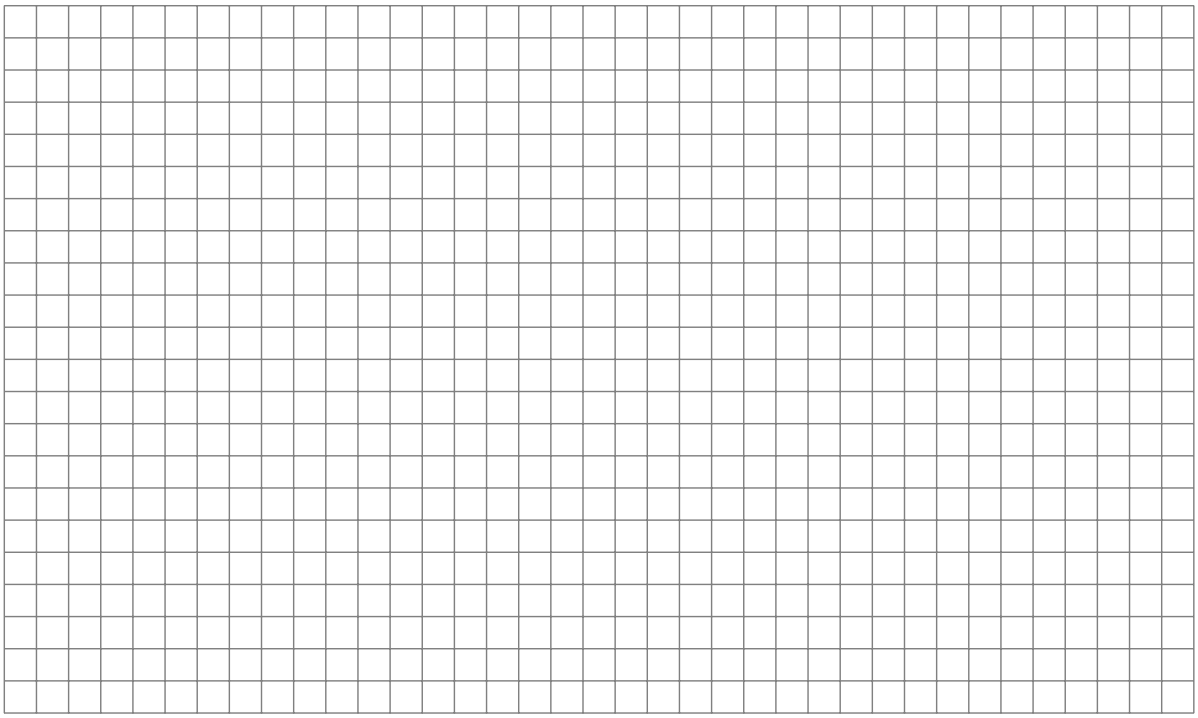


Size	16	25	32	40	50
H	84	88	93	103	138
b1	79*	85	102	125	140
$d1^{H7}$	32	45	60	75	90
$d2^{H7}$	25	34	45	55	68
$t2^{+0.1}$	56	72	85	105	122
Bges.	99	94	103	125	140

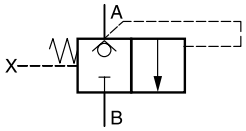
* width 65 mm

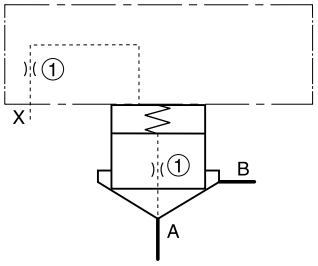
NG	Bolt kit - DIN912 12.9	[Nm]	Kit NBR	Kit FPM
16	BK-M8x50-4pcs	33	SK-SVLB10-E16	SK-SVLB10-E16V
25	BK-M12x50-4pcs	115	SK-SVLB10-E25	SK-SVLB10-E25V
32	BK-M16x55-4pcs	281	SK-SVLB10-E32	SK-SVLB10-E32V
40	BK-M20x70-4pcs	553	SK-SVLB10-E40	SK-SVLB10-E40V
50	BK-M20x75-4pcs	553	SK-SVLB10-E50	SK-SVLB10-E50V

Notes



2 way seat valve, flow A ⇒ B



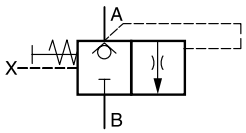


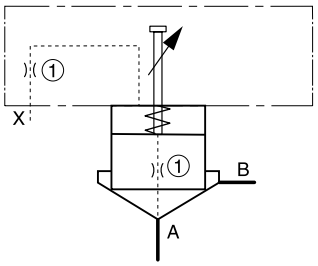
Description	Type							
	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
Cover [1]	C016AA*	C025AA*	C032AA*	C040AA*	C050AA*	C063AA*	C080AA*	C100AA*
Cover orifice ①	1/16xØ0.8	1/16xØ1.0	1/16xØ1.2	1/8xØ1.5	1/8xØ1.8	1/8xØ2.0	1/8xØ2.2	1/8xØ2.5
Cartridge [2]	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*	CE080C01*	CE100C01*
Poppet orifice ①	1/16xØ00							
Spring	1.6 bar, type S (Order no. see spare parts)							
Bolt kit cover	BK-M8x40-4pcs	BK-M12x50-4pcs	BK-M16x55-4pcs	BK-M20x70-4pcs	BK-M20x75-4pcs	BK-M30x100-4pcs	BK-M24x120-8pcs	BK-M30x130-8pcs

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see ordering code C*A
[2] Complete type see ordering code CE*

2 way seat valve with stroke limiter, flow A ⇒ B





Description	Type							
	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
Cover [1]	C016B**	C025B**	C032B**	C040B**	C050B**	C063B**	C080B**	C100B**
Cover orifice ①	M6xØ0.8	M6xØ1.0	1/16xØ1.2	1/16xØ1.5	1/16xØ1.8	1/8xØ2.0	1/8xØ2.2	1/8xØ2.5
Cartridge [2]	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*	CE080C01*	CE100C01*
Poppet orifice ①	1/16xØ00							
Spring	1.6 bar, type S (Order no. see spare parts)							
Bolt kit cover	BK-M8x40-4pcs	BK-M12x50-4pcs	BK-M16x55-4pcs	BK-M20x70-4pcs	BK-M20x75-4pcs	BK-M30x100-4pcs	BK-M24x120-8pcs	BK-M30x130-8pcs

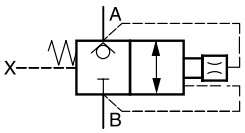
Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

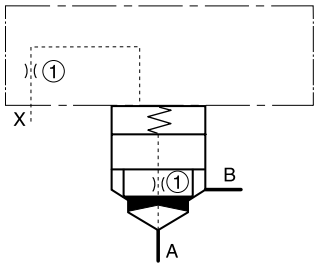
[1] Complete type see ordering code C*B
[2] Complete type see ordering code CE*

Adaptor plates see chapter 12

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2 way functions with dampening poppet, flow A ⇔ B



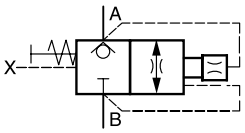


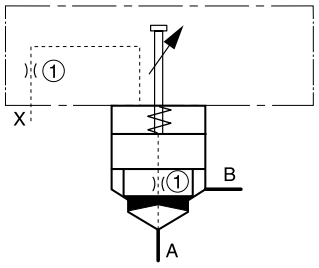
Description	Type							
	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
Cover [1]	C016AA*	C025B*	C032AA*	C040AA*	C050AA*	C063AA*	C080AA*	C100AA*
Cover orifice ①	1/16xØ0.8	1/16xØ1.0	1/16xØ1.2	1/8xØ1.5	1/8xØ1.8	1/8xØ2.0	1/8xØ2.2	1/8xØ2.5
Cartridge [2]	CE016C08*	CE025C08*	CE032C08*	CE040C08*	CE050C08*	CE063C08*	CE080C08*	CE100C08*
Poppet orifice ①	1/16xØ00							
Spring	1.6 bar, type S (Order no. see spare parts)							
Bolt kit cover	BK-M8x40-4pcs	BK-M12x50-4pcs	BK-M16x55-4pcs	BK-M20x70-4pcs	BK-M20x75-4pcs	BK-M30x100-4pcs	BK-M24x120-8pcs	BK-M30x130-8pcs

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see ordering code C*A
[2] Complete type see ordering code CE*

2 way functions with stroke limiter and dampening poppet, flow A ⇔ B





Description	Type							
	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
Cover [1]	C016B*	C025B*	C032B*	C040B*	C050B*	C063B*	C080B*	C100B*
Cover orifice ①	M6xØ0.8	M6xØ1.0	1/16xØ1.2	1/16xØ1.5	1/16xØ1.8	1/8xØ2.0	1/8xØ2.2	1/8xØ2.5
Cartridge [2]	CE016C08*	CE025C08*	CE032C08*	CE040C08*	CE050C08*	CE063C08*	CE080C08*	CE100C08*
Poppet orifice ①	1/16xØ00							
Spring	1.6 bar, type S (Order no. see spare parts)							
Bolt kit cover	BK-M8x40-4pcs	BK-M12x50-4pcs	BK-M16x55-4pcs	BK-M20x70-4pcs	BK-M20x75-4pcs	BK-M30x100-4pcs	BK-M24x120-8pcs	BK-M30x130-8pcs

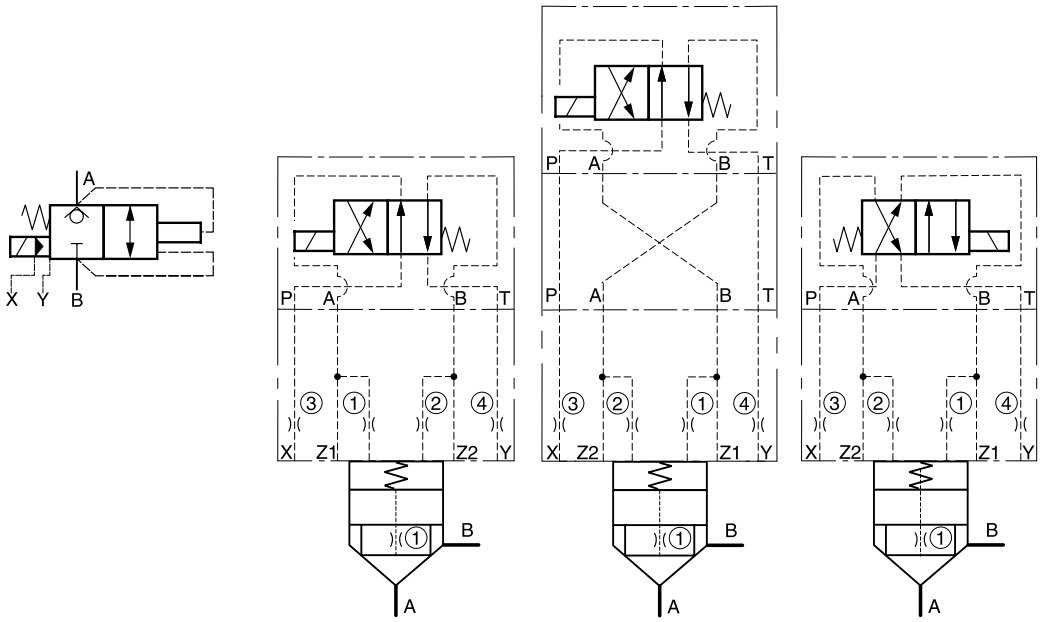
Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see ordering code C*B
[2] Complete type see ordering code CE*

Adaptor plates see chapter 12

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2 way seat valve with pilot normally closed, flow A ⇔ B



NG16 - 40 with pilot NG06

NG50 - 63 with pilot NG06

NG50 - 100 with pilot NG10

8

Description	Type									
	Pilot NG06						Pilot NG10			
	NG16	NG25	NG32	NG40	NG50	NG63	NG50	NG63	NG80	NG100
4/2-DC valve [1]	D1VW20B*						D3W20H*			
Adaptor plate [2]	without				PADA1007/A-B/B-A		without			
Cover [3]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*	C050CA*	C063CA*	C080CA*	C100CA*
Cover orifice ①	M5xØ0.8	M5xØ1.0	M5xØ1.2	M5xØ1.5	M6xØ1.8	M6xØ2.0	M6xØ1.8	M6xØ2.0	1/16xØ2.2	1/16xØ2.5
Cover orifice ②	M5xØ00				M6xØ00				1/16xØ00	
Cover orifice ③	M5xØ1.0	M6xØ1.2	M6xØ1.5	M6xØ1.8	M8xØ2.0	M8xØ2.2	M8xØ2.0	M8xØ2.2	M10x1xØ2.5	M10x1xØ3.0
Cover orifice ④	M5xØ99	M6xØ99			M8xØ99C				M10x1xØ99	
Cartridge [4]	CE016C04*	CE025C04*	CE032C04*	CE040C04*	CE050C04*	CE063C04*	CE050C04*	CE063C04*	CE080C04*	CE100C04*
Poppet orifice ①	1/16NPTxØ00									
Spring	1.6 bar, type S (Order no. see spare parts)									
Bolt kit cover	BK-M8x40 -4pcs	BK-M12x50 -4pcs	BK-M16x55 -4pcs	BK-M20x70 -4pcs	BK-M20x75 -4pcs	BK-M30x100 -4pcs	BK-M24x120 -8pcs	BK-M30x130 -8pcs	BK-M24x120 -8pcs	BK-M30x140 -8pcs
Bolt kit pilot	BK-M5x30-4pcs						BK-M6x40-4pcs			

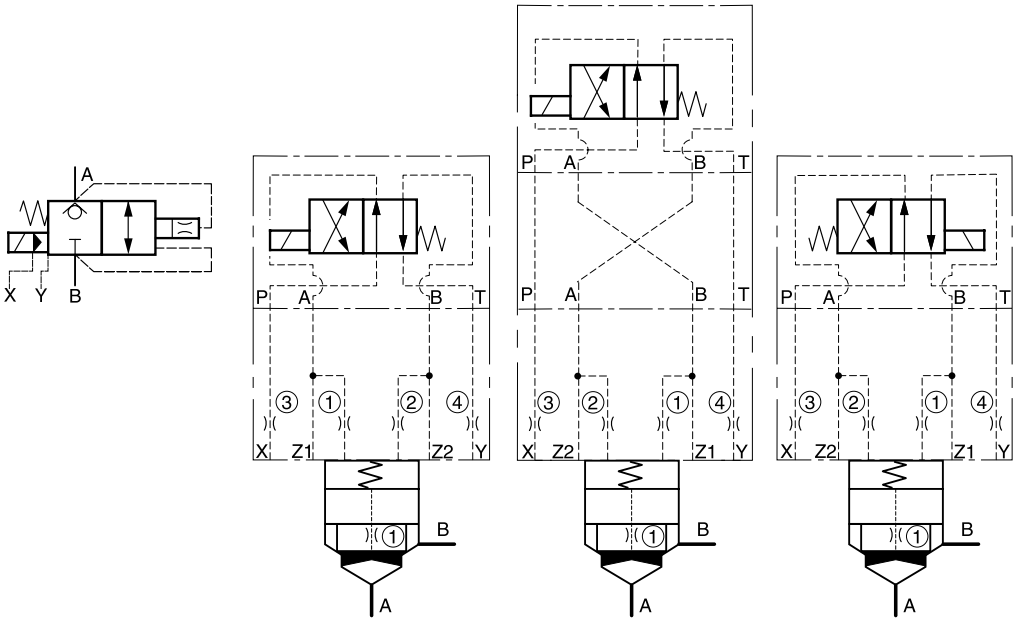
Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see chapter "Directional Control Valves", series D1VW, D3W.
[2] NG10-NG06 inclusive O-rings and mounting bolts
[3] Complete type see ordering code C*C
[4] Complete type see ordering code CE*

Adaptor plates see chapter 12

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2 way seat valve with pilot and dampening poppet, normally closed, flow A ⇔ B



NG16 - 40 with pilot NG06

NG50 - 63 with pilot NG06

NG50 - 100 with pilot NG10

8

Description	Type									
	Pilot NG06						Pilot NG10			
	NG16	NG25	NG32	NG40	NG50	NG63	NG50	NG63	NG80	NG100
4/2-DC valve [1]	D1VW20B*						D3W20H*			
Adaptor plate [2]	without				PADA1007/A-B/B-A		without			
Cover [3]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*	C050CA*	C063CA*	C080CA*	C100CA*
Cover orifice ①	M5xØ0.8	M5xØ1.0	M5xØ1.2	M5xØ1.5	M6xØ1.8	M6xØ2.0	M6xØ1.8	M6xØ2.0	1/16xØ2.2	1/16xØ2.5
Cover orifice ②	M5xØ00				M6xØ00				1/16xØ00	
Cover orifice ③	M5xØ1.0	M6xØ1.2	M6xØ1.5	M6xØ1.8	M8xØ2.0	M8xØ2.2	M8xØ2.0	M8xØ2.2	M10x1xØ2.5	M10x1xØ3.0
Cover orifice ④	M5xØ99	M6xØ99			M8xØ99C				M10x1xØ99	
Cartridge [4]	CE016C08*	CE025C08*	CE032C08*	CE040C08*	CE050C08*	CE063C08*	CE050C08*	CE063C08*	CE080C08*	CE100C08*
Poppet orifice ①	1/16NPTxØ00									
Spring	1.6 bar, type S (Order no. see spare parts)									
Bolt kit cover	BK-M8x40 -4pcs	BK-M12x50 -4pcs	BK-M16x55 -4pcs	BK-M20x70 -4pcs	BK-M20x75 -4pcs	BK-M30x100 -4pcs	BK-M24x120 -8pcs	BK-M30x130 -8pcs	BK-M24x120 -8pcs	BK-M30x140 -8pcs
Bolt kit pilot	BK-M5x30-4pcs						BK-M6x40-4pcs			

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see chapter "Directional Control Valves", series D1VW, D3W.
[2] NG10-NG06 inclusive O-rings and mounting bolts
[3] Complete type see ordering code C*C
[4] Complete type see ordering code CE*

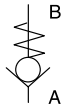
Adaptor plates see chapter 12

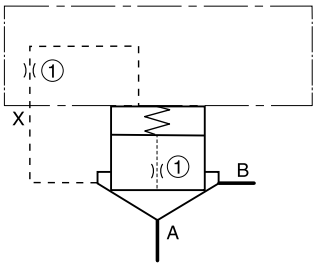
comb-2way.INDD RH_13.03.08

Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

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Check valve, flow A ⇒ B





Description	Type							
	NG16	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**	**NG80**	**NG100**
Cover [1]	C016AA*	C025AA*	C032AA*	C040AA*	C050AA*	C063AA*	C080AA*	C100AA*
Cover orifice ①	M5xØ00				M6xØ99		1/16xØ99	
Cartridge [2]	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*	CE080C01*	CE100C01*
Poppet orifice ①	1/16NPTxØ00							
Spring	1.6 bar, type S (Order no. see spare parts)							
Bolt kit cover	BK-M8x40-4pcs	BK-M12x50-4pcs	BK-M16x55-4pcs	BK-M20x70-4pcs	BK-M20x75-4pcs	BK-M30x100-4pcs	BK-M24x120-8pcs	BK-M30x130-8pcs

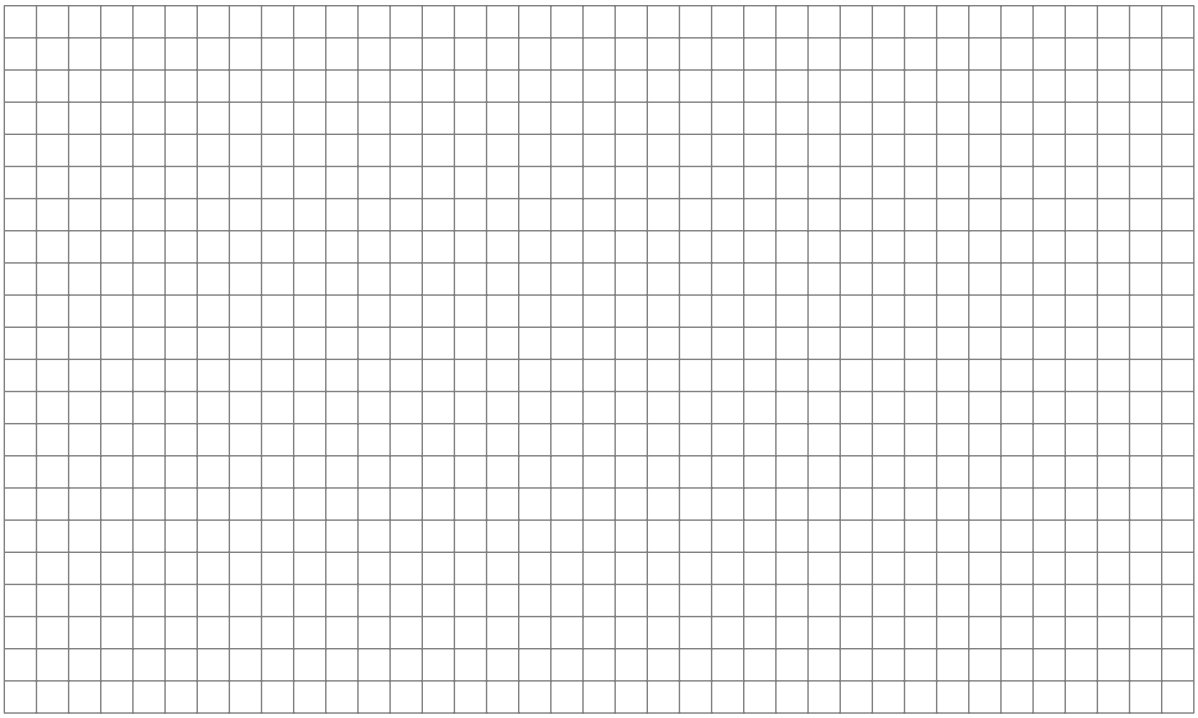
Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see ordering code C*A
[2] Complete type see ordering code CE*

Adaptor plates see chapter 12

8

Notes



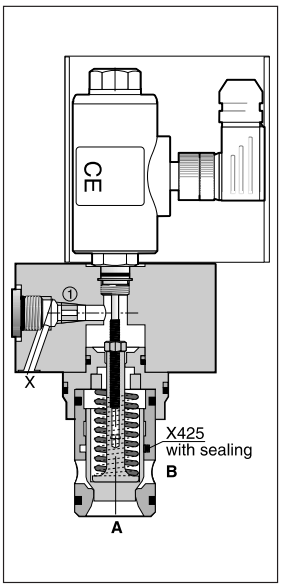
comb-2way.INDD RH_13.03.08

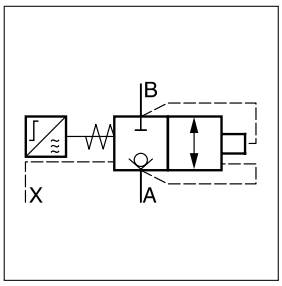
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Hydraulic Controls Division
Kaarst, Germany

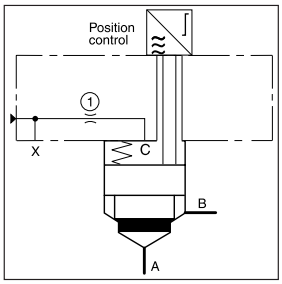
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The 2/2 way seat valves series C10 D*C are equipped with an inductive switch to monitor the closed position. After the poppet is lifted from the seat, the design of the poppet ensures that only a minimum amount of oil can pass the seat before the inductive switch changes the signal.

The poppet has a 60/40 area ratio (A_A = 0.6 A_C, A_B = 0.4 A_C) and is capable for flow from A to B and B to A.







Features

- German trade association certificate, No. 00 077
- Cavity and mounting pattern acc. to ISO 7368
- Monitored closed position
- Inductive switch CE conform
- Optional poppet sealing
- 6 sizes NG16 up to NG63

Ordering code

	C	10	D	E	C	101	E		/ 0			00	
Seal	2/2 way valve	Poppet shape	Hydraulically operated	Design series	Inductive monitoring German trade association certificate 00 077	Cover	Slip-in cartridge	Nominal size	Cavity and mounting pattern DIN ISO 7368	Spring	Orifice (1)		Poppet seal

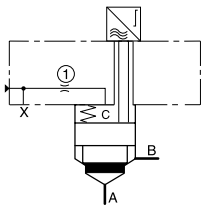
Code	Seal
omit	NBR
V	FPM

Code	Size
16	NG16
25	NG25
32	NG32
40	NG40
50	NG50
63	NG63

Code	Spring
L	Opening press. 0.1 bar
N	Opening press. 0.5 bar
S	Opening press. 1.6 bar
U	Opening press. 4.0 bar

Code	Poppet seal
omit	—
X425	Only with spring code S and U

Code	Orifice
99	Without orifice, open

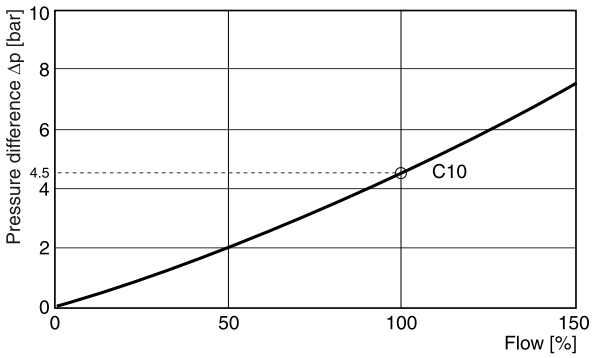


(1) Orifice (see accessories)

8

General							
Size			**16**	**25**	**32**	**40**	**50**	**63**
Interface			2 way slip-in cartridge valves DIN ISO 7368					
Mounting position			unrestricted					
Operation			Hydraulic					
Ambient temperature		[C°]	-40...+60					
Weight		[kg]	1.5	2.7	4.3	7.4	12	23
Hydraulic								
Max. operating press., connection A, B, X		[bar]	350					
Nominal flow Δp 5 bar		[l/min]	220	450	900	1300	1800	3600
Fluid			Hydraulic oil acc. to DIN 51 524...525					
Fluid temperature,	recommended	[C°]	+30...+50					
	permitted	[C°]	-20...+60					
Viscosity	recommended	[cSt]/[mm²/s]	30...80					
	permitted	[cSt]/[mm²/s]	20...380					
Filtration			NAS 1638 class 9, to be achieved by ß10 > 75					
Control volume at max. stroke		[cm³]	2.03	6.45	12.21	20.32	39.40	94.56
Control surface (surface C = 100%) A/B		[%]	approx. 60 / 40 related on surface C					
Opening pressure								
	flow direction B—>A	[bar]	Spring: L = 0.25; N = 1.25; S = 4.0; U = 10.0					
	flow direction A—>B	[bar]	Spring: L = 0.16; N = 0.85; S = 2.7; U = 6.6					
Electrical (Inductive switch)			See position control					

Flow diagram



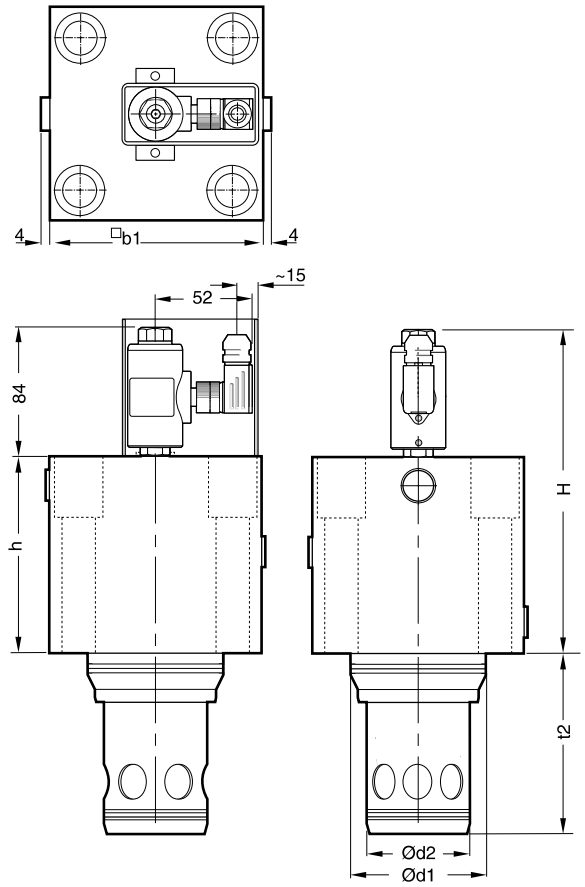
Orifice recommendation and thread

Orifice	NG16	NG25	NG32	NG40	NG50	NG63
No.: 1	1/16 Ø0.8	1/16 Ø1.2	1/16 Ø1.5	1/8 Ø2.0	1/8 Ø2.5	1/8 Ø3.0

Orifices Ø in mm, thread in NPT

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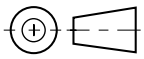
Dimensions



Nominal size	H	h	b1	d1	d2	t2 +0.1
16	130	40	79 [1]	32	25	56
25	135	45	85	45	34	72
32	140	50	102	60	45	85
40	150	60	125	75	55	105
50	160	70	140	90	68	122
63	175	85	180	120	90	155

[1] width 65 mm

Cavity and mounting pattern acc. to ISO 7368



8

Seal and bolt kits

Nominal size		16	25	32	40	50	63
Seal kit	FPM	SK-CBE16V	SK-CBE25V	SK-CBE32V	SK-CBE40V	SK-CBE50V	SK-CBE63V
	NBR	SK-CBE16	SK-CBE25	SK-CBE32	SK-CBE40	SK-CBE50	SK-CBE63
Bolt kit	[DIN 912 12.9]	BK-M8x40-4pcs	BK-M12x50-4pcs	BK-M16x55-4pcs	BK-M20x70-4pcs	BK-M20x75-4pcs	BK-M30x100-4pcs
Recommended torque	[Nm]	27	94	234	460	460	1570

Attention!

The switch may only be adjusted by the valve manufacturer. The exchange of individual modules is not permitted.

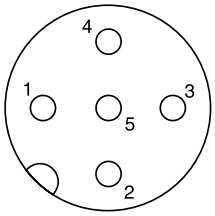
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Hydraulic Controls Division
Kaarst, Germany

Tel: +45 63 12 83 00 | Email: ps@hymatik.com | www.hymatik.com | Hvidkaervej 27a, DK-5250 Odense SV, Denmark

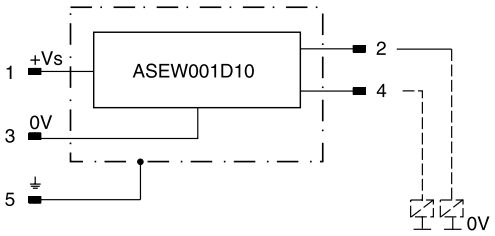
Electrical characteristics of position control as per IEC 61076-2-101 (M12x1)

Protection class		IP 65 in accordance with EN 60529 (plugged and mounted)
Ambient temperature	[°C]	0...+50
Supply voltage / ripple	[V]	18...42 / 10%
Current consumption without load	[mA]	≤ 30
Max. output current per channel, ohmic	[mA]	400
Min. output load per channel, ohmic	[kOhm]	100
Max. output drop at 0.2A	[V]	≤ 1.1
Max. output drop at 0.4A	[V]	≤ 1.6
EMC		EN50081-1 / EN50082-2
Max. tolerance ambient field strength	[A/m]	<1200
Min. distance to next AC solenoid	[m]	>0.1
Interface		M12x1
Wiring min.	[mm²]	5 x 0.25 brad shield recommended
Wiring length max.	[m]	50 recommended

M12 pin assignment



1 + Supply 18...42V
2 Normally open
3 0V
4 Normally closed
5 Earth ground



8

Extract from the German trade association certificate

Fachausschuss Maschinenbau, Hebezeuge, Hütten- und Walzwerksanlagen
Prüf- und Zertifizierungsstelle
im BG-PRÜFZERT

Hauptverband der gewerblichen Berufsgenossenschaften

00 077
Bescheinigungs-Nummer

Name und Anschrift des Bescheinigungsinhabers: (Auftraggeber)	**Parker Hannifin GmbH** Hydraulic Controls Division Gutenbergstr. 38 - 40, D- 41564 Kaarst	
Name und Anschrift des Herstellers:	**Parker Hannifin GmbH** Hydraulic Controls Division Gutenbergstr. 38 - 40, D- 41564 Kaarst	
Zeichen des Auftraggebers:	Zeichen der Prüf- und Zertifizierungsstelle: MHHW 612.1:612.28-UB Gb/bt	Ausstellungsdatum: 03.Januar 2007
Produktbezeichnung:	**2/2- Wegesitzventil mit Überwachung** **Einbauventil nach DIN 24342 (entspricht DIN ISO 7368)**	
Typ:	C10 DEC 101.....	

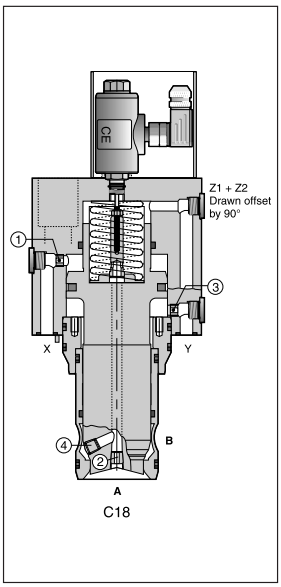
Das geprüfte Baumuster entspricht den einschlägigen Bestimmungen der Richtlinie 98/37/EG (**Maschinen**).

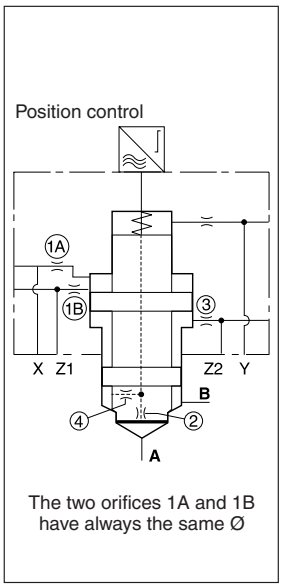
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Hydraulic Controls Division
Kaarst, Germany

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Active 2/2 way monitored seat valves with cartridge design according to ISO 7368 are preferably used for safety circuits: mainly for safety guards, mould form tools and locking mechanisms for presses and injection moulding machines. Pilot pressure actively opens and closes the main poppet - independent of pressure in the main ports.





Features

- German trade association certificate, No. 00 078
- Cavity and mounting pattern acc. to ISO 7368
- Monitored closed position
- Inductive switch CE conform
- Active design with separate control surfaces
- Sealing between control surfaces and connection B
- 5 sizes NG25 up to NG63

Ordering code

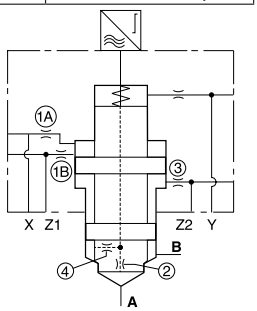
	C	18	D	E	C	107	E		/ 0					
Seal	2/2 way valve	Poppet shape	Hydraulically operated	Design series	Inductive monitoring German trade association certificate 00 077	Cover	Slip-in cartridge	Nominal size	Cavity and mounting pattern DIN ISO 7368	Spring	1	2	3	4
											Orifice			

Code	Seal
omit	NBR
V	FPM

Code	Size
25	NG25
32	NG32
40	NG40
50	NG50
63	NG63

Code	Spring
S	Opening press. 1.6 bar
U	Opening press. 4.0 bar

Code	Orifice
99	Without orifice, open

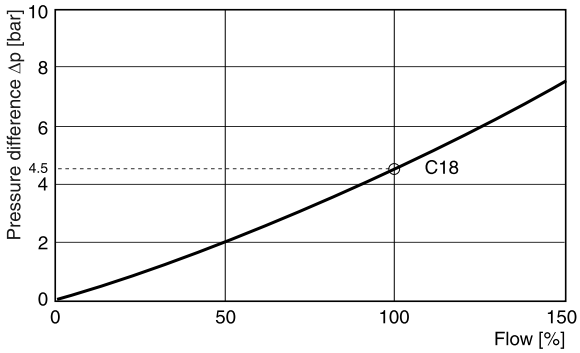


○ Orifice (see accessories)

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General							
Size			**25**	**32**	**40**	**50**	**63**
Interface			2 way slip-in cartridge valves DIN ISO 7368				
Mounting position			unrestricted				
Operation			Hydraulic				
Ambient temperature		[C°]	-40...+60				
Weight		[kg]	3.2	6.7	8.7	13.8	26.3
Hydraulic							
Max. operating pressure, all connections		[bar]	350				
Nominal flow, Δp 5 bar		[L/min]	450	900	1300	1800	3600
Fluid			Hydraulic oil acc. to DIN 51 524...525				
Fluid temperature	recommended	[C°]	+30...+50				
	permitted	[C°]	-20...+60				
Viscosity	recommended	[cSt]/[mm²/s]	30...80				
	permitted	[cSt]/[mm²/s]	20...380				
Filtration			NAS 1638 class 9, to achieved by ß10 > 75				
Control volume spring chamber, surface C		[cm³]	6.45	12.21	20.32	39.40	94.56
Control surface	FC	[%]	100				
	FSt	[%]	123.8	108.6	121.5	117	121
	FA/B	[%]	approx. 60 / 40 related on surface C				
Opening pressure	flow direction B—>A	[bar]	Spring: L = 0.25; N = 1.25; S = 4.0; U = 10.0				
	flow direction A—>B	[bar]	Spring: L = 0.16; N = 0.85; S = 2.7; U = 6.6				
Electrical (inductive switch)			See position control				

Flow diagram



Orifice thread

Orifice	NG25	NG32	NG40	NG50	NG63
1	M6	M6	M6	*1/16	*1/8
2	M6	M6	M6	*1/16	*1/16
3	M6	M6	M6	*1/16	*1/8
4	M6	M6	M6	*1/16	*1/16

*Thread in NPT

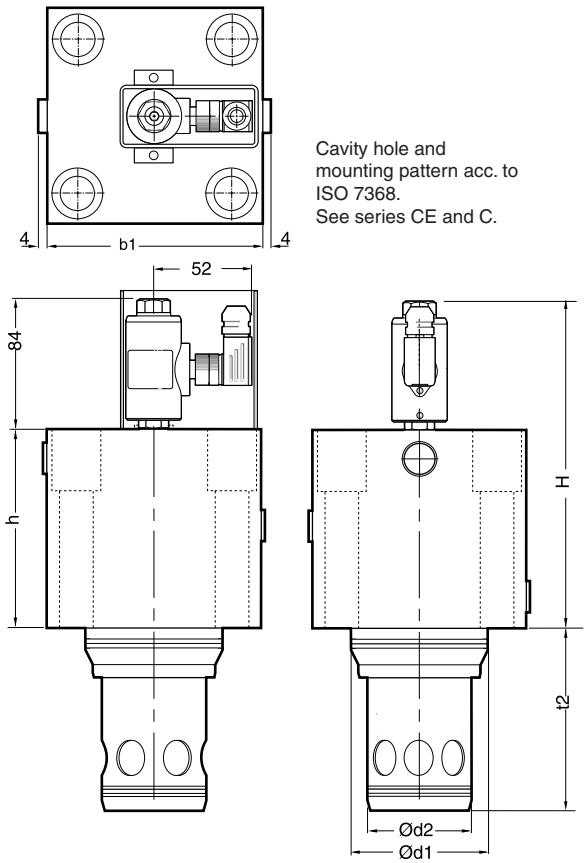
Orifice recommendation

Orifice	NG25	NG32	NG40	NG50	NG63
①-④	Ø 1.2	Ø 1.5	Ø 2.0	Ø 2.5	Ø 3.0

Depending on function, plugs must be used.

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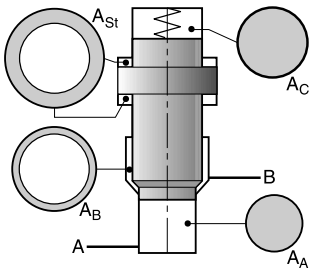
Dimensions



Cavity hole and mounting pattern acc. to ISO 7368.
See series CE and C.

Nominal size	25	32	40	50	63
H	174	174	194	214	234
h	90	90	110	130	150
b1	85	102	125	140	180
d1	45	60	75	90	120
d2	34	45	55	68	90
t2 +0.1	72	85	105	122	155

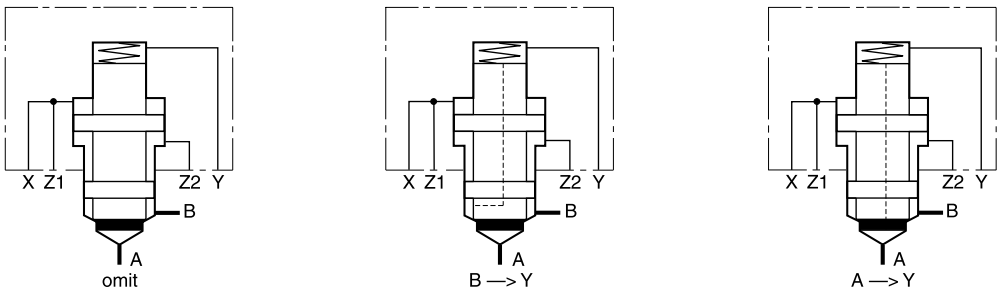
Control surfaces



NG	A_A [%]	A_B [%]	A_C [%]	A_{St} [%]
25	60	40	100	124
32	60	40	100	109
40	60	40	100	121
50	60	40	100	117
63	60	40	100	121

8

Pilot guide inside the poppet



Seal and bolt kits

Nominal size		25	32	40	50	63
Seal kit	FPM	SK-C13DB10-E25V	SK-C13DB10-32V	SK-C13DB-E40V	SK-C13DB10-E50V	SK-C13DB10-E63V
	NBR	SK-C13DB10-E25	SK-C13DB10-32	SK-C13DB10-E40	SK-C13DB10-E50	SK-C13DB10-E63
Bolt kit	[DIN 912 12.9]	BK-M12x50-4pcs	BK-M16x90-4pcs	BK-M20x110-4pcs	BK-M20x120-4pcs	BK-M30x160-4pcs
Recommemded torque	[Nm]	94	234	460	460	1570

Attention!

The switch may only be adjusted by the valve manufacturer. The exchange of individual modules is not permitted.

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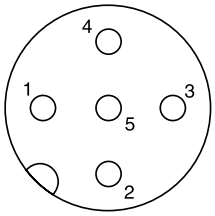
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Hydraulic Controls Division
Kaarst, Germany

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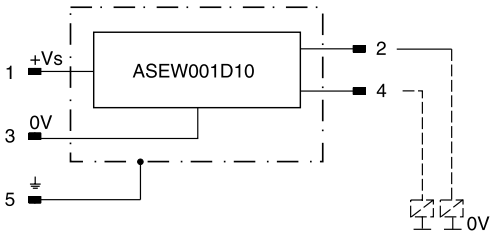
Electrical characteristics of position control as per IEC 61076-2-101 (M12x1)

Protection class		IP 65 in accordance with EN 60529 (plugged and mounted)
Ambient temperature	[°C]	0...+50
Supply voltage / ripple	[V]	18...42 / 10%
Current consumption without load	[mA]	≤ 30
Max. output current per channel, ohmic	[mA]	400
Min. output load per channel, ohmic	[kOhm]	100
Max. output drop at 0.2A	[V]	≤ 1.1
Max. output drop at 0.4A	[V]	≤ 1.6
EMC		EN50081-1 / EN50082-2
Max. tolerance ambient field strength	[A/m]	<1200
Min. distance to next AC solenoid	[m]	>0.1
Interface		M12x1
Wiring min.	[mm²]	5 x 0.25 brad shield recommended
Wiring length max.	[m]	50 recommended

M12 pin assignment



1 + Supply 18...42V
2 Normally open
3 0V
4 Normally closed
5 Earth ground



8

Extract from the German trade association certificate

Fachausschuss Maschinenbau, Hebezeuge, Hütten- und Walzwerksanlagen
Prüf- und Zertifizierungsstelle
im BG-PRÜFZERT

Hauptverband der gewerblichen Berufsgenossenschaften

00 078
Bescheinigungs-Nummer

Name und Anschrift des Bescheinigungsinhabers: (Auftraggeber)	**Parker Hannifin GmbH** Hydraulic Controls Division Gutenbergstr. 38 - 40, D- 41564 Kaarst	
Name und Anschrift des Herstellers:	**Parker Hannifin GmbH** Hydraulic Controls Division Gutenbergstr. 38 - 40, D- 41564 Kaarst	
Zeichen des Auftraggebers:	Zeichen der Prüf- und Zertifizierungsstelle: MHHW 612.1:612.28-UB Gb/bt	Ausstellungsdatum: 03.Januar 2007
Produktbezeichnung:	**2/2- Wegesitzventil mit Überwachung** **aktiv gesteuerte Einbauventile nach DIN 24342 (entspricht DIN ISO 7368)**	
Typ:	C18 DEC 107.....	

Das geprüfte Baumuster entspricht den einschlägigen Bestimmungen der Richtlinie 98/37/EG (**Maschinen**).

C18DC_UK.INDD RH_23.01.08

Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

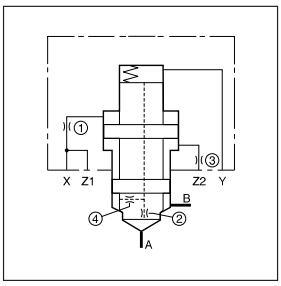
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Active 2/2 way seat valves with cartridge design according to ISO 7368 are preferably used where opening and closing should be controlled by pilot pressure only - independent of the pressure in the main ports.

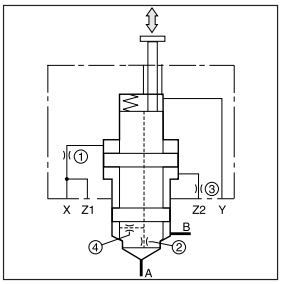
The C18 DB series is offered as hydraulically controlled valve (C18 DB 107), with additional stroke limiter (C18 DBN 112) and with the mounting pattern for a pilot valve (C18 DB 121).

Features

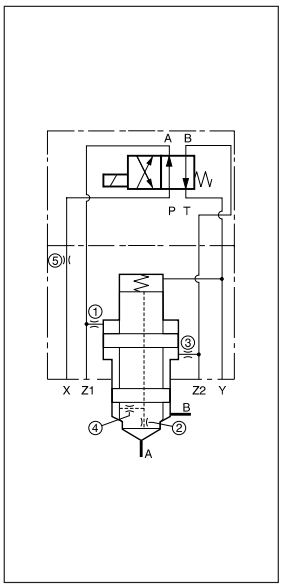
- Cavity and mounting pattern acc. to ISO 7368
- Active design with separate control areas
- Sealing between control surfaces and connection B
- Up to 5 sizes:
  - C18 DB 107 - 5 sizes NG25 up to NG63
  - C18 DBN 112 - 3 sizes NG25 up to NG40
  - C18 DB 121 - 2 sizes NG32 up to NG40



C18DB107

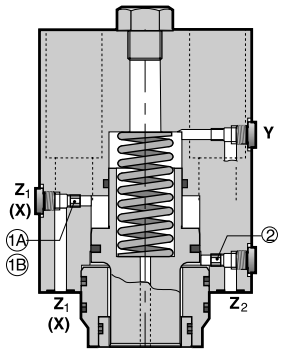


C18DBN112

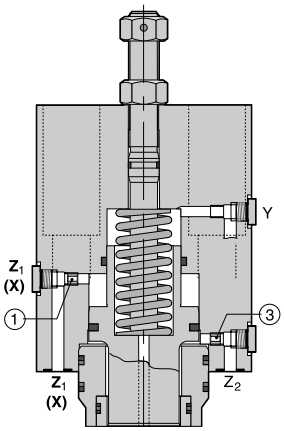


C18DB121

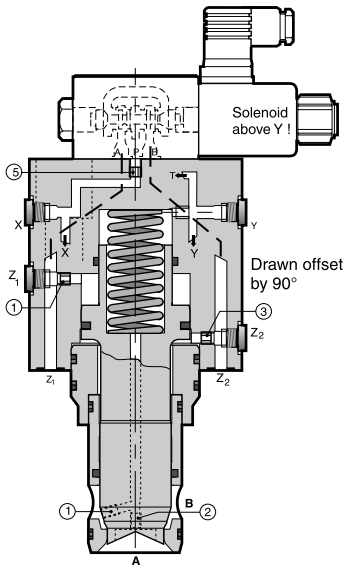
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C18DB107



C18DBN112



C18DB121

	C	18	D	B			E		/ 0						
												1	2	3	4	5 [1]
Seal	**2/2 way valve**	**Poppet with damping**	**Hydrau-lically operated**	**Design series**	**Stroke limiter**	**Cover**	**Slip-in cartridge**	**Nominal size**	**Cavity and mounting pattern DIN ISO 7368**	**Spring**	**Orifice**				

Code	Seal
omit	NBR
V	FPM

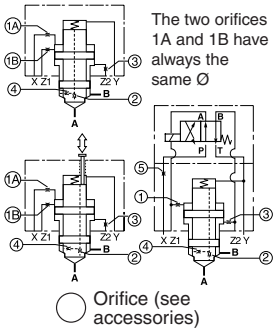
Code	Stroke limiter
omit	Cover 107 and 121, no stroke limiter
N	Cover 112, with stroke limiter, adjustment spindle and lock nut

Code	Cover
107	Standard, without add. function
112	With stroke limiter, only NG25, 32 and 40
121	Designed for DC pilot valves only NG32 and 40

Code	Size
25	NG25
32	NG32
40	NG40
50	NG50
63	NG63

[1] only for code 121

Code	Orifice
99	Without orifice, open



Code	Spring
S	Opening press. 1.6 bar
U	Opening press. 4.0 bar

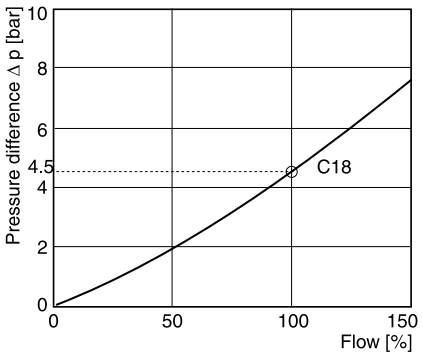
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General							
Size			**25**	**32**	**40**	**50**	**63**
Design type			2 way slip-in cartridge valves DIN ISO 7368				
Mounting position			unrestricted				
Operation			Hydraulic				
Ambient temperature		[C°]	-40...+60				
Weight		[kg]	3.2	6.7	8.7	13.8	26.3
Hydraulic							
Operating pressure, all connections		[bar]	350				
Nominal flow, Δp 5 bar		[L/min]	450	900	1300	1800	3600
Fluid			Hydraulic oil acc. to DIN 51 524...525				
Fluid temperature	recommended	[C°]	+30...+50				
	permitted	[C°]	-20...+60				
Viscosity	recommended	[mm²/s]	30...80				
	permitted	[mm²/s]	20...380				
Contamination			NAS 1638 class 9, to achieved by ß10 > 75				
Control volume spring chamber, surface C		[cm³]	6.45	12.21	20.32	39.40	94.56
Control surface	FC	[%]	100				
	FSt	[%]	123.8	108.6	121.5	117	121
	FA/B	[%]	approx. 60 / 40 related on surface C				
Opening pressure	flow direction B—>A	[bar]	Spring: L = 0.25; N = 1.25; S = 4.0; U = 10.0				
	flow direction A—>B	[bar]	Spring: L = 0.16; N = 0.85; S = 2.7; U = 6.6				

Flow diagram



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Orifice thread

Orifice	NG25	NG32	NG40	NG50	NG63
1	M6	M6	M6	*1/16	*1/8
2	M6	M6	M6	*1/16	*1/16
3	M6	M6	M6	*1/16	*1/8
4	M6	M6	M6	*1/16	*1/16
5	—	M6	M6	—	—

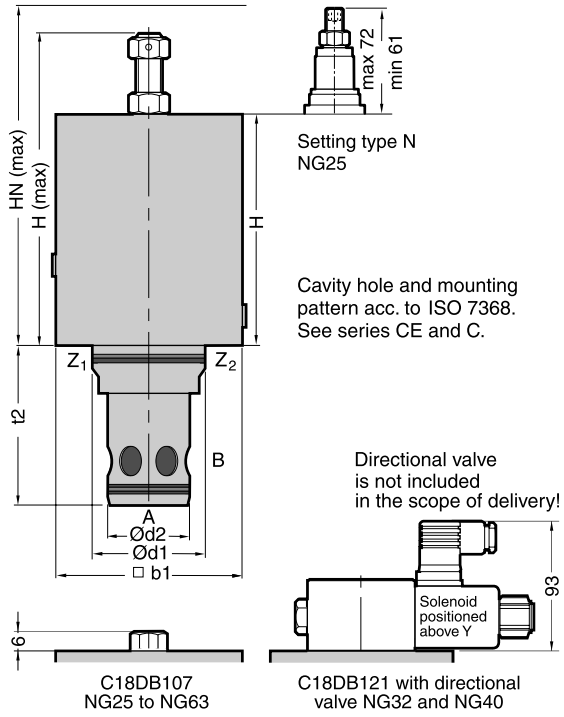
*Thread in NPT

Orifice recommendation

Orifice	NG25	NG32	NG40	NG50	NG63
① - ⑤	Ø 1.2	Ø 1.5	Ø 2.0	Ø 2.5	Ø 3.0

Depending on function, plugs and orifices must be used.

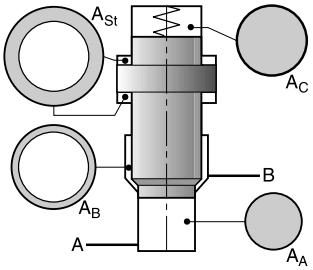
Dimensions



Nominal size	25	32	40	50	63
H max	234	142	208	189	241
HN max	162	197	227	202	222
h	90	125	140	130	150
b1	85	102	125	140	180
d1	45	60	75	90	120
d2	34	45	55	68	90
t2 + 0.1	72	85	105	122	155

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Control surfaces



NG	A_A [%]	A_B [%]	A_C [%]	A_{St} [%]
25	60	40	100	124
32	60	40	100	109
40	60	40	100	121
50	60	40	100	117
63	60	40	100	121

Seal kits

Nominal size		25	32	40	50	63
Seal kit	FPM	SK-C13DB10-E25V	SK-C13DB10-32V	SK-C13DB-E40V	SK-C13DB10-E50V	SK-C13DB10-E63V
	NBR	SK-C13DB10-E25	SK-C13DB10-32	SK-C13DB10-E40	SK-C13DB10-E50	SK-C13DB10-E63

Mounting kits

Nominal size		25	32	40	50	63
Cover code 107 consisting of:	[DIN 912 12.9]	BK-M12x50-4pcs	BK-M16x90-4pcs	BK-M20x110-4pcs	BK-M20x120-4pcs	BK-M30x160-4pcs
Cover code 112 consisting of:	[DIN 912 12.9]	BK-M12x50-4pcs	BK-M16x90-4pcs	BK-M20x110-4pcs	—	—
Cover code 121 consisting of:	[DIN 912 12.9]	—	BK-M16x90-4pcs	BK-M20x110-4pcs	—	—
Recommended torque	[Nm]	94	234	460	460	1570

C18DB_UK.INDD RH_23.01.08

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Series Denison	Description	Size				Mounting		Configuration		Page
	DIN / ISO	¾	1	1¼	1½	SAE61	SAE62	2-port	3-port	
	Pressure valves, manual operation									
R5V	Pressure relief function	•	•	•	•	•	•	•	•	9-3
R5U	Pressure unloading function	•	•	•	•	•			•	9-9
R5S	Pressure sequence function	•	•	•		•			•	9-15
R5R	Pressure reducing function	•	•	•		•		•		9-19
	Pressure valves, proportional operation									
R5V*P2	Pressure relief function	•	•	•	•	•	•	•	•	9-25
R5R*P2	Pressure reducing function	•	•	•		•		•		9-31
	Directional seat valves									
D5S		•	•	•	•	•		•	•	9-35
	Flow valves									
F5C	Throttle valves, proportional	•	•	•		•		•		9-49
R5A	2-way pressure compensator	•	•	•		•		•		9-53
R5P	3-way pressure compensator	•	•	•	•	•			•	9-57
	Check valves									
C5V	Direct operated	•	•	•	•	•	•	•		9-65
C5P	Pilot and direct operated	•	•	•		•		•		9-69
	Accessories									
	Bolt kits, flanges, plugs									9-73

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Notes

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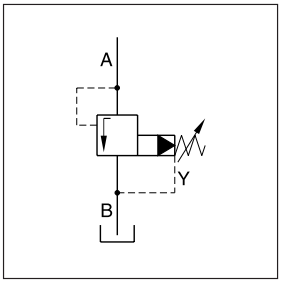
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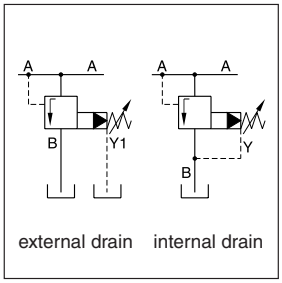
Pilot operated pressure relief valves series R5V have a similar design to the subplate mounted R4V series. The SAE flanges allow to mount the valves directly on the outlet flanges of pumps or inlet flanges of actuators to achieve a very compact design.
Valves with SAE flanges can also be bolted together to combine functions without the need of a manifold block.


R5V 2-port


R5V 3-port



R5V 2-port

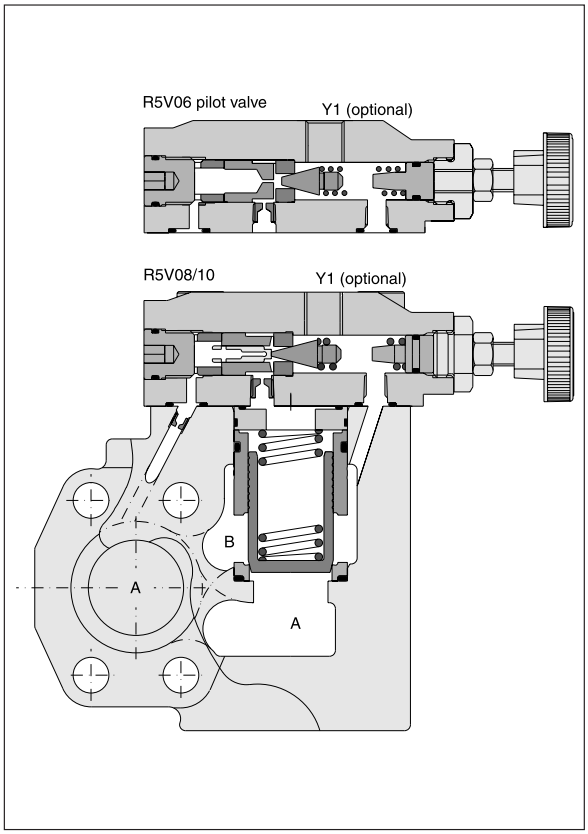


R5V 3-port

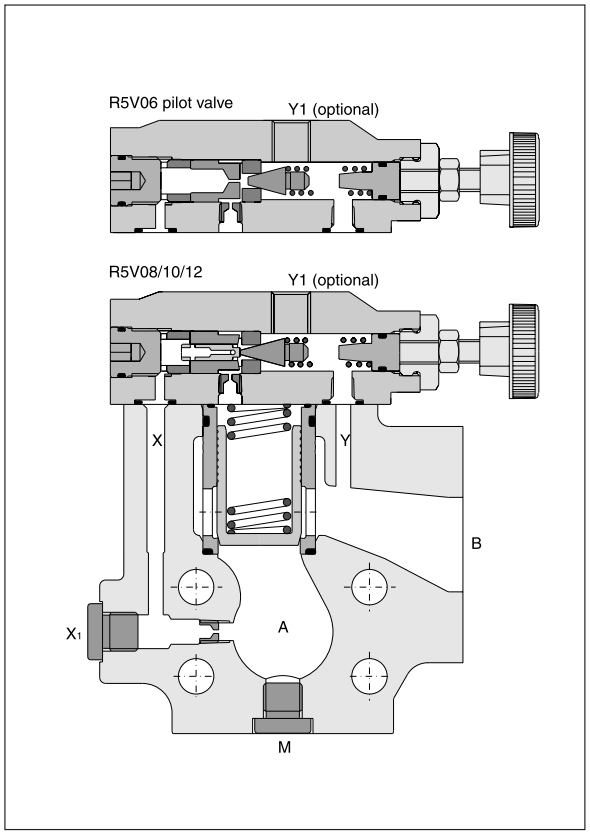
Features

- Pilot operated with manual adjustment
- R5V with 2-port body
  - 3 sizes (SAE ¾", 1", 1¼")
  - SAE61 flange
- R5V with 3-port body
  - 4 sizes (SAE ¾", 1", 1¼", 1½")
  - SAE61 and SAE62 flange
- 3 pressure stages
- 3 adjustment modes
  - Hand knob
  - Acorn nut with lead seal
  - Key lock
- With optional vent function

R5V 2-port

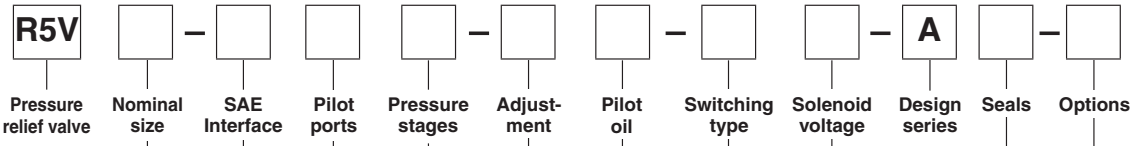


R5V 3-port



9

Ordering code



Code	Port size
06	SAE ¾"
08	SAE 1"
10	SAE 1¼"
12[1)]	SAE 1½"

[1)] only R5V 3-port

SAE 61		
Code	Size	Max. press. [bar]
3	12	210
4	10	280
5	06/08	350
SAE 62		
Code	Size	Max. press. [bar]
6 [1)]	06/08/10/12	350

[1)] only R5V 3-port

2-port body	
Code	pilot ports
7	Y1 = G¼" [2)]
3-port body	
Code	pilot ports
9	Y1[2)], X1, M = G¼"

[2)] Y1 only available at external drain (pilot oil code 6)

Code	Pressure stages
1	up to 105bar
3	up to 210bar
5	up to 350bar

Code	Adjustment
1	Hand knob
3	Acorn nut with lead seal
4	Key lock

Further options on request

Code	Options
008	Vent function with slow un-loading
070 [3)]	Through-hole dia. 15mm (for M14), and tank port flange thread M12
152	3-port body with metric threads

[3)] only R5V10 SAE62

Code	Seals
1	NBR
5	FPM

Code	Solenoid voltage
omit	Standard w/o vent function
G0R	12V=
G0Q	24V=
GAR	98V=
GAG	205V=
W30	110V / 50Hz 120V / 60Hz
W31	230V / 50Hz 240V / 60Hz

Code	Switching type
omit	Standard w/o vent function
09	Solenoid not activ. unpress. circulation
11	Solenoid activated unpress. circulation

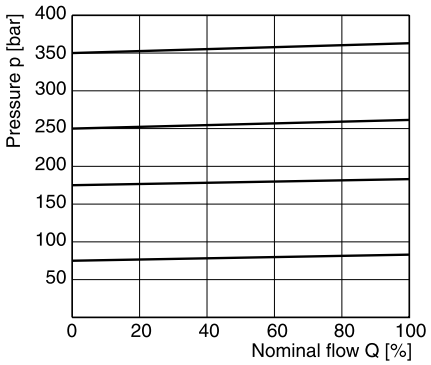
Pilot oil	
Code	Drain line
2	internal
6	external from Y1-port

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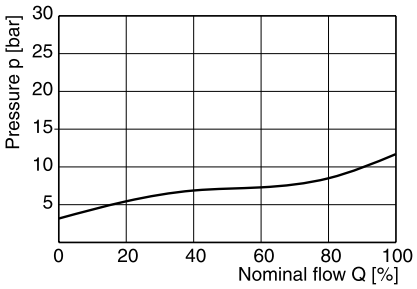
Technical data

General							
Size				**06 (¾")**	**08 (1")**	**10 (1¼")**	**12 (1½")**
Mounting				Flanged according to SAE 61 and SAE 62			
Mounting position				unrestricted			
Ambient temperature			[°C]	-20...+50			
Weight	R5V 2port		[kg]	4.0	4.6	5.9	—
	R5V 3port		[kg]	3.6	4.6	5.2	8.0
Hydraulic							
Max. operating pressure			[bar]				
		SAE61	Ports A, B	350	350	280	210
			Port Y1	30	30	30	30
		SAE62	Ports A, B	350	350	350	350
			Port Y1	30	30	30	30
Pressure stages			[bar]	105, 210, 350			
Nominal flow			[l/min]	90	300	600	600
Fluid				Hydraulic oil as per DIN 51524...525			
Fluid temperature			[°C]	-20...+80			
Viscosity permitted			[cSt] [mm²/s]	10...650			
Viscosity recommended			[cSt] [mm²/s]	30			
Filtration				ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			
Electrical (solenoid)							
Duty ratio			[%]	100			
Solenoid connection				Connector as per EN175301-803			
Protection class				IP65 in accordance with EN 60529 (plugged and mounted)			
			Code	G0R	G0Q	GAR	GAG	W30	W31
Supply voltage			[V]	12V =	24V =	98V =	205V =	110 at 50Hz 120 at 60Hz	230 at 50Hz 240 at 60Hz
Tolerance supply voltage			[%]	+5...-10	+5...-10	+5...-10	+5...-10	+5...-10	+5...-10
Power consumption	hold		[W]	31	31	31	31	78	78
	in rush		[W]	31	31	31	31	264	264
Response time			[ms]	Energized / De-energized AC: 20/18 , DC: 46/27					
Max. switching frequency				AC: up to 7200, DC: up to 16000 switchings/hour					
Coil insulation class				H (180 °C)					

p/Q performance curve



Minimum pressure curve

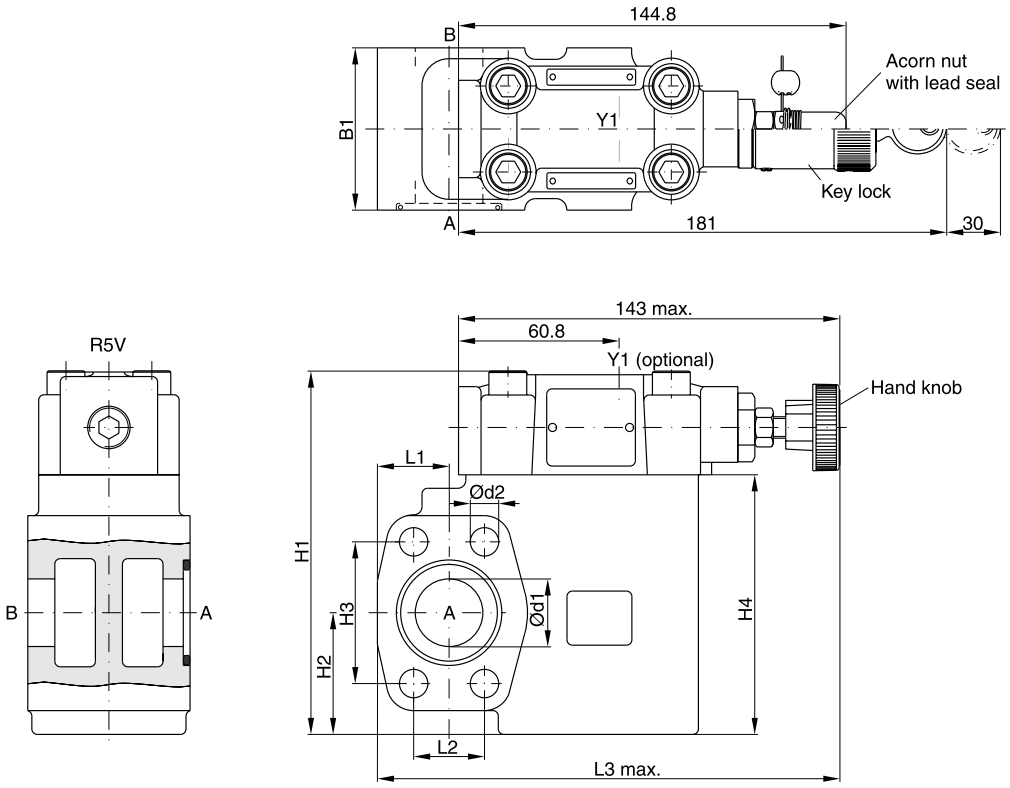


The performance curves are measured with external drain.
For internal drain the tank pressure has to be added to curve.

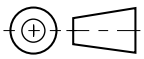
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Dimensions R5V 2-port



9



SAE61

NG	B1	H1	H2	H3	H4	L1	L2	L3	d1	d2
06	60	131.6	37	47.6	90	24.6	22.2	152	19	10.5
08	60	137.6	45	52.4	96	26.5	26.2	171	25	10.5
10	75	150.6	48	58.7	109	34.0	30.2	179	32	12.5

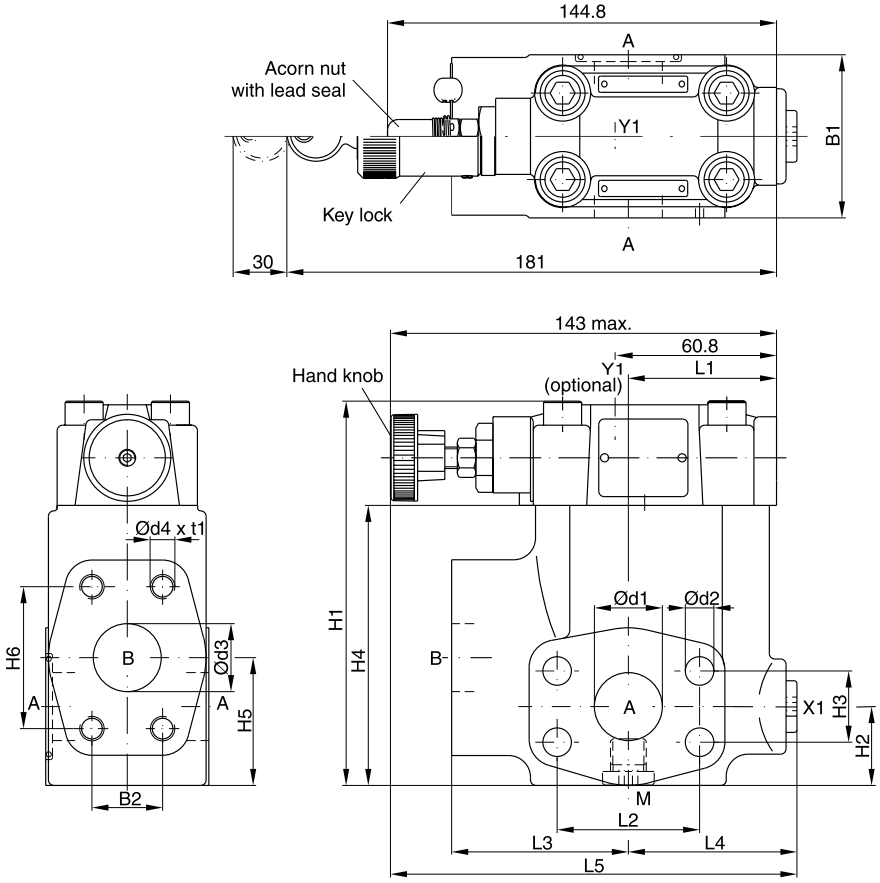
Port	Function	Port size		
		R5V06	R5V08	R5V10
A	Pressure	¾" SAE61	1" SAE61	1¼" SAE61
B	Tank	¾" SAE61	1" SAE61	1¼" SAE61
Y1	External drain	G¼"		

R5V_UK.INDD RH_06.03.08

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Dimensions R5V 3-port



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SAE61

NG	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	d1	d2	d3	d4 (option 152)	t1
06	60	22.2	119	28	22.2	81	41.6	47.6	50.3	47.6	63	56	152	19	10.5	19	3/8"-16 UNC (M10)	20
08	60	26.2	141	29	26.2	103	47	52.4	55.8	52.4	65	58	149	25	10.5	25	3/8"-16 UNC (M10)	23
10	75	30.2	151	34.5	30.2	113	64	58.7	57.8	58.7	61	62	150.5	32	12.5	32	7/16"-14 UNC (M12)	22
12	80	35.7	178	34	35.7	140	73	69.8	37.3	69.8	92.5	55.2	171.2	38	13.5	38	1/2"-13 UNC (M12)	27

SAE62

NG	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	d1	d2	d3	d4 (option 152)	t1
06	60	23.8	119	28	23.8	81	41.6	50.8	50.3	50.8	63	56	152	19	10.5	19	3/8"-16 UNF (M10)	20
08	60	27.8	141	29	27.8	103	47	57.2	55.8	57.2	65	58	149	25	12.5	25	7/16"-14 UNC (M12)	22
10	75	31.8	151	34.5	31.8	113	64	66.7	57.8	66.7	61	62	150.5	32	13.5	32	1/2"-13 UNC (M12)	24
12	80	36.5	178	34	36.5	140	73	79.4	37.3	79.4	92.5	55.2	171.2	38	17	38	5/8"-11 UNC (M16)	33

Port	Function	Port size			
		R5V06	R5V08	R5V10	R5V12
A (2)	Pressure	¾" SAE61/62	1" SAE61/62	1¼" SAE61/62	1½" SAE61/62
B	Tank	¾" SAE61/62	1" SAE61/62	1¼" SAE61/62	1½" SAE61/62
X1	External pilot port [1]	G¼"			
Y1	External drain	G¼"			
M	Pressure gauge	G¼"			

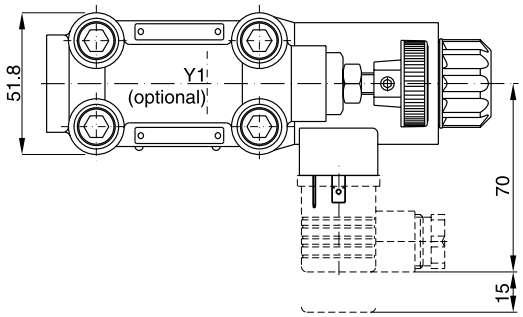
[1] closed when supplied

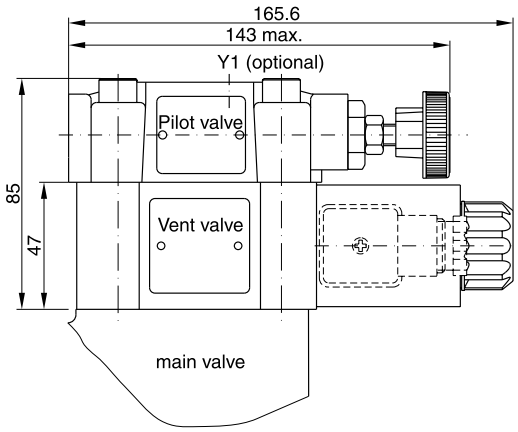
R5V_UK.INDD RH_06.03.08

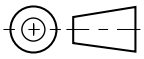
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Hydraulic Controls Division
Kaarst, Germany

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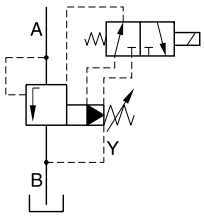
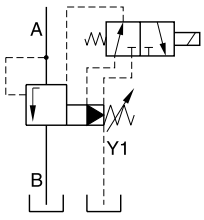
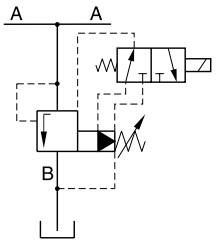
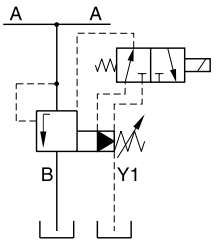
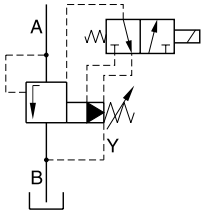
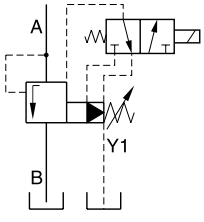
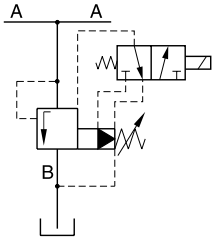
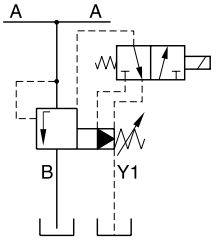
Dimensions R5V with vent function







9

	R5V 2-port		R5V 3-port	
Code	Internal drain	External drain	Internal drain	External drain
11				
09				

R5V_UK.INDD RH_06.03.08

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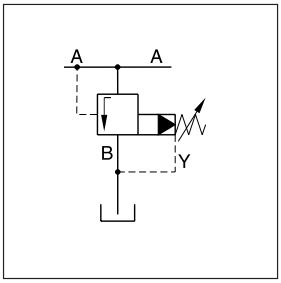
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Pilot operated pressure unloading valves series R5U have a similar design to the subplate mounted R4U series. The SAE flanges allow to mount the valve directly on the outlet flanges of pumps.
A typical application is the unloading of a pump in an accumulator circuit. The combination of an R5U, C5V and R5V on a double pump generates a high pressure / low pressure pump system without the need of a manifold block or piping between the valves.

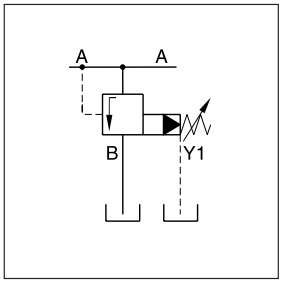


Features

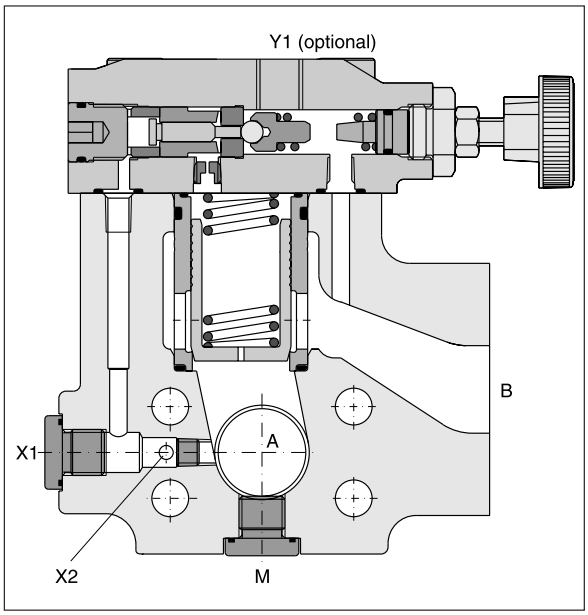
- Pilot operated unloading valve
- 3-port body with SAE61 flange
- 4 sizes (SAE ¾", 1", 1¼", 1½")
- 3 pressure stages
- 3 adjustment modes
  - Hand knob
  - Acorn nut with lead seal
  - Key lock
- With optional vent function



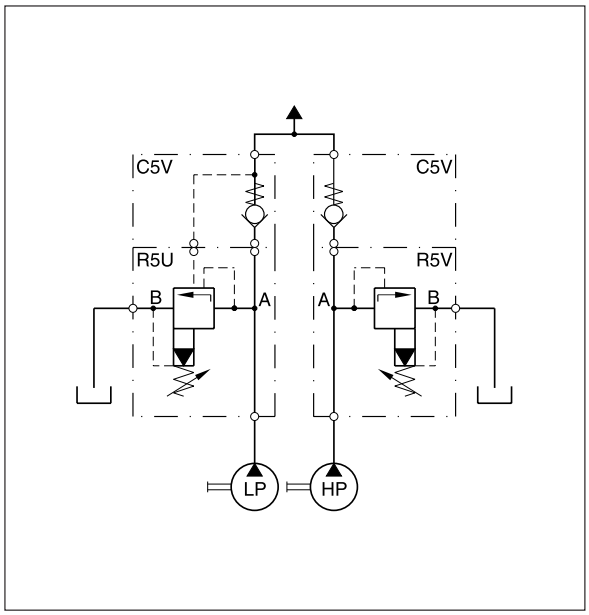
R5U 3-port internal drain



R5U 3-port external drain

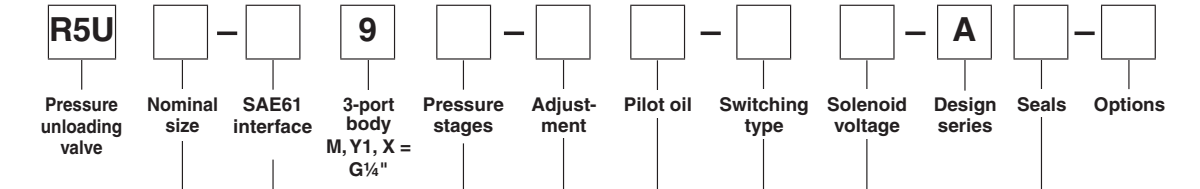


High pressure / low pressure system



9

Ordering code



Code	Port size
06	SAE ¾"
08	SAE 1"
10	SAE 1¼"
12[1)]	SAE 1½"

SAE 61		
Code	Size	Max. press. [bar]
3	12	210
4	10	280
5	06/08	350

Code	Pressure stages [bar]	Pressure differential
1	up to 105	28%
3	up to 210	28%
5	up to 350	15%

Code	Adjustment
1	Hand knob
3	Acorn nut with lead seal
4	Key lock

Code	Seals
1	NBR
5	FPM

Code	Solenoid voltage
omit	Standard w/o vent function
G0R	12V=
G0Q	24V=
GAR	98V=
GAG	205V=
W30	110V / 50Hz 120V / 60Hz
W31	230V / 50Hz 240V / 60Hz

Code	Switching type
omit	Standard w/o vent function
09	Solenoid not activ. unpress. circulation
11	Solenoid activated unpress. circulation

Pilot oil		
Code	Pilot	Drain
4	External via port X1 or X2	External
5	External via port X1 or X2	Internal

Further options on request

R5U_UK.INDD RH_19.12.07

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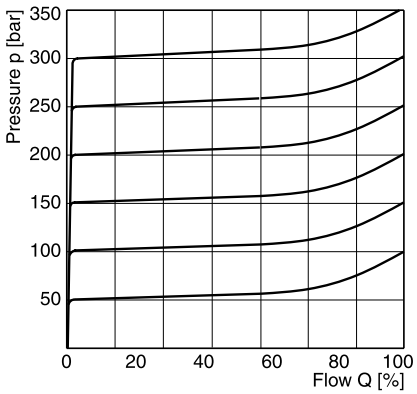
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Technical data

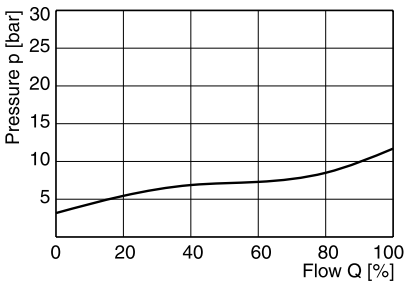
General							
Size			**06 (¾")**	**08 (1")**	**10 (1¼")**	**12 (1½")**	
Mounting			Flanged according to SAE 61				
Mounting position			unrestricted				
Ambient temperature		[°C]	-20...+50				
Weight		[kg]	3.6	4.6	5.2	8.0	
Hydraulic							
Max. operating pressure		[bar]					
		Ports A, B, X	350	350	280	210	
		Ports Y, Y1	30	30	30	30	
Pressure stages		[bar]	105, 210, 350				
Nominal flow		[l/min]	90	300	600	600	
Fluid			Hydraulic oil as per DIN 51524...525				
Fluid temperature		[°C]	-20...+80				
Viscosity permitted		[cSt] [mm²/s]	10...650				
Viscosity recommended		[cSt] [mm²/s]	30				
Filtration			ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)				
Electrical							
Duty ratio		[%]	100				
Solenoid connection			Connector as per EN175301-803				
Protection class			IP65 in accordance with EN 60529 (plugged and mounted)				
		Code	G0R	G0Q	GAR	GAG	W30	W31
Supply voltage		[V]	12V =	24V =	98V =	205V =	110 at 50Hz 120 at 60Hz	230 at 50Hz 240 at 60Hz
Tolerance supply voltage		[%]	+5...-10	+5...-10	+5...-10	+5...-10	+5...-10	+5...-10
Power consumption	hold	[W]	31	31	31	31	78	78
	in rush	[W]	31	31	31	31	264	264
Response time		[ms]	Energized / De-energized AC: 20/18 , DC: 46/27					
Max. switching frequency			AC: up to 7200, DC: up to 16000 switchings/hour					
Coil insulation class			H (180 °C)					

9

p/Q performance curve



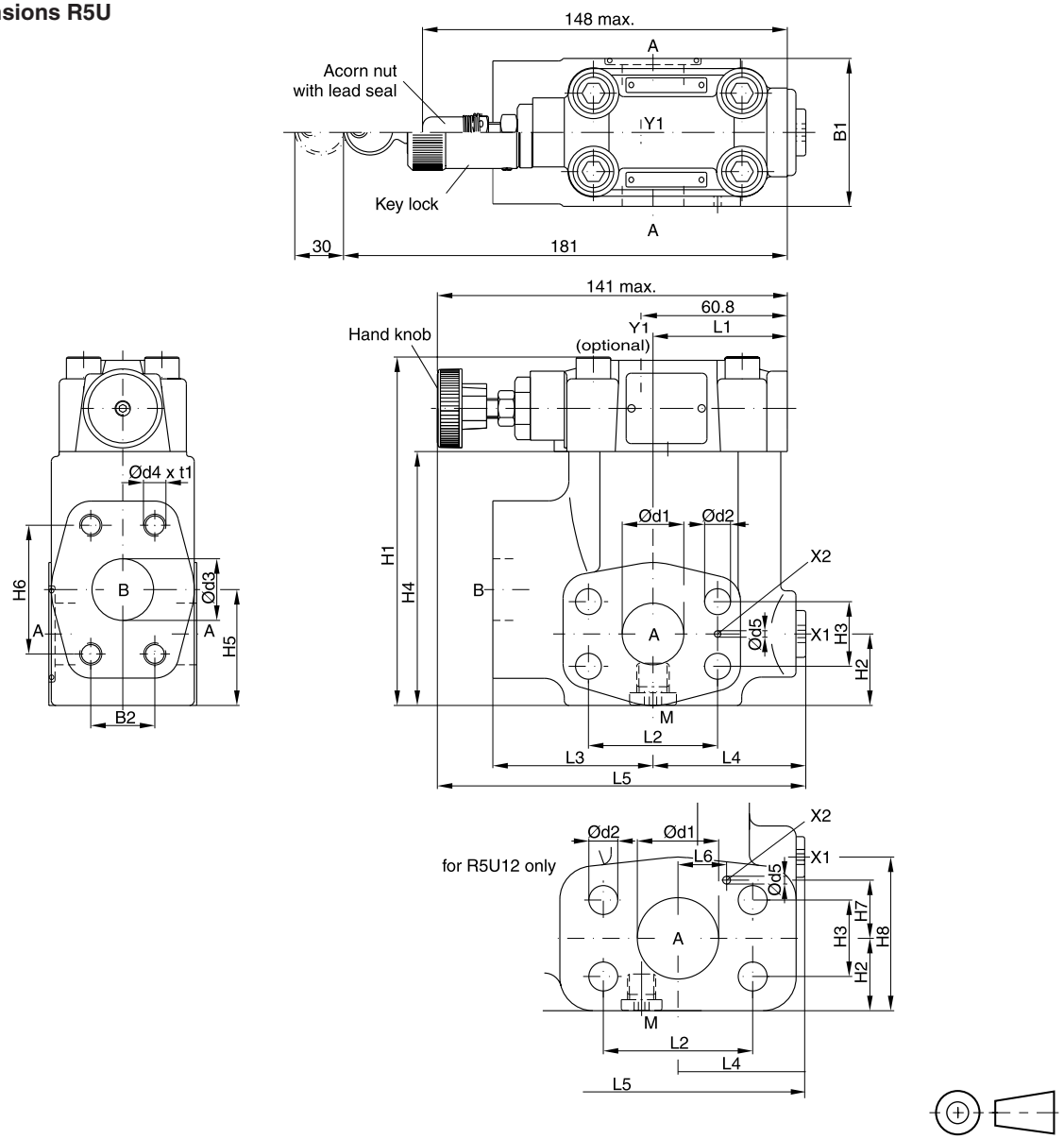
Minimum pressure curve



The performance curves are measured with external drain.
For internal drain the tank pressure has to be added to curve.

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Dimensions R5U



NG	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	d1	d2	d3	d4	t1	d5	L6	H7	H8
06	60	22.2	119	28	22.2	81	41.6	47.6	50.3	47.6	63	56	152	19	10.5	19	3/8"-16 UNC	20	3.0	-	-	-
08	60	26.2	141	29	26.2	103	47	52.4	55.8	52.4	65	58	149	25	10.5	25	3/8"-16 UNC	23	3.0	-	-	-
10	75	30.2	151	34.5	30.2	113	64	58.7	57.8	58.7	61	62	150.5	32	12.5	32	7/16"-14 UNC	22	3.0	-	-	-
12	80	35.7	178	34	35.7	140	73	69.8	37.3	69.8	92.5	55.2	171.2	38	13.5	38	1/2"-13 UNC	27	3.0	34.9	27.2	73

Port	Function	Port size			
		R5U06	R5U08	R5U10	R5U12
A (2)	Pressure	¾" SAE61	1" SAE61	1¼" SAE61	1½" SAE61
B	Tank	¾" SAE61	1" SAE61	1¼" SAE61	1½" SAE61
X1	External pilot port [1]	G¼"			
Y1	External drain	G¼"			
M	Pressure gauge	G¼"			

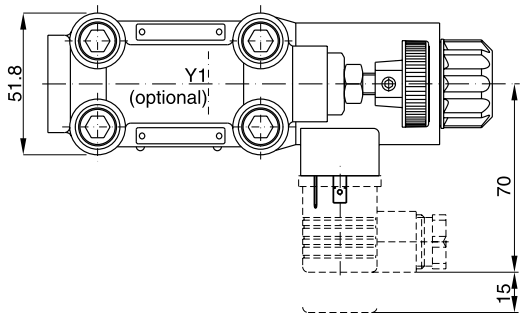
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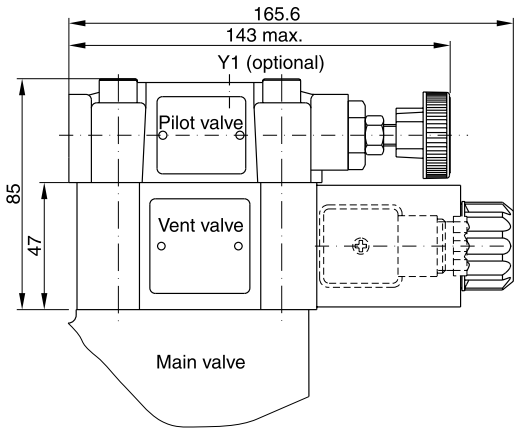
R5U_UK.INDD RH_19.12.07

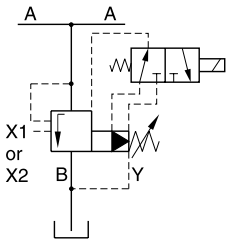
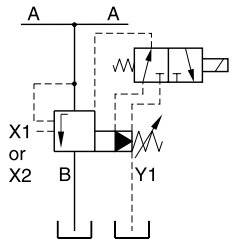
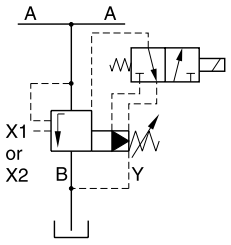
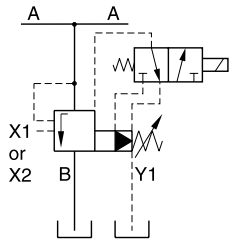
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Hydraulic Controls Division
Kaarst, Germany

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Dimensions R5U with vent function





Code	Internal drain	External drain
11		
09		

R5U_UK.INDD RH_19.12.07

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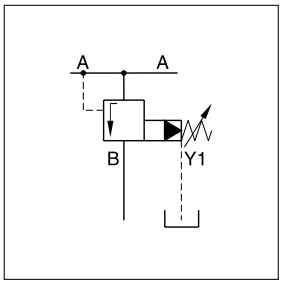
Notes

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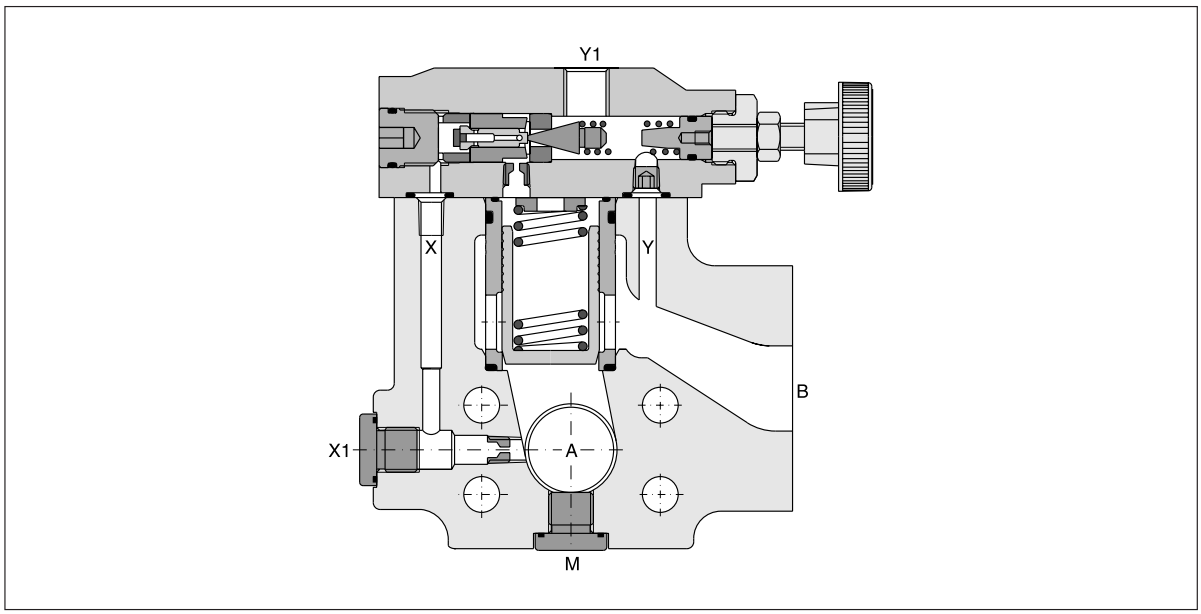
Pilot operated sequence valves series R5S have a similar design to the subplate mounted R4S series. The SAE flanges allow to mount the valve directly on the inlet flanges of actuators or outlet flanges of pumps to achieve a very compact design.



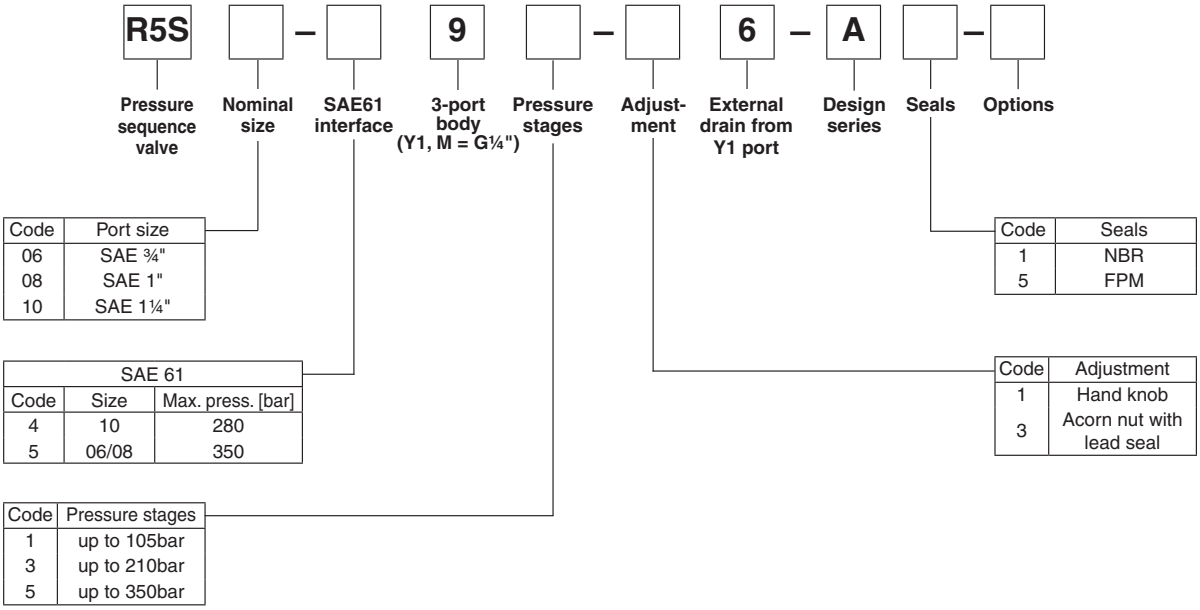


Features

- Pilot operated with manual adjustment
- 3-port body with SAE61 flange
- 3 sizes (SAE ¾", 1", 1¼")
- 3 pressure stages
- 2 adjustment modes
  - Hand knob
  - Acorn nut with lead seal



Ordering code



Code	Port size
06	SAE ¾"
08	SAE 1"
10	SAE 1¼"

SAE 61		
Code	Size	Max. press. [bar]
4	10	280
5	06/08	350

Code	Pressure stages
1	up to 105bar
3	up to 210bar
5	up to 350bar

Code	Seals
1	NBR
5	FPM

Code	Adjustment
1	Hand knob
3	Acorn nut with lead seal

Further options on request

9

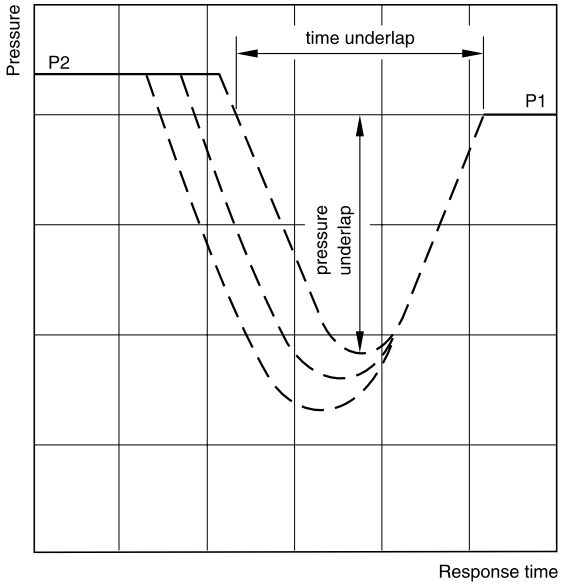
Technical Data

General				
Size		**06 (¾")**	**08 (1")**	**10 (1¼")**
Mounting		Flanged according to SAE 61		
Mounting position		unrestricted		
Ambient temperature	[°C]	-20...+50		
Weight	[kg]	3.6	4.6	5.2
Hydraulic				
Max. operating pressure	[bar]			
	Ports A, B	350	350	280
	Ports Y, Y1	30	30	30
Pressure stages	[bar]	105, 210, 350		
Nominal flow	[l/min]	90	300	600
Fluid		Hydraulic oil as per DIN 51524...525		
Fluid temperature	[°C]	-20...+80		
Viscosity permitted	[cSt] [mm²/s]	10...650		
Viscosity recommended	[cSt] [mm²/s]	30		
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)		

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Typical pressure characteristics at closing point

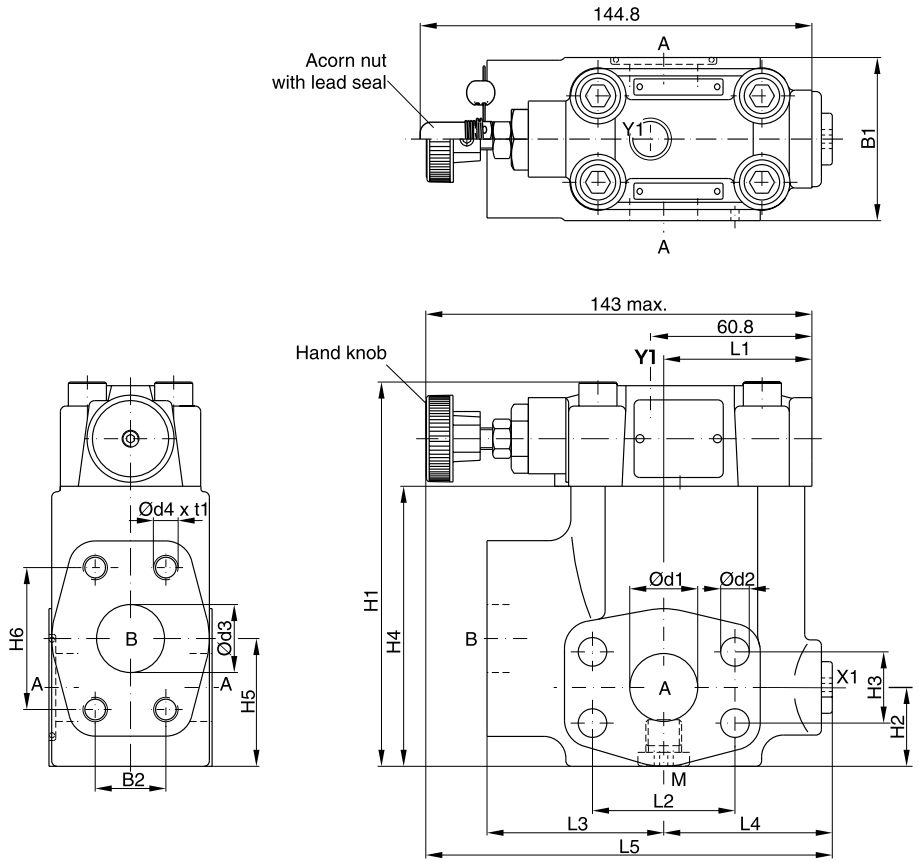


P1 = setting pressure
P2 = operating pressure

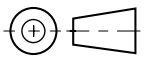
Time and pressure underlap depend on the characteristics of the specific system.

9

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9



SAE61

NG	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	d1	d2	d3	d4 (option 152)	t1
06	60	22.2	119	28	22.2	81	41.6	47.6	50.3	47.6	63	56	152	19	10.5	19	3/8"-16 UNC (M10)	20
08	60	26.2	141	29	26.2	103	47	52.4	55.8	52.4	65	58	149	25	10.5	25	3/8"-16 UNC (M10)	23
10	75	30.2	151	34.5	30.2	113	64	58.7	57.8	58.7	61	62	150.5	32	12.5	32	7/16"-14 UNC (M12)	22

Port	Function	Port size		
		R5S06	R5S08	R5S10
A (2)	Pressure	¾" SAE61	1" SAE61	1¼" SAE61
B	Secondary port	¾" SAE61	1" SAE61	1¼" SAE61
X1	External pilot port [1]	G¼"		
Y1	External drain	G¼"		
M	Pressure gauge	G¼"		

[1] closed when supplied

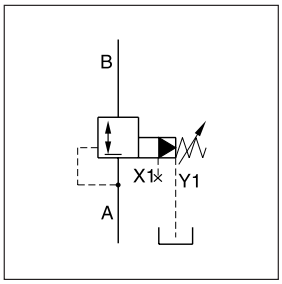
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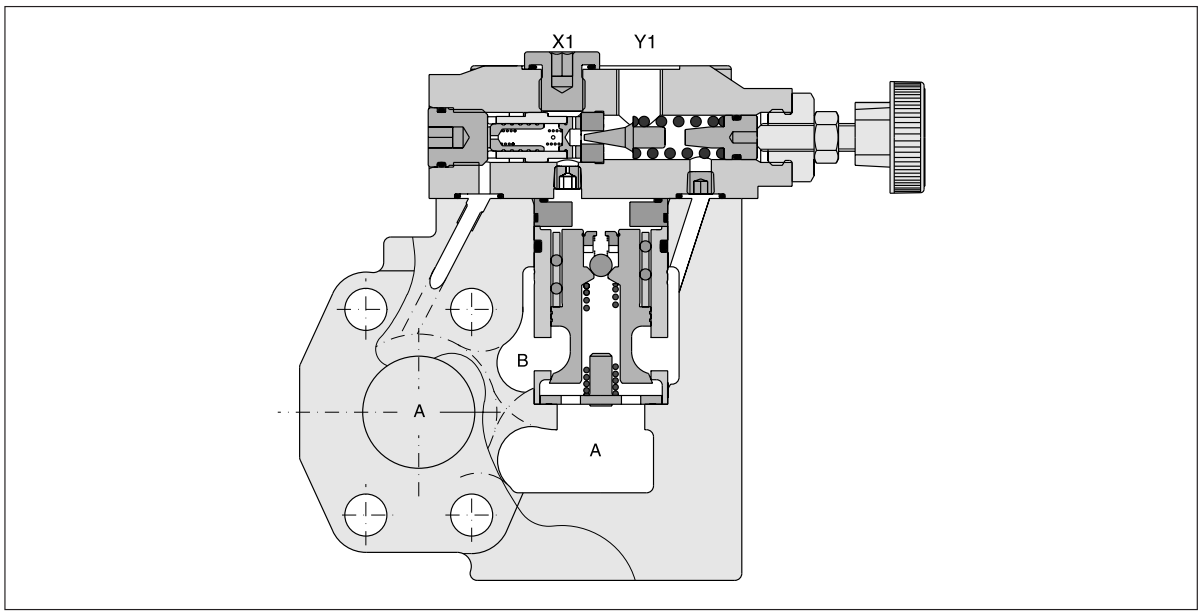
Pilot operated pressure reducing valves series R5R have a similar design as the subplate mounted R4R series. The SAE flanges allow to mount the valves directly on the inlet flanges of actuators to achieve a very compact design.



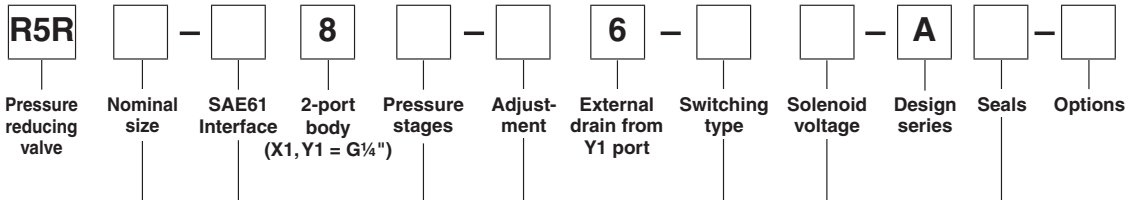


Features

- Pilot operated with manual adjustment
- Normally closed to avoid unintended motion
- 2-port body with SAE61 flange
- 3 sizes (SAE ¾", 1", 1¼")
- 3 pressure stages
- 3 adjustment modes
  - Hand knob
  - Acorn nut with lead seal
  - Key lock
- With optional vent function



Ordering code



Code	Port size
06	SAE ¾"
08	SAE 1"
10	SAE 1¼"

SAE 61		
Code	Size	Max. press. [bar]
4	10	280
5	06/08	350

Code	Pressure stages
1	up to 105bar
3	up to 210bar
5	up to 350bar

Code	Adjustment
1	Hand knob
3	Acorn nut with lead seal
4	Key lock

Code	Seals
1	NBR
5	FPM

Code	Solenoid voltage
omit	Standard w/o vent function
G0R	12V=
G0Q	24V=
GAR	98V=
GAG	205V=
W30	110V / 50Hz 120V / 60Hz
W31	230V / 50Hz 240V / 60Hz

Code	Switching type
omit	Standard w/o vent function
09	Solenoid not activ. unpress. circulation
11	Solenoid activated unpress. circulation

Further options on request

9

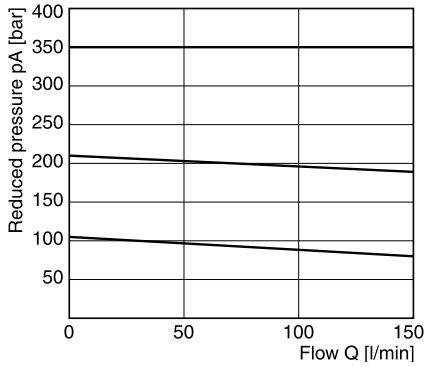
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General								
Size			**06**		**08**		**10**	
Mounting			Flanged according to SAE 61					
Mounting position			unrestricted					
Ambient temperature		[°C]	-20...+50					
Weight		[kg]	4.0		4.6		5.9	
Hydraulic								
Max. operating pressure		[bar]						
		Ports A, B, X1	350		350		280	
		Port Y1	30		30		30	
Pressure stages		[bar]	105, 210, 350					
Nominal flow		[l/min]	90		300		500	
Fluid			Hydraulic oil as per DIN 51524...525					
Fluid temperature		[°C]	-20...+80					
Viscosity permitted		[cSt] [mm²/s]	10...650					
Viscosity recommended		[cSt] [mm²/s]	30					
Filtration			ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)					
Electrical (solenoid)								
Duty ratio		[%]	100					
Solenoid connection			Connector as per EN175301-803					
Protection class			IP65 in accordance with EN 60529 (plugged and mounted)					
		Code	G0R	G0Q	GAR	GAG	W30	W31
Supply voltage		[V]	12V =	24V =	98V =	205V =	110 at 50Hz 120 at 60Hz	230 at 50Hz 240 at 60Hz
Tolerance supply voltage		[%]	+5...-10	+5...-10	+5...-10	+5...-10	+5...-10	+5...-10
Power consumption	hold	[W]	31	31	31	31	78	78
	in rush	[W]	31	31	31	31	264	264
Response time		[ms]	Energized / De-energized AC: 20/18 , DC: 46/27					
Max. switching frequency			AC: up to 7200, DC: up to 16000 switchings/hour					
Coil insulation class			H (180 °C)					

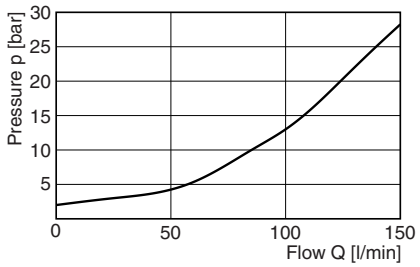
9

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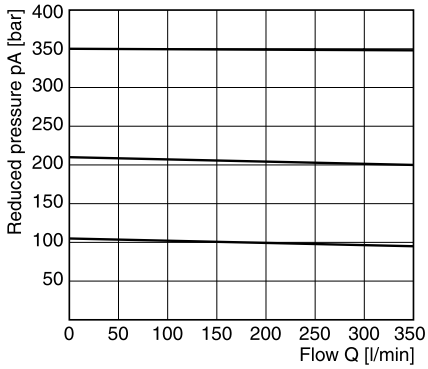
Reduced pressure pA versus flow Q
Series R5R06 [1)]



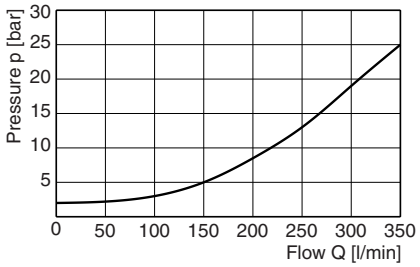
Minimum pressure curve



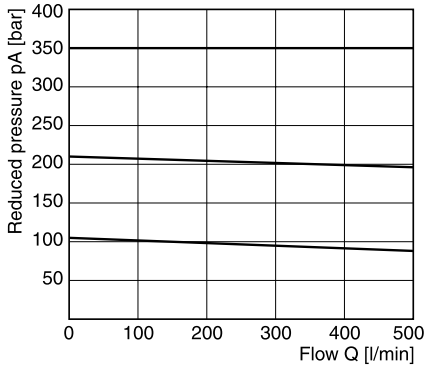
Reduced pressure pA versus flow Q
Series R5R08 [1)]



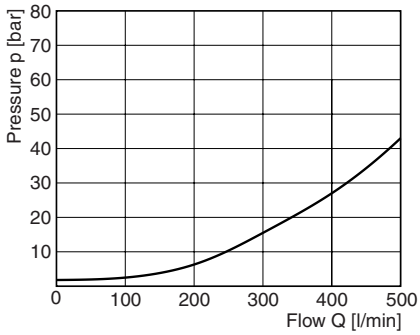
Minimum pressure curve



Reduced pressure pA versus flow Q
Series R5R10 [1)]

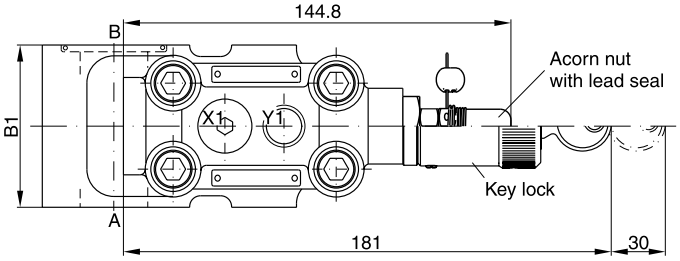


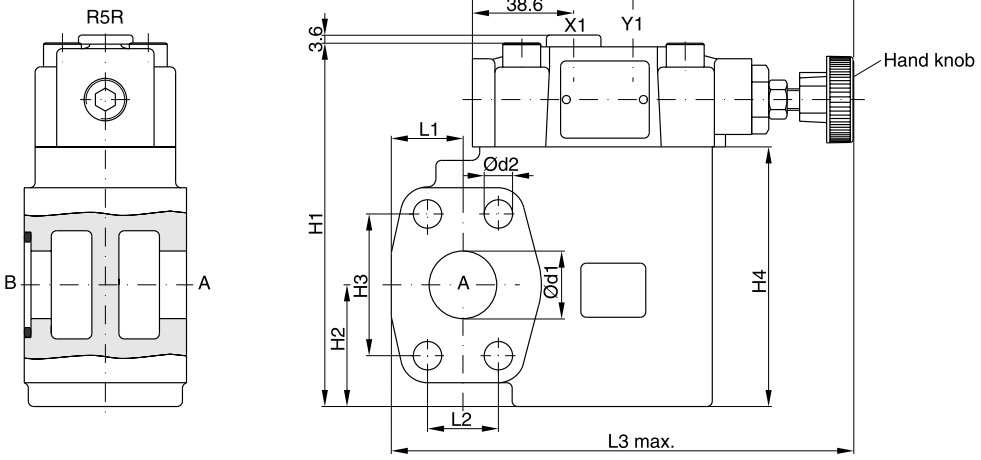
Minimum pressure curve



[1)] Measured at 350 bar primary pressure pB.

9





9

NG	B1	H1	H2	H3	H4	L1	L2	L3	d1	d2
06	60	131.6	37	47.6	90	24.6	22.2	152	19	10.5
08	60	137.6	45	52.4	96	26.5	26.2	171	25	10.5
10	75	150.6	48	58.7	109	34.0	30.2	179	32	12.5

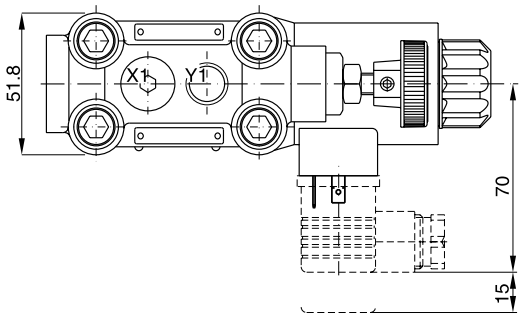
Port	Function	Port size		
		R5R06	R5R08	R5R10
B	Inlet pressure	¾" SAE61	1" SAE61	1¼" SAE61
A	Reduced outlet pressure	¾" SAE61	1" SAE61	1¼" SAE61
Y1	External drain	G¼"		
X1	Pressure gauge	G¼"		

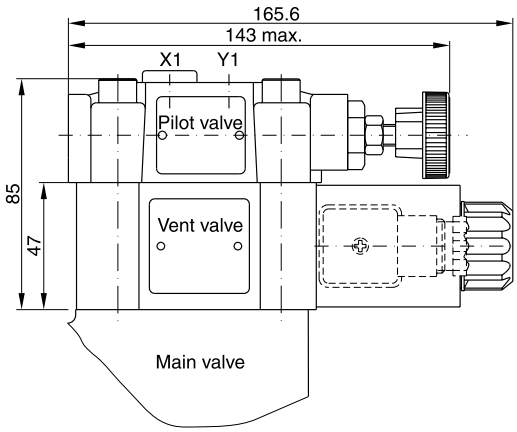
R5R_UK.INDD RH_13.03.08

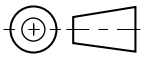
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Kaarst, Germany

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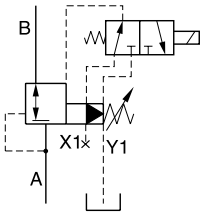
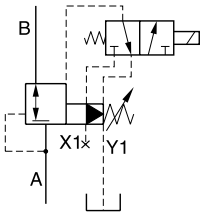
Dimensions R5R with vent function







9

Code	External drain
11	
09	

R5R_UK.INDD RH_13.03.08

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Proportional pressure relief valves series R5V*P2 are based on the mechanical adjusted series R5V. The additional proportional unit between the mechanical pilot valve and the main stage allows continuous pressure adjustment.
The optimum performance can be achieved in combination with the digital amplifier module PCD00A-400.

Features

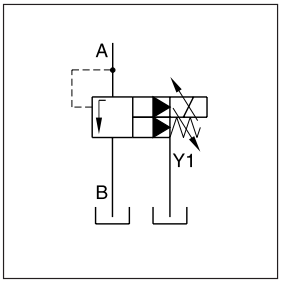
- Pilot operated with proportional solenoid
- Continuous adjustment by proportional solenoid
- R5V with 2-port body
  - 3 sizes (SAE ¾", 1", 1¼")
  - SAE61 flange
- R5V with 3-port body
  - 4 sizes (SAE ¾", 1", 1¼", 1½")
  - SAE61 and SAE62 flange
- 3 pressure stages
- With mechanical maximum pressure adjustment



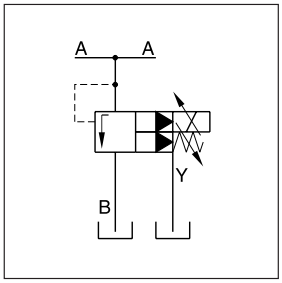
R5V*P2 2-port



R5V*P2 3-port

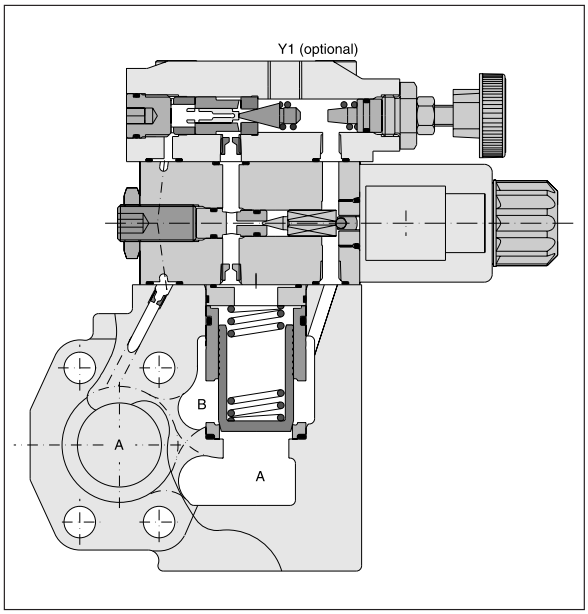


R5V*P2 2-port

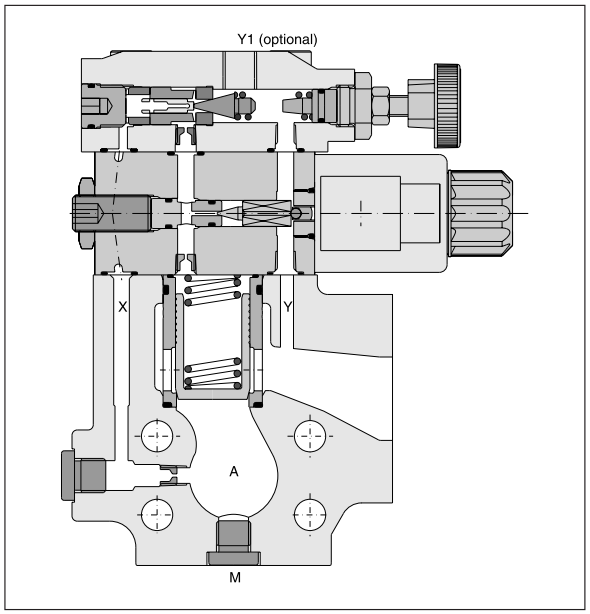


R5V*P2 3-port

R5V*P2 2-port

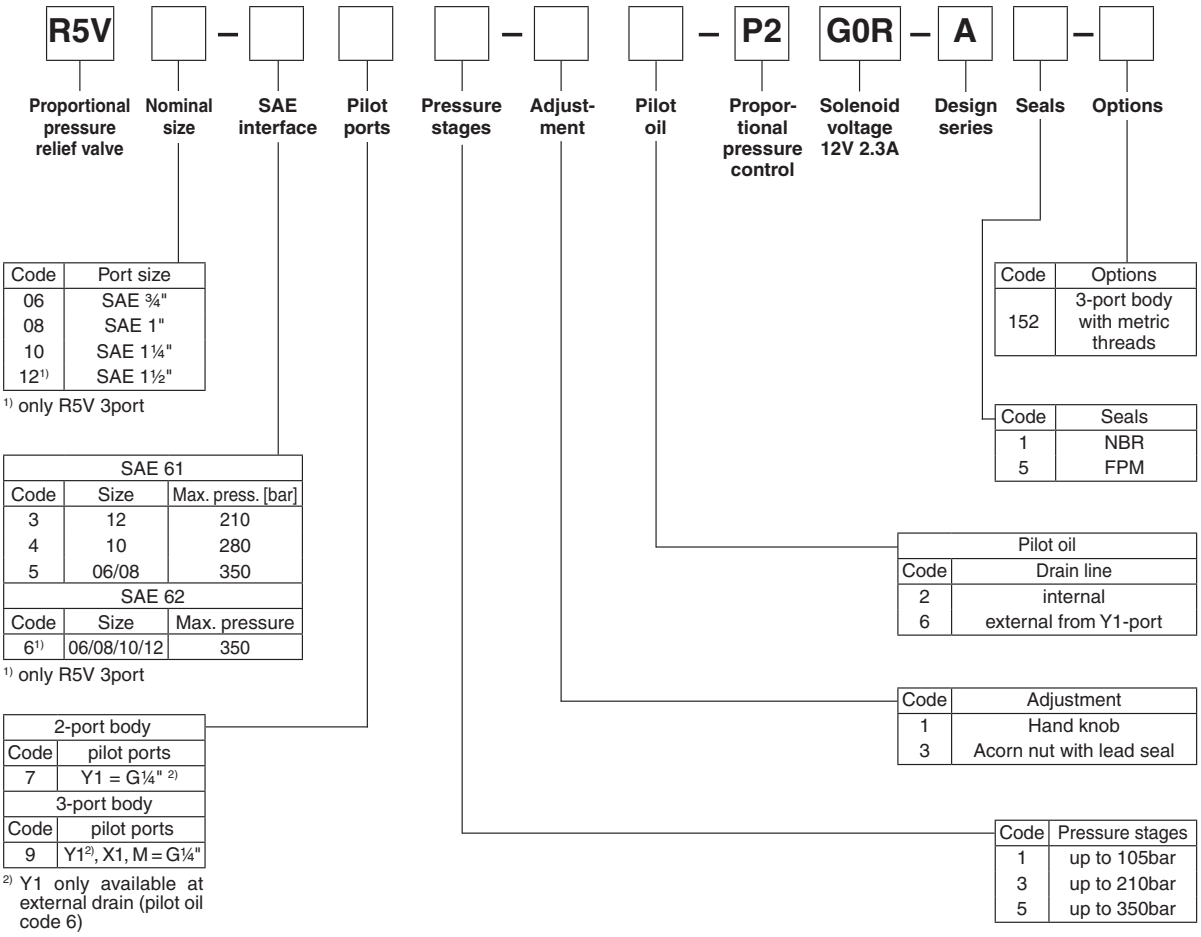


R5V*P2 3-port



9

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Code	Port size
06	SAE ¾"
08	SAE 1"
10	SAE 1¼"
12[1]	SAE 1½"

[1] only R5V 3port

SAE 61		
Code	Size	Max. press. [bar]
3	12	210
4	10	280
5	06/08	350
SAE 62		
Code	Size	Max. pressure
6[1]	06/08/10/12	350

[1] only R5V 3port

2-port body	
Code	pilot ports
7	Y1 = G¼" [2]
3-port body	
Code	pilot ports
9	Y1[2], X1, M = G¼"

[2] Y1 only available at external drain (pilot oil code 6)

Code	Options
152	3-port body with metric threads

Code	Seals
1	NBR
5	FPM

Pilot oil	
Code	Drain line
2	internal
6	external from Y1-port

Code	Adjustment
1	Hand knob
3	Acorn nut with lead seal

Code	Pressure stages
1	up to 105bar
3	up to 210bar
5	up to 350bar

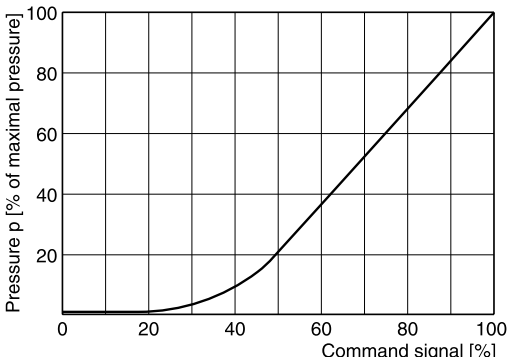
9

General							
Size				**06 (¾")**	**08 (1")**	**10 (1¼")**	**12 (1½")**
Mounting				Flanged according to SAE 61 (size 12 = SAE 62)			
Mounting position				unrestricted			
Ambient temperature			[°C]	-20...+50			
Weight	R5V 2port		[kg]	5.8	6.4	7.7	—
	R5V 3port		[kg]	5.4	6.4	7.0	9.8
Hydraulic							
Max. operating pressure			[bar]				
		SAE61	Ports A, B	350	350	280	210
			Port Y1	30	30	30	30
		SAE62	Ports A, B	350	350	350	350
			Port Y1	30	30	30	30
Pressure stages			[bar]	105, 210, 350			
Nominal flow			[l/min]	90	300	600	600
Fluid				Hydraulic oil as per DIN 51524...525			
Fluid temperature			[°C]	-20...+80			
Viscosity permitted			[cSt] [mm²/s]	10...650			
Viscosity recommended			[cSt] [mm²/s]	30			
Filtration				ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			
Electrical (proportional solenoid)							
Duty ratio			[%]	100			
Nominal voltage			[V]	12			
Max. current			[A]	2.3			
Coil resistance			[Ohm]	4 at 20°C			
Solenoid connection				Connector as per EN175301-803			
Protection class				IP65 in accordance with EN 60529 (plugged and mounted)			
Power amplifier				PCD00A-400			

9

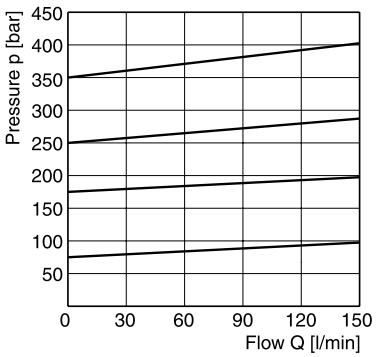
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Signal/pressure curve R5V*P2

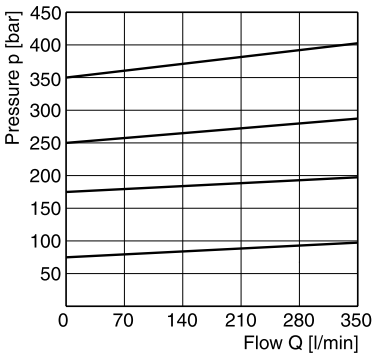


p/Q performance curve [1)]

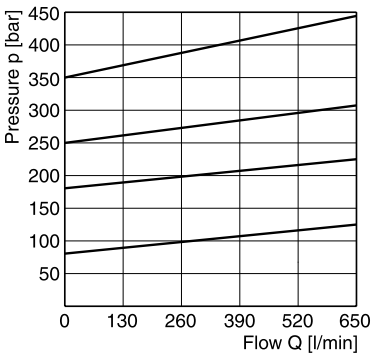
R5V06*P2



R5V08*P2



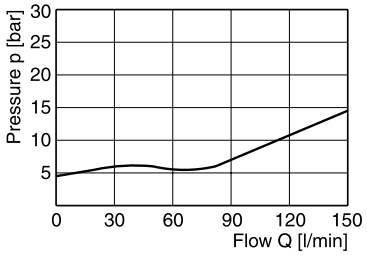
R5V10*P2



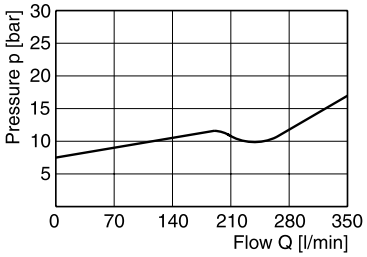
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Minimum pressure curve [1)]

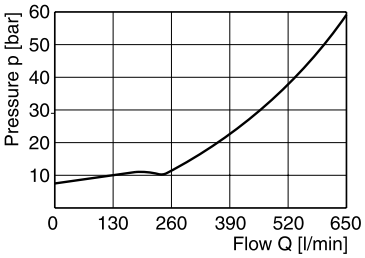
R5V06*P2



R5V08*P2

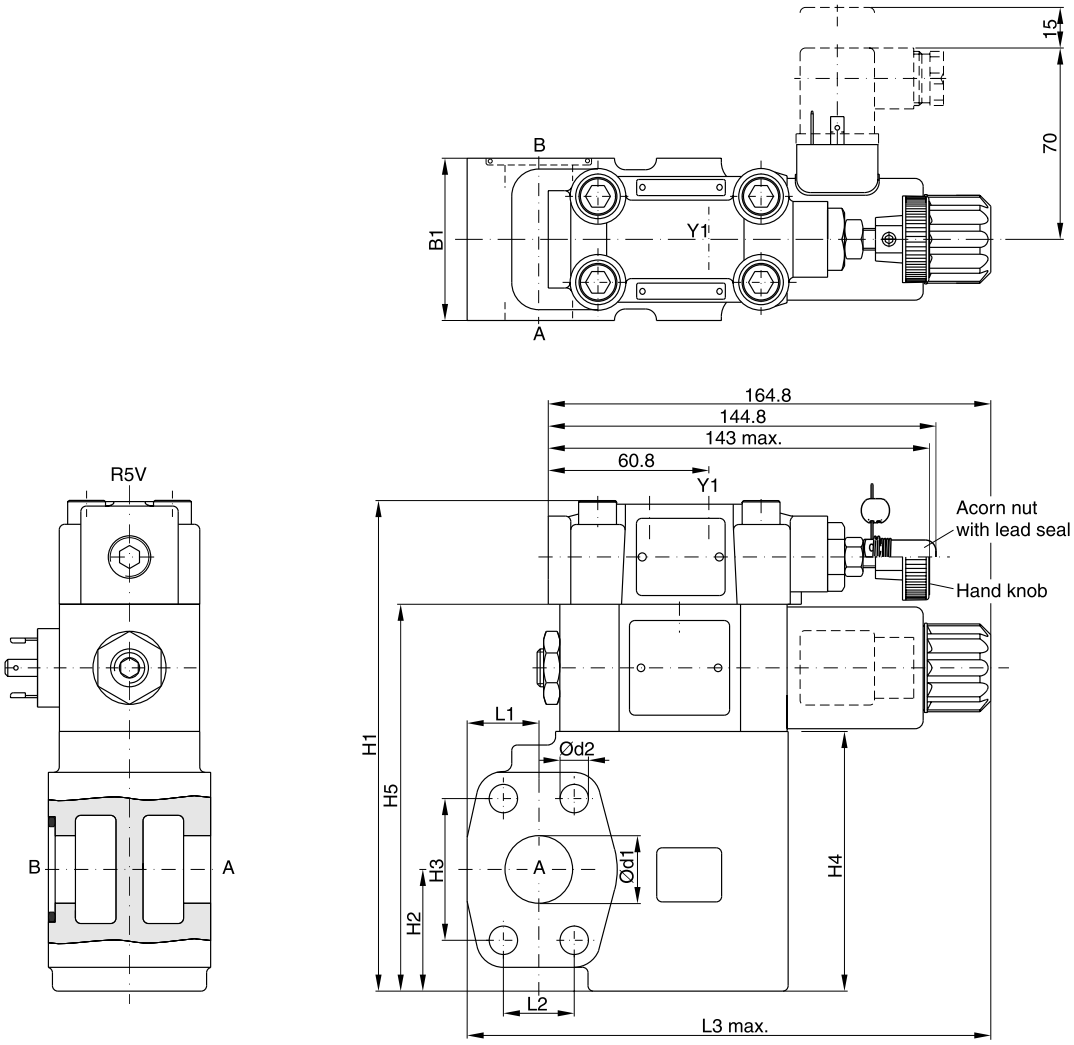


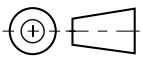
R5V10*P2



[1)] The performance curves are measured with external drain.
For internal drain the tank pressure has to be added to curve.

R5V*P2 2-port





SAE61

NG	B1	H1	H2	H3	H4	H5	L1	L2	L3	d1	d2
06	60	175	37	47.6	90	137	24.6	22.2	174	19	10.5
08	60	181	45	52.4	96	143	26.5	26.2	193.6	25	10.5
10	75	194	48	58.7	109	156	34.0	30.2	201	32	12.5

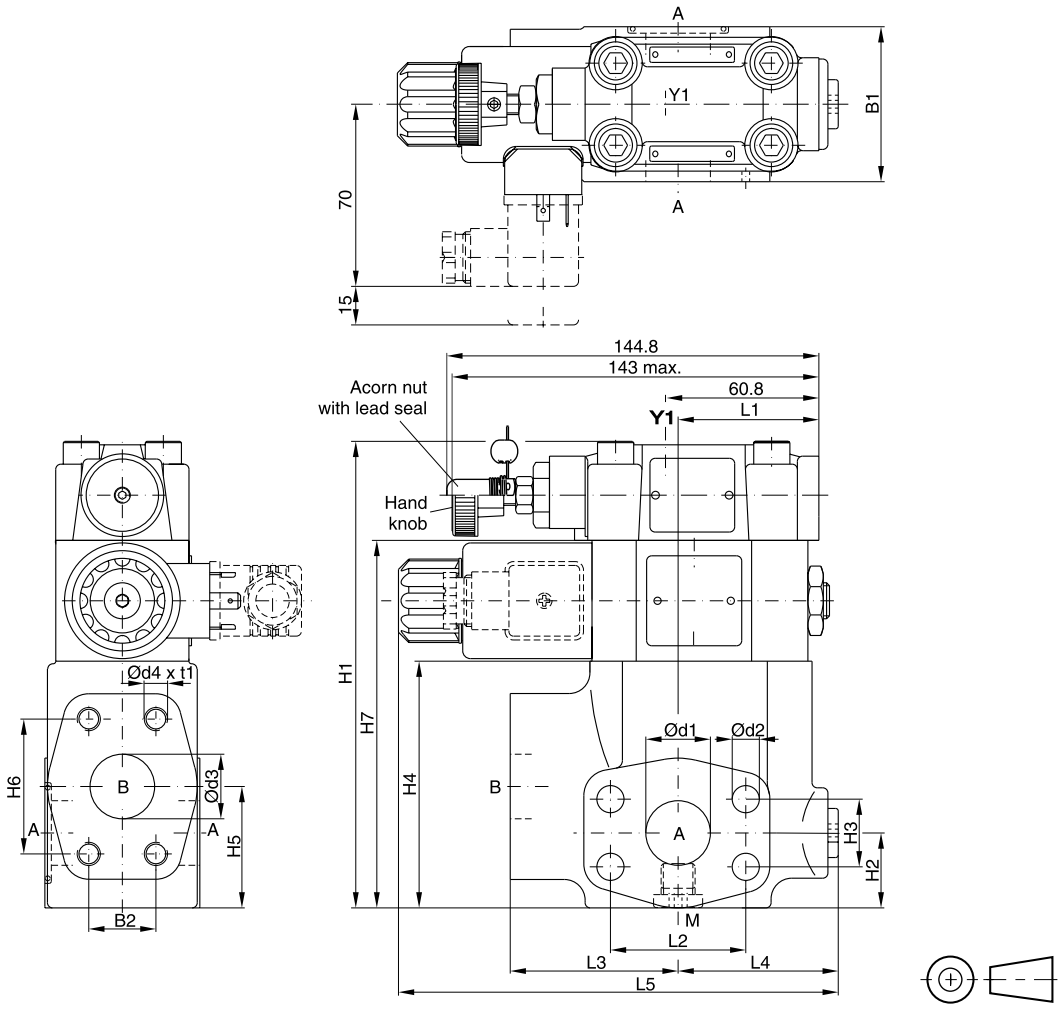
Port	Function	Port size		
		R5V06	R5V08	R5V10
A	Pressure	¾" SAE61	1" SAE61	1¼" SAE61
B	Tank	¾" SAE61	1" SAE61	1¼" SAE61
Y1	External drain	G¼"		

R5VP2_UK.INDD RH_06.03.08

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R5V*P2 3-port



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SAE61

NG	B1	B2	H1	H2	H3	H4	H5	H6	H7	L1	L2	L3	L4	L5	d1	d2	d3	d4 (option 152)	t1
06	60	22.2	166	28	22.2	81	41.6	47.6	128	50.3	47.6	63	56	174.6	19	10.5	19	3/8”-16 UNC (M10)	20
08	60	26.2	188	29	26.2	103	47	52.4	150	55.8	52.4	65	58	177	25	10.5	25	3/8”-16 UNC (M10)	23
10	75	30.2	198	34.5	30.2	113	64	58.7	160	57.8	58.7	61	62	179.1	32	12.5	32	7/16”-14 UNC (M12)	22
12	80	35.7	225	34	35.7	140	73	69.8	187	37.3	69.8	92.5	55.2	186.8	38	13.5	38	1/2”-13 UNC (M12)	27

SAE62

NG	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	d1	d2	d3	d4 (option 152)	t1
06	60	23.8	119	28	23.8	81	41.6	50.8	50.3	50.8	63	56	152	19	10.5	19	3/8”-16 UNF (M10)	20
08	60	27.8	141	29	27.8	103	47	57.2	55.8	57.2	65	58	149	25	12.5	25	7/16”-14 UNC (M12)	22
10	75	31.8	151	34.5	31.8	113	64	66.7	57.8	66.7	61	62	150.5	32	13.5	32	1/2”-13 UNC (M12)	24
12	80	36.5	178	34	36.5	140	73	79.4	37.3	79.4	92.5	55.2	171.2	38	17	38	5/8”-11 UNC (M16)	33

Port	Function	Port size			
		R5V06	R5V08	R5V10	R5V12
A (2)	Pressure	¾" SAE61	1" SAE61	1¼" SAE61	1½" SAE61
B	Tank	¾" SAE61	1" SAE61	1¼" SAE61	1½" SAE61
Y1	External drain	G¼"			
M	Pressure gauge	G¼"			

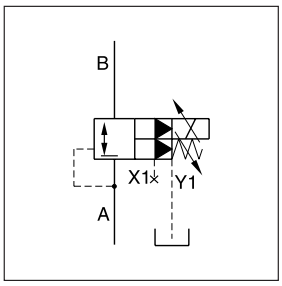
R5VP2_UK.INDD RH_06.03.08

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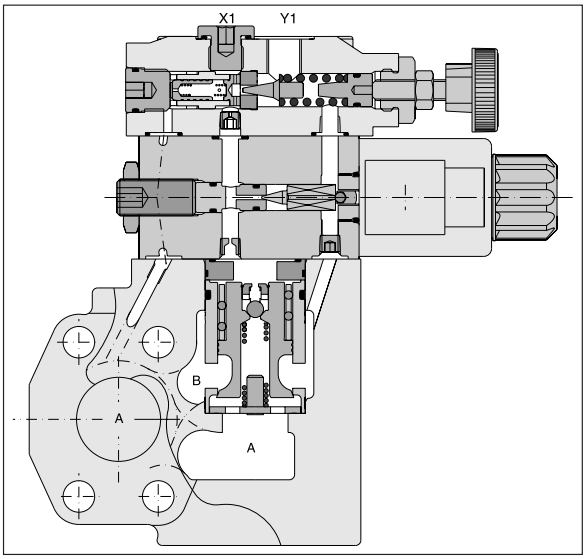
Proportional pressure reducing valves series R5R*P2 are based on the mechanical adjusted series R5R. The additional proportional unit between the mechanical pilot valve and the main stage allows continuous pressure adjustment. The optimum performance can be achieved in combination with the digital amplifier module PCD00A-400.





Features

- Pilot operated with proportional solenoid
- Continuous adjustment by proportional solenoid
- 2-port body with SAE61 flange
- 3 sizes (SAE ¾", 1", 1¼")
- 3 pressure stages
- With mechanical maximum pressure adjustment



Ordering code

R5R		–		8		–		6	–	P2	G0R	–	A		–	
Pressure reducing valve	Nominal size		SAE61 interface	Body 2-port (X1, Y1 = G¼")	Pressure stages		Adjust-ment	External drain from Y1-port		Propor-tional pressure control	Solenoid voltage 12V 2.3A		Design series	Seals		Options

Code	Port size
06	SAE ¾"
08	SAE 1"
10	SAE 1¼"

SAE 61		
Code	Size	Max. press. [bar]
4	10	280
5	06/08	350

Code	Pressure stages
1	up to 105bar
3	up to 210bar
5	up to 350bar

Code	Seals
1	NBR
5	FPM

Code	Adjustment
1	Hand knob
3	Acorn nut with lead seal

Further options on request

R5RP2_UK.INDD RH_27.11.07

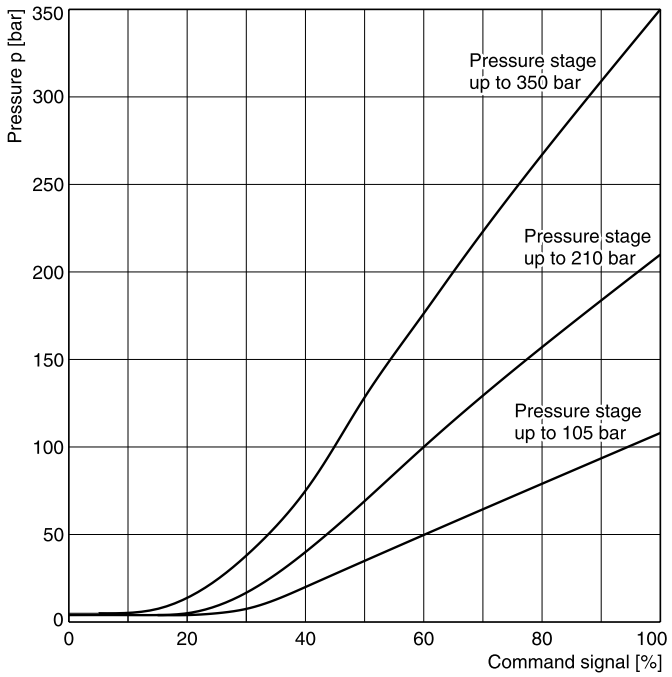
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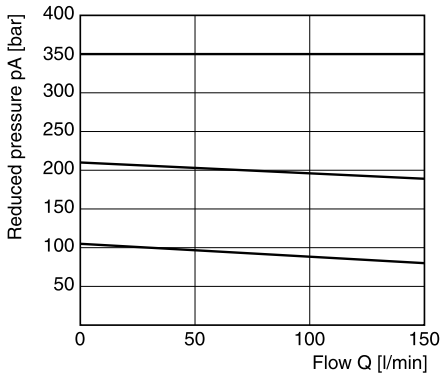
Technical data

General				
Size		**06**	**08**	**10**
Mounting		Flanged according to SAE 61		
Mounting position		unrestricted		
Ambient temperature	[°C]	-20...+50		
Weight	[kg]	5.8	6.4	7.7
Hydraulic				
Max. operating pressure	[bar]			
	Ports A, B, X1	350	350	280
	Port Y1	30	30	30
Pressure stages	[bar]	105, 210, 350		
Nominal flow	[l/min]	90	300	500
Fluid		Hydraulic oil as per DIN 51524...525		
Fluid temperature	[°C]	-20...+80		
Viscosity permitted	[cSt] [mm²/s]	10...650		
Viscosity recommended	[cSt] [mm²/s]	30		
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)		
Electrical (proportional solenoid)				
Duty ratio	[%]	100		
Nominal voltage	[V]	12		
Max. current	[A]	2.3		
Coil resistance	[Ohm]	4 at 20°C		
Solenoid connection		Connector as per EN175301-803		
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)		
Power amplifier		PCD00A-400		

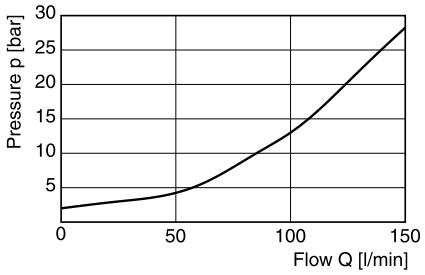
Command / pressure curve



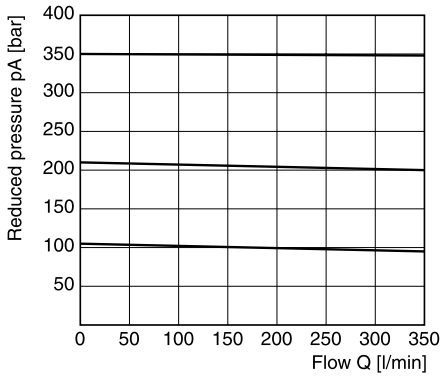
Reduced pressure pA vs. flow Q
Series R5R06*P2 [1)]



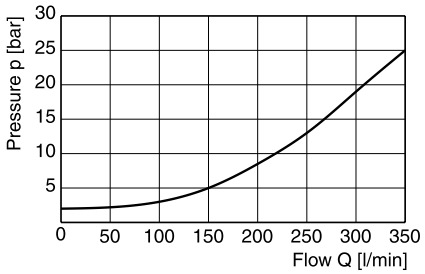
Minimum pressure curve



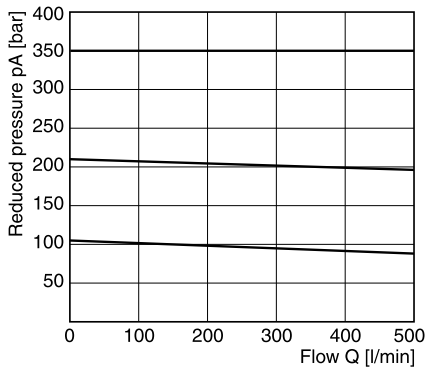
Reduced pressure pA vs. flow Q
Series R5R08*P2 [1)]



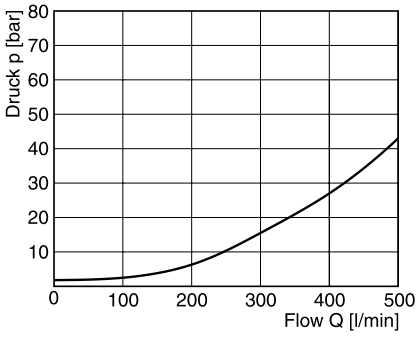
Minimum pressure curve



Reduced pressure pA vs. flow Q
Series R5R10*P2 [1)]



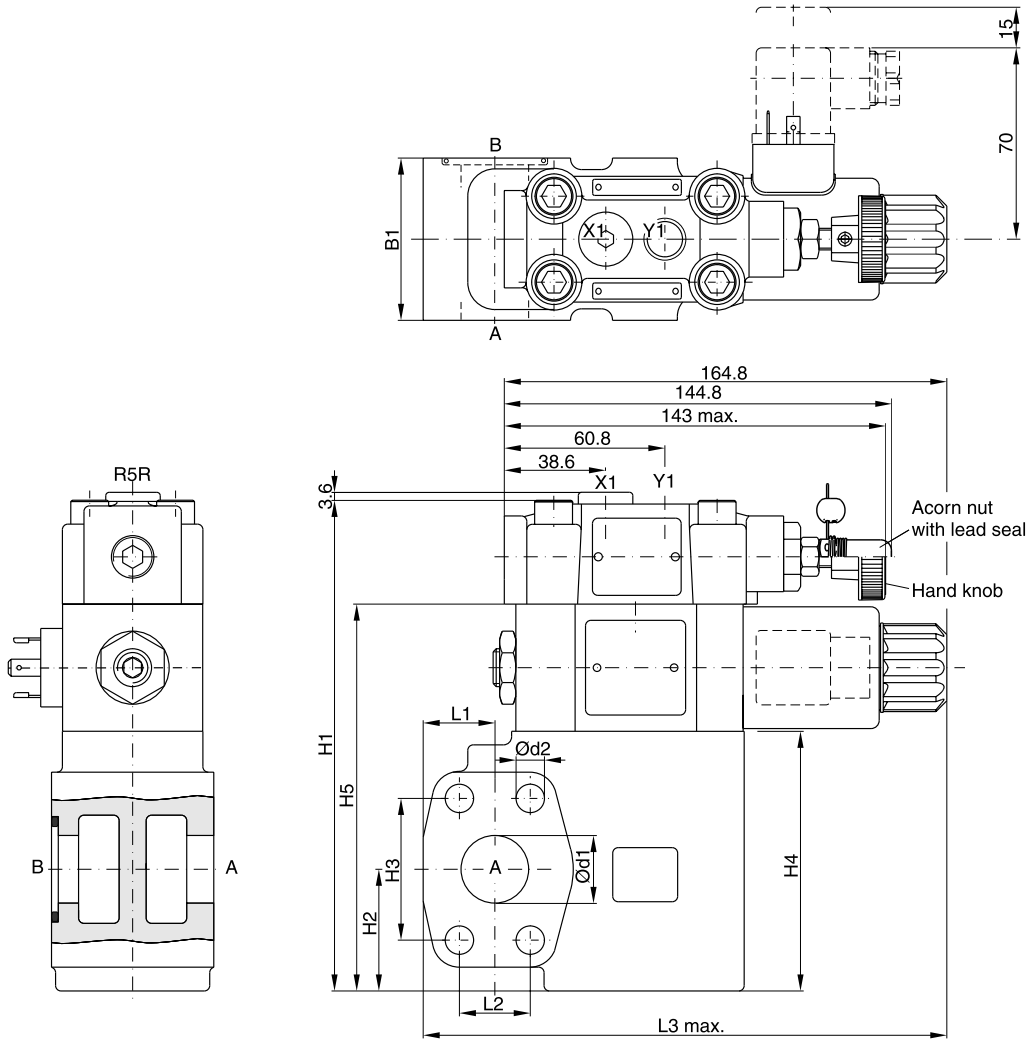
Minimum pressure curve

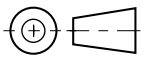


[1)] Measured at 350 bar primary pressure pB.

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NG	B1	H1	H2	H3	H4	H5	L1	L2	L3	d1	d2
06	60	175	37	47.6	90	137	24.6	22.2	174	19	10.5
08	60	181	45	52.4	96	143	26.5	26.2	193.6	25	10.5
10	75	194	48	58.7	109	156	34.0	30.2	201	32	12.5

Port	Function	Port size		
		R5R06	R5R08	R5R10
B	Inlet pressure	¾" SAE61	1" SAE61	1¼" SAE61
A	Reduced outlet pressure	¾" SAE61	1" SAE61	1¼" SAE61
Y1	External drain	G¼"		
X1	Pressure gauge	G¼"		

R5RP2_UK.INDD RH_27.11.07

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Seat valves series D5S are designed for directional control functions. They enable individual hydraulic solutions for nominal flow up to 800 l/min due to a large variety of poppets, springs and covers, including shuttle valves, stroke limiters, solenoid valves (VV01) and position control.

A complete program is offered under the Denison brand:
subplate mounted valves (D4S - chapter 6),
SAE flange valves (D5S - chapter 9),
pipe mounted valves (D4S - chapter 10),
slip-in cartridges (CAR - on request).

Features

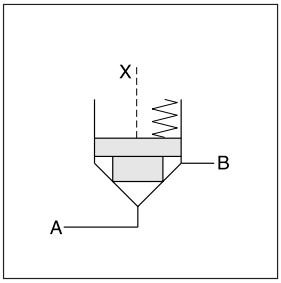
- Leak-free seat valve design
- 2- and 3-port bodies
- SAE61 flange
- Numerous pilot options
- 6 poppet types
- 4 sizes, SAE 3/4“, 1“, 1 1/4“, 1 1/2“



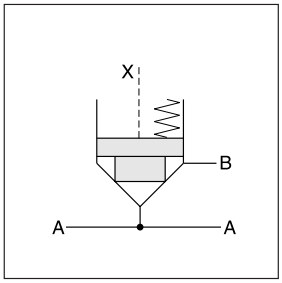
D5S 2-port



D5S 3-port

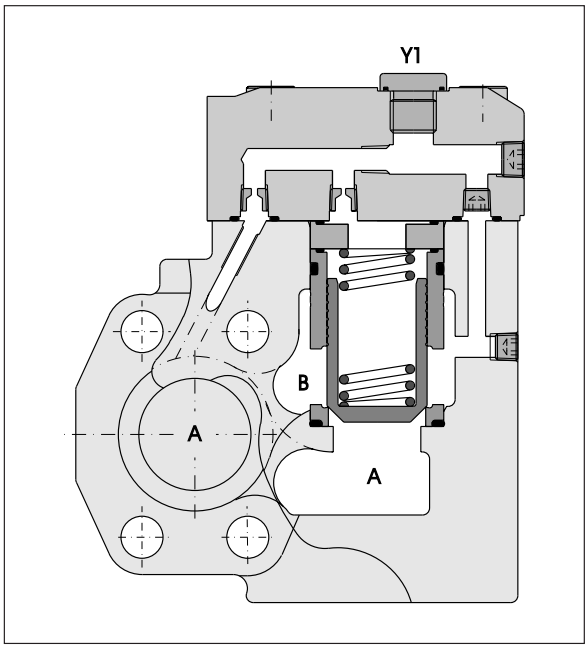


D5S 2-port

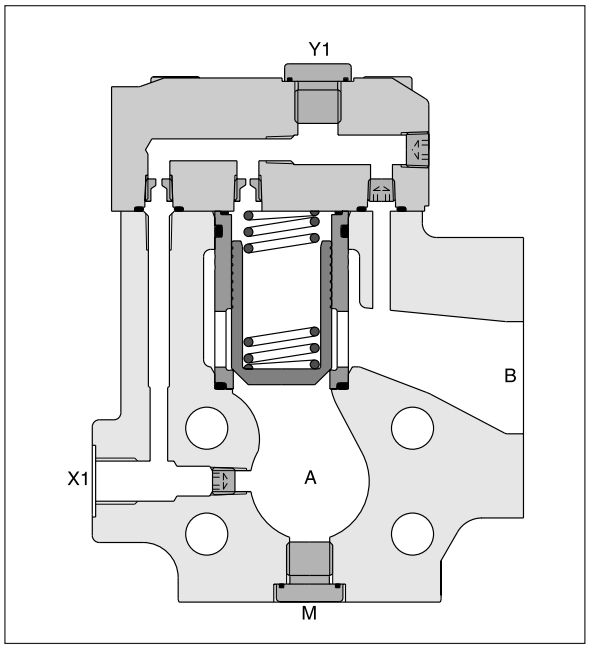


D5S 3-port

D5S 2-port



D5S 3-port



9

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D5S □ – □ □ □ – □ □ □ – □ □ – **B** □ – □

Seat valve | Nominal size | Body | Pilot body configuration | Pilot cap | Sleeve | Spool type | Spring | Switching type | Solenoid voltage | Design series | Seals | Options

Code	Port size
06	SAE ¾"
08	SAE 1"
10	SAE 1¼"
12[1]	SAE 1½"

[1] D5S 3-port only

Code	Body	Ports
5	3-port	Seat entry, A; X1, Y1, M = G¼"
7	2-port	Seat entry, A; X1, Y1 = G¼"
8	2-port	Annular entry, B; X1, Y1 = G¼"

Code	Pilot oil line in body
1	internal from A
2	internal from B
3	internal from A and B
4	external from X1
5	int. from B, ext. from X1

Code	Body	Ports	X	Y	Z	X-Y	X1	Y1	VV01
Standard									
1	2-/3-port	Pilot oil = pilot drain	⊖	●	⊖	○	—	●	—
2	2-/3-port	Pilot oil = pilot drain	●	⊖	⊖	○	—	●	—
3	2-port	Pilot oil = pilot drain	●	●	⊖	○	○	●	—
With solenoid valve (VV01)									
4	2-/3-port	Internal to B	⊖	○	⊖	●	—	●	○
5	2-port	Internal to B	●	○	⊖	●	○	●	○
6	2-/3-port	Ext. out of cap	⊖	○	⊖	●	—	○	●
7	2-port	Ext. out of cap	●	○	⊖	●	○	○	●
With stroke limiter (not for D5S06)									
A	2-/3-port	Pilot oil = pilot drain	⊖	●	⊖	—	●	—	—
B	2-/3-port	Pilot oil = pilot drain	●	⊖	—	—	●	—	—
C	2-port	Pilot oil = pilot drain	●	●	⊖	—	○	—	—

○ open bore ● closed bore ⊖ orifice Ø 1.2

Note: Combination examples at the end of chapter

Code	Sleeve
1	AA=95%, AB=5%
3	AA=60%, AB=40%

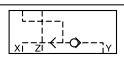
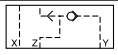
Code	Size	Poppet type	Sleeve
1	06, 08,10,12	With closed bottom and 15° chamfer (p_Z max. = p_A +20bar	1
2	06	With 0.8 dia. orifice at the bottom and 15° chamfer	1
	08, 10	With 1.2 dia. orifice at the bottom and 15° chamfer	1
4	06, 08,10,12	With closed bottom and 45° chamfer	1, 3
A[2]	08, 10, 12	Safety spool (for end position control only)	3
B[2]	08, 10, 12	Throttle spool, 10° chamfer	3
C[2]	08, 10, 12	Throttle spool, 3° chamfer	3

[2] Springs 2, 3, 4 and 6 only

Code	Options
omit	Standard
013	Position control with protection

Code	Seals
1	NBR
5	FPM

Code	Solenoid voltage
omit	Standard w/o vent function
G0R	12V=
G0Q	24V=
GAR	98V=
GAG	205V=
W30	110V / 50Hz ; 120V / 60Hz
W31	230V / 50Hz ; 240V / 60Hz

Code	Switching type	
omit	Standard w/o vent function	
09	VV01 with manual override	de-energized: power comp. open
10	VV01 without manual override	
11	VV01 with manual override	de-energized: power comp. closed
12	VV01 without manual override	
CA	Shuttle valve	
DA	Shuttle valve	
CB	VV01 code 09 and shuttle valve code CA	
CD	VV01 code 11 and shuttle valve code CA	
DB	VV01 code 09 and shuttle valve code DA	
DD	VV01 code 11 and shuttle valve code DA	
BH	VV01 code 10 and shuttle valve code CA and position control[3] with amplifier	
BK	VV01 code 12 and shuttle valve code CA and position control[3] with amplifier	
BN	VV01 code 10 and shuttle valve code DA and position control[3] with amplifier	
BQ	VV01 code 12 and shuttle valve code DA and position control[3] with amplifier	
BC	VV01 code 10 and position control[3] with amplifier	
BE	VV01 code 12 and position control[3] with amplifier	
BA	Position control[3] with amplifier	
BF	Position control[3] with amplifier and shuttle valve code CA	
BL	Position control[3] with amplifier and shuttle valve code DA	

[3] Position control for D5S08/10 only.
Spring 2 or 4. Spool A and sleeve 3.

Code	Spring (approx. cracking pressure [bar])					
	Sleeve Code 1		Sleeve Code 3			
	A -> B		A -> B		B -> A	
	D5S06	D5S08/12	D5S06	D5S08/12	D5S06	D5S08/12
1	2.8	3.5	6.5	6.5	9.5	11.0
2	0.5	0.5	1.0	1.0	1.5	1.7
3	0.3	0.3	0.6	0.6	0.9	1.0
4	2.2	2.2	4.0	3.5	5.5	6.0
5	—	9.0	—	16.0	—	28.0
6	1.2	1.2	2.0	2.2	3.0	3.8
7	3.0	—	8.0	—	12.0	—

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D5S_UK.INDD RH_19.12.07

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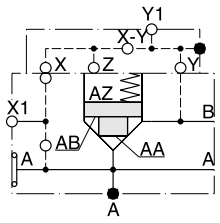
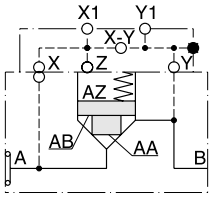
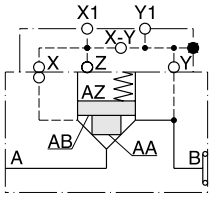
Technical data

General						
Size			**06**	**08**	**10**	**12**
Mounting			Flanged according to SAE 61			
Mounting position			unrestricted			
Ambient temperature		[°C]	-20...+50			
Weight	D5S 2port	[kg]	3.6	4.1	5.4	—
	D5S 3port	[kg]	3.4	4.4	5.0	7.8
Hydraulic						
Max. operating pressure		[bar]				
	SAE61	Ports A, B	350	350	280	210
		Port Y1	30	30	30	30
Nominal flow		[l/min]	180	360	600	800
Fluid			Hydraulic oil as per DIN 51524...525			
Fluid temperature		[°C]	-20...+80			
Viscosity permitted		[cSt]/[mm²/s]	10...650			
Viscosity recommended		[cSt]/[mm²/s]	30			
Filtration			ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			

Electrical (solenoid)								
Duty ratio		[%]	100					
Response time		[ms]	Energized / De-energized AC: 20/18 , DC: 46/27					
		Code	G0R	G0Q	GAR	GAG	W30	W31
Supply voltage		[V]	12V =	24V =	98V =	205V =	110 at 50Hz 120 at 60Hz	230 at 50Hz 240 at 60Hz
Tolerance supply voltage		[%]	+5...-10	+5...-10	+5...-10	+5...-10	+5...-10	+5...-10
Power consumption	hold	[W]	31	31	31	31	78	78
	in rush	[W]	31	31	31	31	264	264
Max. switching frequency			AC: up to 7200, DC: up to 16000 switchings/hour					
Solenoid connection			Connector as per EN175301-803					
Protection class			IP65 in accordance with EN 60529 (plugged and mounted)					
Coil insulation class			H (180 °C)					

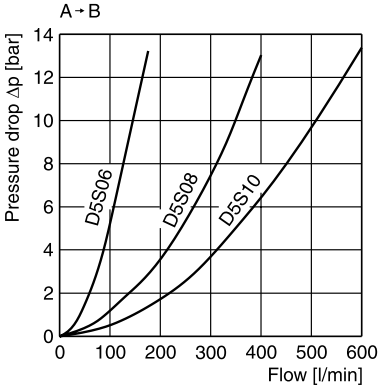
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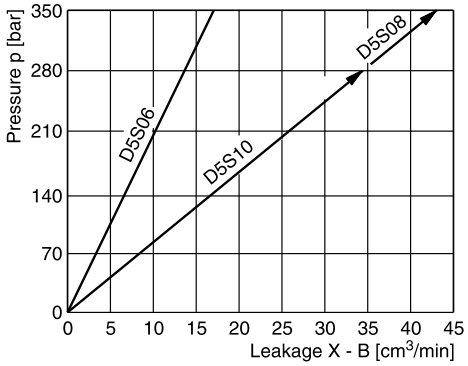
D5S pilot configuration

3-port	2-port: Seat Entry	2-port: Annular Entry
		

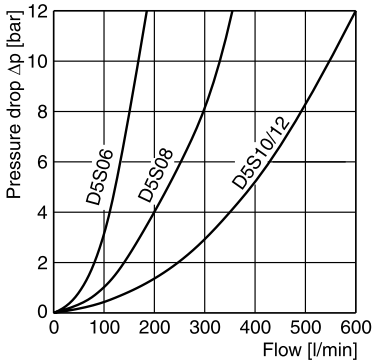
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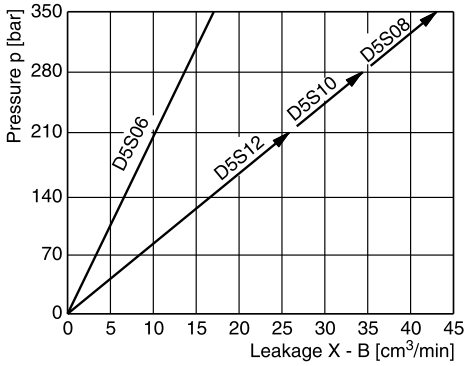
D5S 2-port





D5S 3-port

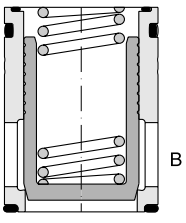
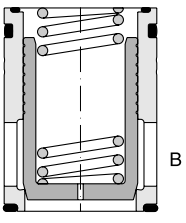
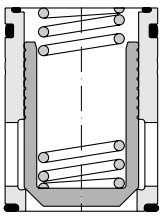
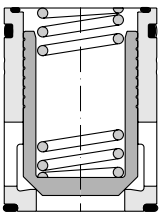
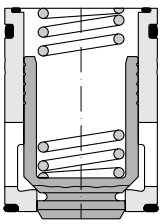
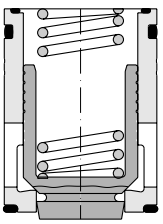




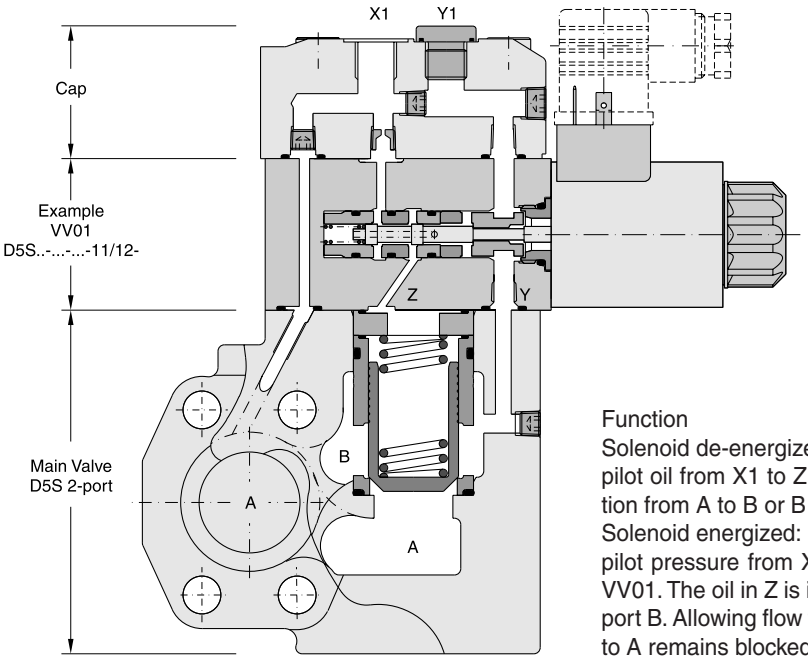
Fluid viscosity 38cSt at 50 °C

9

Selection of Cartridges

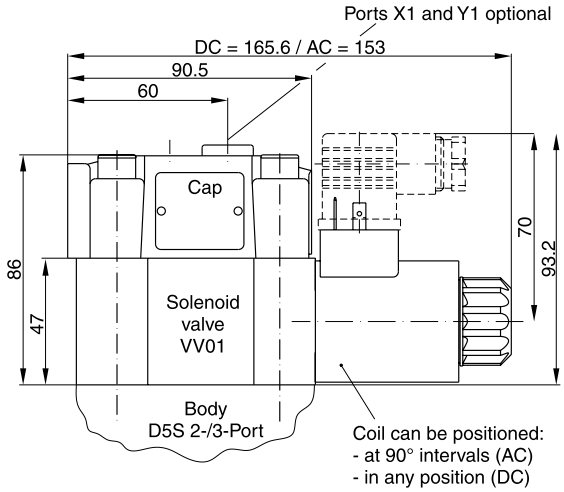
Sleeve 1, poppet 1	Sleeve 1, poppet 2	Sleeve 1, poppet 4	Sleeve 3, poppet 4	Sleeve 3, poppet A	Sleeve 3, poppet B/C
					
1 : 1.05 $A_A = 0.95\ A_C$ $A_B = 0.05\ A_C$ 15° chamfer	1 : 1.05 $A_A = 0.95\ A_C$ $A_B = 0.05\ A_C$ 15° chamfer orifice	1 : 1.05 $A_A = 0.95\ A_C$ $A_B = 0.05\ A_C$ 45° chamfer	1 : 1.67 $A_A = 0.6\ A_C$ $A_B = 0.4\ A_C$ 45° chamfer	1 : 1.67 $A_A = 0.6\ A_C$ $A_B = 0.4\ A_C$ 45° chamfer safety spool	1 : 1.67 $A_A = 0.6\ A_C$ $A_B = 0.4\ A_C$ 45° chamfer throttle spool

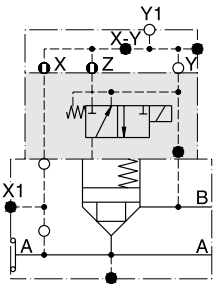
Example pilot oil external from X1, pilot drain internal out of B



Function
Solenoid de-energized:
pilot oil from X1 to Z blocks the connection from A to B or B to A.
Solenoid energized:
pilot pressure from X1 is blocked in the VV01. The oil in Z is internally drained to port B. Allowing flow from A to B, while B to A remains blocked.

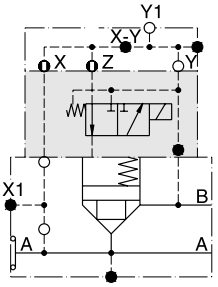
D5S with VV01 dimensions





with manual override | without manual override

D5S..-...-...-09/10-
Solenoid energized:
Blocked flow from A to B or B to A.
Solenoid de-energized:
Free flow from A to B or B to A.



with manual override | without manual override

D5S..-...-...-11/12-
Solenoid energized:
Free flow from A to B or B to A.
Solenoid de-energized:
Blocked flow from A to B or B to A.

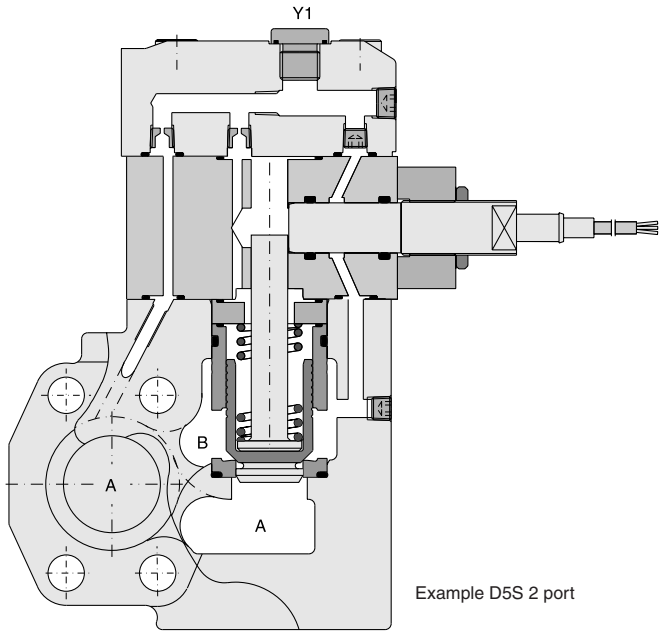
9

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D5S with position control

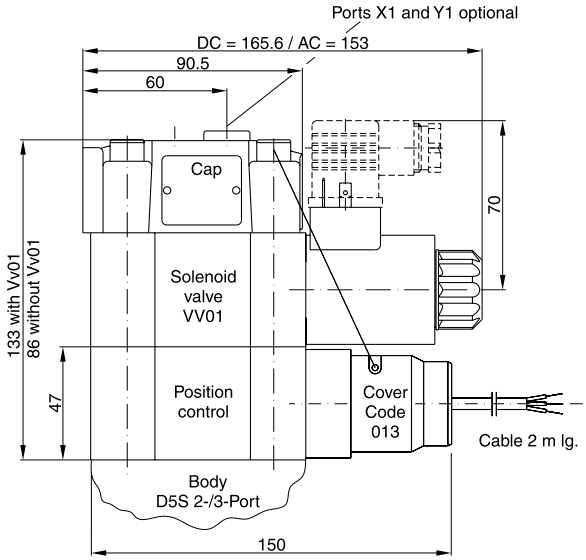
Position control by proximity switch (incl. amplifier). Valve open: proximity switch activated. This proximity switch is pressure proof and has no wearing parts.

Note: Position control for D5S08 and D5S10 only.



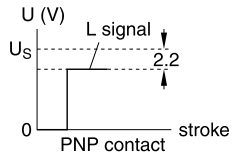
Example D5S 2 port

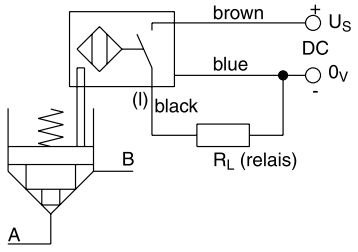
D5S with position control dimensions



Technical data (proximity switch)

Function		PNP, contact
Supply voltage (Us)	[VDC]	10...30
Supply voltage ripple	[%]	≤ 10
Current consumption	[mA]	max. 8
Residual voltage L-signal	[V]	Us - 2.2 at I_{max}
Output current (I)	[mA]	≤ 200
Protection class		IP67
Ambient temperature	[C°]	-25...+70
Wire cross section	[mm²]	3 x 0.5



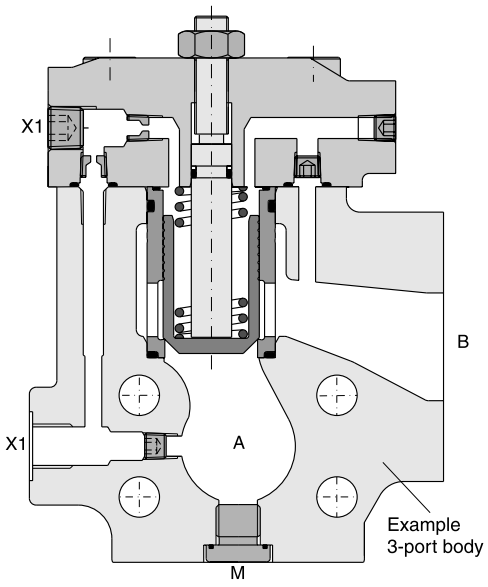


D5S_UK.INDD RH_19.12.07

Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

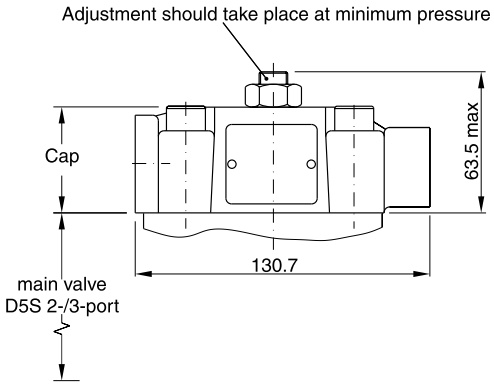
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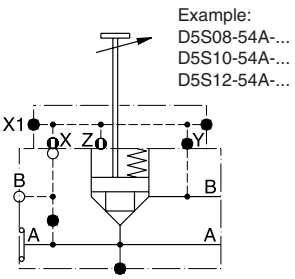
D5S stroke limiter



X1 = external pilot-oil (optional)
Note: Stroke limiter not for use with D5S06, solenoid valve VV01, shuttle valve and position control.

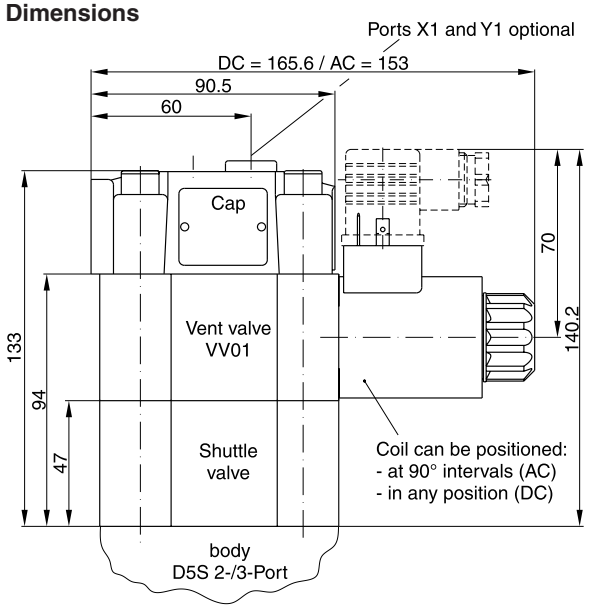
Stroke limiter dimensions



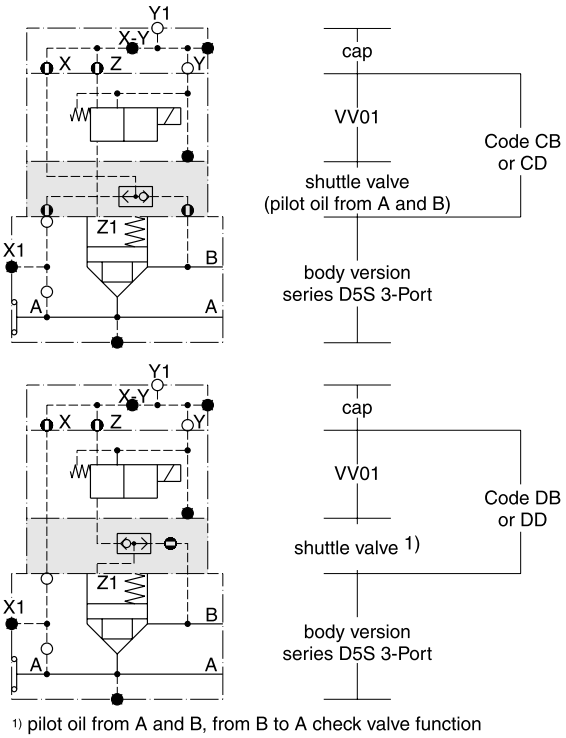


D5S with shuttle valve

Dimensions



Shuttle valve only in connection with vent valve VV01.



1) pilot oil from A and B, from B to A check valve function

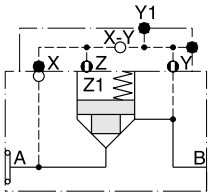
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Hydraulic Controls Division
Kaarst, Germany

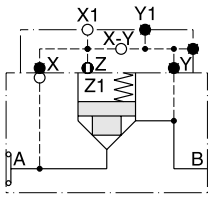
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D5S 2-port

Seat entry

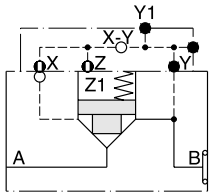


D5S..-122-
7
Pilot oil: internal from B

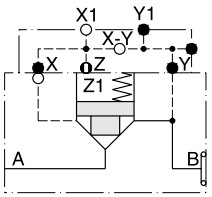


D5S..-143-
7
Pilot oil: external from X1

Annular entry



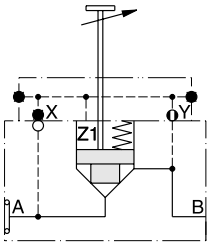
D5S..-221-
8
Pilot oil: internal from B



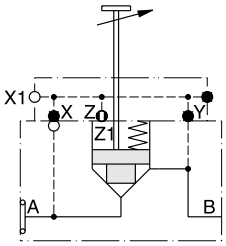
D5S..-243-
8
Pilot oil: external from X1

Stroke limiter D5S 2-port

Seat entry

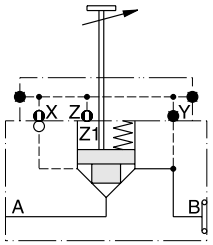


D5S08-12B-
10 7
Pilot oil: internal from B

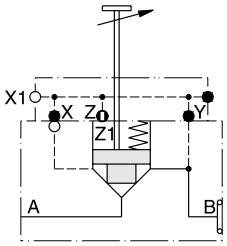


D5S08-14C-
107
Pilot oil: external from X1

Annular entry

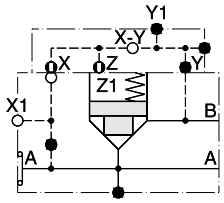


D5S08-22A-
10 8
Pilot oil: internal from B

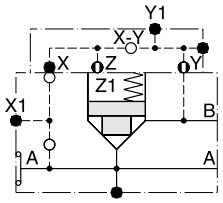


D5S08-24C-
108
Pilot oil: external from X1

D5S 3-port

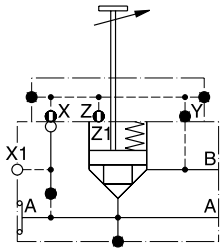


D5S .. -541-
9
Pilot oil: external from X1

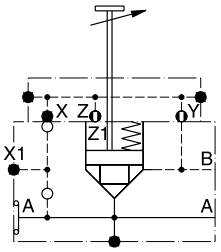


D5S .. -522-
9
Pilot oil: internal from B

Stroke limiter D5S 3-port



D5S 08 -54A-
10 9
12
Pilot oil: external from X1



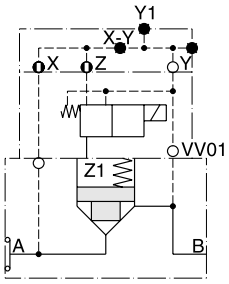
D5S 08 -52B-
10 9
12
Pilot oil: internal from B

9

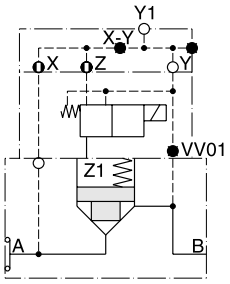
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D5S 2-port with solenoid valve VV01

Seat entry

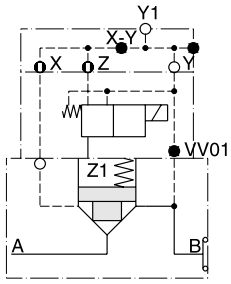


D5S .. -114-09-
7 10
11
12
Pilot oil: internal from A
Pilot drain: internal to B

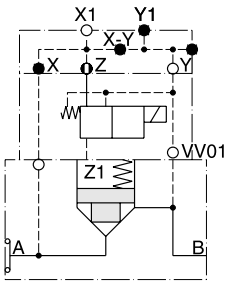


D5S .. -116-09-
7 10
11
12
Pilot oil: internal from A
Pilot drain: external out of Y1

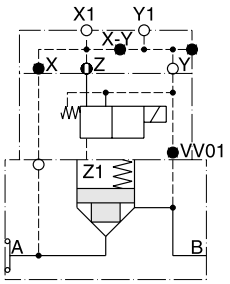
Annular entry



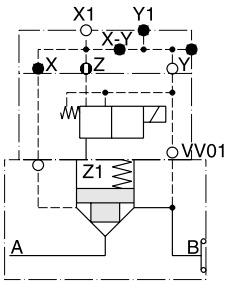
D5S .. -226-09-
8 10
11
12
Pilot oil: internal from B
Pilot drain: external out of Y1



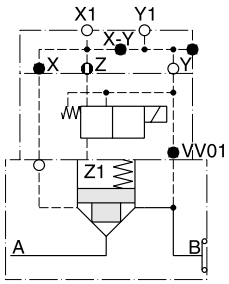
D5S .. -145-09-
7 10
11
12
Pilot oil: internal from X1
Pilot drain: internal to B



D5S .. -147-09-
7 10
11
12
Pilot oil: internal from X1
Pilot drain: external out of Y1



D5S .. -245-09-
8 10
11
12
Pilot oil: internal from X1
Pilot drain: internal to B

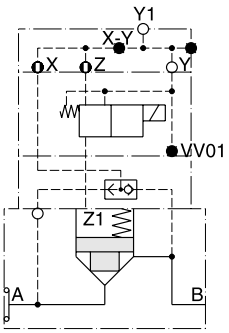


D5S .. -247-09-
8 10
11
12
Pilot oil: internal from X1
Pilot drain: external out of Y1

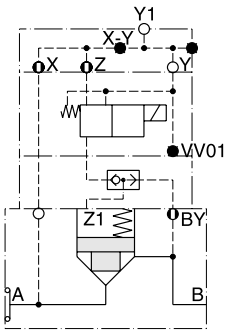
9

D5S 2-port with with solenoid valve VV01 and shuttle valve

Seat entry

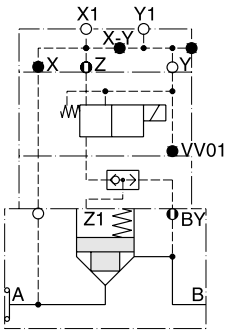


D5S .. -136-...-CB-
7 CD
Pilot oil: internal from A +
internal from B
Pilot drain: external out of Y1

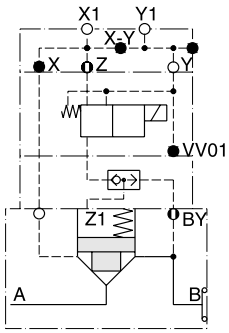


D5S .. -136-...-DB-
7 DD
Pilot oil: internal from A +
internal from B
Pilot drain: external out of Y1

Annular entry



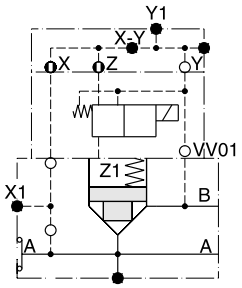
D5S .. -157-...-DB-
7 DD
Pilot oil: external from X1 +
internal from B
Pilot drain: external out of Y1



D5S .. -857-...-DB-
2 DD
Pilot oil: external from X1 +
internal from B
Pilot drain: external out of Y1

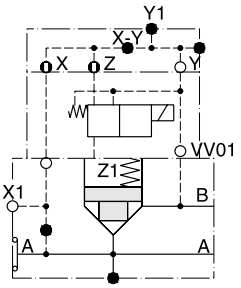
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D5S 3-port with solenoid valve VV01



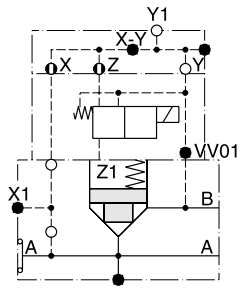
D5S .. -514-09-
9 10
11
12

Pilot oil: internal from A
Pilot drain: internal to B



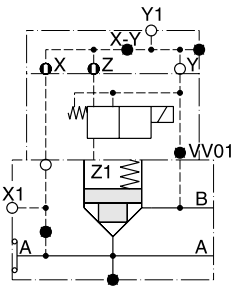
D5S .. -544-09-
9 10
11
12

Pilot oil: external from X1
Pilot drain: internal to B



D5S .. -516-09-
9 10
11
12

Pilot oil: internal from A
Pilot drain: external out of Y1

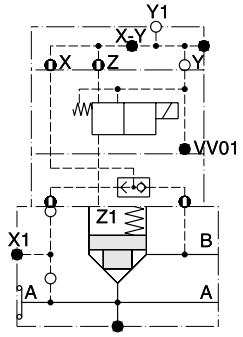


D5S .. -546-09-
9 10
11
12

Pilot oil: external from X1
Pilot drain: external out of Y1

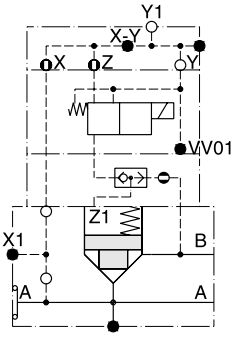
9

D5S 3-port with with solenoid valve VV01 and shuttle valve



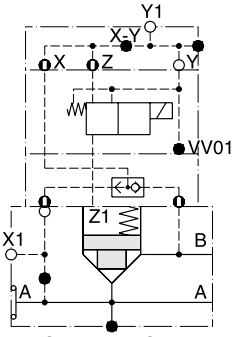
D5S .. -536-...-CB-
9 CD

Pilot oil: internal from A +
internal from B
Pilot drain: external out of Y1



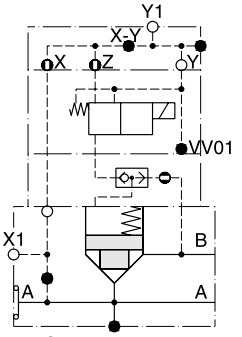
D5S .. -536-...-DB-
9 DD

Pilot oil: internal from A +
internal from B
Pilot drain: external out of Y1



D5S .. -556-...-CB-
9 CD

Pilot oil: internal from X1 +
internal from B
Pilot drain: external out of Y1

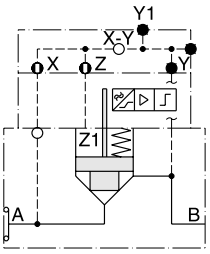


D5S .. -556-...-DB-
9 DD

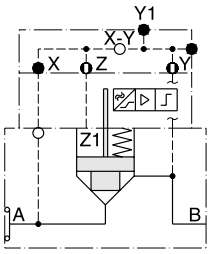
Pilot oil: external from X1 +
internal from B
Pilot drain: external out of Y1

D5S 2-port position control

Seat entry

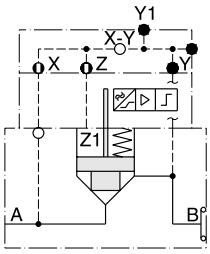


D5S 08 -111-3A.-BA-
D5S 10 7
Pilot oil: internal from A

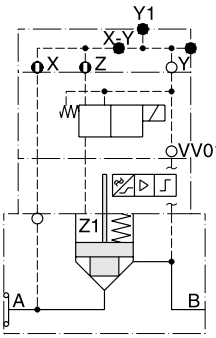


D5S 08 -122-3A.-BA-
D5S 10 7
Pilot oil: internal from B

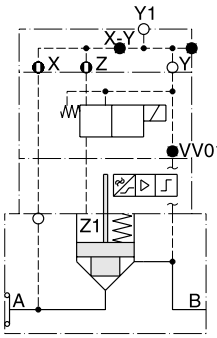
Annular entry



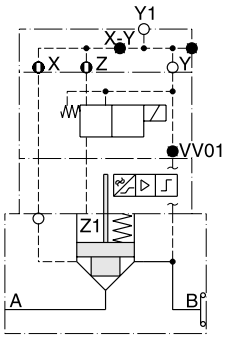
D5S 08 -221-3A.-BA-
D5S 10 8
Pilot oil: internal from B



D5S 08 -114-3A.-BC-
D5S 10 7 BE
Pilot oil: internal from A
Pilot drain: internal to B



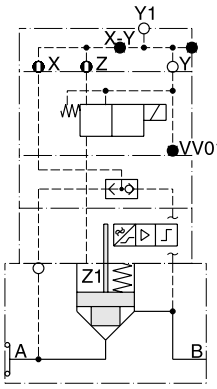
D5S 08 -116-3A.-BC-
D5S 10 7 BE
Pilot oil: internal from A
Pilot drain: external out of Y1



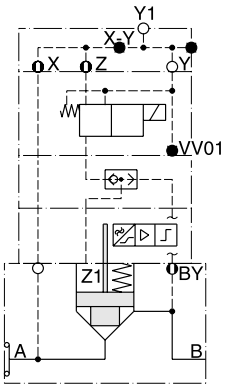
D5S 08 -226-3A.-BC-
D5S 10 8 BE
Pilot oil: internal from B
Pilot drain: external out of Y1

9

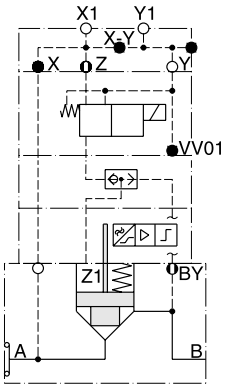
Seat entry



D5S .. -136-...-BH-
7 BK
Pilot oil: internal from A + internal from B
Pilot drain: external out of Y1

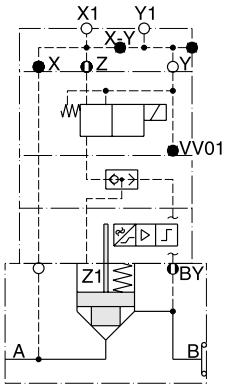


D5S .. -136-...-BN-
7 BQ
Pilot oil: internal from A + internal from B
Pilot drain: external out of Y1



D5S .. -157-...-BN-
7 BQ
Pilot oil: external from X1 + internal from B
Pilot drain: external out of Y1

Annular entry

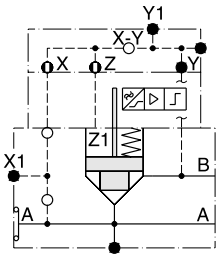


D5S .. -857-...-BN-
2 BQ
Pilot oil: external from X1 + internal from B
Pilot drain: external out of Y1

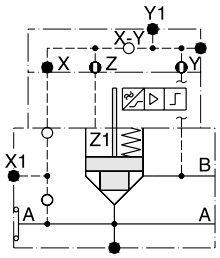
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D5S 3-port position control

Seat entry

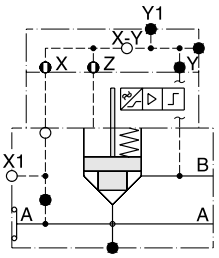


D5S 08 -511-3A.-BA-
10 9
12
Pilot oil: internal from A

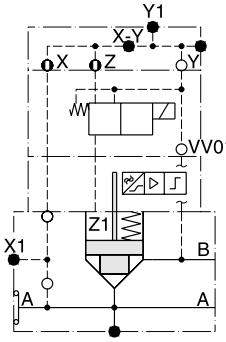


D5S 08 -522-3A.-BA-
10 9
12
Pilot oil: internal from B

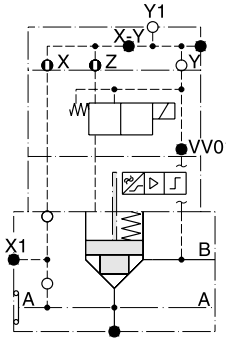
Annular entry



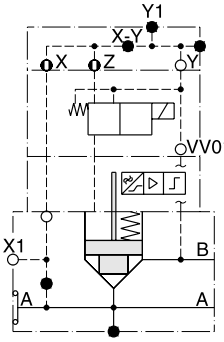
D5S 08 -521-3A.-BA-
10 9
12
Pilot oil: external from X1



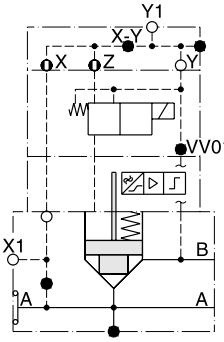
D5S 08 -514-3A.-BC-
10 9 BE
12
Pilot oil: internal from A
Pilot drain: internal to B



D5S 08 -516-3A.-BC
10 9 BE
12
Pilot oil: internal from A
Pilot drain: external out of Y1



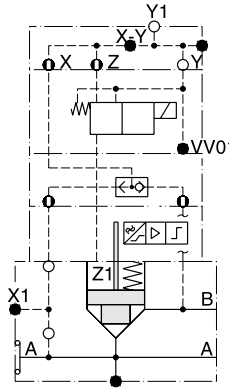
D5S 08 -544-3A.-BC-
10 9 BE
12
Pilot oil: external from X1
Pilot drain: internal to B



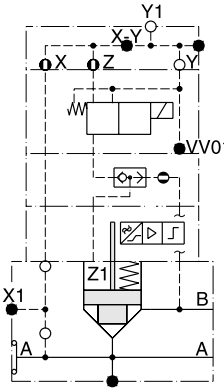
D5S 08 -546-3A.-BC-
10 9 BE
12
Pilot oil: external from X1
Pilot drain: external out of Y1

9

Seat entry

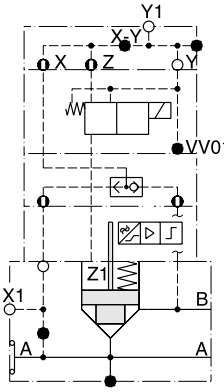


D5S 08 -536-3A.-BH-
10 9 BE
12
Pilot oil: internal from A +
internal from B
Pilot drain: external out of Y1

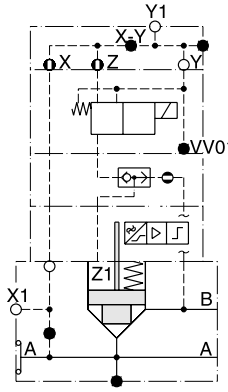


D5S 08 -536-3A.-BN-
10 9 BQ
12
Pilot oil: internal from A +
internal from B
Pilot drain: external out of Y1

Annular entry



D5S 08 -556-3A.-BH-
10 9 BK
12
Pilot oil: external from X1 +
internal from B
Pilot drain: external out of Y1

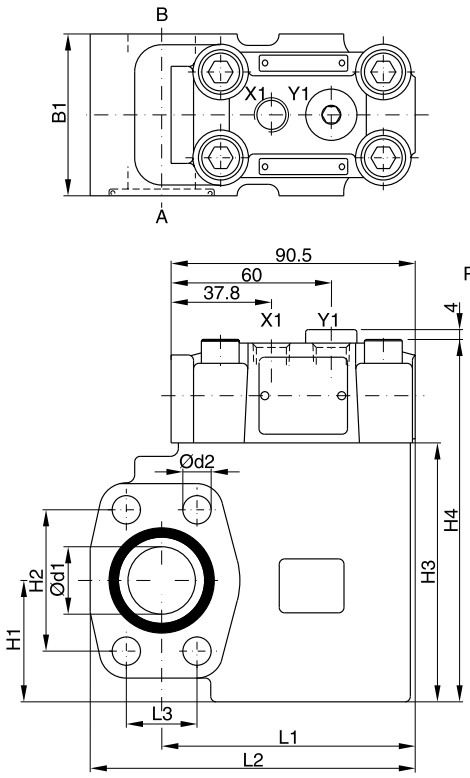


D5S 08 -556-3A.-BN-
10 9 BQ
12
Pilot oil: external from X1 +
internal from B
Pilot drain: external out of Y1

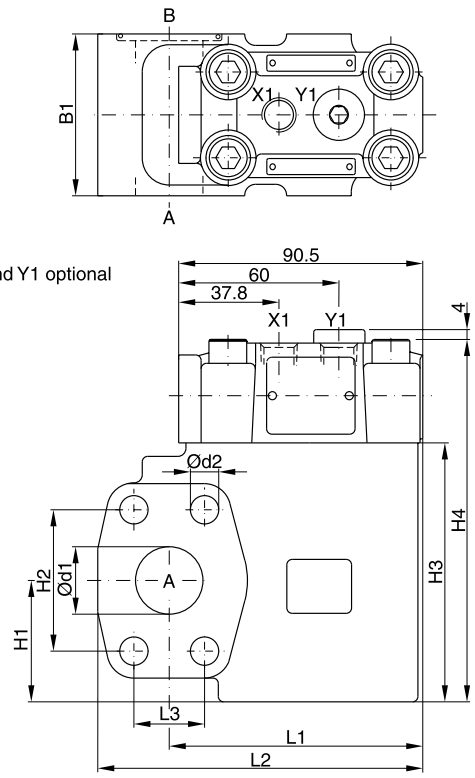
Tel: +45 63 12 83 00 | Email: ps@hymatik.com | www.hymatik.com | Hvidkaervej 27a, DK-5250 Odense SV, Denmark

Dimensions D5S 2-port

Seat entry



Annular entry



Ports X1 and Y1 optional

9

NG	l1	l2	l3	b1	h1	h2	h3	h4	d1	d2
06	77	101.0	22.2	60	37	47.6	90	127.6	19	10.5
08	94	120.5	26.2	60	45	52.4	96	133.6	25	10.5
10	94	128.0	30.2	75	48	58.7	109	146.6	32	12.5

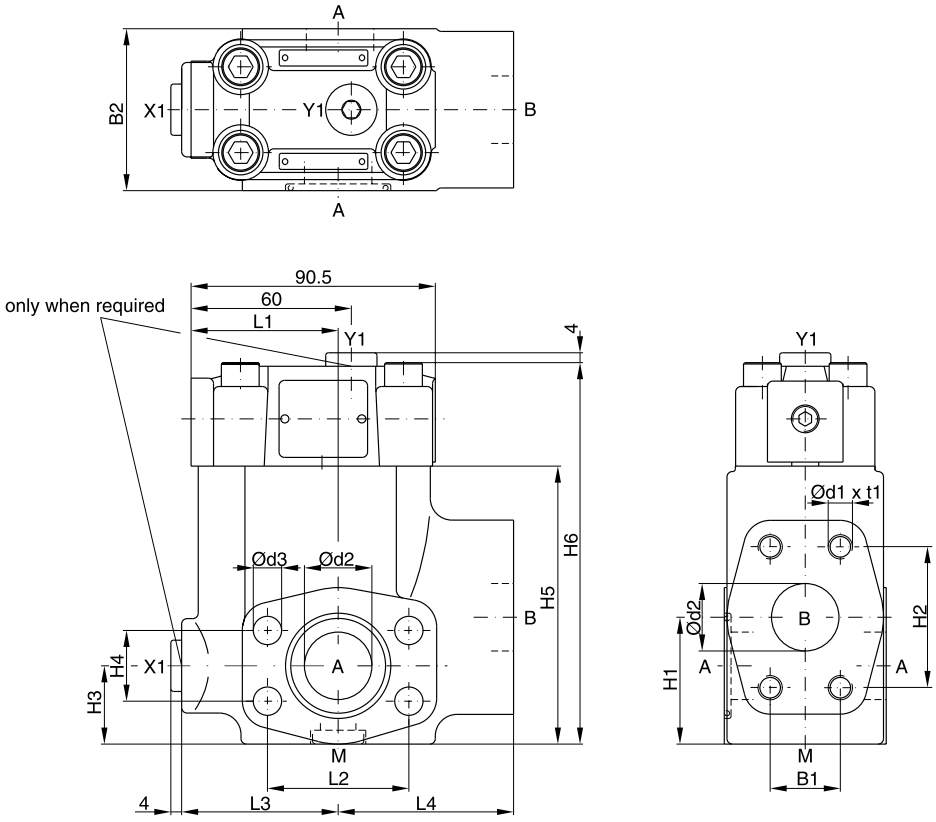
Ports	Function	Port size		
		D5S06	D5S08	D5S10
A	Inlet or outlet	¾" SAE-61	1" SAE-61	1¼" SAE-61
B	Outlet or inlet	¾" SAE-61	1" SAE-61	1¼" SAE-61
X1	External pilot port	G¼"		
Y1	External pilot drain			

D5S_UK.INDD RH_19.12.07

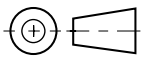
Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

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Dimensions D5S 3-port



9



NG	l1	l2	l3	l4	b1	b2	h1	h2	h3	h4	h5	h6	d1	t1	d2	d3
06	49	47.6	56	63	22.2	60	41	47.6	28	22.2	82	119	3/8" UNC	20	19	10.5
08	55	52.4	58	65	26.2	60	47	52.4	29	26.2	103	141	3/8" UNC	23	25	10.5
10	57	58.7	64	61	30.2	75	65	58.7	36	30.2	113	150	7/16" UNC	22	32	12.5
12	37	69.8	55	93	35.7	80	73	69.8	72	35.7	140	178	1/2" UNC	27	38	13.5

Ports	Function	Port size			
		D5S06	D5S08	D5S10	D5S12
A (2x)	Inlet or outlet	¾" SAE-61	1" SAE-61	1¼" SAE-61	1½" SAE-61
B	Outlet or inlet	¾" SAE-61	1" SAE-61	1¼" SAE-61	1½" SAE-61
X1 [1]	External pilot port	G¼"			
Y1	External pilot drain				
M	Pressure gauge				

[1] closed when supplied

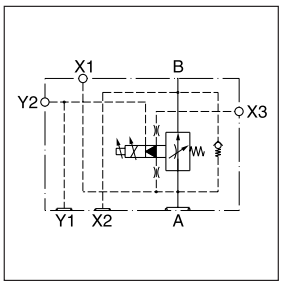
D5S_UK.INDD RH_19.12.07

Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

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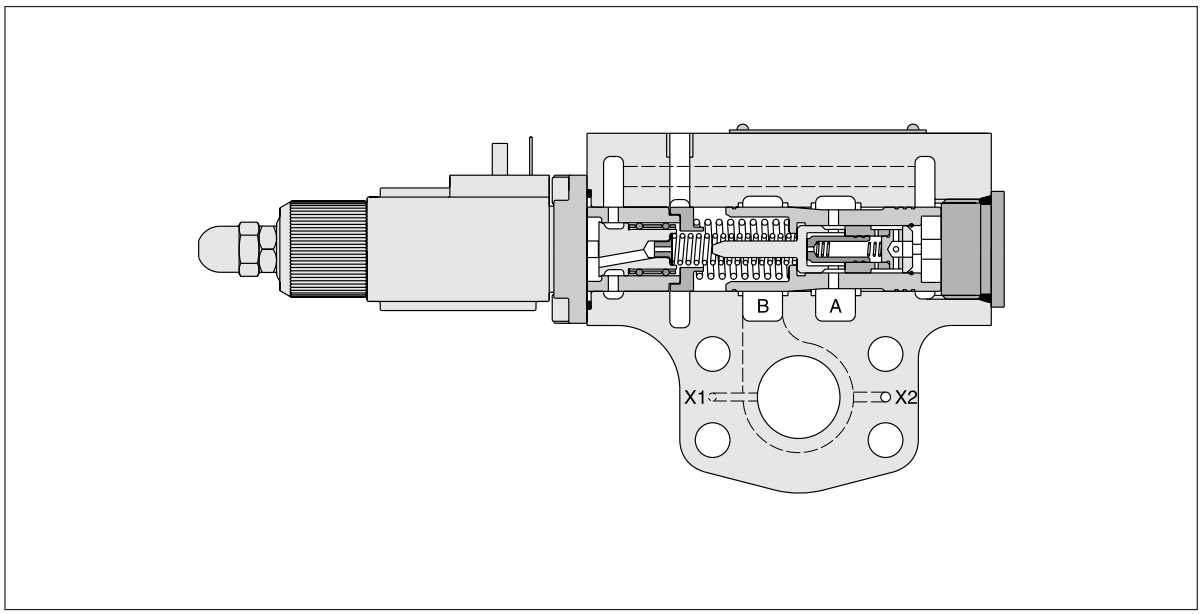
Proportional throttle valves series F5C allow to adjust the flow in proportion to the input signal. The combination of the F5C with pressure compensators R5A or R5P serves as a flow control valve - providing load compensated flow.
The F5C is offered with two types of response time:
standard 350 ms at 1 l/min pilot flow
code A, faster 250 ms at 2 l/min pilot flow





Features

- Spool type proportional throttle valve
- SAE61 flange
- Maximum pressure 270 bar
- Maximum flow 380 l/min
- 3 sizes, SAE 3/4“, 1“, 1 1/4“
- Load compensated flow in combination with R5A and R5P



F5C			– 4	3		–			0 – A		
Proportional throttle valve	Nominal size	Pilot flow and response	SAE61 interface	Pilot ports G¼"	Spool type		Proportional solenoid	Pilot connection	Accesso-ries	Design series	Seals	Options

Code	Nominal size
06	SAE ¾"
08	SAE 1"
10	SAE 1¼"

Code	Pilot flow	Max. response
omit	1 l/min	350 ms
A	2 l/min	250 ms

Spool type		
Code	Size	Max. flow [1]
A	06	23 l/min
B	06/08	45 l/min
1	06/08/10	95 l/min
2	08/10	190 l/min
3	10	380 l/min

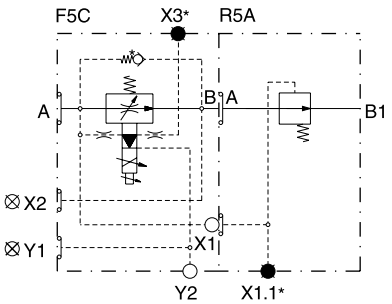
[1] At nominal pressure drop (Δp = 8.4bar)

Code	Prop. solenoid
1	12V / 220 mA
2	12V / 2500 mA

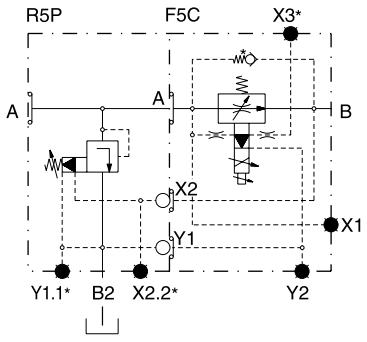
Code	Pilot connec-tions	F5C without compensators R5A, R5P	F5C for com-bination with R5A	F5C for com-bination with R5P
2	internal PD (Y) internal PP (X)			X1, X3, Y2 ● X2, Y1 ○ X2, Y1 ○
3	external PD (Y) external PP (X)		X1, X3, Y2 ○ X2, Y1 ⊗	
4	external PD (Y) external PP (X)	X3, Y2 ○ X1 ● X2, Y1 ⊗		X2, X3, Y1, Y2 ○ X1 ●
5	external PD (Y) internal PP (X)		X1, Y2 ○ X3 ● X2, Y1 ⊗	
6	external PD (Y) internal PP (X)	X1, X3 ● X2, Y1 ⊗ Y2 ○		X1, X3 ● X2, Y1, Y2 ○

9

F5C with R5A



F5C with R5P



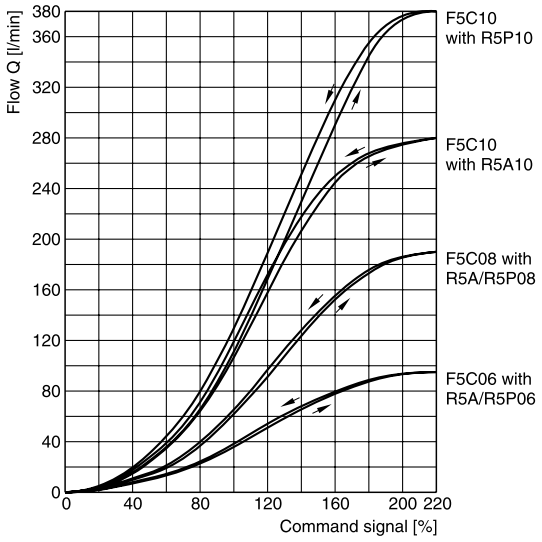
* optional

○ open ● closed ⊗ closed by counterpart

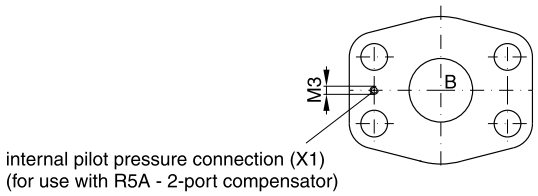
Technical data

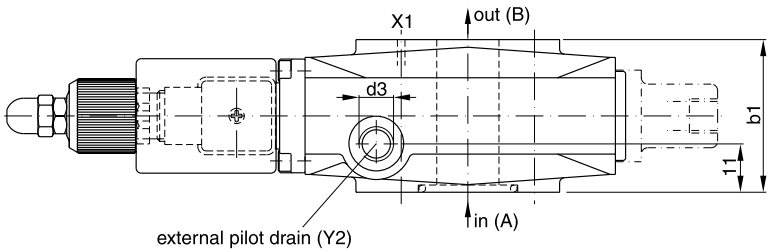
General				
Size		**06 (¾")**	**08 (1")**	**10 (1¼")**
Mounting		Flanged according to SAE 61		
Mounting position		unrestricted		
Ambient temperature	[°C]	-20...+50		
Weight	[kg]	3.9	4.1	5.8
Hydraulic				
Max. operating pressure				
Ports A, B, X1, X2, X3	[bar]	270		
Ports Y1, Y2	[bar]	70		
Max. pressure drop (from A to B)	[bar]	21		
Nominal flow	[l/min]	95	190	380
Fluid		Hydraulic oil as per DIN 51524...525		
Fluid temperature	[°C]	-20...+80		
Viscosity permitted	[cSt] [mm²/s]	10...650		
Viscosity recommended	[cSt] [mm²/s]	30		
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)		
Electrical characteristics				
Duty ratio	[%]	100		
Solenoid connection		Connector as per EN175301-803		
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)		
Supply voltage	[V]	12		
Current consumption	[mA]	220 (solenoid code 1); 2500 (solenoid code 2)		
Resistance	[Ohm]	60 (solenoid code 1); 0.3 (solenoid code 2)		
Response time	[ms]	see ordering code		
Coil insulation class		H (180 °C)		

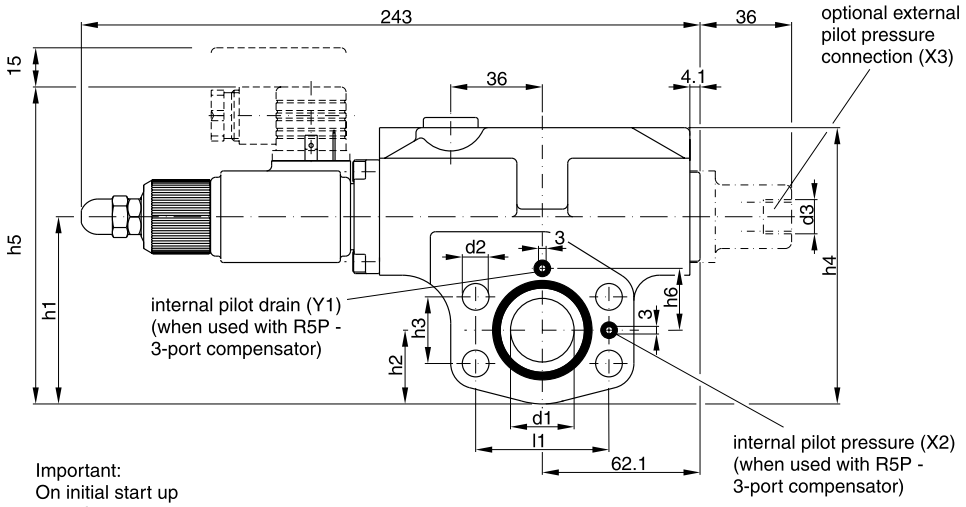
Characteristic curves



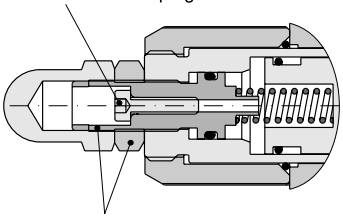
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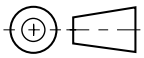




Important:
On initial start up
and after long shut down periods
bleed air from this plug.



Zero point is factory set!
Lock nut must not be loosened!



	l1	b1	h1	h2	h3	h4	h5	h6	d1	d2	d3
F5C06	47.6	60	68.2	26	22.2	103.2	119.2	20.8	19	10.5	G¼"
F5C08	52.4	60	73.6	29	26.2	108.6	124.6	24.3	25	10.5	G¼"
F5C10	58.7	75	83.5	36.5	30.2	118.5	134.5	29.3	32	12.5	G¼"

F5C_UK.INDD RH_19.12.07

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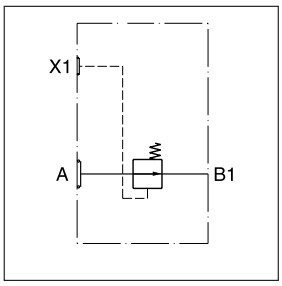
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Characteristics

2-Port Pressure Compensator
Series R5A (Denison)

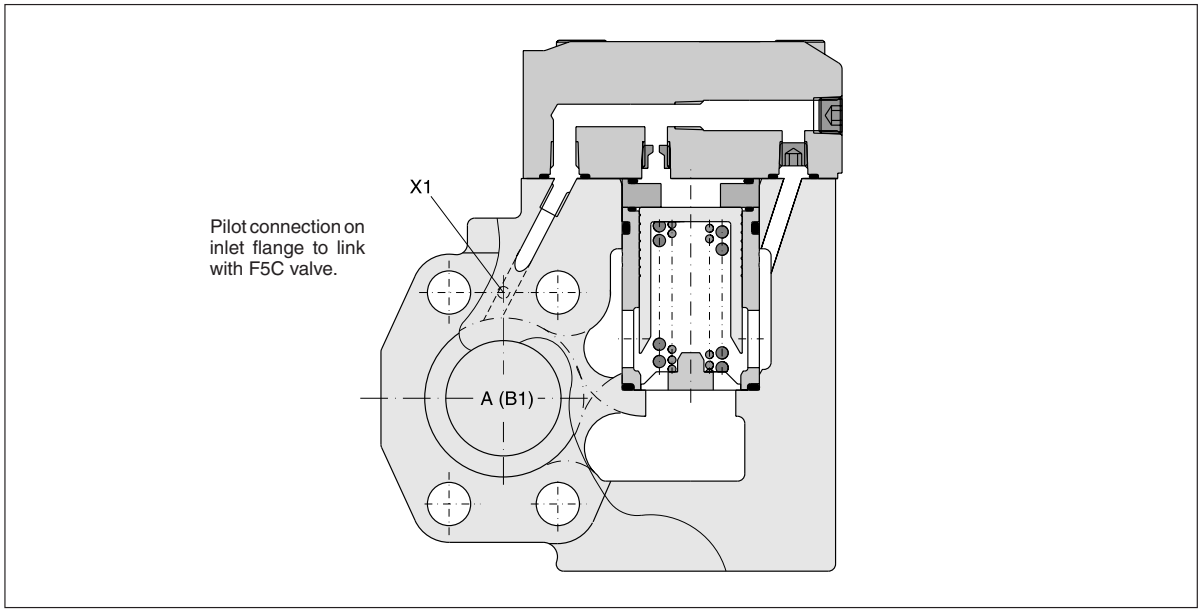
Direct operated 2 way pressure compensators series R5A can be combined with any type of fixed or adjustable flow resistor (throttle) to provide a load compensated flow. The combination with the proportional throttle valve F5C serves as a compact 2 way flow control unit in SAE flange design. The R5A is typically used as meter-out compensator behind the flow resistor.





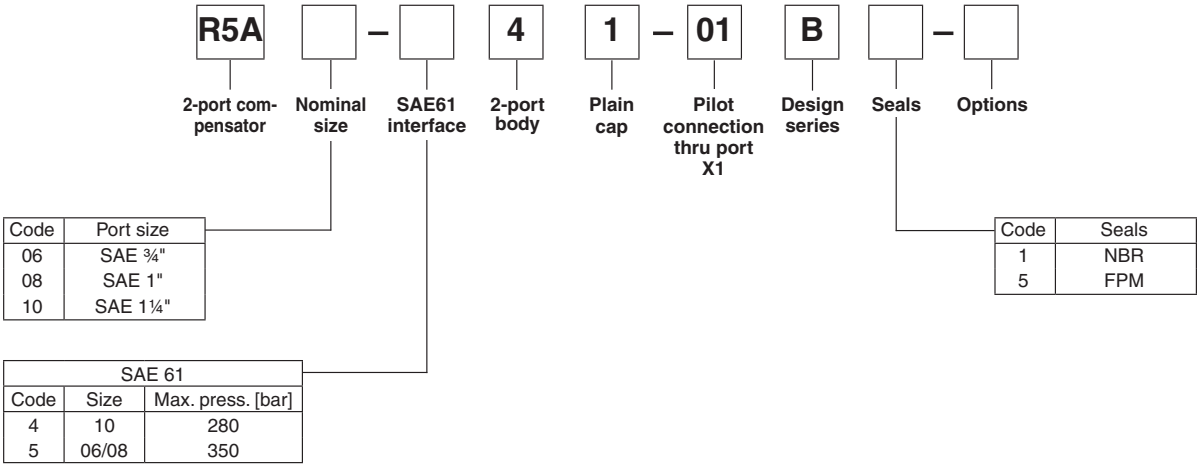
Features

- Seated type 2 way pressure compensator
- SAE61 flange
- 8.4 bar control pressure
- 3 sizes, SAE 3/4“, 1“, 1 1/4“
- Load compensated flow in combination with F5C



9

Ordering code



Code	Port size
06	SAE ¾"
08	SAE 1"
10	SAE 1¼"

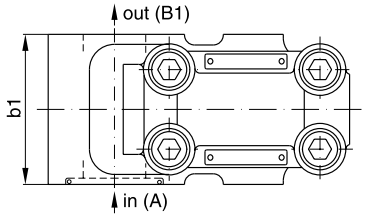
Code	Seals
1	NBR
5	FPM

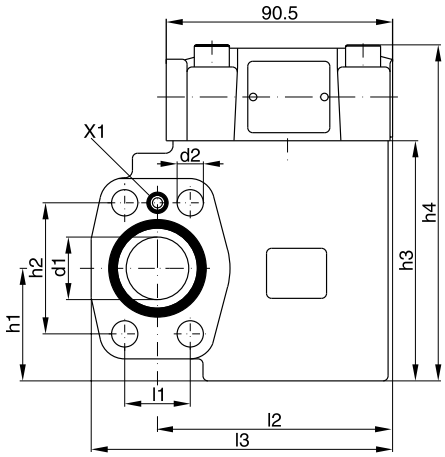
SAE 61		
Code	Size	Max. press. [bar]
4	10	280
5	06/08	350

Technical data

General				
Size		**06 (¾")**	**08 (1")**	**10 (1¼")**
Mounting		Flanged according to SAE 61		
Mounting position		unrestricted		
Ambient temperature	[°C]	-20...+50		
Weight	[kg]	3.6	4.3	5.6
Hydraulic				
Max. operating pressure	[bar]			
	Ports A, B, X1	350	350	280
Control pressure	[bar]	8.4		
Nominal flow	[l/min]	90	300	600
Fluid		Hydraulic oil as per DIN 51524...525		
Fluid temperature	[°C]	-20...+80		
Viscosity permitted	[cSt] [mm²/s]	10...650		
Viscosity recommended	[cSt] [mm²/s]	30		
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)		

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	l1	l2	l3	b1	h1	h2	h3	h4	d1	d2
R5A06	22.2	84	108	60	37	47.6	90	128	19	10.5
R5A08	26.2	101	128	60	45	52.4	96	134	25	10.5
R5A10	30.2	101	135	75	48	58.7	109	147	32	12.5

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Notes

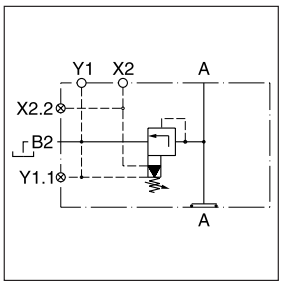
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Direct operated 3 way pressure compensators series R5P can be combined with any type of fixed or adjustable flow resistor (throttle) to provide a load compensated flow. The combination with the proportional throttle valve F5C serves as a compact 3 way flow control unit in SAE flange design. The R5P is typically used as meter-in compensator in front of the flow resistor.

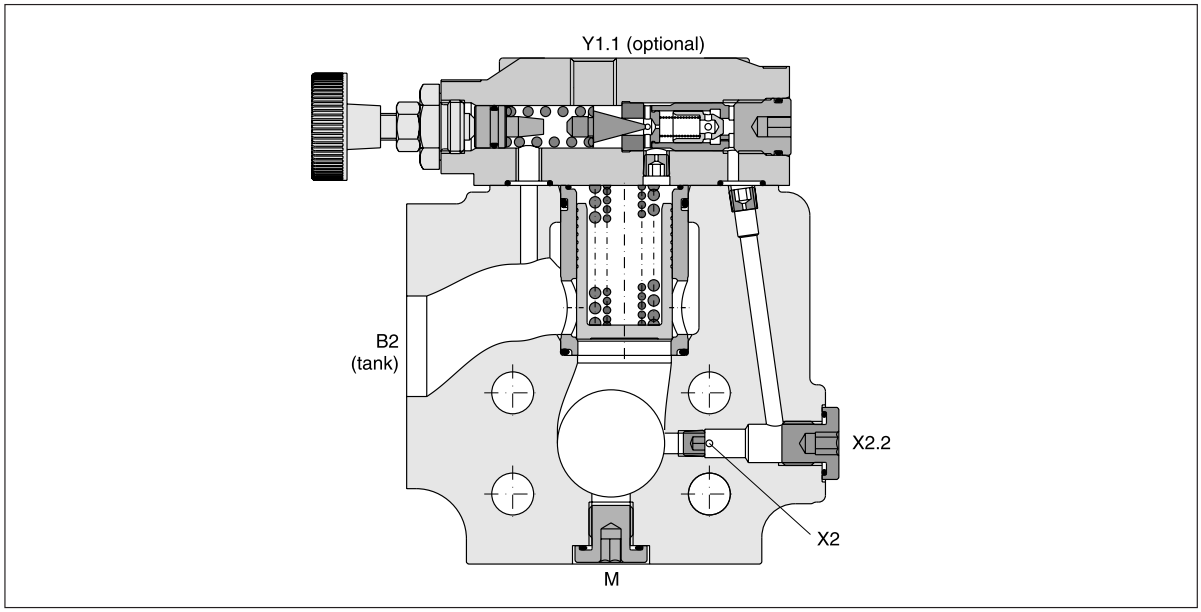
The R5P is additionally equipped with a pressure relief pilot, that controls the compensator cartridge and operates a system pressure relief valve. The R5P*P2 provides a proportional relief function.

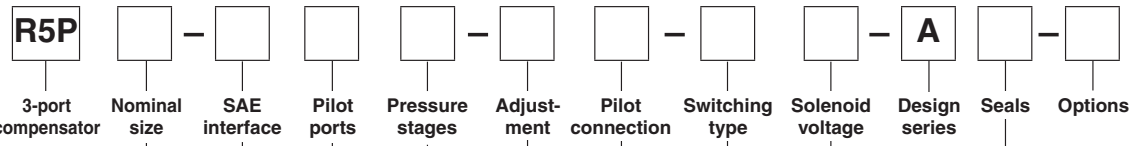




Features

- Seated type 3 way pressure compensator
- SAE61 flange
- 8.4 bar control pressure
- Pressure relief function (optionally proportional)
- With optional vent function
- 3 sizes, SAE 3/4“, 1“, 1 1/4“
- Load compensated flow in combination with F5C





Code	Port size
06	SAE ¾"
08	SAE 1"
10	SAE 1¼"

SAE 61		
Code	Size	Max. press. [bar]
4	10	280
5	06/08	350

Code	Pilot ports	Port Y1 [1]
9	G¼"	plugged
P		open

[1] Y1 port is used in combination with F5C, when the F5C should be drained through the R5P (internal or external drain)

Code	Pressure stages
1	7...105bar
3	7...210bar
5	7...350bar

Code	Adjustment
1	Hand knob
3	Acorn nut with lead seal

Code	Seals [6]
1	NBR
5	FPM

[6] Further seals on request

Code	Solenoid voltage
omit	Standard w/o vent function
G0R	12V=
G0Q	24V=
GAR	98V=
GAG	205V=
W30	110V / 50Hz 120V / 60Hz
W31	230V / 50Hz 240V / 60Hz

Code	Switching type
omit	Standard w/o vent function
09	Solenoid not activ. unpress. circulation
11	Solenoid activated unpress. circulation

Code	Pilot connection
2	internal PD internal PP [3]
6	external PD [2] internal PP [3]

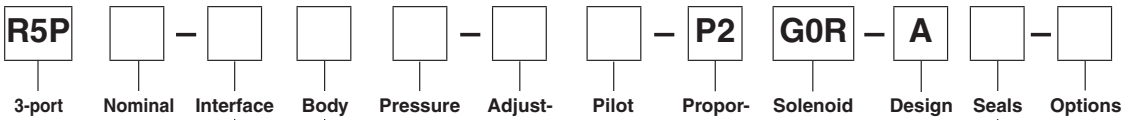
[2] Through port Y1.1

[3] PP through port X1 in outlet flange

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Code	Port size
06	SAE ¾"
08	SAE 1"
10	SAE 1¼"

SAE 61		
Code	Size	Max. pressure
4	10	280
5	06/08	350

Code	Pilot ports	Port Y1 [1]
9	G¼"	plugged
P		open

[1] Y1 port is used in combination with F5C, when the F5C should be drained through the R5P (internal or external drain)

Code	Pressure stages
1	7...105bar
3	7...210bar
5	7...350bar

Code	Seals [4]
1	NBR
5	FPM

[4] Further seals on request

Code	Pilot connection
2	internal PD internal PP [3]
6	external PD [2] internal PP [3]

[2] Through port Y1.1

[3] PP through port X1 in outlet flange

Code	Adjustment
1	Hand knob
3	Acorn nut with lead seal

9

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R5P

General								
Size			**06 (¾")**		**08 (1")**		**10 (1¼")**	
Mounting			Flanged according to SAE 61					
Mounting position			unrestricted					
Ambient temperature		[°C]	-20...+50					
Weight	R5P	[kg]	3.7		4.4		5.3	
	R5P with VV01	[kg]	5.4		6.1		7.0	
Hydraulic								
Max. operating pressure		[bar]						
		Ports A, B	350		350		280	
Pressure stages		[bar]	105, 210, 350					
Nominal flow		[l/min]	90		300		600	
Fluid			Hydraulic oil as per DIN 51524...525					
Fluid temperature		[°C]	-20...+80					
Viscosity permitted		[cSt] [mm²/s]	10...650					
Viscosity recommended		[cSt] [mm²/s]	30					
Filtration			ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)					
Electrical (solenoid) R5P with VV01								
Duty ratio		[%]	100					
Solenoid connection			Connector as per EN175301-803					
Protection class			IP65 in accordance with EN 60529 (plugged and mounted)					
		Code	G0R	G0Q	GAR	GAG	W30	W31
Supply voltage		[V]	12V =	24V =	98V =	205V =	110 at 50Hz 120 at 60Hz	230 at 50Hz 240 at 60Hz
Tolerance supply voltage		[%]	+5...-10	+5...-10	+5...-10	+5...-10	+5...-10	+5...-10
Power consumption	hold	[W]	31	31	31	31	78	78
	in rush	[W]	31	31	31	31	264	264
Response time		[ms]	Energized / De-energized AC: 20/18 , DC: 46/27					
Max. switching frequency			AC: up to 7200, DC: up to 16000 switchings/hour					
Coil insulation class			H (180 °C)					

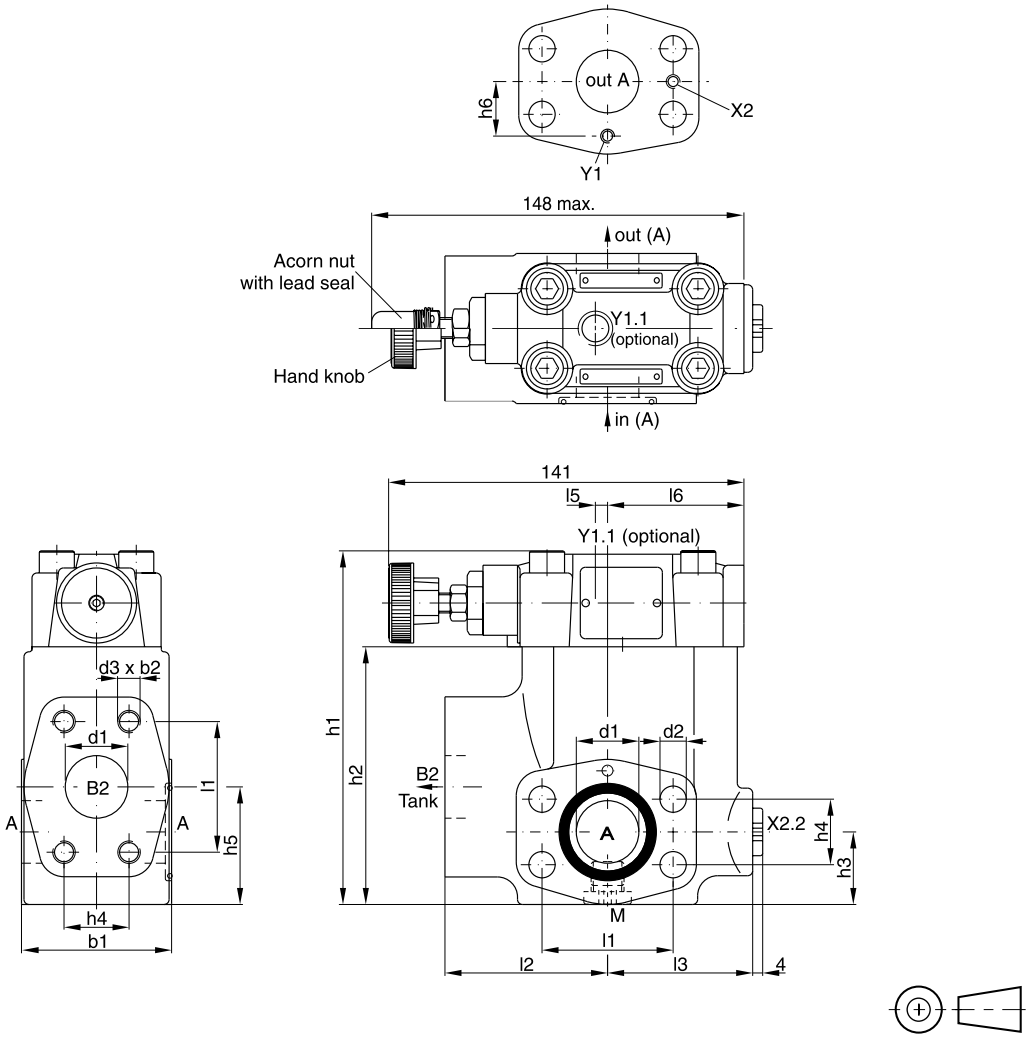
9

R5P*P2

General					
Size		**06 (¾")**	**08 (1")**	**10 (1¼")**	
Mounting		Flanged according to SAE 61			
Mounting position		unrestricted			
Ambient temperature	[°C]	-20...+50			
	[kg]	5.5	6.2	7.1	
Hydraulic					
Max. operating pressure	Ports A, B [bar]	350	350	280	
Pressure stages	[bar]	105, 210, 350			
Nominal flow	[l/min]	90	300	600	
Fluid		Hydraulic oil as per DIN 51524...525			
Fluid temperature	[°C]	-20...+80			
Viscosity permitted	[cSt] [mm²/s]	10...650			
Viscosity recommended	[cSt] [mm²/s]	30			
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			
Electrical (proportional solenoid)					
Duty ratio	[%]	100			
Nominal voltage	[V]	12			
Max. current	[A]	2.3			
Coil resistance	[Ohm]	4 at 20°C			
Solenoid connection		Connector as per EN175301-803			
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)			
Power amplifier		PCD00A-400			

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R5P



	l1	l2	l3	l4	l5	l6	b1	b2	h1	h2	h3	h4	h5	h6	d1	d2	d3
R5P06	47.6	63	56	148	1	49	60	20	119	81.6	28.6	22.2	41.6	20.8	19	10.5	3/8" UNC
R5P08	52.4	65	58	144.6	5	54.5	60	23	142	103	30.6	26.2	48.6	24.3	25	10.5	3/8" UNC
R5P10	58.7	61	62	146.6	3	56.5	75	22	149	111.5	34.6	30.2	64.1	29.3	32	12.5	7/16" UNC

Ports

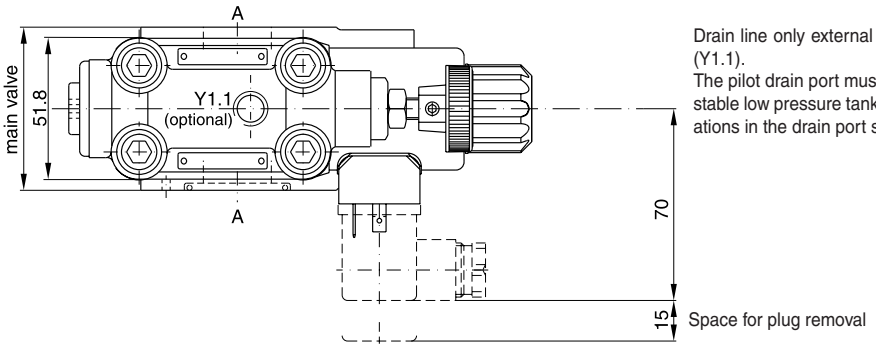
Port	Function	Port size		
		R5P06	R5P08	R5P10
A	Inlet/outlet	¾"	1"	1¼"
B2	Tank	¾"	1"	1¼"
X2	Internal pilot pressure	M3		
X2.2	External pilot pressure	G¼"		
Y1	Internal pilot drain	M3		
Y1.1	External pilot drain	G¼"		
M	Pressure gauge	G¼"		

R5P_UK.INDD RH_15.01.08

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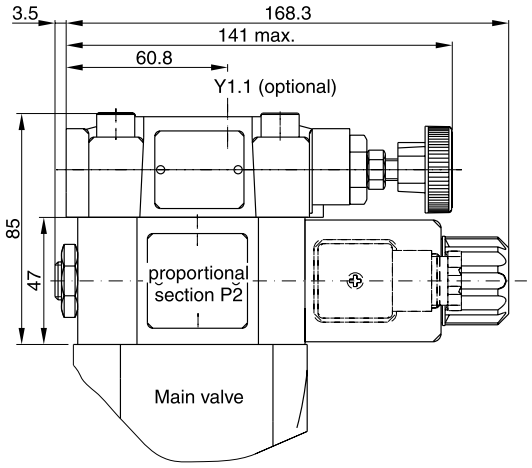
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R5P*P2

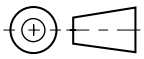


Drain line only external from the pilot head (Y1.1).
The pilot drain port must be connected to a stable low pressure tank line. Pressure variations in the drain port should be avoided.

Space for plug removal



Note
On initial start up and after long shut down periods bleed air from this plug.

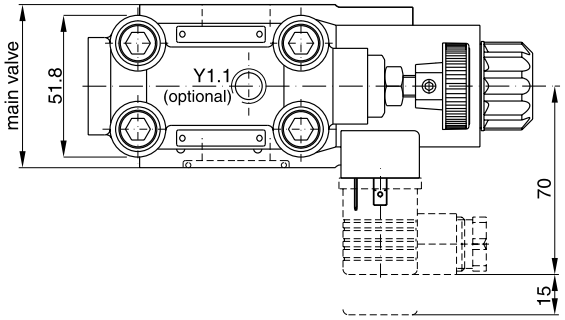


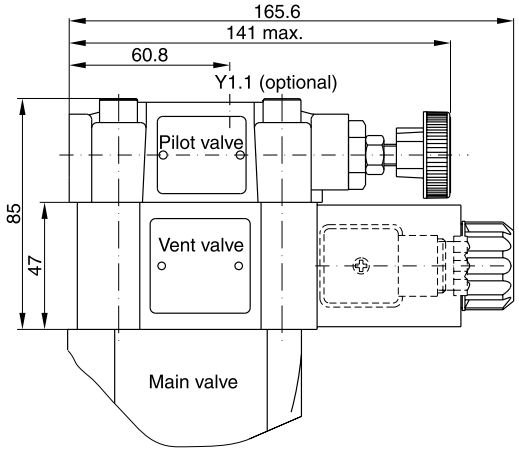
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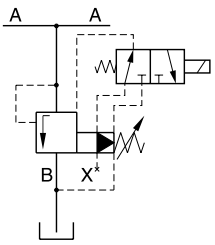
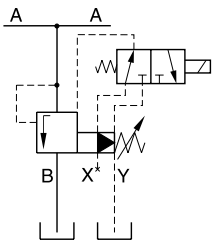
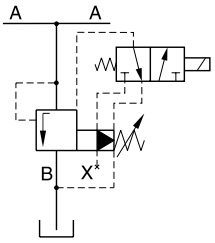
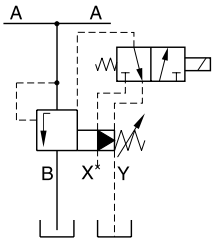
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R5P with vent function





9

Code	Internal drain	External drain
11		
09		

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Notes

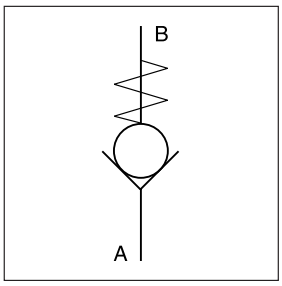
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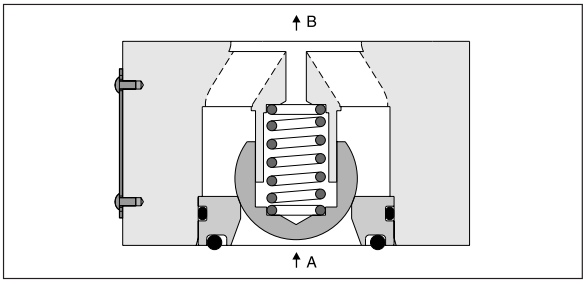
Direct operated check valves series C5V provide free flow in one direction and block the flow in the counter direction.
The SAE flanges allow to mount the C5V directly on the pressure port of pumps for protection against pressure shocks from the system.





Features

- Direct operated check valve
- SAE61 and SAE62 flange
- 4 sizes (SAE ¾", 1", 1¼", 1½")
- 3 springs
- 5 different seal configurations

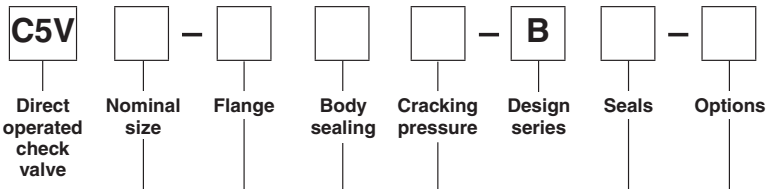


Technical data

General					
Size		**06 (¾")**	**08 (1")**	**10 (1¼")**	**12 (1½")**
Mounting		2-port inline flange (SAE61 and 62)			
Mounting position		unrestricted			
Ambient temperature	[°C]	-20...+50			
Weight	[kg]	0.6	0.9	1.3	1.8
Hydraulic					
Max. operating pressure	[bar]				
	SAE61	350	350	280	210
	SAE62	420	420	420	420
Pressure stages	[bar]				
Nominal flow	[l/min]	100	200	400	750
Fluid		Hydraulic oil as per DIN 51524...525			
Fluid temperature	[°C]	-20...+80			
Viscosity permitted	[cSt]/[mm²/s]	10...650			
Viscosity recommended	[cSt]/[mm²/s]	30			
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			

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Code	Port size
06	SAE ¾"
08	SAE 1"
10	SAE 1¼"
12[1)]	SAE 1½"

Code	Flange
3	SAE 61
6	SAE 62

Code	Body sealing
1	sealing for port A
2 [1)]	sealing for port A and X
3	without sealing
4	sealing for port B
5	sealing for port A and B

[1)] For combination with R5U unloading valve (SAE61 only)

Code	Option
omit	Standard
019[2)]	C5V10 for M14 mounting screws

[2)] For SAE62 only

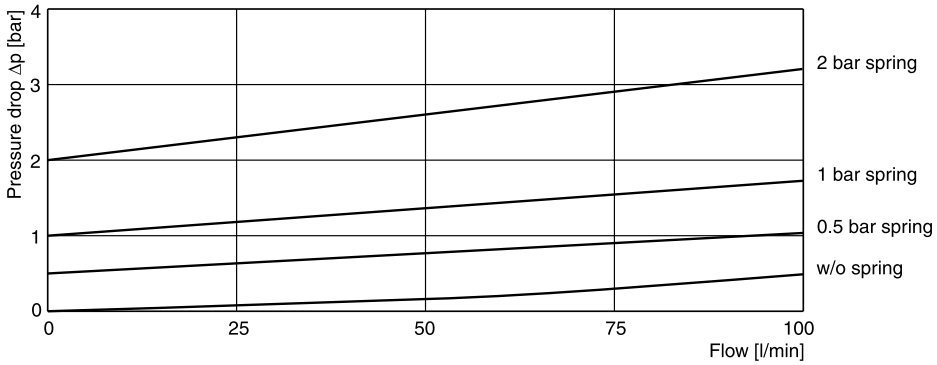
Code	Seals
1	NBR
5	FPM

Code	Cracking press.
0	0.5 bar
1	1.0 bar
2	2.0 bar

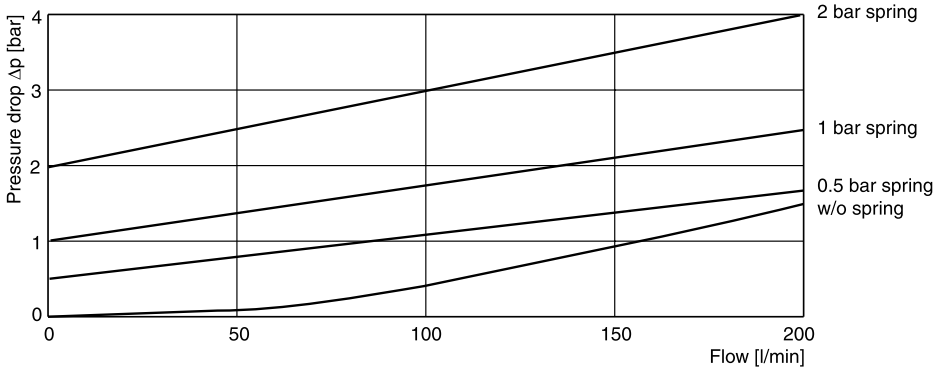
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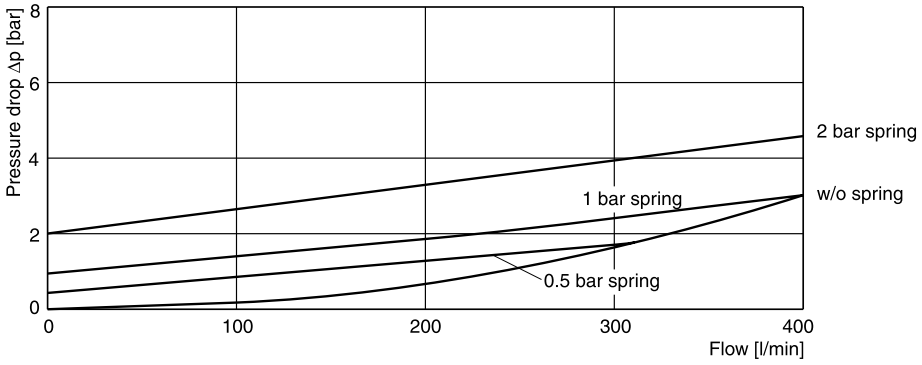
C5V06



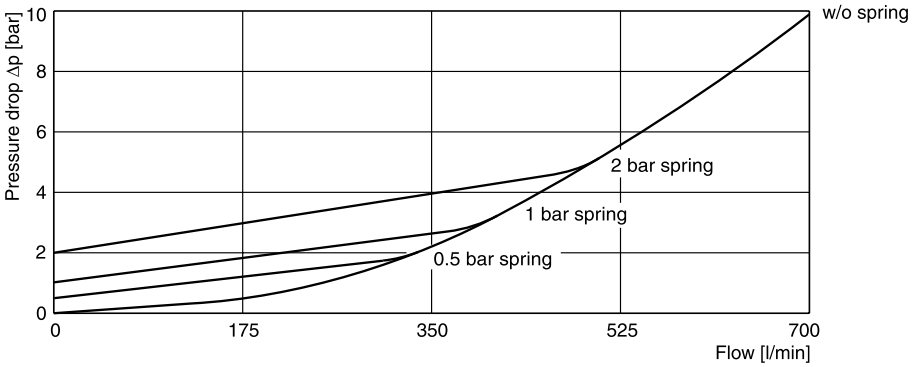
C5V08



C5V10



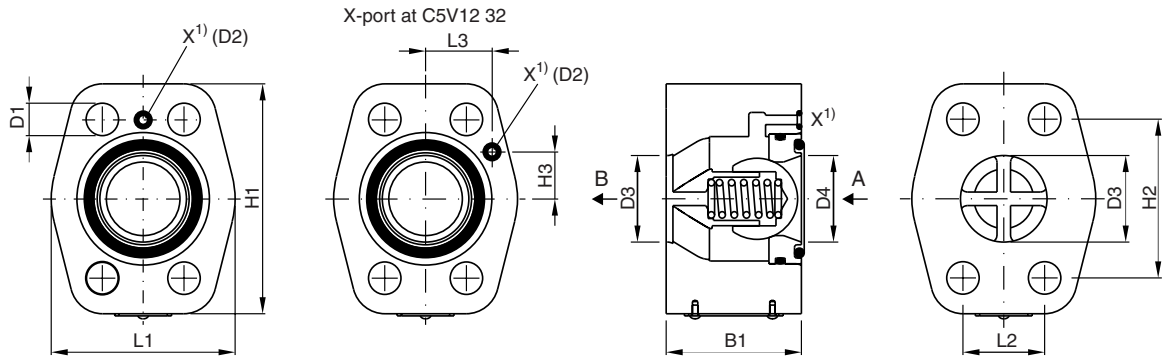
C5V12



C5V_UK.INDD RH_19.12.07

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Hydraulic Controls Division
Kaarst, Germany

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Position of O-ring seal according to ordering code.

[1] X1 port for C5V*32* (for use with unloading valve R5U)

Series	Nominal Size		L1	L2	L3	H1	H2	H3	B1	D1	D2	D3 + 0.8	D4
C5V06	3/4“	SAE61	48	22.2	27.2	64	47.6	22.4	45	10.5	Ø3	19	19
		SAE62	48	23.8	27.2	64	50.8	22.4	45	10.5	-	19	19
C5V08	1“	SAE61	60	26.2	27.2	74	52.4	22.4	45	10.5	Ø3	25	25
		SAE62	60	27.8	27.2	74	57.2	22.4	45	12.5	-	25	25
C5V10	1 1/4“	SAE61	68	30.2	27.2	85	58.7	22.4	50	12.5	Ø3	32	32
		SAE62	68	31.8	27.2	85	66.7	22.4	50	13.5 [2]	-	32	32
C5V12	1 1/2“	SAE61	80	35.7	27.2	104	69.8	22.4	50	13.5	Ø3	42	38
		SAE62	80	36.5	27.2	104	79.4	22.4	50	17	-	42	38

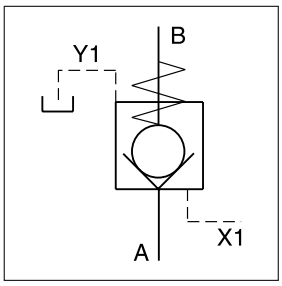
[2] D1 = 15 at option code 019 for M14 mounting screws

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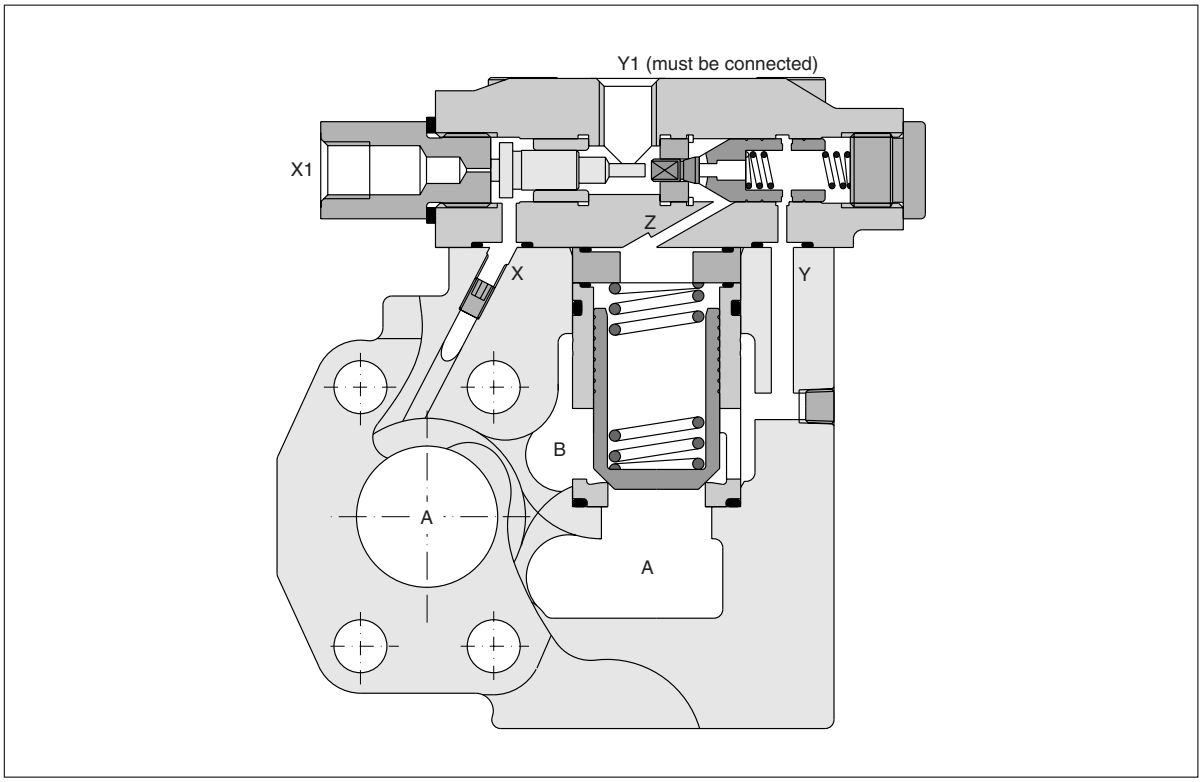
Pilot operated check valves series C5P have a similar design to the subplate mounted C4V series. The SAE flanges allow to mount directly on the flanges of actuators to achieve a very compact design.



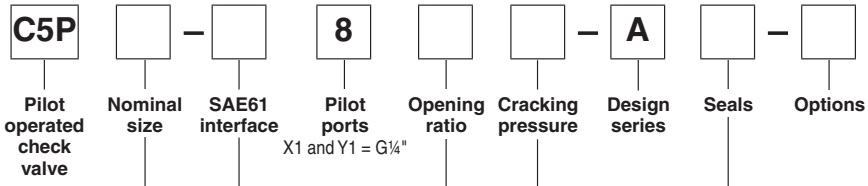


Features

- Pilot operated check valve
- 2-port body with SAE61 flange
- 3 sizes (SAE ¾", 1", 1¼")
- 4 opening ratios



Ordering code



Code	Nominal size
06	¾"
08	1"
10	1¼"

Code	Seals
1	NBR
5	FPM

SAE61		
Code	Max. pressure	Size
4	280 bar	10 (SAE61)
5	350 bar	06/08 (SAE61)

Code	Size	Flow A —> B	Flow B —> A
2	06	1.0 bar	1.5 bar
	08/10	1.0 bar	1.7 bar
4	06	4.0 bar	5.5 bar
	08/10	3.5 bar	6.0 bar
6	06	2.0 bar	3.0 bar
	08/10	2.2 bar	3.8 bar

Code	Opening ratio
1	1 : 1
3	3 : 1
8	8 : 1
9	10 : 1

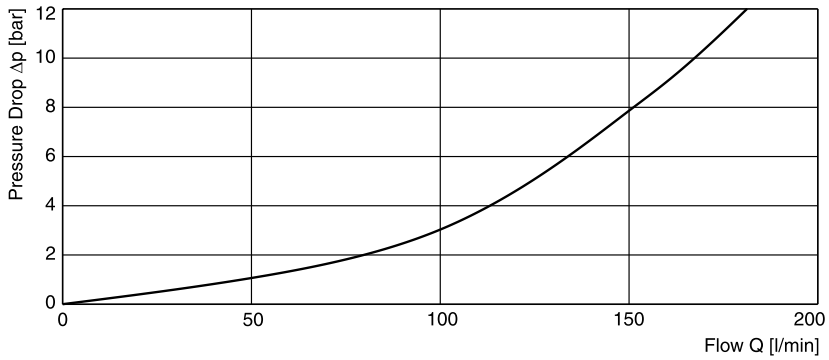
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Technical data

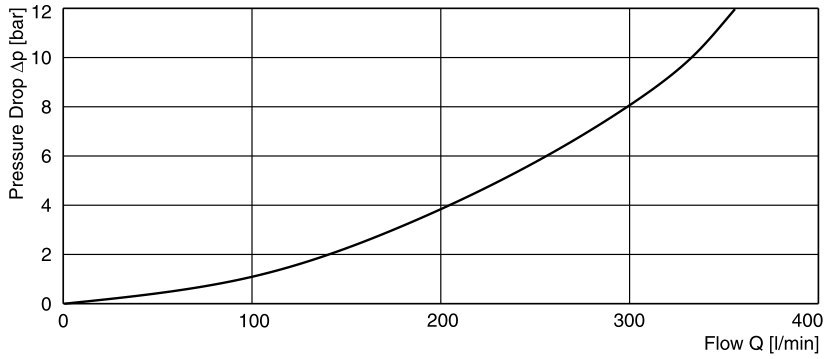
General				
Size		**06 (¾")**	**08 (1")**	**10 (1¼")**
Mounting		2-port inline flange (SAE61)		
Mounting position		unrestricted		
Ambient temperature	[°C]	-20...+50		
Weight	[kg]	3.9	4.4	5.7
Hydraulic				
Max. operating pressure	[bar]			
	Ports A, B	350	350	280
	Port Y1	30	30	30
Pressure stages	[bar]			
Nominal flow	[l/min]	180	360	600
Fluid		Hydraulic oil as per DIN 51524...525		
Fluid temperature	[°C]	-20...+80		
Viscosity permitted	[cSt]/[mm²/s]	10...650		
Viscosity recommended	[cSt]/[mm²/s]	30		
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)		

p/Q-performance curves

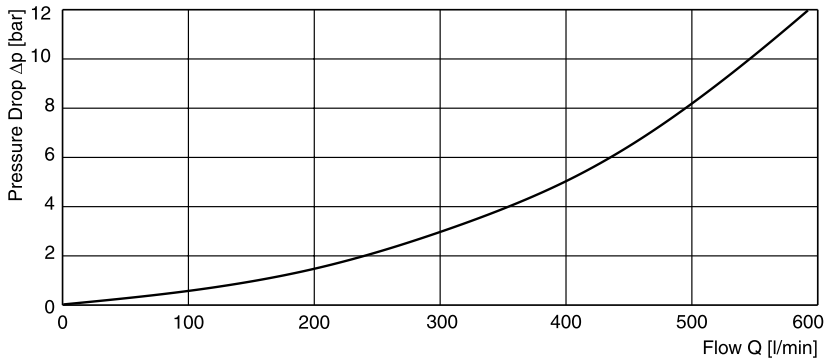
C5P06



C5P08



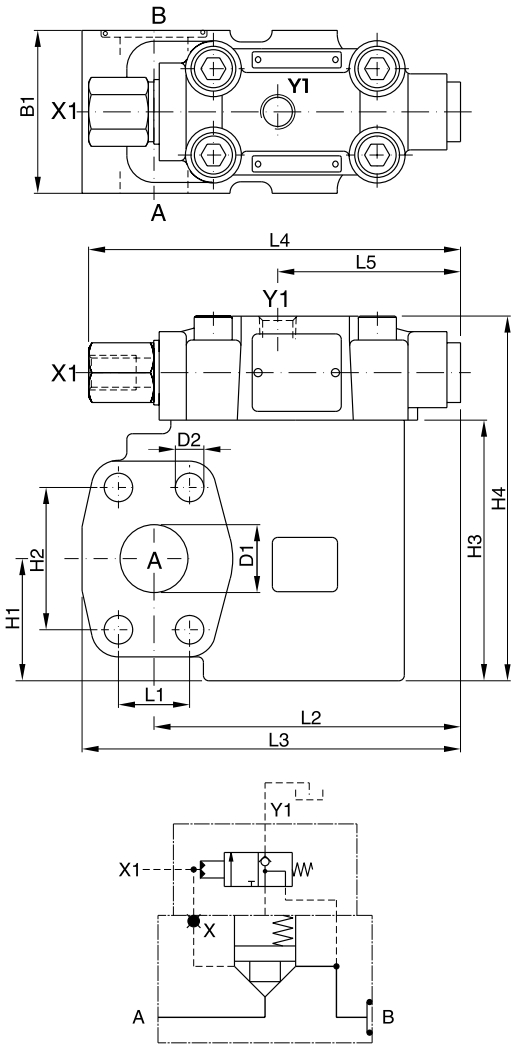
C5P10

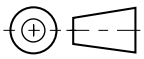


Fluid viscosity 40cSt at 50°C

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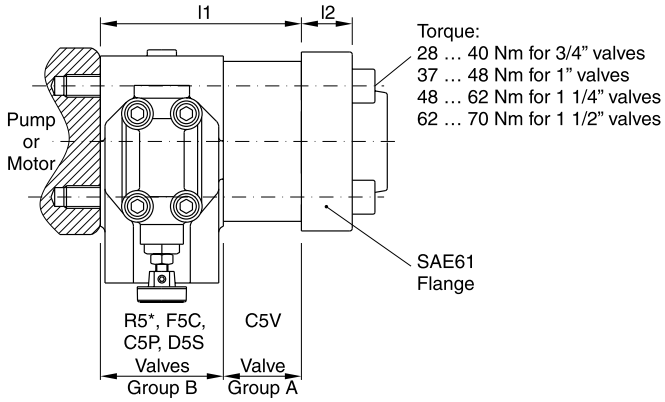
Dimensions

Type	L1	L2	L3	L4	L5	B1	H1	H2	H3	H4	D1	D2
C5P06	22.2	95.8	119.8	137	67.3	60	37	47.6	90	128	19	10.5
C5P08	26.2	112.9	139.4	137	67.3	60	45	52.4	96	134	25	10.5
C5P10	30.2	112.9	146.9	137	67.3	75	48	58.7	109	147	32	12.5

Ports

Port	Function	Port size		
		C5P06	C5P08	C5P10
A	Inlet or outlet	¾" SAE61	1" SAE61	1¼" SAE61
B	Outlet or inlet	¾" SAE61	1" SAE61	1¼" SAE61
X1	External pilot port	G¼"		
Y1	External pilot drain	G¼"		

BK bolt kits for SAE61 valves



Port	Qty. of valves and group for each stack	I1	I2	UNC screws (12.9)	
				Dimension	Ordering code
¾" SAE61	1 x A	45	16...22	3/8"-16 x 3¼"	BK-358-16330-0
	1 x B	60		3/8"-16 x 3¾"	BK-358-16350-0
	(1 x A) + (1 x B)	105		3/8"-16 x 5½"	BK-358-16420-0
	2 x B	120		3/8"-16 x 6"	BK-358-16440-0
1" SAE61	1 x A	45	18...24	3/8"-16 x 3¼"	BK-358-16330-0
	1 x B	60		3/8"-16 x 3¾"	BK-358-16350-0
	(1 x A) + (1 x B)	105		3/8"-16 x 5¾"	BK-358-16430-0
	2 x B	120		3/8"-16 x 6¼"	BK-358-16450-0
1¼" SAE61	1 x A	50	21...25	7/16"-14 x 3½"	BK-358-18340-0
	1 x B	75		7/16"-14 x 4½"	BK-358-18380-0
	(1 x A) + (1 x B)	125		7/16"-14 x 6½"	BK-358-18460-0
	2 x B	150		7/16"-14 x 7½"	BK-358-18500-0
1½" SAE61	1 x A	50	25...27	1/2"-13 x 3¾"	BK-358-20350-0
	1 x B	80		1/2"-13 x 5"	BK-358-20400-0
	(1 x A) + (1 x B)	130		1/2"-13 x 6¾"	BK-358-20470-0
	2 x B	160		1/2"-13 x 8"	BK-358-20520-0

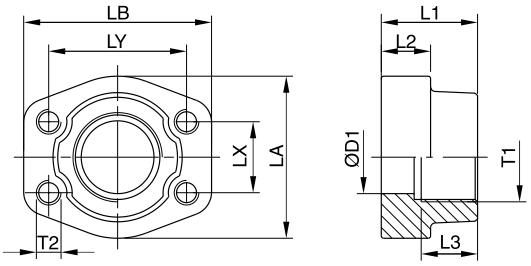
1 bolt kit contains 4 screws.

BK bolt kits for SAE62 valves

Series	Nominal size	I1	I2	Metric screws (12.9)	
				Dimension	Ordering code
C5V06	¾"	45	21	3/8"-16 x 3¼"	BK-358-16330-0
C5V08	1"	45	25	7/16"-14 x 3½"	BK-358-18340-0
C5V10	1¼"	50	27	1/2"-13 x 3¾"	BK-358-20350-0
R5V06-6	¾"	60	21	3/8"-16 x 3¾"	BK-358-16350-0
R5V08-6	1"	60	25	7/16"-14 x 3¾"	BK-358-18350-0
R5V10-6	1¼"	75	27	1/2"-13 x 4½"	BK-358-20380-0
R5V12-6	1½"	80	30	5/8"-11 x 5¼"	BK-358-24410-0

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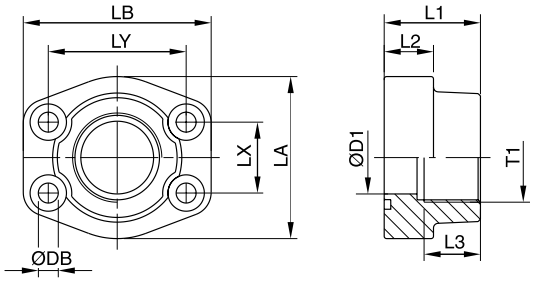
Inlet flange



Port size	Inlet flange									
	Order no. [1]	D1	L1	L2	L3	LA	LB	LX	LY	T2
SAE61										
G¾"	PCFF33GSU	19	36	18	19	49	66	22.3	47.6	3/8" UNC
G1"	PCFF34GSU	25	38	18	19	53	71	26.2	52.4	3/8" UNC
G1¼"	PCFF35GSU	31	41	21	22	69	80	30.2	58.7	7/16" UNC
G1½"	PCFF36GSU	38	44	25	24	77	94	35.7	69.9	1/2" UNC
SAE62										
G¾"	PCFF63GSU	19	36	19	22	53	71	23.8	50.8	3/8" UNC
G1"	PCFF64GSU	25	44	24	24	69	80	27.8	57.2	7/16" UNC
G1¼"	PCFF65GSU	31	44	27	25	77	94	31.8	66.6	1/2" UNC
G1½"	PCFF66GSU	38	51	30	28	89	106	36.5	79.3	5/8" UNC

[1] 4-bolt flange with UNC threads

Outlet and tank port flange

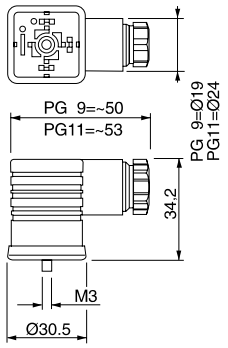


Port size	Outlet and tank port flange										
	Order no. [2]	D1	L1	L2	L3	LA	LB	LX	LY	DB	Srews
SAE61											
G¾"	PFF33GSU	19	36	18	18	49	66	22.3	47.6	10.5	3/8" x 1 1/2 UNC
G1"	PFF34GSU	25	38	18	20	53	71	26.2	52.4	10.5	3/8" x 1 1/2 UNC
G1¼"	PFF35GSU	31	41	21	22	69	80	30.2	58.7	11.5	7/16" x 1 1/2 UNC
G1½"	PFF36GSU	38	44	25	24	77	94	35.7	69.9	13.5	1/2" x 1 3/4 UNC
SAE62											
G¾"	PFF63GSU	19	36	19	18	53	71	23.8	50.8	10.5	3/8" x 1 1/2 UNC
G1"	PFF64GSU	25	44	24	20	69	80	27,8	57,2	11.5	7/16" x 1 1/2 UNC
G1¼"	PFF65GSU	31	44	27	22	77	94	31.8	66.6	15.0	1/2" x 1 3/4 UNC
G1½"	PFF66GSU	38	51	30	24	89	106	36.5	79.3	17.0	5/8" x 2 1/4 UNC

[2] 4-bolt flange including UNC screws and O-ring

Description	Threaded cable joint	Body colour coding	Figures switching	Order no.
Plug DIN 43650, design type AF, protection class IP 65 Voltages up to 250 V	PG 9	black, B grey, A	Fig. 1	**5001710** **5001711**
	PG11	black, B grey, A	Fig. 1	**5001716** **5001717**

Fig. 1



Other plugs on request

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Notes

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Hydraulic Controls Division
Kaarst, Germany

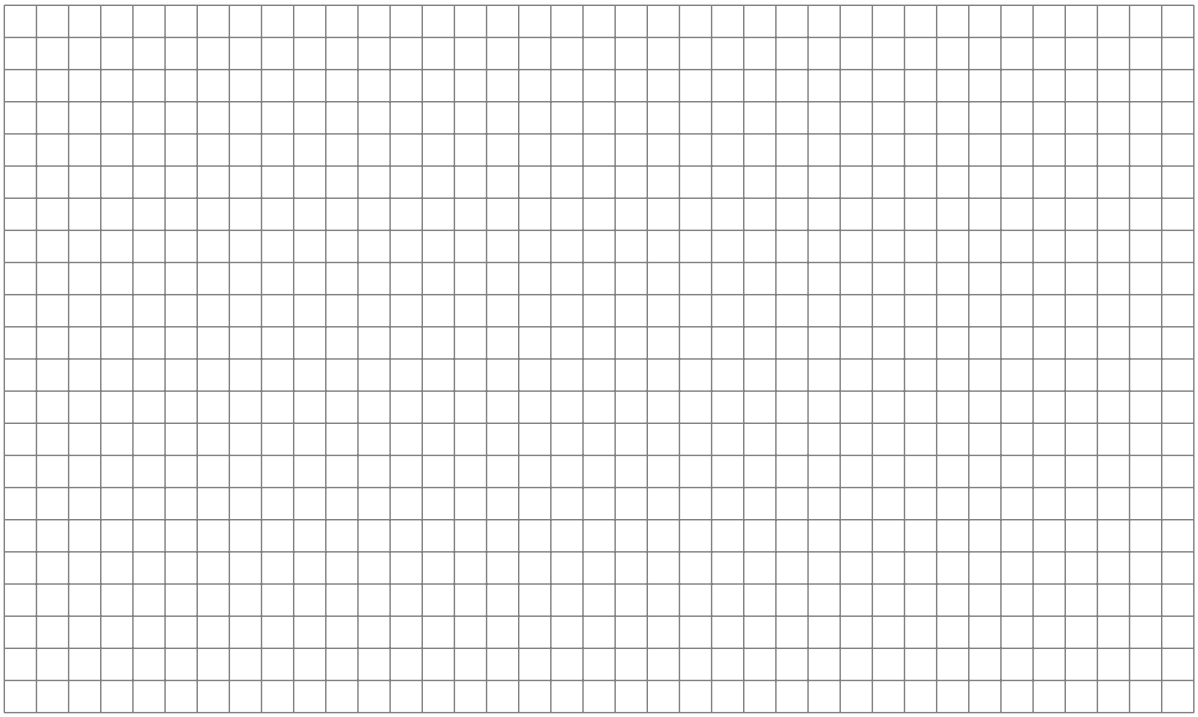
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Series Parker	Series Denison	Description	Size									Body		Page
		DIN / ISO	1/8	1/4	3/8	1/2	3/4	1	1¼	1½	2	L-port	T-port	
		Pressure valves, manual operation												
—	R4V	Pressure relief function				•	•	•	•			•	•	10-3
—	R4R	Pressure reducing function				•	•	•	•			•	•	10-9
		Pressure valves, proportional operation												
—	R4V*P2	Pressure relief function				•	•	•	•			•	•	10-15
—	R4R*P2	Pressure reducing function				•	•	•	•			•	•	10-21
		Directional seat valves												
—	D4S	In-line mounted				•	•	•	•			•	•	10-27
		Flow valves												
MV / 9MV	—	Throttle valve, with handle	•	•	•	•	•	•						10-37
N / 9N	—	Throttle valve, with knob	•	•	•	•	•	•						10-39
F / 9F	—	Throttle check valve, with knob	•	•	•	•	•	•	•	•	•			10-41
PCM / 9PCM	—	Flow control valve, with knob		•	•	•	•	•						10-43
		Check valves												
C / 9C	—	Direct operated	•	•	•	•	•	•						10-45
CP / 9CP	—	Pilot operated			•		•							10-47
RH	—	Pilot operated		•	•	•	•							10-49
		Accessories												
		Plug-in connectors												10-53

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Notes



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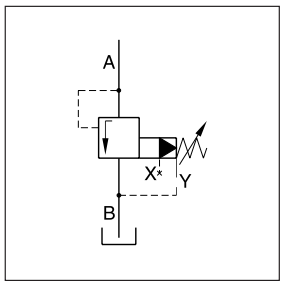
Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

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Pilot operated pressure relief valves for in-line mounting series R4V have a similar design to the subplate mounted R4V series. For single functions - where no manifold blocks are used - the valves can be directly placed in the pipework.
The R4V valves are available with 2 ports (L-body) for in-line relief function or with 3 ports (T-body) for relief functions in the bypass.



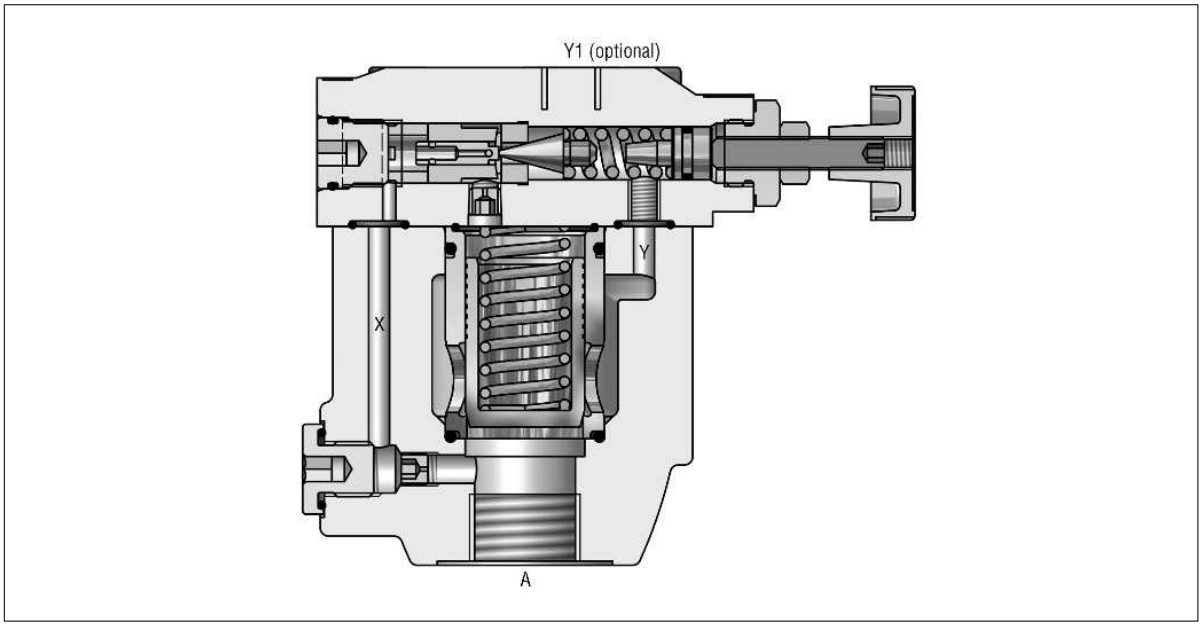
R4V10 L-body



Features

- Pilot operated with manual adjustment
- 2 interfaces
  - L-body (R4V06-G¾", R4V10-G1¼")
  - T-body (R4V03-G½", R4V06-G1")
- 3 pressure stages
- 3 adjustment modes
  - Hand knob
  - Acorn nut with lead seal
  - Key lock
- With optional vent function

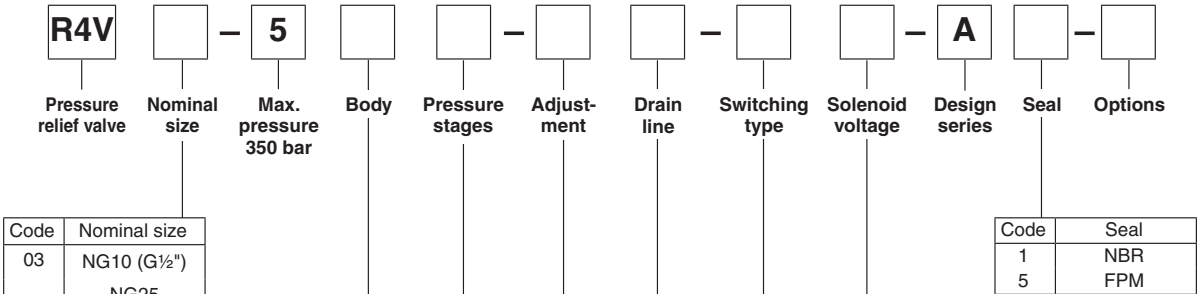
R4V06 L-body



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Ordering code



Code	Nominal size
03	NG10 (G½")
06	NG25 (G1" - T-body, G¾" - L-body)
10	NG32 (G1¼")

Code	Body
6	R4V03 T-body R4V06 T-body
D	R4V06 L-body R4V10 L-body

Code	Pressure stages
1	up to 105bar
3	up to 210bar
5	up to 350bar

Code	Adjustment
1	Hand knob
3	Acorn nut with lead seal
4	Key lock

Code	Seal
1	NBR
5	FPM

Code	Solenoid voltage
omit	Standard w/o vent function
G0R	12V=
G0Q	24V=
GAR	98V=
GAG	205V=
W30	110V / 50Hz 120V / 60Hz
W31	230V / 50Hz 240V / 60Hz

Code	Switching type
omit	Standard w/o vent function
09	Solenoid not activ. unpress. circulation
11	Solenoid activated unpress. circulation

Code	Drain line
0	internal
2	external from pilot head (Y1)

10

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R4V

General		T-body		L-body	
Size		**03 (½")**	**06 (1")**	**06 (¾")**	**10 (1¼")**
Mounting		Threaded body			
Mounting position		unrestricted			
Ambient temperature	[°C]	-20...+50			
Weight	[kg]	3.2	6.6	3.3	5.6
Hydraulic					
Max. operating pressure	[bar]	Ports A and X up to 350; Ports B and Y 30 bar			
Pressure stages	[bar]	105, 210, 350			
Nominal flow	[l/min]	60	200	200	450
Fluid		Hydraulic oil as per DIN 51524...525			
Fluid temperature	[°C]	-20...+80			
Viscosity permitted	[cSt]/[mm²/s]	10...650			
Viscosity recommended	[cSt]/[mm²/s]	30			
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			

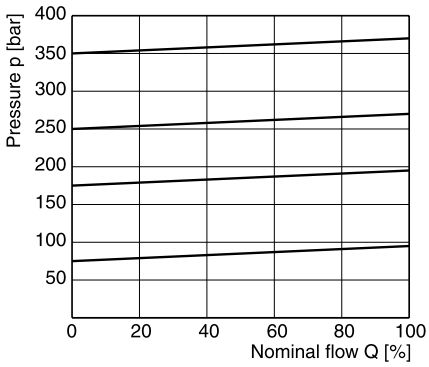
R4V with vent function

General		T-body		L-body	
Size		**03 (½")**	**06 (1")**	**06 (¾")**	**10 (1¼")**
Mounting		Threaded body			
Mounting position		unrestricted			
Ambient temperature	[°C]	-20...+50			
Weight	[kg]	4.9	8.3	5.0	7.3
Hydraulic					
Max. operating pressure	[bar]	Ports A and X up to 350; Ports B and Y 30			
Pressure stages	[bar]	105, 210, 350			
Nominal flow	[l/min]	60	200	200	450
Fluid		Hydraulic oil as per DIN 51524...525			
Fluid temperature	[°C]	-20...+80			
Viscosity permitted	[cSt]/[mm²/s]	10...650			
Viscosity recommended	[cSt]/[mm²/s]	30			
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			

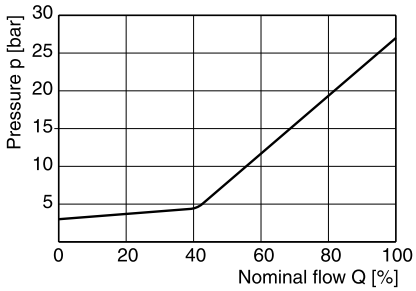
Electrical (solenoid)							
Duty ratio	[%]	100					
Response time	[ms]	Energized / de-energized AC: 20/18 , DC: 46/27					
	Code	G0R	G0Q	GAR	GAG	W30	W31
Supply voltage	[V]	12V =	24V =	98V =	205V =	110 at 50Hz 120 at 60Hz	230 at 50Hz 240 at 60Hz
Tolerance supply voltage	[%]	+5...-10	+5...-10	+5...-10	+5...-10	+5...-10	+5...-10
Power consumption hold	[W]	31	31	31	31	78	78
in rush	[W]	31	31	31	31	264	264
Max. switching frequency		AC: up to7.200, DC: up to 16.000 switchings/hour					
Solenoid connection		Connector as per EN175301-803					
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)					
Coil insulation class		H (180 °C)					

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p/Q performance curve Series R4V [1)]

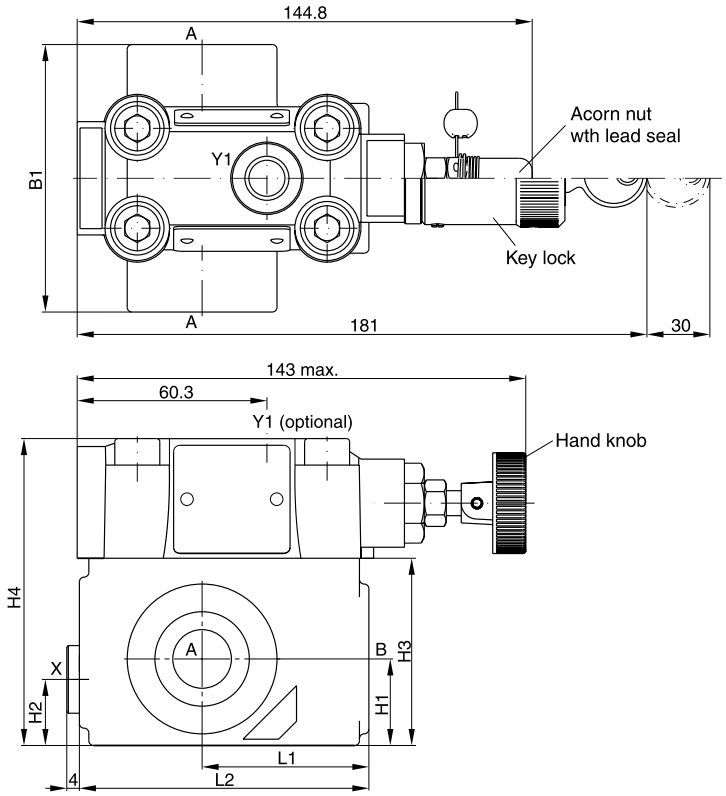


Minimum pressure curve



1) The performance curves are measured with external drain. For internal drain the tank pressure has to be added to curve.

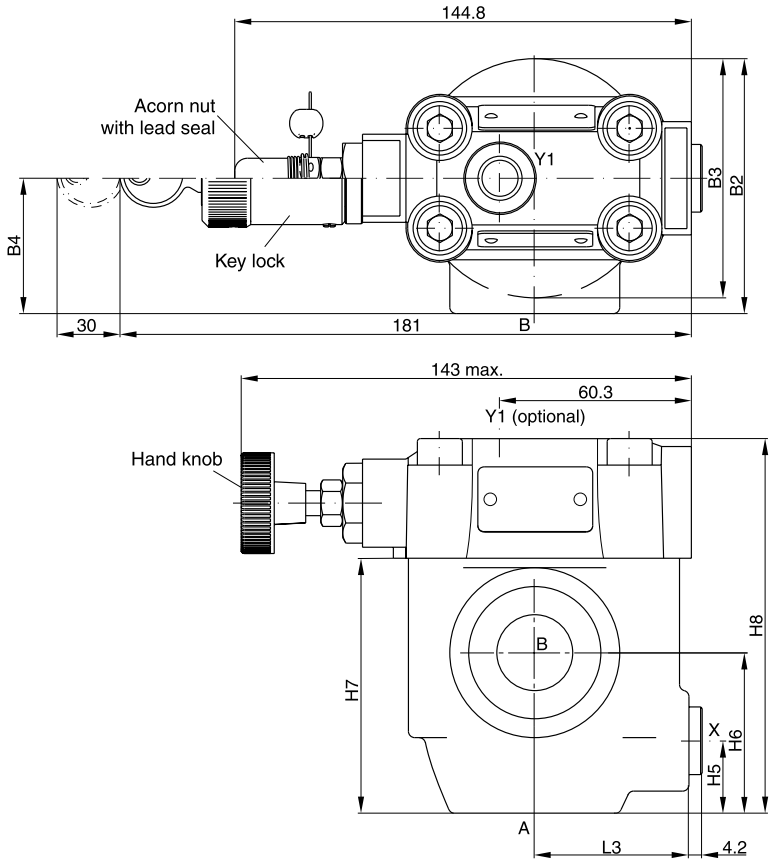
Dimensions R4V*06
T-body



10

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Dimensions R4V*06
L-body



NG	Body	B1	B2	B3	B4	H1	H2	H3	H4	H5	H6	H7	H8	L1	L2	L3
03	T-body	85	-	-	-	27.5	21	59.5	97.5	-	-	-	-	53	92	-
06	T-body	136	-	-	-	38	28	93	131	-	-	-	-	66.5	117.5	-
06	L-body	-	81	76	43	-	-	-	-	23	51	81	119	-	-	49
10	L-body	-	120.7	85.8	77.8	-	-	-	-	31.8	50.8	96	134	-	-	49.8

Ports	Function	Port size			
		R4V03 T-body	R4V06 L-body	R4V06 T-body	R4V10 L-body
A	pressure (inlet)	G½ "	G¾ "	G1 "	G1¼ "
B	tank (outlet)	G½ "	G¾ "	G1 "	G1¼ "
X[1)]	ext. remote control or vent connection	G¼ "			
Y1[2)]	external drain				

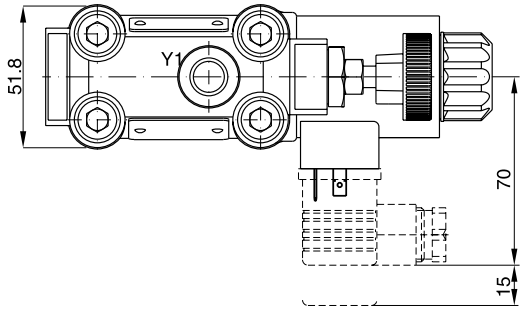
[1)] closed when supplied
[2)] port Y1 is only available at drain line (code2) external from the pilot head

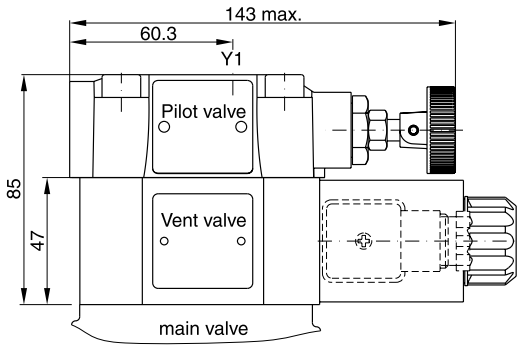
R4V_UK.INDD RH_19.12.07

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Hydraulic Controls Division
Kaarst, Germany

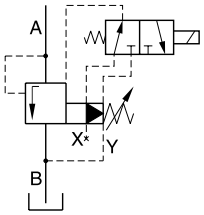
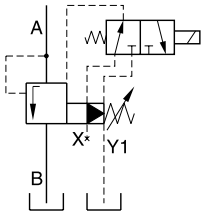
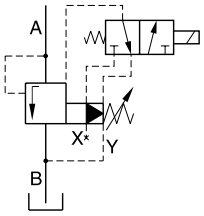
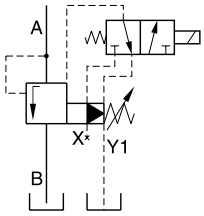
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Dimensions R4V with vent function





10

Code	Internal drain	External drain
11		
09		

R4V_UK.INDD RH_19.12.07

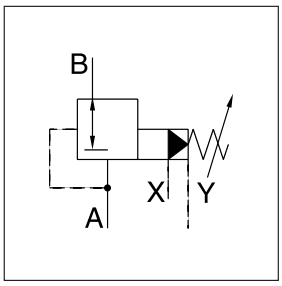
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Pilot operated pressure reducing valves for in-line mounting series R4R have a similar design to the subplate mounted R4R series. For single functions - where no manifold blocks are used - the valves can be directly placed in the pipework.
The valves are available with 2 ports (L-body) or with 3 ports (T-body).



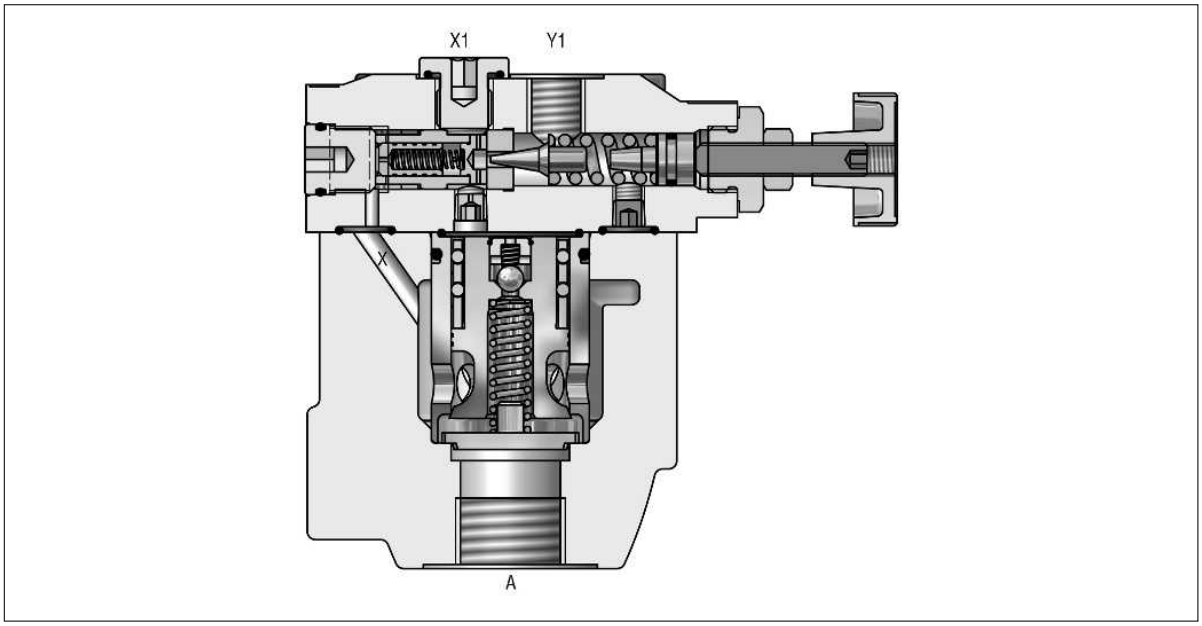
R4R10 L-body



Features

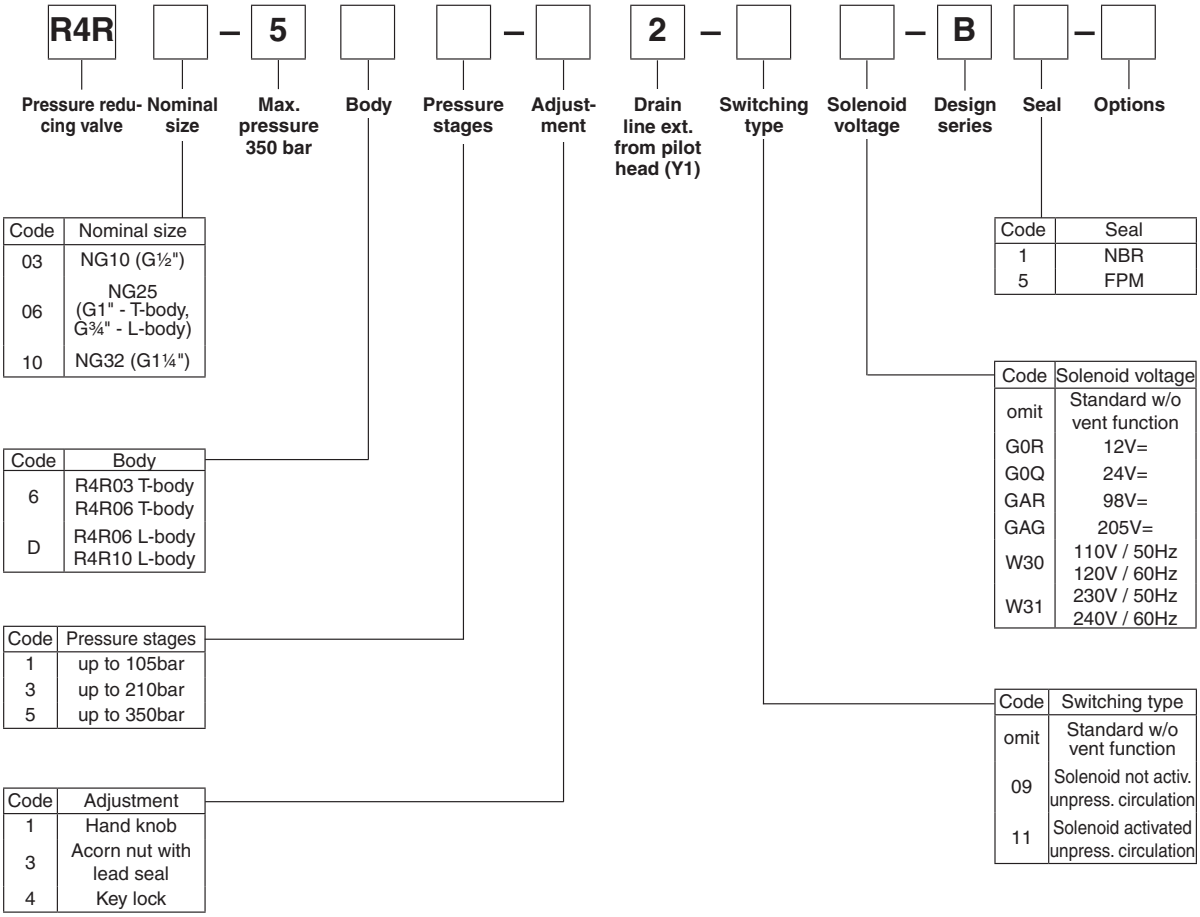
- Pilot operated with manual adjustment
- Normally closed to avoid undesired motion
- 2 interfaces
  - L-body (R4R06-G¾", R4R10-G1¼")
  - T-body (R4R03-G½", R4R06-G1")
- 3 pressure stages
- 3 adjustment modes
  - Hand knob
  - Acorn nut with lead seal
  - Key lock
- With optional vent function

R4R06 L-body



10

Ordering code



Code	Nominal size
03	NG10 (G½")
06	NG25 (G1" - T-body, G¾" - L-body)
10	NG32 (G1¼")

Code	Body
6	R4R03 T-body R4R06 T-body
D	R4R06 L-body R4R10 L-body

Code	Pressure stages
1	up to 105bar
3	up to 210bar
5	up to 350bar

Code	Adjustment
1	Hand knob
3	Acorn nut with lead seal
4	Key lock

Code	Seal
1	NBR
5	FPM

Code	Solenoid voltage
omit	Standard w/o vent function
G0R	12V=
G0Q	24V=
GAR	98V=
GAG	205V=
W30	110V / 50Hz 120V / 60Hz
W31	230V / 50Hz 240V / 60Hz

Code	Switching type
omit	Standard w/o vent function
09	Solenoid not activ. unpress. circulation
11	Solenoid activated unpress. circulation

10

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R4R

General		T-body		L-body	
Size		**03 (½")**	**06 (1")**	**06 (¾")**	**10 (1¼")**
Mounting		Threaded body			
Mounting position		unrestricted			
Ambient temperature	[°C]	-20...+50			
Weight	[kg]	3.2	3.3	5.6	6.6
Hydraulic					
Max. operating pressure	[bar]	Ports A, B and X: 350; Port Y depressurized			
Pressure stages	[bar]	105, 210, 350			
Nominal flow	[l/min]	60	200	200	450
Fluid		Hydraulic oil as per DIN 51524...525			
Fluid temperature	[°C]	-20...+80			
Viscosity permitted	[cSt]/[mm²/s]	10...650			
Viscosity recommended	[cSt]/[mm²/s]	30			
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			

R4R with vent function

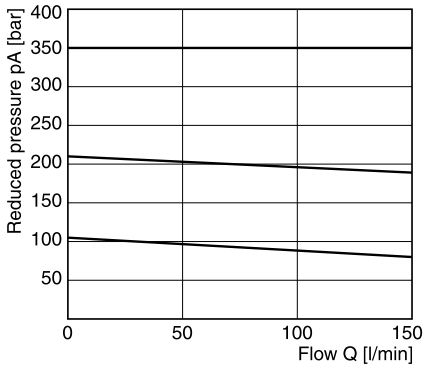
General					
Size		**03 (½")**	**06 (¾")**	**06 (1")**	**10 (1¼")**
Mounting		Threaded body			
Mounting position		unrestricted			
Ambient temperature	[°C]	-20...+50			
Weight	[kg]	4.9	5.0	7.3	8.3
Hydraulic					
Max. operating pressure	[bar]	Ports A and X up to 350; Ports B and Y depressurized			
Pressure stages	[bar]	105, 210, 350			
Nominal flow	[l/min]	60	200	200	450
Fluid		Hydraulic oil as per DIN 51524...525			
Fluid temperature	[°C]	-20...+80			
Viscosity permitted	[cSt]/[mm²/s]	10...650			
Viscosity recommended	[cSt]/[mm²/s]	30			
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			

Electrical (solenoid)							
Duty ratio	[%]	100					
Response time	[ms]	Energized / de-energized AC: 20/18 , DC: 46/27					
	Code	G0R	G0Q	GAR	GAG	W30	W31
Supply voltage	[V]	12V =	24V =	98V =	205V =	110 at 50Hz 120 at 60Hz	230 at 50Hz 240 at 60Hz
Tolerance supply voltage	[%]	+5...-10	+5...-10	+5...-10	+5...-10	+5...-10	+5...-10
Power consumption hold	[W]	31	31	31	31	78	78
in rush	[W]	31	31	31	31	264	264
Max. switching frequency		AC: up to7.200, DC: up to 16.000 switchings/hour					
Solenoid connection		Connector as per EN175301-803					
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)					
Coil insulation class		H (180 °C)					

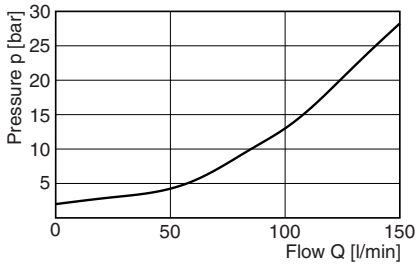
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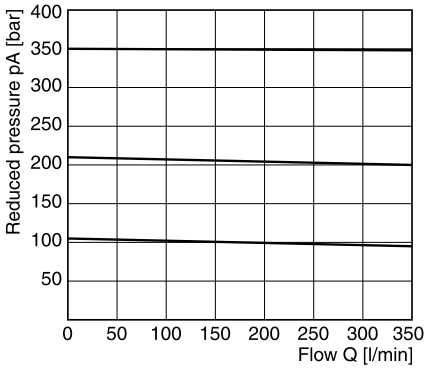
Reduced pressure pA versus flow Q
Series R4R03 [1)]



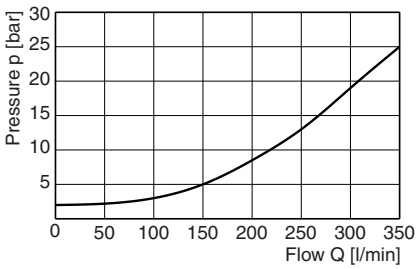
Minimum pressure curve



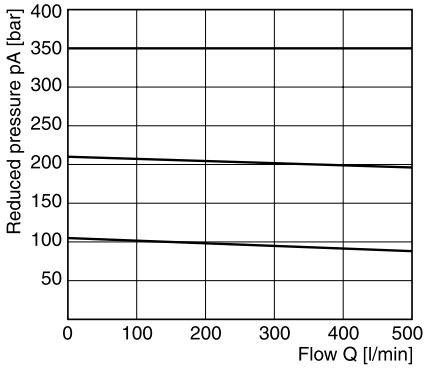
Reduced pressure pA versus flow Q
Series R4R06 [1)]



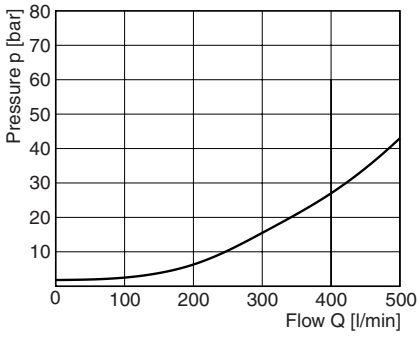
Minimum pressure curve



Reduced pressure pA versus flow Q
Series R4R10 [1)]



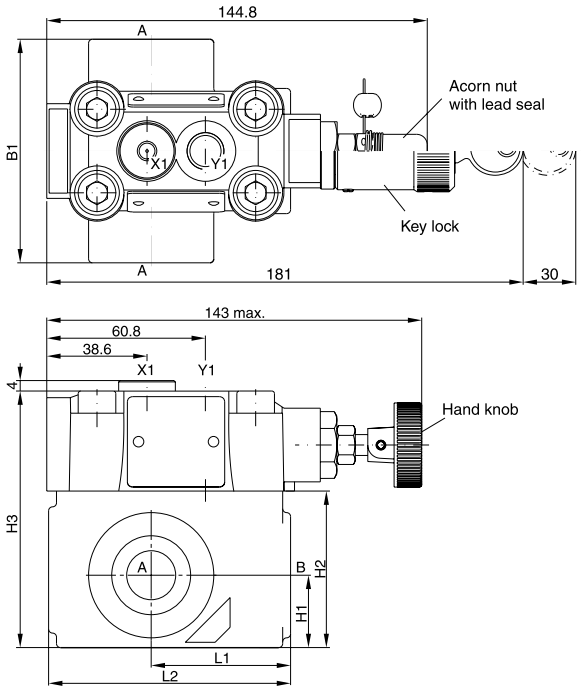
Minimum pressure curve



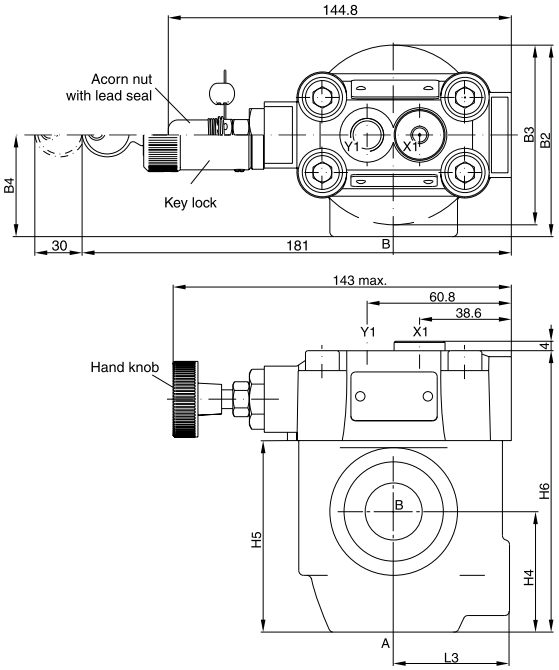
10

[1)] Measured at 350 bar primary pressure pB.

T-body



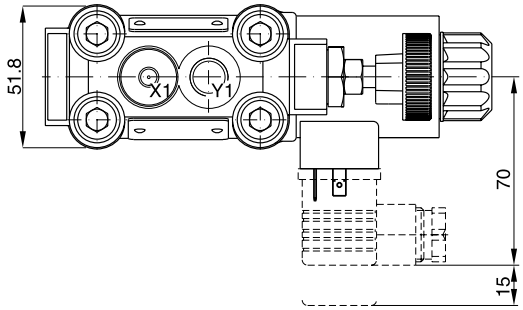
L-body

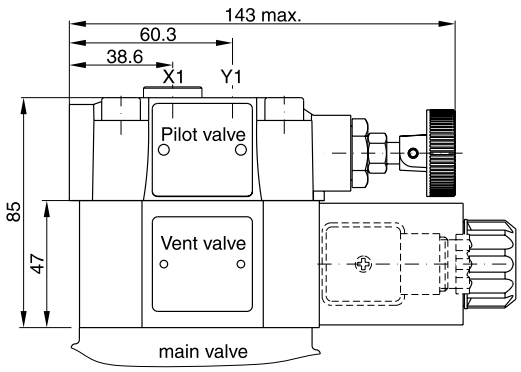


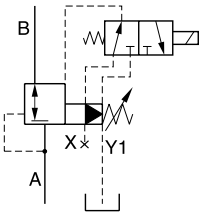
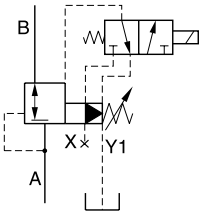
NG	Body	B1	B2	B3	B4	H1	H2	H3	H4	H5	H6	L1	L2	L3
03	T-body	85	-	-	-	27.5	59.5	97.5	-	-	-	53	92	-
06	T-body	136	-	-	-	38	93	131	-	-	-	66.5	117.5	-
06	L-body	-	81	76	43	-	-	-	51	81	119	-	-	49
10	L-body	-	120.7	85.8	77.8	-	-	-	50.8	96	134	-	-	49.8

Ports	Function	Port size			
		R4V03 T-body	R4V06 L-body	R4V06 T-body	R4V10 L-body
B	pressure (inlet)	G½ "	G¾ "	G1 "	G1¼ "
A	pressure (outlet)	G½ "	G¾ "	G1 "	G1¼ "
X1	ext. remote control or vent connection	G¼ "			
Y1	external drain				

Dimensions R4R with vent function





Code	External drain
11	
09	

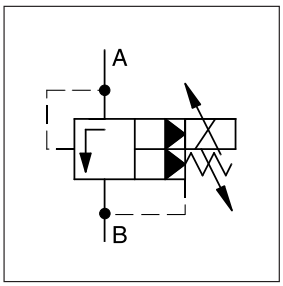
10

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Proportional pressure relief valves series R4V*P2 are based on the mechanically adjusted series R4V. The additional proportional unit between the mechanical pilot valve and the main stage allows continuous pressure adjustment.
The optimum performance can be achieved in combination with the digital amplifier module PCD00A-400.



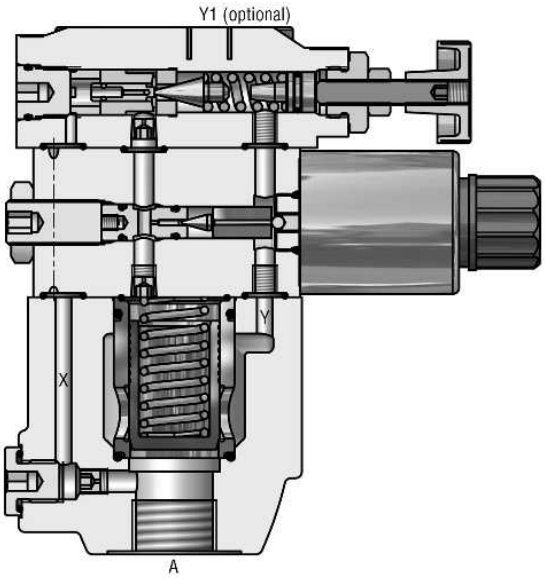
R4V10*P2 L-body



Features

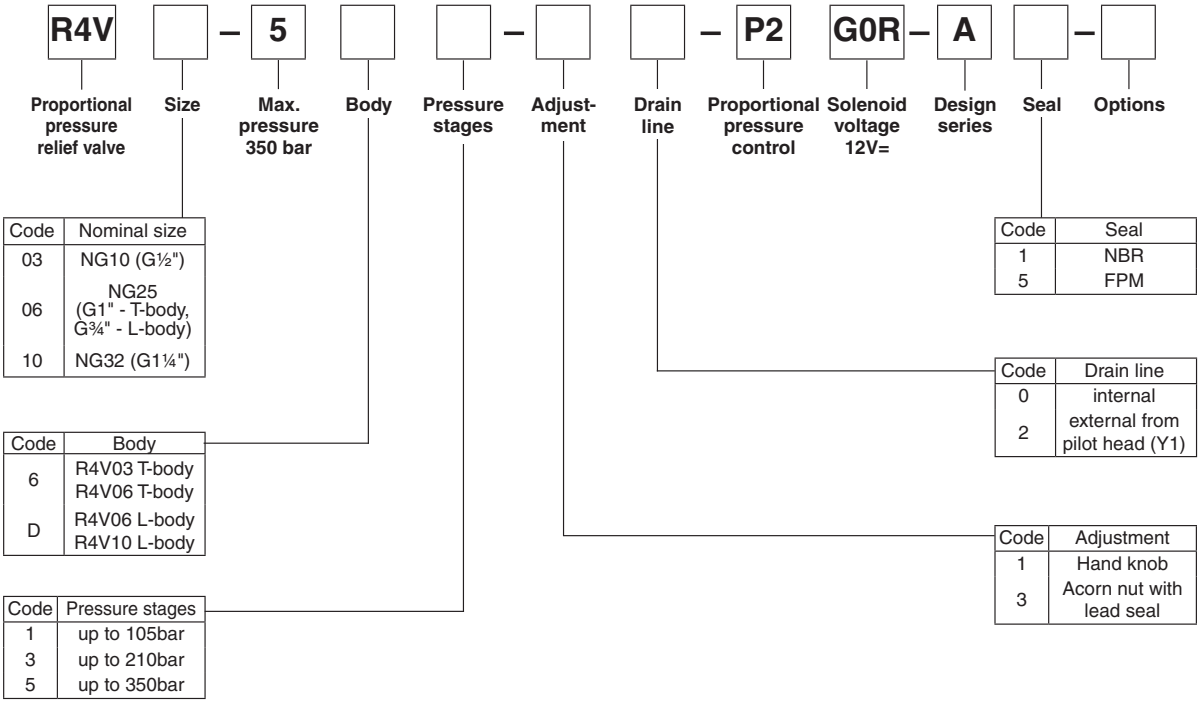
- Pilot operated with manual adjustment
- Continuous adjustment by proportional solenoid
- 2 interfaces
  - L-body (R4V06-G¾", R4V10-G1¼")
  - T-body (R4V03-G½", R4V06-G1")
- 3 pressure stages
- With mechanical maximum pressure adjustment

R4V06*P2 L-body



10

Ordering code



Code	Nominal size
03	NG10 (G½")
06	NG25 (G1" - T-body, G¾" - L-body)
10	NG32 (G1¼")

Code	Body
6	R4V03 T-body R4V06 T-body
D	R4V06 L-body R4V10 L-body

Code	Pressure stages
1	up to 105bar
3	up to 210bar
5	up to 350bar

Code	Seal
1	NBR
5	FPM

Code	Drain line
0	internal
2	external from pilot head (Y1)

Code	Adjustment
1	Hand knob
3	Acorn nut with lead seal

Technical data R4V*P2

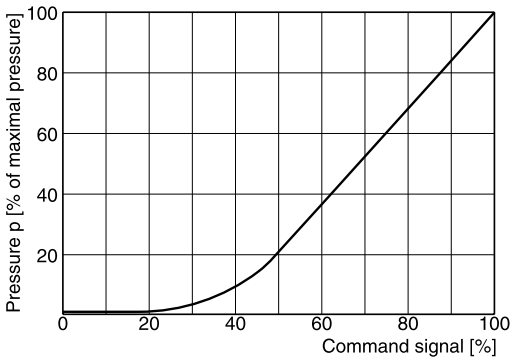
General		T-body		L-body	
Size		**03 (½")**	**06 (1")**	**06 (¾")**	**10 (1¼")**
Mounting		Threaded body			
Mounting position		unrestricted			
Ambient temperature	[°C]	-20...+50			
Weight	[kg]	5.0	5.1	7.4	8.4
Hydraulic					
Max. operating pressure	[bar]	Ports A and X up to 350; Ports B and Y 30 bar			
Pressure stages	[bar]	105, 210, 350			
Nominal flow	[l/min]	60	200	200	450
Fluid		Hydraulic oil as per DIN 51524...525			
Fluid temperature	[°C]	-20...+80			
Viscosity permitted	[cSt]/[mm²/s]	20...380			
Viscosity recommended	[cSt]/[mm²/s]	30			
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			

Electrical (prop. solenoid)		
Duty ratio	[%]	100
Nominal voltage	[V]	12=
Max. current	[A]	2.3
Coil resistance	[Ohm]	4 at 20°C
Solenoid connection		Connector as per EN175301-803
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)
Power amplifier		PCD00A-400

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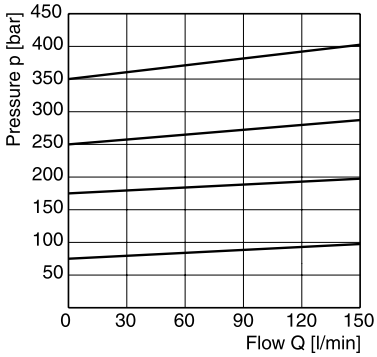
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Signal/pressure curve R4V

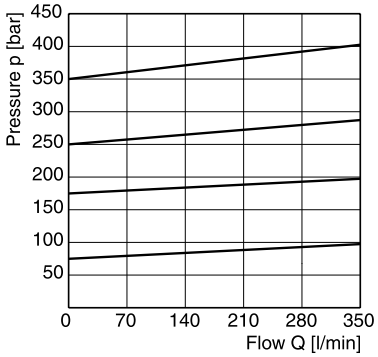


p/Q performance curves [1)]

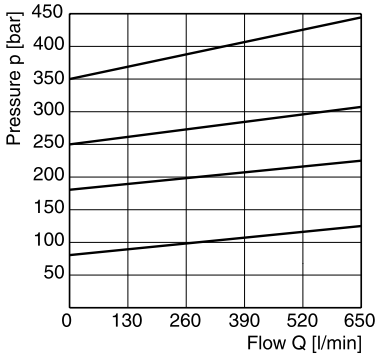
R4V03



R4V06

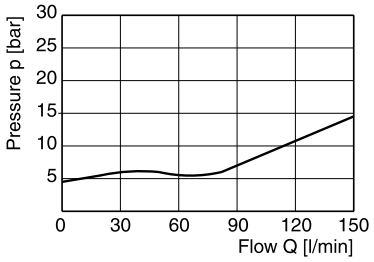


R4V10

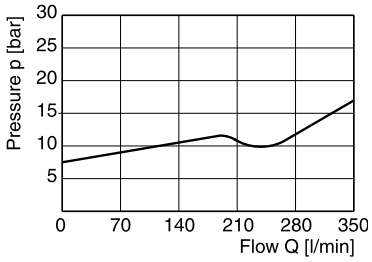


Minimum pressure curve [1)]

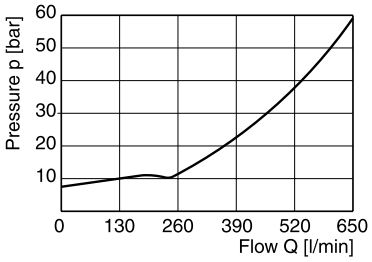
R4V03



R4V06



R4V10

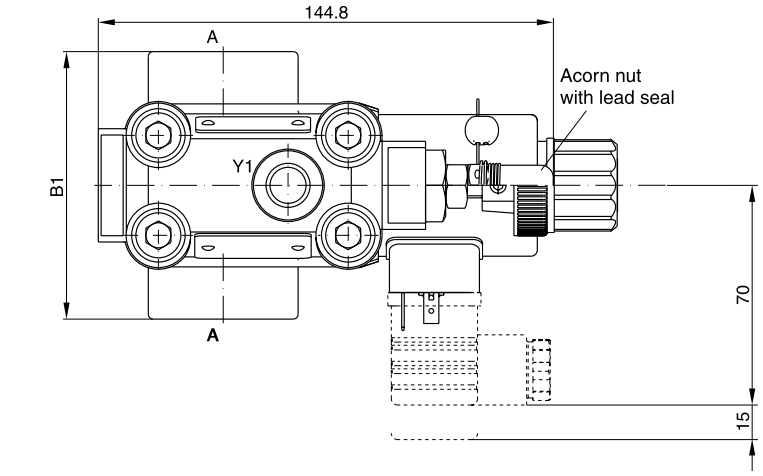


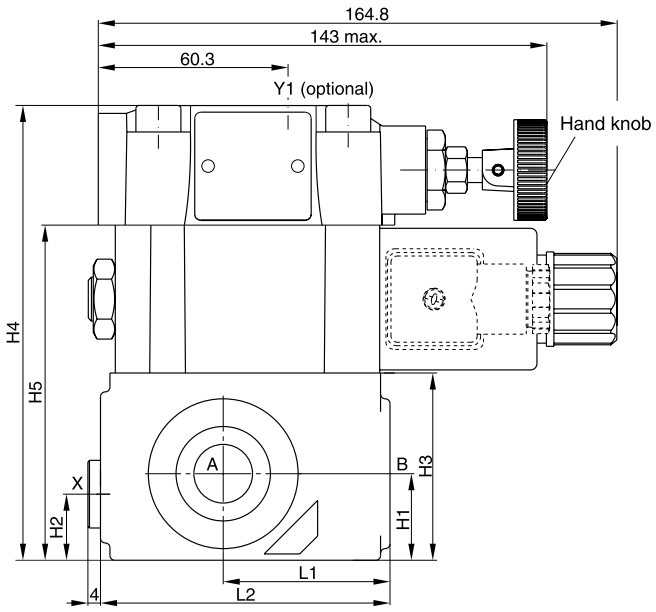
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[1)] The performance curves are measured with external drain. For internal drain the tank pressure has to be added to curve.

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T-body





NG	Body	B1	H1	H2	H3	H4	H5	L1	L2
03	T-body	85	27.5	21	59.5	144.5	106.5	53	92
06	T-body	136	38	28	93	178	140	66.5	117.5

Ports	Function	Port size	
		R4V03*P2 T-body	R4V06*P2 T-body
A	pressure (inlet)	G½ "	G1 "
B	tank (outlet)	G½ "	G1 "
X[1)]	ext. remote control or vent connection	G¼ "	
Y1[2)]	external drain		

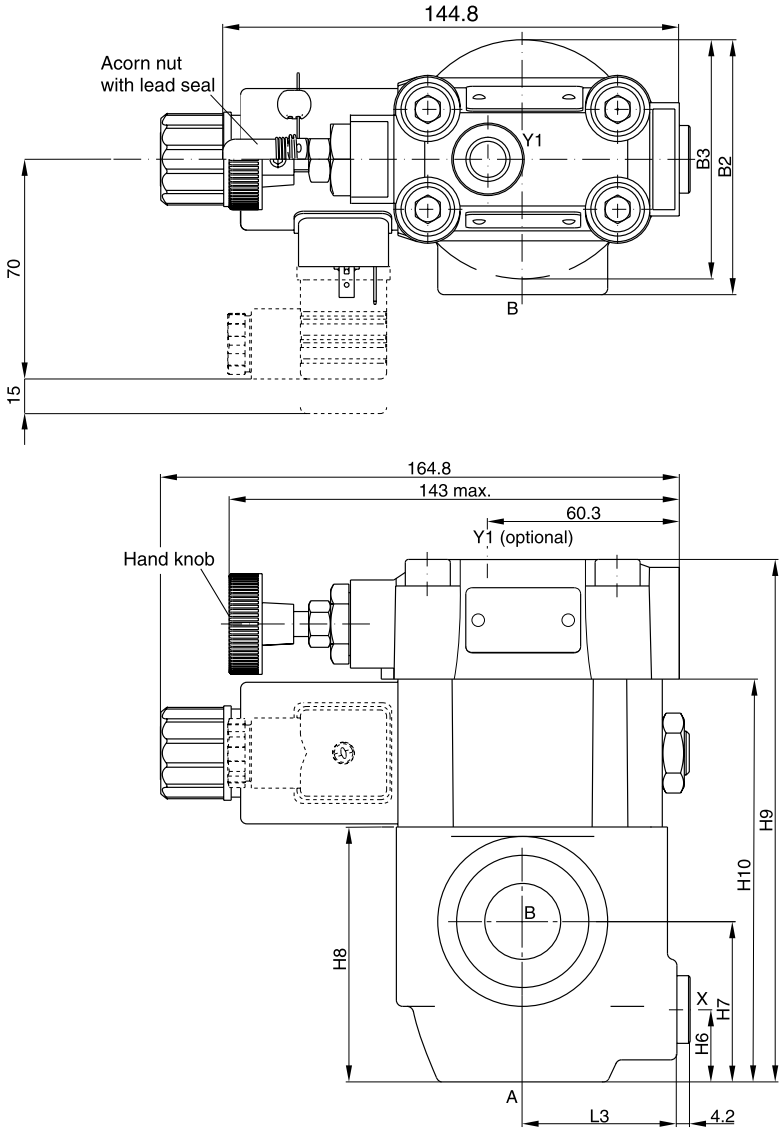
[1)] closed when supplied
[2)] port Y1 is only available at drain line (code2) external from the pilot head

R4VP2_UK.INDD RH_23.11.07

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L-body



NG	Body	B2	B3	H6	H7	H8	H9	H10	L3
06	L-body	81	76	23	51	81	166	128	49
10	L-body	120.7	85.8	31.8	50.8	96	181	143	49.8

Ports	Function	Port size	
		R4V06 L-body	R4V10 L-body
A	pressure (inlet)	G¾ "	G1¼ "
B	tank (outlet)	G¾ "	G1¼ "
X[1)]	ext. remote control or vent connection	G¼ "	
Y1[2)]	external drain		

[1)] closed when supplied
[2)] port Y1 is only available at drain line (code2) external from the pilot head

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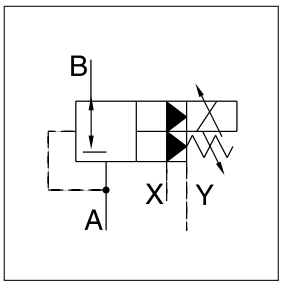
Notes

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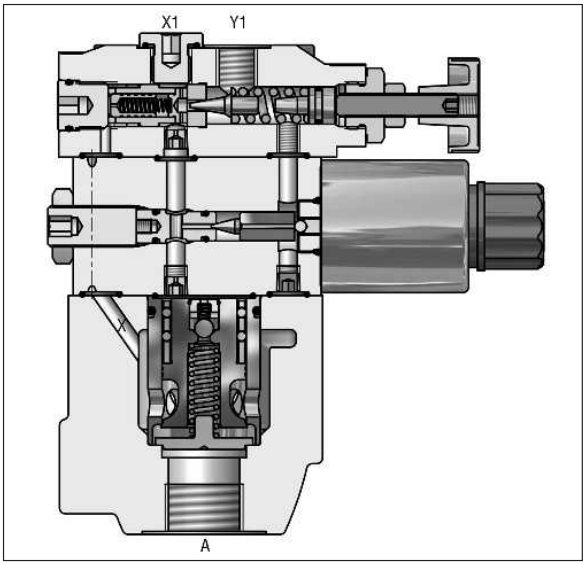
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Proportional pressure reducing valves series R4R*P2 are based on the mechanically adjusted series R4R. The additional proportional unit between the mechanical pilot valve and the main stage allows continuous pressure adjustment.
The optimum performance can be achieved in combination with the digital amplifier module PCD00A-400.





R4R10*P2 L-body



R4R06*P2 L-body

Features

- Pilot operated with proportional solenoid
- Normally closed to avoid undesired motion
- Continuous adjustment by proportional solenoid
- 2 interfaces
  - L-body (R4R06-G¾", R4R10-G1¼")
  - T-body (R4R03-G½", R4R06-G1")
- 3 pressure stages
- With mechanical maximum pressure adjustment

Ordering code

R4R		–	5			–		2	–	P2	G0R	–	B		–	
Pressure reducing valve	Nominal size		Max. pressure 350 bar	Body	Pressure stages		Adjust-ment	Drain line ext. from pilot head (Y1)		Proportional pressure control	Solenoid voltage 12V=		Design series	Seal		Options

Code	Nominal size
03	NG10 (G½")
06	NG25 (G1" - T-body, G¾" - L-body)
10	NG32 (G1¼")

Code	Body
6	R4R03 T-body R4R06 T-body
D	R4R06 L-body R4R10 L-body

Code	Seal
1	NBR
5	FPM

Code	Adjustment
1	Hand knob
3	Acorn nut with lead seal

Code	Pressure stages
1	up to 105bar
3	up to 210bar
5	up to 350bar

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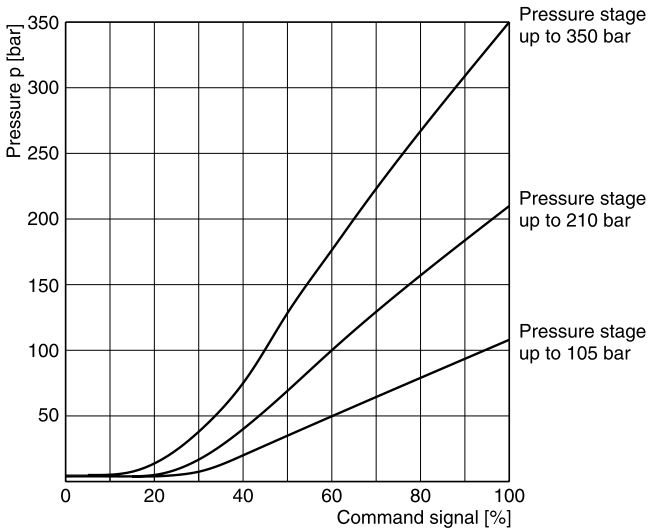
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Technical data R4R

General		T-body		L-body	
Size		**03 (½")**	**06 (1")**	**06 (¾")**	**10 (1¼")**
Mounting		Threaded body			
Mounting position		unrestricted			
Ambient temperature	[°C]	-20...+50			
Weight	[kg]	5.0	5.1	7.4	8.4
Hydraulic					
Max. operating pressure	[bar]	Ports A, B and X up to 350; Port Y depressurized			
Pressure stages	[bar]	105, 210, 350			
Nominal flow	[l/min]	60	200	200	450
Fluid		Hydraulic oil as per DIN 51524...525			
Fluid temperature	[°C]	-20...+80			
Viscosity permitted	[cSt]/[mm²/s]	20...380			
Viscosity recommended	[cSt]/[mm²/s]	30			
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			

Electrical (prop. solenoid)		
Duty ratio	[%]	100
Nominal voltage	[V]	12=
Max. current	[A]	2.3
Coil resistance	[Ohm]	4 at 20°C
Solenoid connection		Connector as per EN175301-803
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)
Power amplifier		PCD00A-400

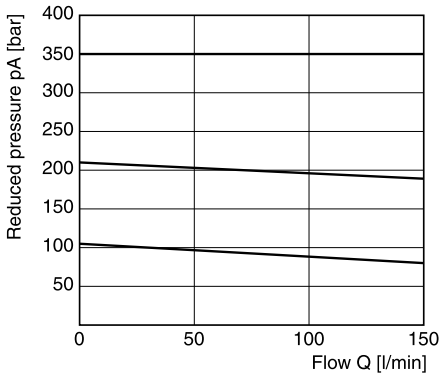
Command/pressure curve



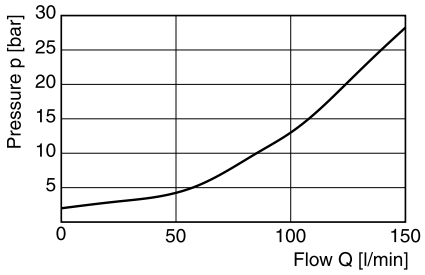
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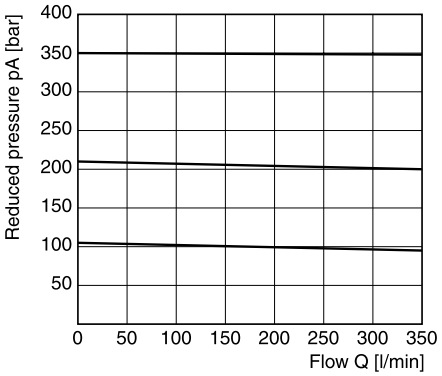
Reduced pressure pA versus flow Q
Series R4R03 [1)]



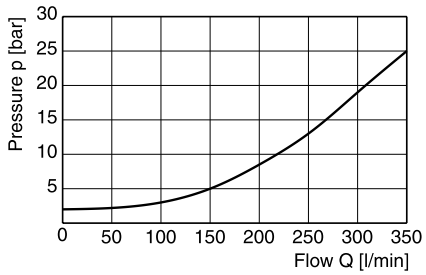
Minimum pressure curve



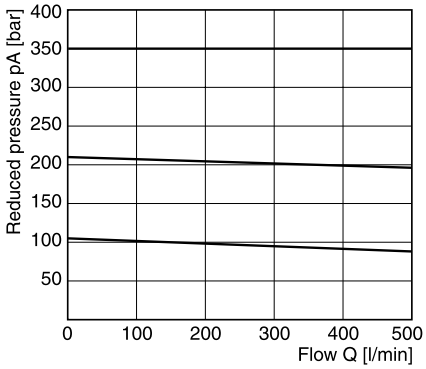
Reduced pressure pA versus flow Q
Series R4R06 [1)]



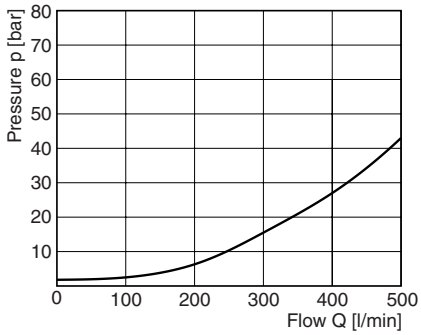
Minimum pressure curve



Reduced pressure pA versus flow Q
Series R4R10 [1)]



Minimum pressure curve



10

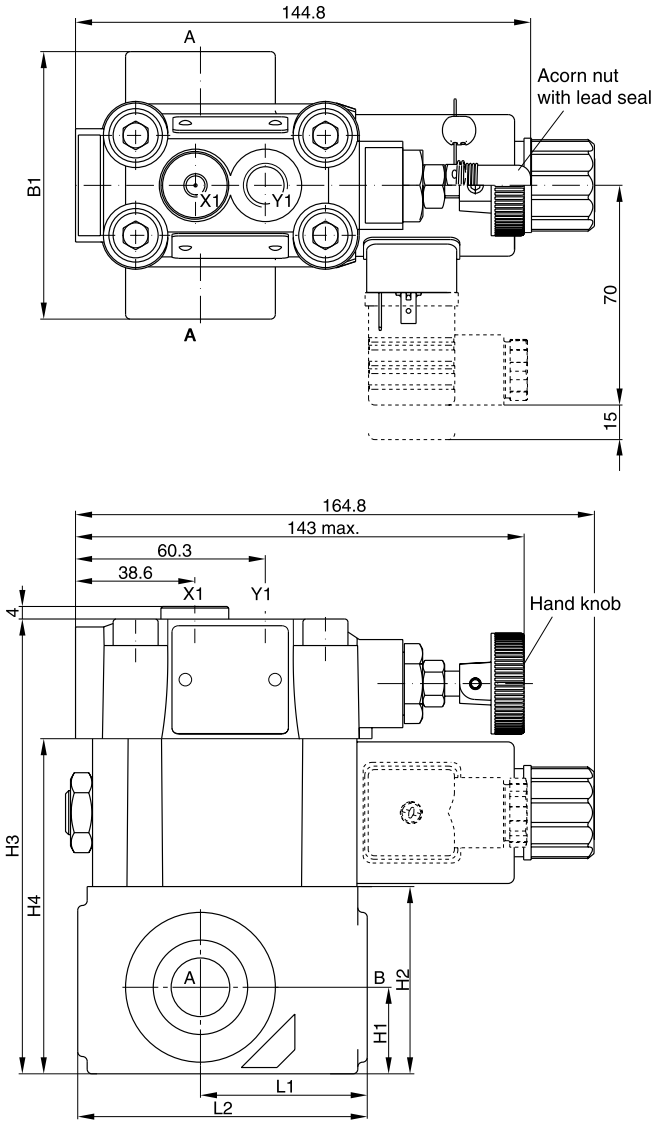
[1)] Measured at 350 bar primary pressure pB.

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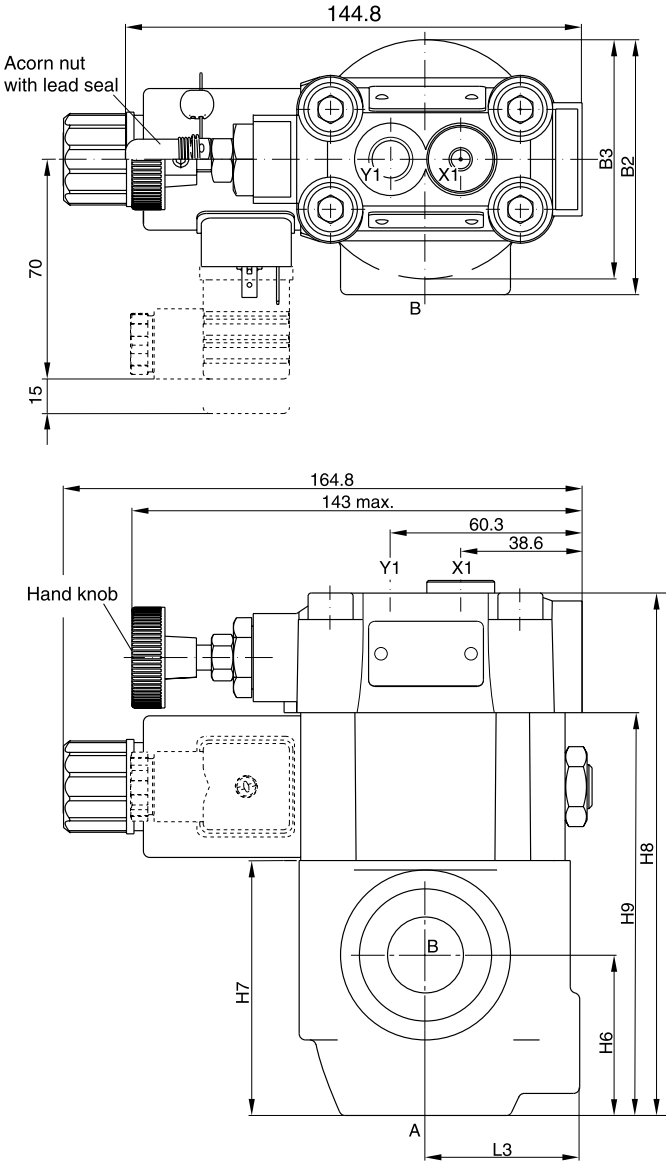
T-body



NG	Body	B1	H1	H2	H3	H4	L1	L2
03	T-body	85	27.5	59.5	144.5	106.5	53	92
06	T-body	136	38	93	178	140	66.5	117.5

Ports	Function	Port size	
		R4V03*P2 T-body	R4V06*P2 T-body
B	pressure (inlet)	G½ "	G1 "
A	pressure (outlet)	G½ "	G1 "
X1	ext. remote control or vent connection	G¼ "	
Y1	external drain		

L-body



NG	Body	B2	B3	H6	H7	H8	H9	L3
06	L-body	81	76	51	81	166	128	49
10	L-body	120.7	85.8	50.8	96	181	143	49.8

Ports	Function	Port size	
		R4V06*P2 L-body	R4V10*P2 L-body
B	pressure (inlet)	G¾ "	G1¼ "
A	pressure (outlet)	G¾ "	G1¼ "
X1	ext. remote control or vent connection	G¼ "	
Y1	external drain		

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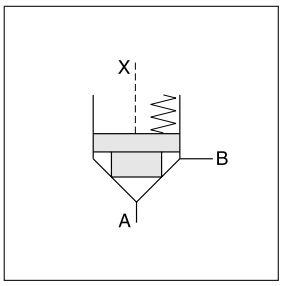
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Seat valves series D4S are designed for directional control functions. A large variety of poppets, springs and covers - including shuttle valves, stroke limiters, solenoid valves (VV01) and position control - allow to design individual hydraulic solutions for nominal flow up-to 600 l/min.

A complete program is offered under the Denison brand:
subplate mounted valves (D4S - chapter 6),
SAE flange valves (D5S - chapter 9),
pipe mounted valves (D4S - chapter 10),
slip-in cartridges (CAR - on request).



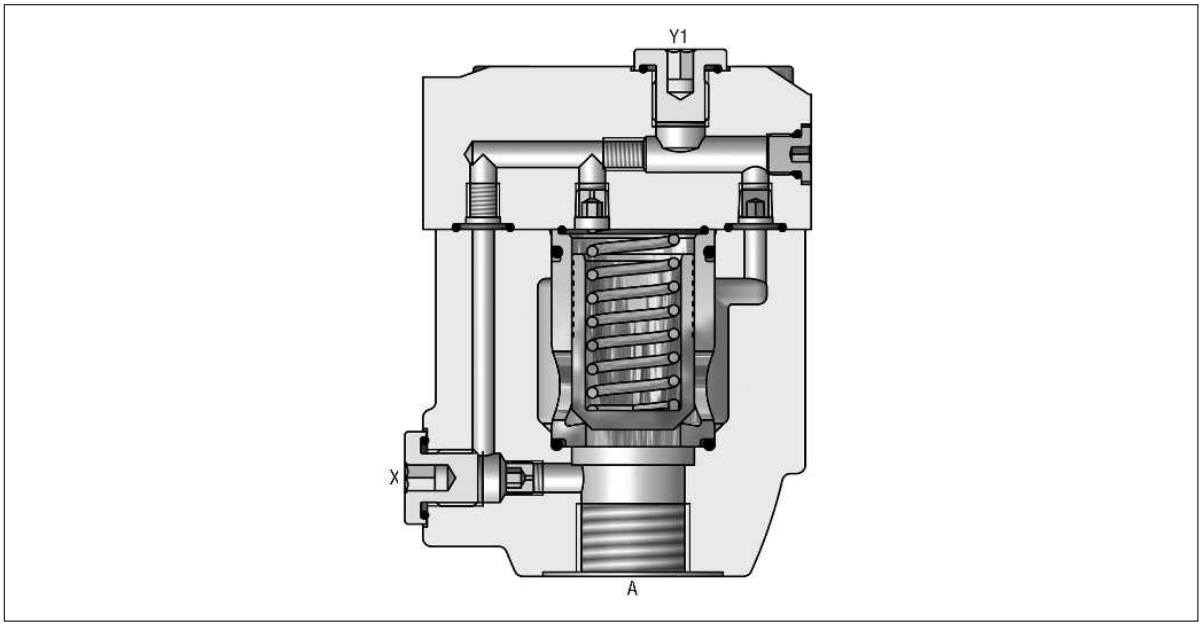
D4S10 L-body



Features

- Leak-free seat valve design
- 2 body designs
  - L-body (2-port)
  - T-body (3-port)
- Numerous pilot options
- 6 poppet types
- 4 port sizes
  - G 1/2“, G1“ for T-body
  - G 3/4“, G 1 1/4“ for L-body

D4S06 L-body



10

D4S □ – □ □ □ – □ □ □ □ □ – **B** □ – □

Seat valve | Nominal size | Body | Pilot connection | Cap version | Sleeve | Spool type | Spring | Switching type | Solenoid voltage | Design series | Seals | Options

Code	Port size
03	NG10 (CAR4 build-in)
06	NG25 (CAR2 build-in)
10	NG32 (CAR2 build-in)

Code	Body	Ports
6	D4S03 T-body D4S06 T-body	A, B = G½"; X, Y1 = G¼" A, B = G1"; X, Y1 = G¼"
D	D4S06 L-body D4S10 L-body	A, B = G¾"; X, Y1 = G¼" A, B = G1¼"; X, Y1 = G¼"

Code	Pilot oil line in body	A-X	B-Y
1	internal from A	⊖	○
2	internal from X	●	○

Code	Ports	X	Y	Z	X-Y	Y1	VV01
	Standard						
1	Pilot oil = pilot drain	—	●	⊖	○	●	—
C	Pilot oil = pilot drain	●	○	⊖	○	●	—
	With solenoid valve (VV01)						
2	Ext. PD from cap	—	○	⊖	●	○	●
6	Internal pilot drain	—	○	⊖	●	●	—
	With stroke limiter (not for D4S03)						
3	Pilot oil = pilot drain	⊖	●	—	—	—	—
4	Pilot oil = pilot drain	●	⊖	—	—	—	—

○ open bore ● closed bore ⊖ orifice Ø 1.2

Note: Combination examples at the end of chapter

Code	Sleeve
1	AA=95%, AB=5%
3	AA=60%, AB=40%

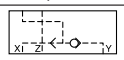
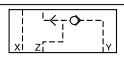
Code	Size	Poppet type	Sleeve
1	03, 06,10	With closed bottom and 15° chamfer (pZ max. = pA +20bar	1
2	03	With 0.8 dia. orifice at the bottom and 15° chamfer	1
	06, 10	With 1.2 dia. orifice at the bottom and 15° chamfer	1
4	03, 06,10	With closed bottom and 45° chamfer	1, 3
A[1)]	06, 10	Safety spool (for position control only)	3
B[1)]	06, 10	Throttle spool, 10° chamfer	3
C[1)]	06, 10	Throttle spool, 3° chamfer	3

[1)] Springs 2, 3, 4 and 6 only

Code	Options
omit	Standard
013	Cover for position control

Code	Seals
1	NBR
5	FPM

Code	Solenoid voltage
omit	Standard w/o vent function
G0R	12V=
G0Q	24V=
GAR	98V=
GAG	205V=
W30	110V / 50Hz ; 120V / 60Hz
W31	230V / 50Hz ; 240V / 60Hz

Code	Switching type	
omit	Standard w/o vent function	
09	VV01 with manual override	de-energized: power comp. open
10	VV01 without manual override	
11	VV01 with manual override	de-energized: power comp. closed
12	VV01 without manual override	
CA	Shuttle valve	
DA	Shuttle valve	
CB	VV01 code 09 and shuttle valve code CA	
CD	VV01 code 11 and shuttle valve code CA	
DB	VV01 code 09 and shuttle valve code DA	
DD	VV01 code 11 and shuttle valve code DA	
BH	VV01 code 10 and shuttle valve code CA and position control [2)] with amplifier	
BK	VV01 code 12 and shuttle valve code CA and position control [2)] with amplifier	
BN	VV01 code 10 and shuttle valve code DA and position control [2)] with amplifier	
BQ	VV01 code 12 and shuttle valve code DA and position control [2)] with amplifier	
BC	VV01 code 10 and position control [2)] with amplifier	
BE	VV01 code 12 and position control [2)] with amplifier	
BA	Position control [2)] with amplifier	
BF	Position control [2)] with amplifier and shuttle valve code CA	
BL	Position control [2)] with amplifier and shuttle valve code DA	

[2)] Position control for D4S06/10 only.
Spring 2 or 4. Spool A and sleeve 3.
Valve open: proximity switch damped

Code	Spring (approx. cracking pressure [bar])					
	Sleeve Code 1		Sleeve Code 3			
	A -> B		A -> B		B -> A	
	D5S03	D5S06/10	D5S03	D5S06/10	D5S03	D5S06/10
1	2.8	3.5	6.5	6.5	9.5	11.0
2	0.5	0.5	1.0	1.0	1.5	1.7
3	0.3	0.3	0.6	0.6	0.9	1.0
4	2.2	2.2	4.0	3.5	5.5	6.0
5	—	9.0	—	16.0	—	28.0
6	1.2	1.2	2.0	2.2	3.0	3.8
7	3.0	—	8.0	—	12.0	—

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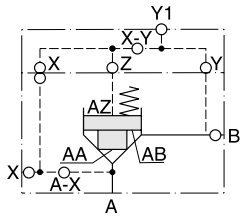
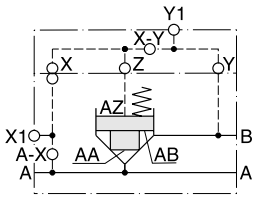
Technical data

General			T-body		L-body	
Size			**03 (½")**	**06 (1")**	**06 (¾")**	**10 (1¼")**
Mounting			Threaded body			
Mounting position			unrestricted			
Ambient temperature		[°C]	-20...+50			
Weight	D4S T-body	[kg]	3.2	6.6	—	—
	D4S L-body	[kg]	—	—	3.3	5.6
Hydraulic						
Max. operating pressure		[bar]	Ports A, B up to 350; Port Y 140 (with VV01)			
Nominal flow		[l/min]	180	360	360	600
Fluid			Hydraulic oil as per DIN 51524...525			
Fluid temperature		[°C]	-20...+80			
Viscosity permitted		[cSt]/[mm²/s]	10...650			
Viscosity recommended		[cSt]/[mm²/s]	30			
Filtration			ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			

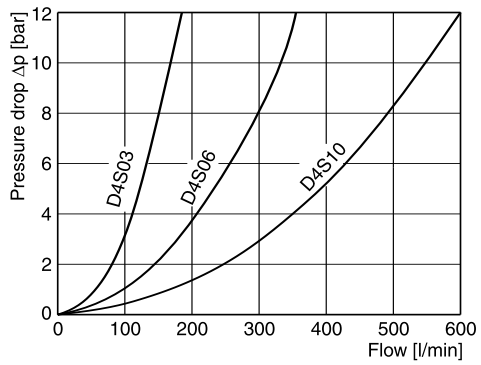
Electrical (solenoid)								
Duty ratio		[%]	100					
Response time		[ms]	Energized / de-energized AC: 20/18 , DC: 46/27					
		Code	G0R	G0Q	GAR	GAG	W30	W31
Supply voltage		[V]	12V =	24V =	98V =	205V =	110 at 50Hz 120 at 60Hz	230 at 50Hz 240 at 60Hz
Tolerance supply voltage		[%]	+5...-10	+5...-10	+5...-10	+5...-10	+5...-10	+5...-10
Power consumption, hold		[W]	31	31	31	31	78	78
Power consumption, in rush		[W]	31	31	31	31	264	264
Max. switching frequency		[1/h]	AC: up to 7.200, DC: up to 16.000 switchings/hour					
Solenoid connection			Connector as per EN175301-803					
Protection class			IP65 in accordance with EN 60529 (plugged and mounted)					
Coil insulation class			H (180 °C)					

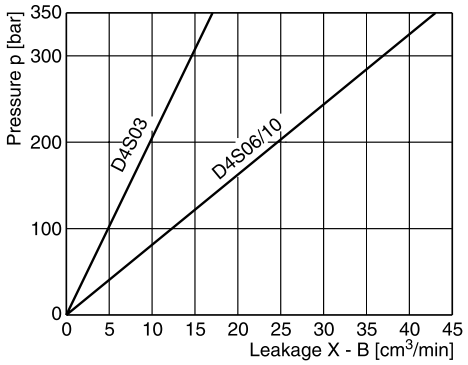
10

D4S pilot configuration

L-body (2-port)	T-body (3-port)
	

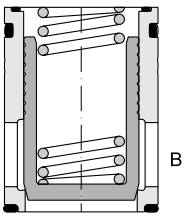
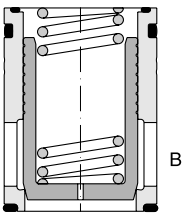
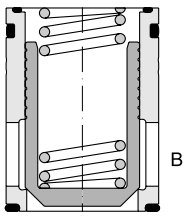
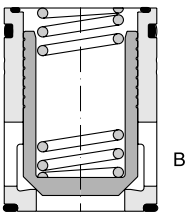
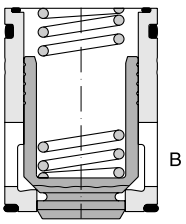
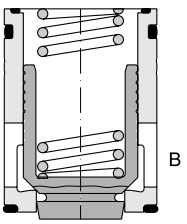
Δp/Q performance curves



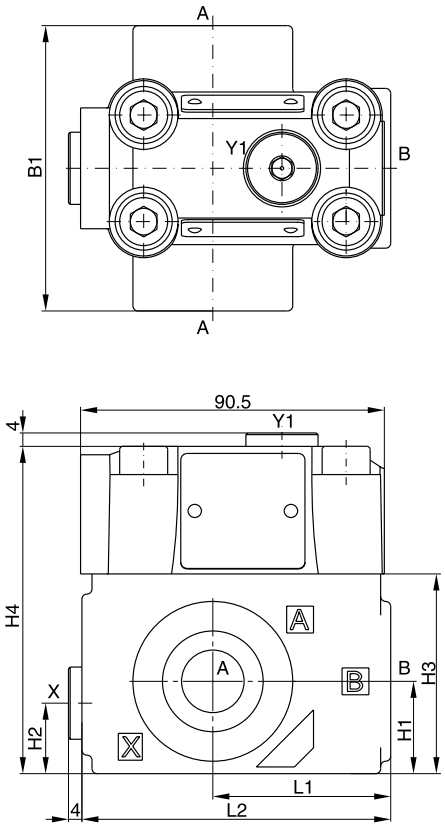


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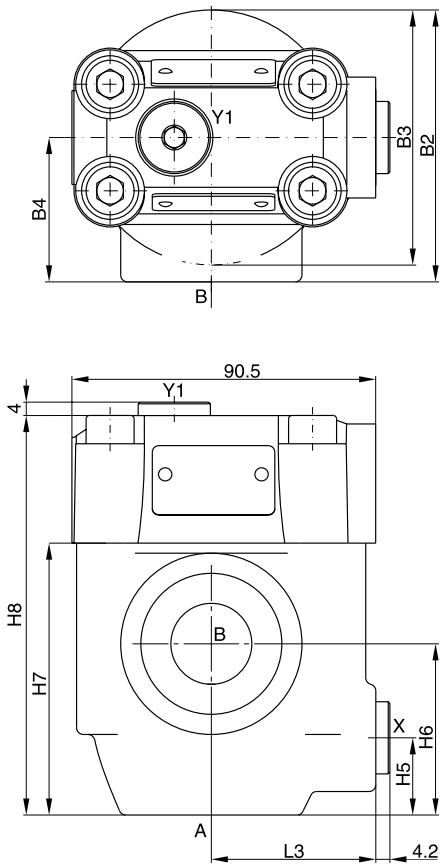
Selection of Cartridges

Sleeve 1, poppet 1	Sleeve 1, poppet 2	Sleeve 1, poppet 4	Sleeve 3, poppet 4	Sleeve 3, poppet A	Sleeve 3, poppet B/C
					
1 : 1.05 $A_A = 0.95\ A_C$ $A_B = 0.05\ A_C$ 15° chamfer	1 : 1.05 $A_A = 0.95\ A_C$ $A_B = 0.05\ A_C$ 15° chamfer orifice	1 : 1.05 $A_A = 0.95\ A_C$ $A_B = 0.05\ A_C$ 45° chamfer	1 : 1.67 $A_A = 0.6\ A_C$ $A_B = 0.4\ A_C$ 45° chamfer	1 : 1.67 $A_A = 0.6\ A_C$ $A_B = 0.4\ A_C$ 45° chamfer safety spool	1 : 1.67 $A_A = 0.6\ A_C$ $A_B = 0.4\ A_C$ 45° chamfer throttle spool

D4S 03/06 T-body



D4S 06/10 L-body



10

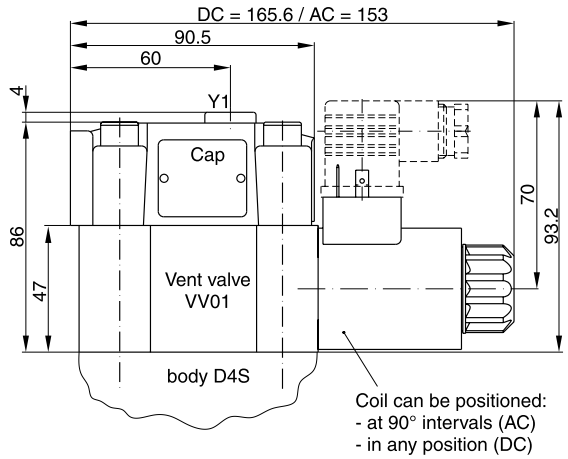
Ports	Function	Port size			
		D4S03 T-body	D4S06 L-body	D4S06 T-body	D4S10 L-body
A	inlet or outlet	G½"	G¾"	G1"	G1¼"
B	outlet or inlet	G½"	G¾"	G1"	G1¼"
X1	external pilot port	G¼"			
Y1	external drain [1]				

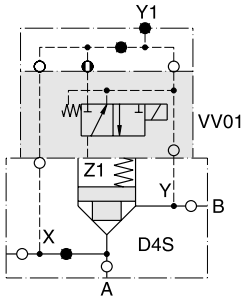
[1] With VV01 only

Size	L1	L2	B1	H1	H2	H3	H4
03 (T-body)	53	92	85	27.5	21	59.5	97.5
06 (T-body)	66.5	117.5	136	38	28	93	131

Size	L3	B2	B3	B4	H5	H6	H7	H8
06 (L-body)	49	81	76	43	23	51	81	119
10 (L-body)	49.8	120.7	85.6	77.8	38.1	50.8	96	134

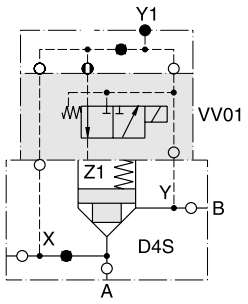
Dimensions D4S with VV01





with manual override | without manual override

D4S..-...-...-09/10-
Solenoid energized:
D4S blocked
Solenoid deenergized:
Flow from A-B or B-A



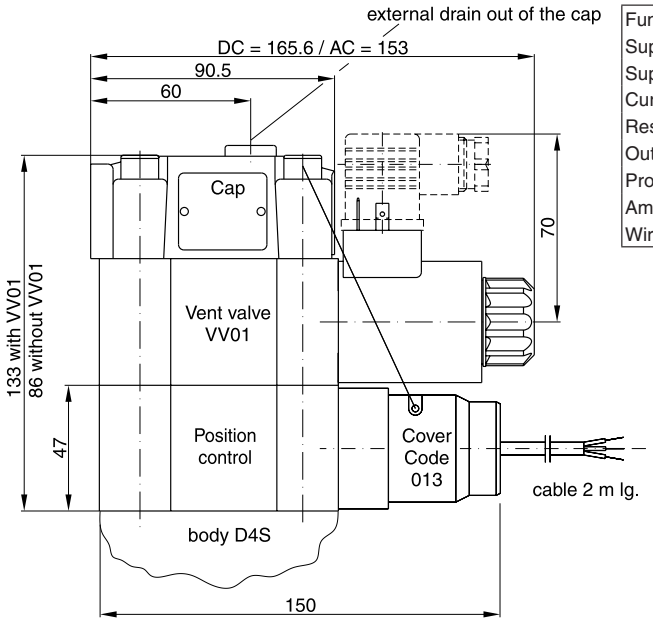
with manual override | without manual override

D4S..-...-...-11/12-
Solenoid energized:
Flow from A-B or B-A
Solenoid deenergized:
D4S Blocked

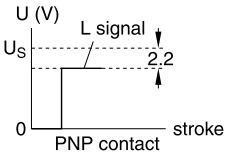
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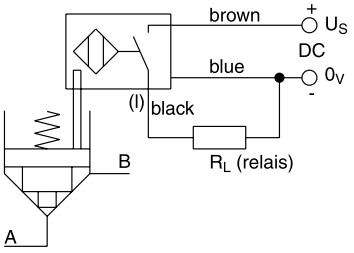
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Dimensions D4S position control



Function		PNP, contact
Supply voltage (Us)	[VDC]	10...30
Supply voltage ripple	[%]	≤ 10
Current consumption	[mA]	max. 8
Residual voltage L-signal	[V]	Us - 2.2 at I_{max}
Output current (I)	[mA]	≤ 200
Protection class		IP67
Ambient temperature	[C°]	-25...+70
Wire cross section	[mm²]	3 x 0.5





Position control by proximity switch (incl. amplifier)

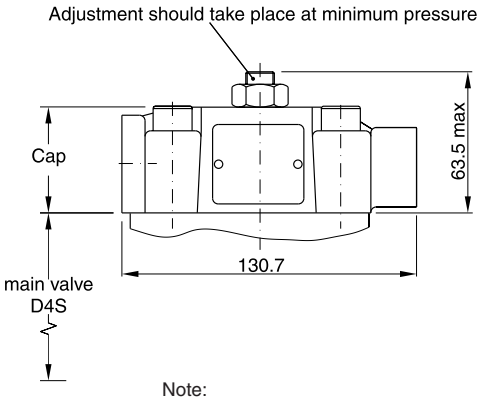
Valve open: proximity switch activated.

This proximity switch is pressure proof and has no wearing parts.

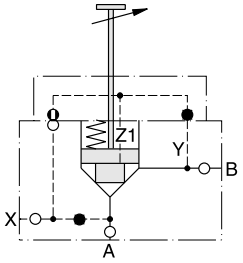
Note

Position control for D4S06 and D4S10 only.

Dimensions D4S stroke limiter



Example: D4S$^{06}_{10}$-.23-3B.

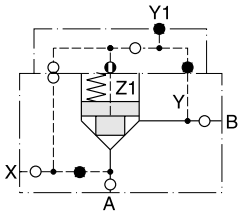


Note:
Stroke limiter not for use with D4S03, VV01, shuttle valve and positon control.

10

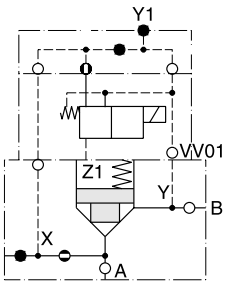
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D4S direct operated

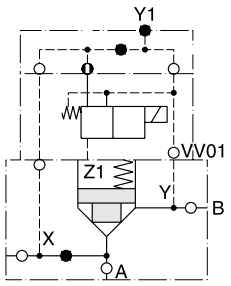


D4S..-.21
Pilot oil X = exrernal

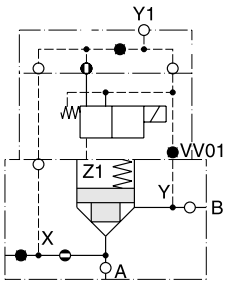
D4S with solenoid valve VV01



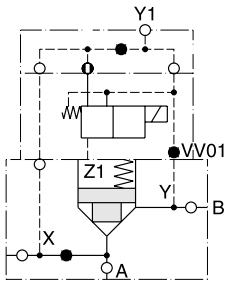
D4S..-.16-...- 09 10 11 12 with VV01
Pilot oil X = internal from A
Drain Y = internal to B



D4S..-.26-...- 09 10 11 12 with VV01
Pilot oil X = external
Drain Y = internal to B



D4S..-.12-...- 09 10 11 12 with VV01
Pilot oil X = internal from A
Drain Y1 = external out of the cap

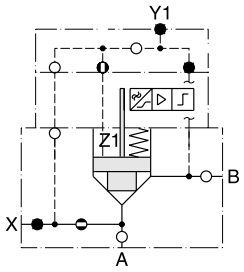


D4S..-.22-...- 09 10 11 12 with VV01
Pilot oil X = external
Drain Y1 = external out of the cap

10

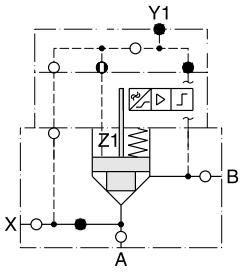
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D4S with position control



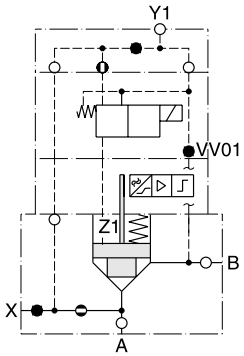
D4S..-.11-3A.-BA
(with postion control)

Pilot oil X = internal from A



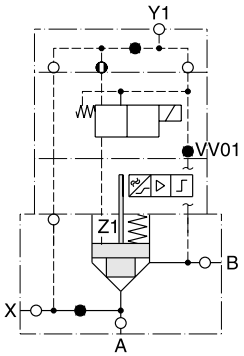
D4S..-.21-3A.-BA
(with postion control)

Pilot oil X = external



D4S..-.12-3A.- BC / BE } with postion control and VV01

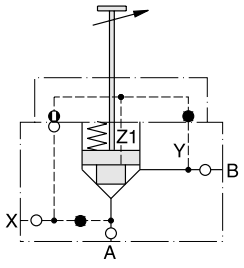
Pilot oil X = internal from A
Drain Y1 = external out of the cap



D4S..-.22-3A.- BC / BE } with postion control and Vv01

Pilot oil X = external
Drain Y1 = external out of the cap

D4S with stroke limiter

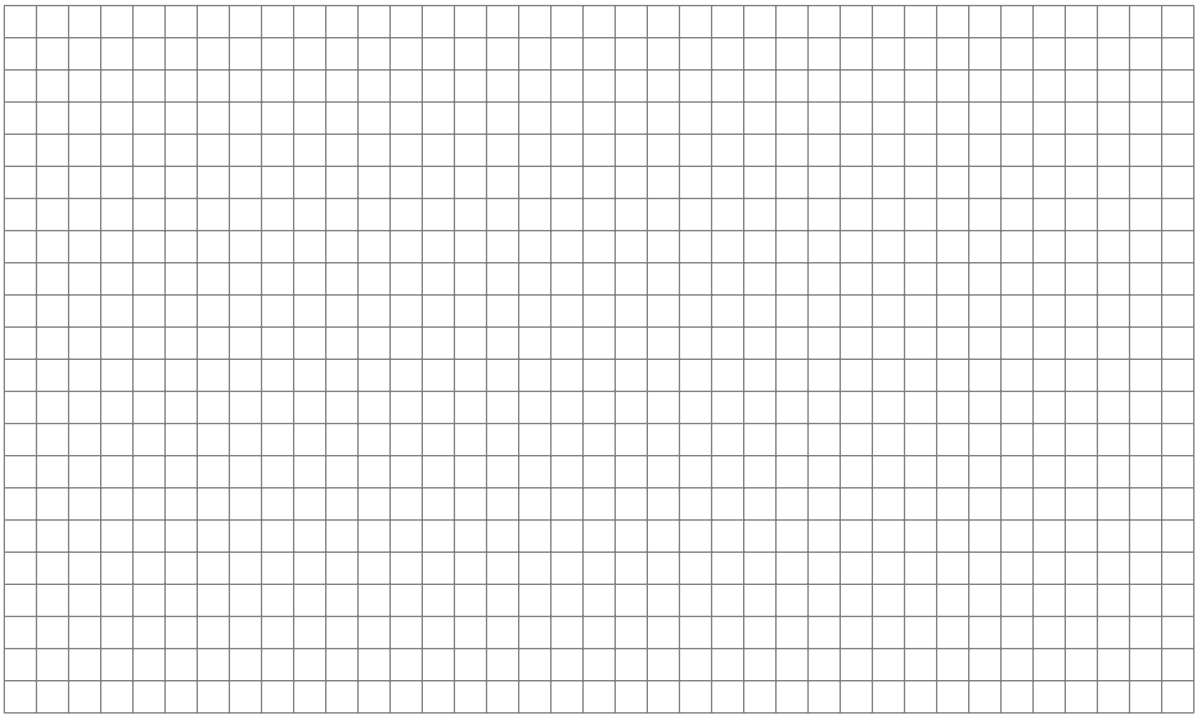


D4S..-.23-3B. with stroke limiter
Pilot oil X = external
(Note: for D4S06 and D4S10 only)

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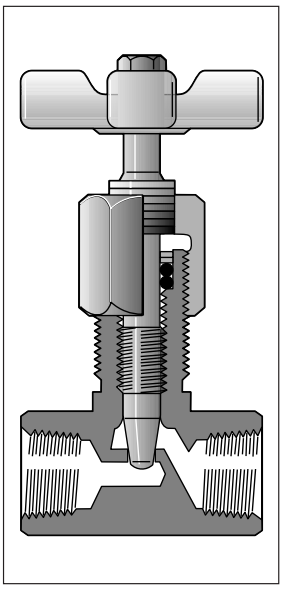
Notes



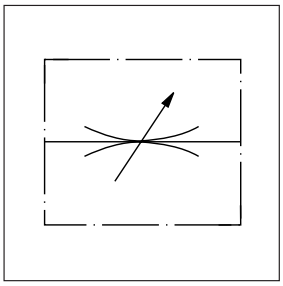
Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

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Manatrol needle valve, optional with 30° poppet, V-notch, or rectangular slot. The form of the throttle opening influences the accuracy of the flow setting, which depends on the pressure and viscosity. The needle is made of stainless steel and corresponds to a ring gap in the valve body.







$$\text{Flow rate } Q\ [l/min] = Kv \cdot \sqrt{\frac{\Delta p}{\gamma}}$$

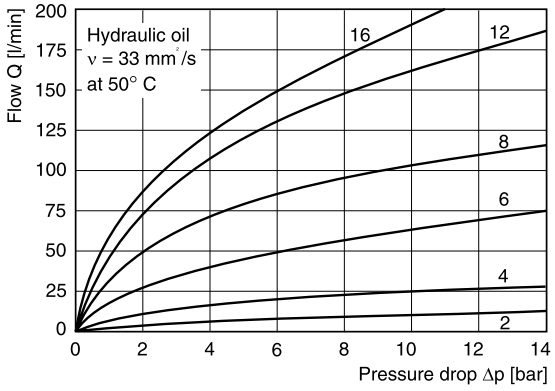
Kv — from the table
Δp [bar]
γ [kg/dm³] = spezific weight of the medium
(γ for mineral oil = 0.85 - 0.9)

Technical data

Size	Max.pressure [bar]		Flow [l/min]	Max. cross. sect. [cm²]	Kv factor valve	Weight
	steel	brass	Δp 10bar	10bar	open	[kg]
200	350	140	11	0.07	3.5	0.13
400	350	140	25	0.14	6.3	0.31
600	350	140	65	0.37	18.5	0.54
800	350	140	105	0.55	27.5	0.95
1200	350	-	160	0.90	45.7	1.58
1600	210	-	190	1.10	54.6	1.9

Size and needle type	
200-2	7
200-3	2
400-2	11

Δp/Q curves



Ordering code

Thread type	MV	Size and design	Body	Needle	Seal
Needle valve					

Code	Thread
omit	NPTF
9	**BSPP**

Straight way valve code	Size	Angle valve code
200	1/8	261
400	1/4	461
600	3/8	661
800	1/2	861
1200	3/4	1261
1600	1	—

Code	Body
S	**Steel**
B [1]	Brass

[1] not for models MV 1200/1600 and design „61"

Code	Seal
omit	**NBR**
V	FPM

Code	Needle
omit	**Standard with 30° taper**
2 [2]	Fine due to V-notch
3 [2]	Micro-fine due to rect. slot

[2] only for size 400

Bold letters =
Short-term availability

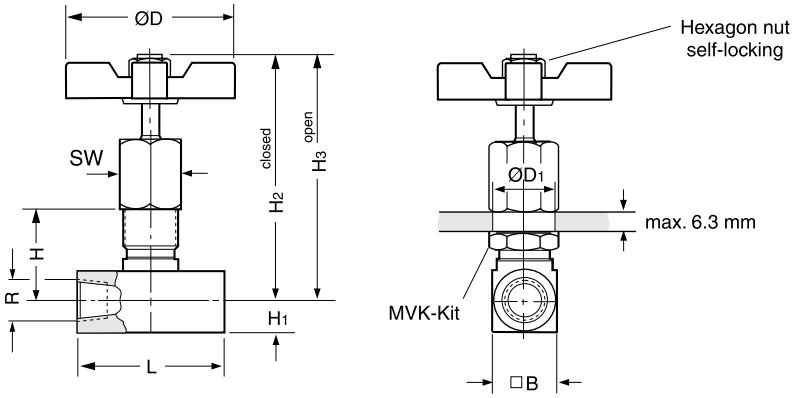
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MV-9MV_UK.INDD RH_26.11.07

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Kaarst, Germany

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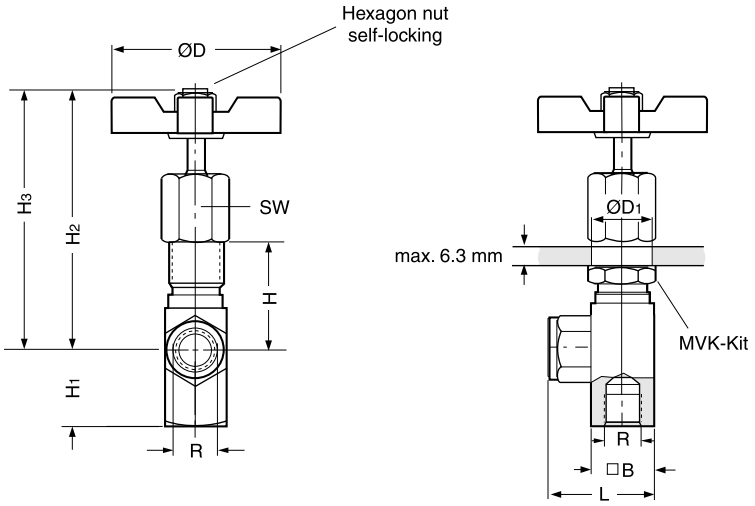
Series MV*00 valve with connecting thread in-line



Size	R*	H	H3	H2	H1	B	ØD1	L	ØD	SW	MVK sets
2	1/8	24	69	64	8	16	15	38	45	15.7	MVK 2
4	1/4	33	86	81	10.5	21	20	51	51	22.1	MVK 4
6	3/8	38	108	100	13	26	23	64	64	25.4	MVK 6
8	1/2	51	130	117	16	32	29	67	83	31.8	MVK 8
12	3/4	54	142	128	19	38	36	83	98	41.2	MVK 12
16	1	60	147	133	22.5	45	36	108	98	41.2	MVK 12

* Pipe thread G or NPTF

Series MV*61 angle valve with connections at 90° angle



Size	R*	H	H3	H2	H1	B	ØD1	L	ØD	SW
2	1/8	27	72	67	20.6	16	15	27	45	15.7
4	1/4	36	90	85	27.7	21	20	38	51	22.1
6	3/8	42	111	103	34.8	26	23	45	64	25.4
8	1/2	55	134	121	42.7	32	29	53	83	31.8
12	3/4	59	147	133	41.1	38	36	64	98	41.2

* Pipe thread G or NPTF

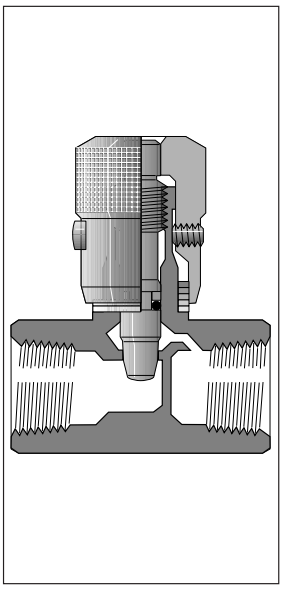
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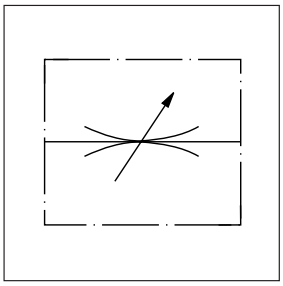
Manatrol stop and throttle valves with 2-stage needle cone. Fine adjustment for the first stage can be achieved with 3 rotations of the adjustment knob. The second stage with normal throttle characteristics is achieved with 3 further rotations. A cylindrical needle with a rectangular slot is provided to reduce the viscosity effect for sizes 200 up to 600. The flow is dependent on pressure and viscosity.

$$\text{Flow rate } Q\ [\text{l/min}] = Kv \cdot \sqrt{\frac{\Delta p}{\gamma}}$$

Kv	from the table
Δp [bar]	
γ [kg/dm^3]	= spezific weight of the medium
(γ for mineral oil	= 0.85 - 0.9)







Specifications

Return check poppet Nominal cracking pressure	0.4 bar
Operating temperature	-40°C to +121°C

Technical data (only for standard 2 stage needle)

Size	Steel	Brass	Flow [l/min]	Max. cross section	Kv factor valve	Weight [kg]
200	350	140	11	0.066	3.3	0.15
400	350	140	25	0.13	6.3	0.22
600	350	140	40	0.22	11.2	0.6
800	350	140	50	0.28	13.9	0.63
1200	350	140	120	0.70	35.4	1.04
1600	210	35	250	1.48	75	2.13

Ordering code

	N					
Thread type	Needle valve	Thread size	Body	Needle	Clamping screw	Seal

Code	Thread
omit	NPTF
9	**BSPP**

Code	Size
200	**1/8**
400	**1/4**
600	**3/8**
800	**1/2**
1200	**3/4**
1600	1

Code	Body
S	**Steel**
B	Brass

Code	Seal
omit	**NBR**
V	FPM

Code	Clamping screw
omit	**Hexagon socket**
F	With knurled knob
T	Tamper-proof

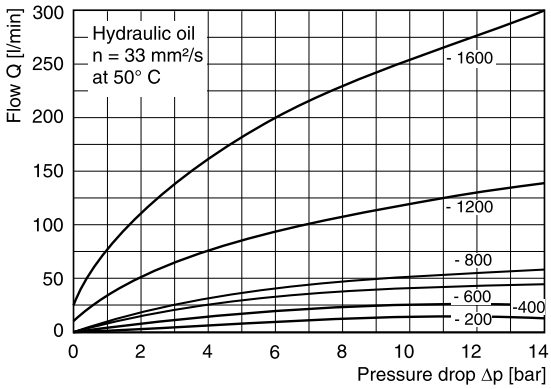
Code	Needle
omit	**Standard 2-stage needle**
4 [2]	Micro-fine hollow needle with slot

[2] only for sizes 200 to 600

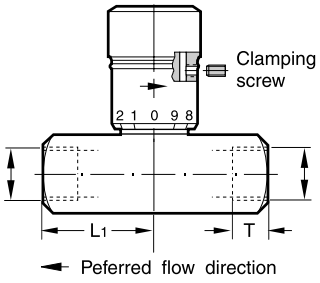
Bold letters =
Short-term availability

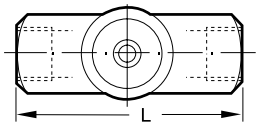
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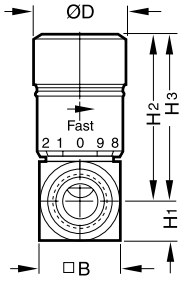
p/Q curves



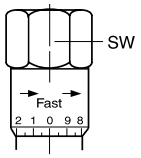
Dimensions



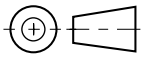




H2 = closed
H3 = open



Hexagon adjusting knob, standard for size 1600



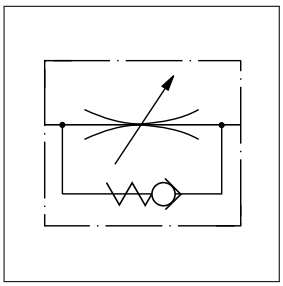
Size	R* Threads	H3	H2	H1	B	L1	L	ØD	SW
200	1/8	39	35	8	16	16	38	19	-
400	1/4	46	40	10.5	21	25	51	21	-
600	3/8	55	49	13	26	32	64	25	-
800	1/2	69	61	16	32	33	67	30	-
1200	3/4	86	71	19	38	41	83	35	-
1600	1	124	107	22.5	45	54	108	-	47.8

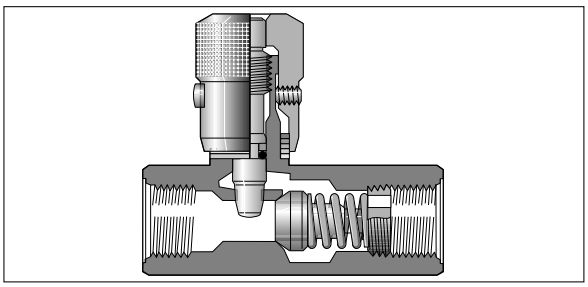
* G or NPTF

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Manatrol throttle check valves of series F with fine adjustment of the flow rate for a defined flow direction. The built-in check valve allows free flow in the counter direction with little flow resistance. A 2-stage needle provides very exact setting of smaller flow rates with the first three rotations of the adjustment knob. After 3 more rotations, the valve is completely open. The valve setting can be locked using a locking screw.







$$\text{Flow rate } Q\ [l/min] = Kv \cdot \sqrt{\frac{\Delta p}{\gamma}}$$

Kv — from the table
Δp [bar]
γ [kg/dm³] = spezific weight of the medium
(γ for mineral oil = 0.85 - 0.9)

Specifications

Return check poppet Nominal cracking pressure	0.4 bar
Operating temperature	-40°C to +121°C

Technical data

Size	Pressure [bar]		Max. flow [l/min Δp10bar]	Throttle surface [cm²]	Throttle v. open Kv factor	Weight [kg]	
	Steel	Brass				Steel	Brass
200	350	140	11	0.066	3.3	0.13	0.13
400	350	140	25	0.13	6.3	0.23	0.23
600	350	140	40	0.22	11.2	0.31	0.31
800	350	140	50	0.28	14	0.67	0.68
1200	210	140	120	0.70	35.4	1.17	1.18
1600	210	35	250	1.48	75	2.31	2.32
2000	210	–	250	1.48	75	3.67	–
2400	210	–	250	1.48	75	4.62	–
3200	210	–	250	1.48	75	7.78	–

Ordering code

	F					
Thread type	Throttle check valve	Thread size	Body	Needle	Clamping screw	Seal

Code	Thread
omit	NPTF
9	**BSPP**

Code	Size
200	**1/8**
400	**1/4**
600	**3/8**
800	**1/2**
1200	**3/4**
1600	**1**
2000	1¼
2400	1½
3200	2

Code	Body
S	**Steel**
B [1]	Brass

Code	Seal
omit	**NBR**
V	FPM

Code	Clamping screw
omit	**Hexagon socket**
F	With knurled knob
T	Tamper-proof

Code	Needle
omit	**Standard 2-stage needle**
4 [3]	Micro-fine hollow needle with slot

[3] only for sizes 200 to 600

Bold letters =
Short-term availability

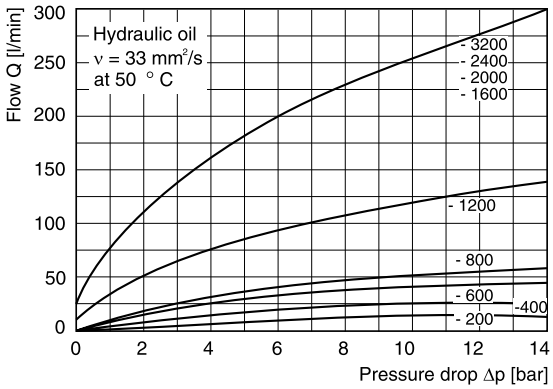
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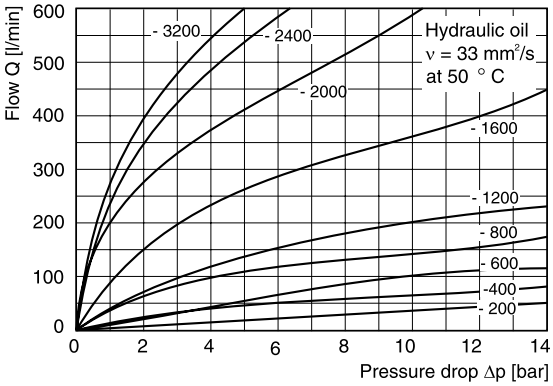
Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

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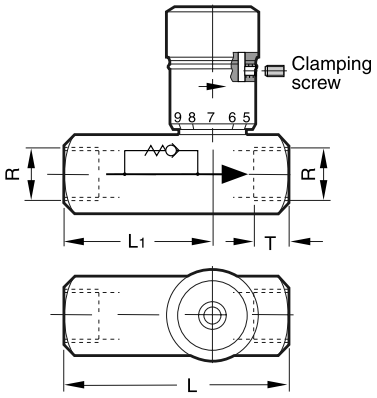
Controlled flow vs. pressure drop needle fully open

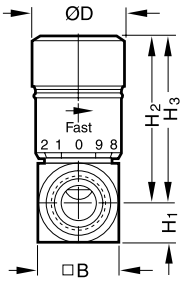


Free flow vs. pressure drop needle fully open

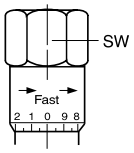


Dimensions

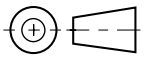




H_2 = closed
H_3 = open



Hexagon adjusting knob, standard for sizes 1600 to 3200

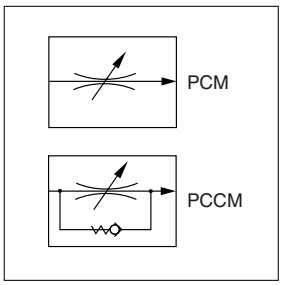


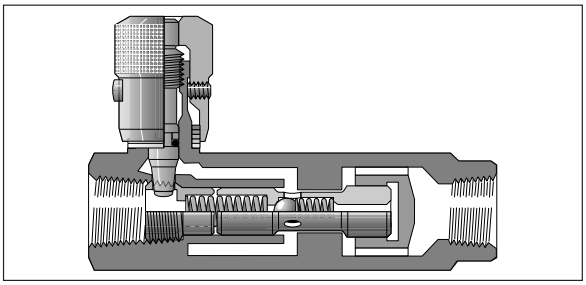
Size	R*	H3	H2	H1	B	L1	L	ØD	SW	T
200	1/8	39	35	8	16	36	51	19	-	9
400	1/4	46	40	10.5	21	43	67	21	-	13
600	3/8	55	49	13	26	45	70	25	-	13
800	1/2	69	61	16	32	57	87	30	-	16
1200	3/4	86	71	19	38	65	99	35	-	17
1600	1	124	107	22.5	45	83	127	-	47.8	20
2000	1 1/4	130	114	29	58	99	143	-	-	21.5
2400	1 1/2	137	120	35	70	114	143	-	-	23.5
3200	2	146	130	44.5	89	134	165	-	-	25

* Pipe thread G or NPTF

Manatrol 2 way flow control valves for pressure compensated regulation of the flow rate. As a consequence of pressure changes, the set value can vary by ± 5% within the tolerance range. Viscosity changes have the same effect and are to be observed.







Technical data

Size	Max. press. [bar]	Flow control		Check valve		Weight [kg]
		Q* [l/min]	Δp [bar]	Q_{max} [l/min]	Δp [bar]	
400	210	1 - 10	7	20	3	0.82
600	210	2 - 25	7	30	3	1.05
800	210	6 - 60	11	75	8	1.68
1200	210	10 - 100	11	130	8	3.64
1600	210	19 - 190	11	250	10	6.59

* Min. and max. flow rate

Ordering code

	PC		M		S			
Thread type	Press. comp. flow control valve	Design		Thread size	Steel body	Clamping screw	Seal	Design series (is determined by factory)

Code	Thread
omit	NPTF
9	**BSPP**

Code	Design
omit	**Without check valve**
C	With check valve

Code	Size
400	**1/4**
600	**3/8**
800	**1/2**
1200	**3/4**
1600	**1**

Code	Seal
omit	**NBR**
V	FPM

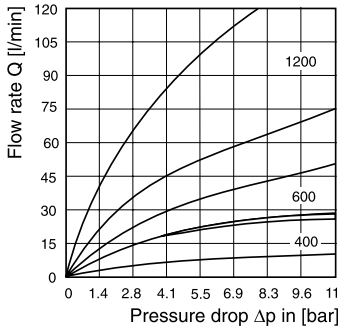
Code	Clamping screw
omit	**Hexagon socket**
F	With knurled knob
T [2]	Tamper-proof

[2] not available above size 1200

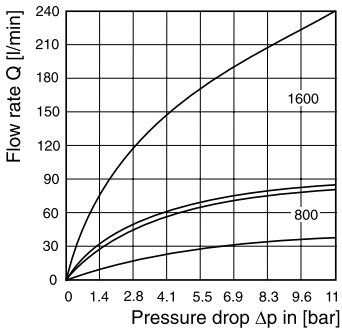
Bold letters =
Short-term availability

10

Δp/Q curves

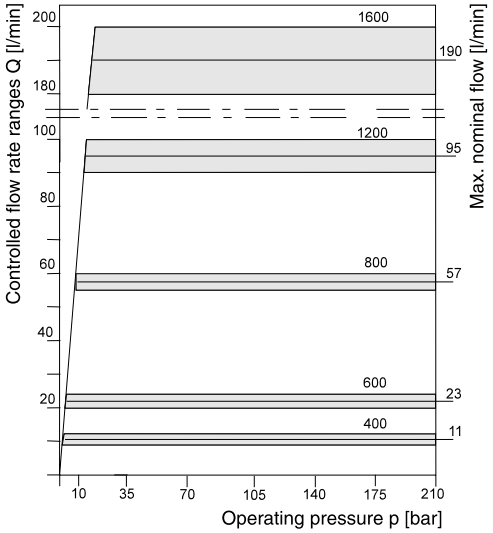


Sizes 400, 600 and 1200: Pressure drop Δp for flow through check valve in range Q_{max} / Q_{min} with each size



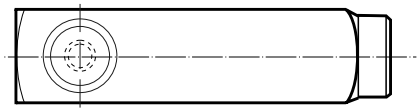
Sizes 800 and 1600: Pressure drop Δp for flow through check valve in range Q_{max} / Q_{min} with each size

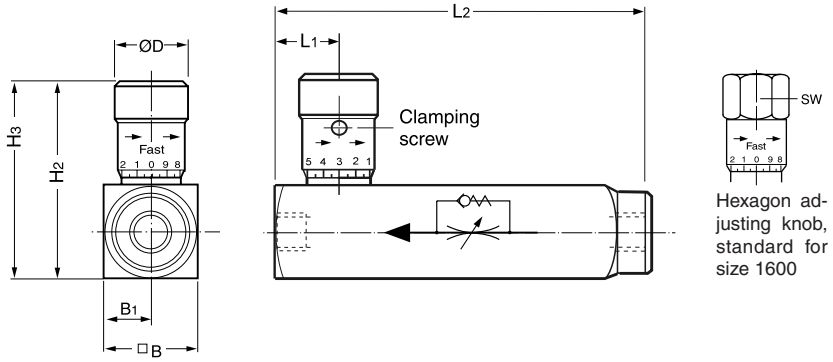
Size 400 - 1600 p/Q control characteristic



The curves refer to hydraulic oil of 33 cSt / 50°C.

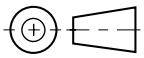
Dimensions





Hexagon adjusting knob, standard for size 1600

H_2 = closed
H_3 = open



Size	R*	H3	H2	B	L1	B1	L2	ØD	SW
400	1/4	69	64	35	16	18	92	21	-
600	3/8	80	74	38	18	19	106	25	-
800	1/2	103	95	44	22	22	125	30	-
1200	3/4	128	116	57	28	29	149	35	-
1600	1	175	158	70	33	35	176	-	47.8

* Pipe thread G or NPTF

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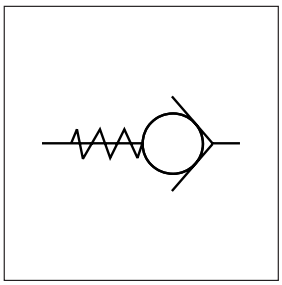
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Kaarst, Germany

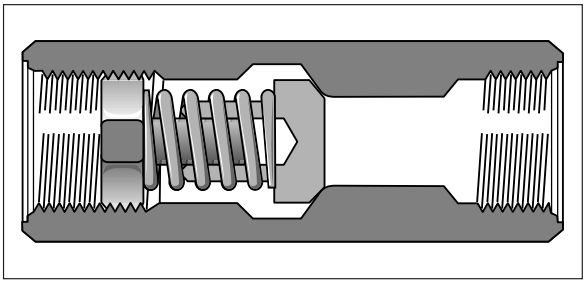
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Manatrol check valves of series C for pipe mounting provide free flow in one direction and block flow in the counter direction. Depending on material specification, these valves are suited for use in hydraulic and pneumatic systems.

Specific poppets and poppet guides ensure reliable functional integrity even at high flow rates and/or pulsations.







Technical data

Size			200	400	600	800	1200	1600
Max. operating pressure	steel	[bar]	350	350	350	350	350	210
	brass	[bar]	140	140	140	140	140	34
Pressure drop Δp		[bar]	10	10	10	10	1	1
Flow Q		[l/min]	40	65	110	155	112	160

Ordering code

		C				
Thread type		**Pipe mounting**	**Port size**	**Body**		**Opening pressure**

Code	Thread
omit	NPTF
9	**BSPP**

Code	Size
200	1/8
400	**1/4**
600	**3/8**
800	**1/2**
1200	**3/4**
1600	**1**

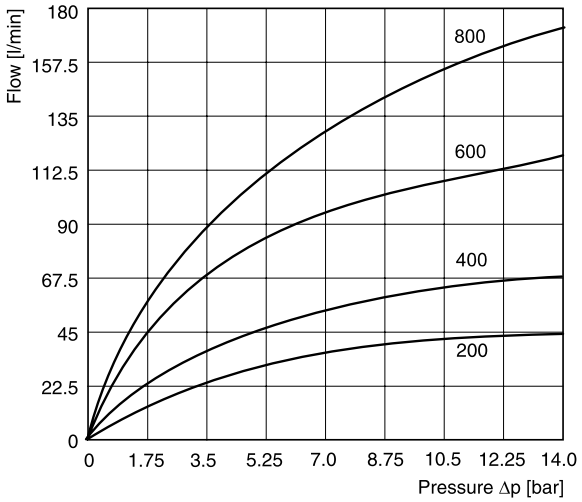
Code	Pressure [bar]
omit	**0.35**
65	4.5

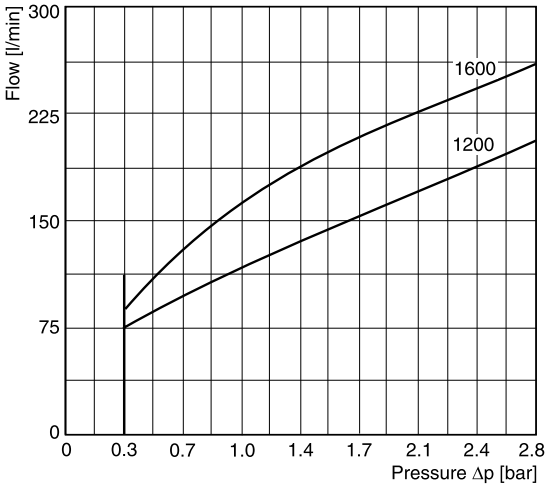
Code	Body
S	**Steel**
B	Brass

Bold letters =
Short-term availability

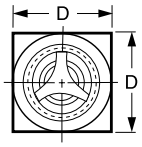
Tel: +45 63 12 83 00 | Email: ps@hymatik.com | www.hymatik.com | Hvidkaervej 27a, DK-5250 Odense SV, Denmark

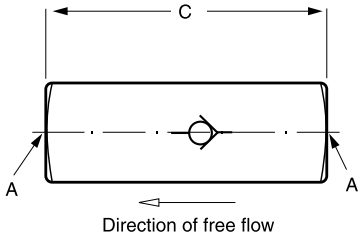
Δp/Q performance curves

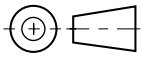




Dimensions







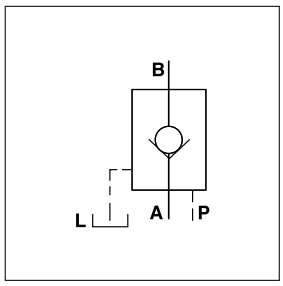
Size	Threaded connection R*		Dimensions [mm]		Weight [kg]
	G thread	NPTF thread	B	L	
C 200	R 1/8"	1/8-27 NPTF	16	51	0.05
C 400	R 1/4"	1/4-18 NPTF	21	66	0.2
C 600	R 3/8"	3/8-18 NPTF	25	70	0.2
C 800	R 1/2"	1/2-14 NPTF	32	87	0.6
C 1200	R 3/4"	3/4-14 NPTF	38	99	0.9
C 1600	R 1"	1-11-1/2 NPTF	45	127	1.5

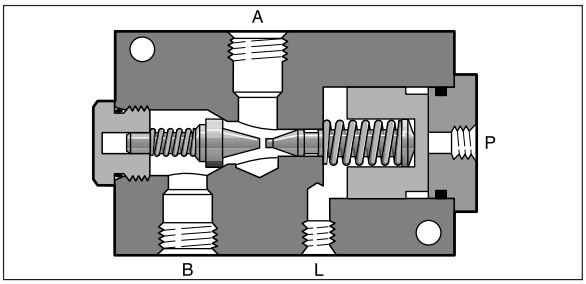
* For alternative thread design, see ordering code.

Pilot operated check valves of the series CP allow free flow in one direction (A to B).

The counter direction (B to A) is blocked. By applying pilot pressure, the poppet can be lifted from its seat against the pressure in port B. Thus flow in the counter direction is also possible. There are 1 and 2 stage poppets available with pilot ratios of 1 : 5 and 1 : 40, to suit different operating conditions.





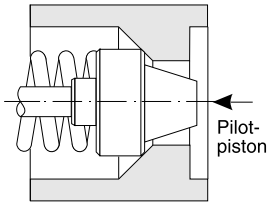


Technical data

Size		600	1200
Max. operating pressure	[bar]	210	210
Max. pilot pressure	[bar]	210	70
Flow Q_{max} at Δp 2.7bar	[l/min]	30	95
Nominal size		3/8	3/4
Weight	[kg]	4	7

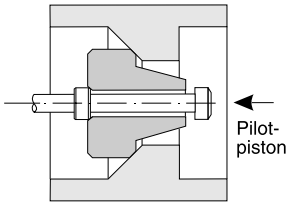
Pilot ratios

Poppet 1 stage



Surface ratio 5 : 1 (pilot spool-poppet surface) for quick response time without decompression.

Poppet 2 stage



Surface ratio 40 : 1 (pilot spool decompression pin surface) for low shock or oscillation performance from decompression.

Ordering code

	CP		S		M	
Thread type	Check valve, pilot operated	Port size	Steel body	Pilot ratio	Steel poppet	Seal

Code	Thread
omit	NPTF
9	**BSPP**

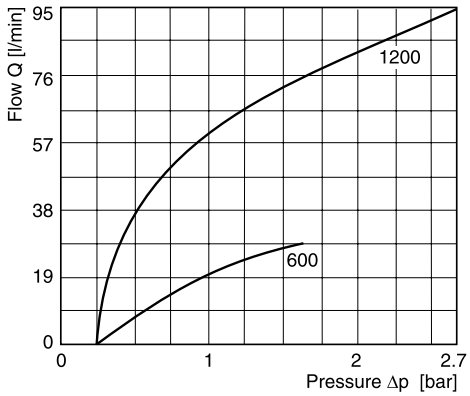
Code	Size
600	**3/8**
1200	**3/4**

Code	Seal
omit	**NBR**
V	FPM

Code	Pilot ratio	Stage
5	**5 : 1**	**1**
40	40 : 1	2

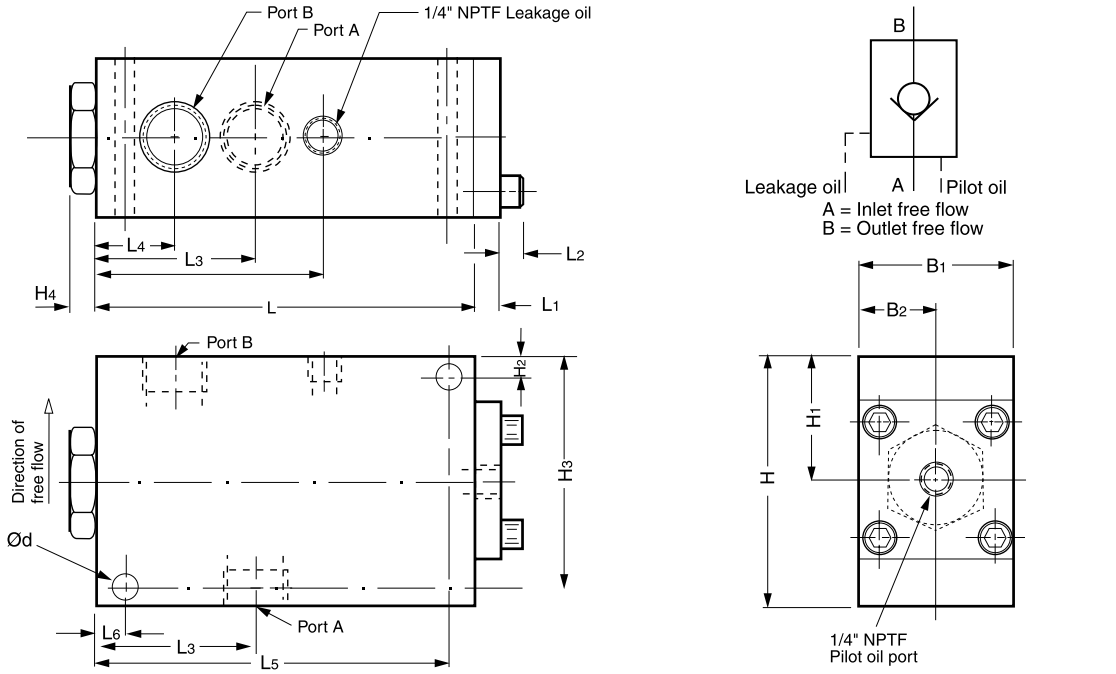
Bold letters =
Short-term availability

Δp/Q performance curves



The curves refer to hydraulic oil of 33 cSt and 50°C.

Dimensions



Size	A, B	L_3	B_1	B_2	H_1	H	L_4	L_7	H_4	L	L_1	H_2	H_3	L_6	L_5	Ød	W
9CP600S	G3/8	53.3	50.8	25.4	38.1	76.2	25.4	76.2	10.4	120.7	10.7	9.4	66.5	9.4	111	9.1	-
9CP1200S	G3/4	63.5	63.5	31.8	50.8	101.6	31.8	91.2	10.7	152.4	11.43	11.2	90.4	11.2	141.2	10.7	7.9

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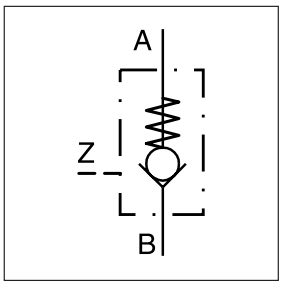
Pilot operated check valves series RH allow free flow in one direction (B to A). The counter flow is blocked (A to B). By applying pilot pressure the ball can be lifted from its seat and allow flow from A to B.

Most common use:

- Keeping cylinders leak-free in position, when spool type directional control valves are used
- Return line discharge, when return flow exceeds functional limits of directional control valve at differential cylinders
- As hydraulically activated drain or circulation valve

The valves are available without and with hydraulic pre-discharging.



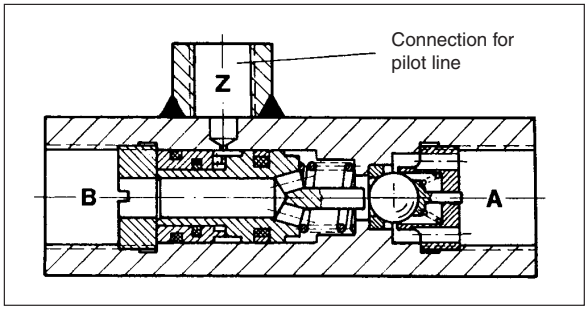


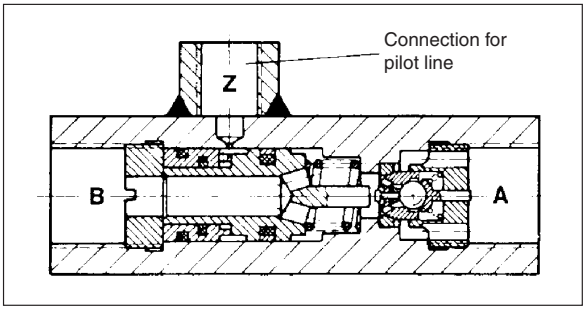
Without pre-discharging

These valves have a ball as valve element, which quickly enables the full flow cross-section proportionally during pilot operation. A metering position in the pilot port dampens the control movement of the pilot spool so that pressure shocks (unloading shocks) are mostly suppressed.

With pre-discharging

For valves with pre-discharging a spherical polished valve spool (seat valve function) is built-in instead of a ball. The additional check valve achieves a pre-opening which provides shock-free unloading of the fluid, especially at high working pressure and large volumes.





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Technical data

Code	RH	1	2	3V	4V
Max. operating pressure	[bar]	700	700	500	500
Flow approx.	[l/min]	15	35	55	100
Pilot flow volume	[cm³]	0.15	0.22	0.4	1
Pipe connections DIN ISO 228/1 A, B		G 1/4	G 3/8	G 1/2	G 3/4
Pipe connections DIN ISO 228/1 Z		G 1/4	G 1/4	G 1/4	G 1/4
Weight	[kg]	0.4	0.4	0.6	1.3
Mounting		Freely suspended in the pipeline			
Mounting position		unrestricted			
Fluid		Hydraulic oil 10...68 mm²/s (ISO VG 10 to 68 as per DIN 51 519)			
Viscosity recommended	[cSt]/[mm²/s]	10...500			
Viscosity permitted	[cSt]/[mm²/s]	4...1500			
Temperatures	[°C]	Fluid and ambient: -40...+80; observe viscosity range!			

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Ordering code

RH		
Check valve, hydr. pilot operated	Flow	Pre-discharging

Code	Flow [l/min]
1	15
2	**35**
3	**55**
4	100

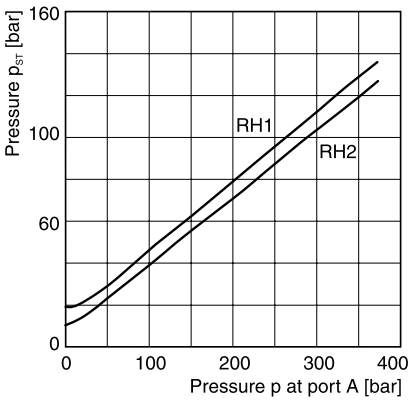
Code	Pre-discharging
V*	**with**
omit	**without**

* only for sizes 3 and 4

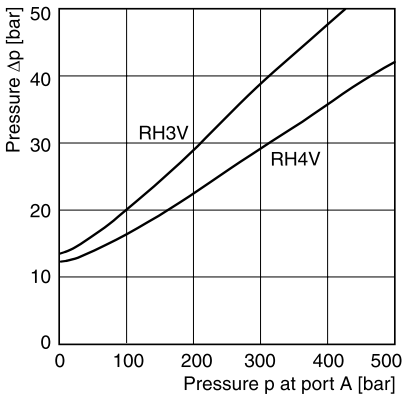
Bold letters =
Short-term availability

Pilot pressure p_{St} for pilot operation of the main valve

(p_B = 0 bar)



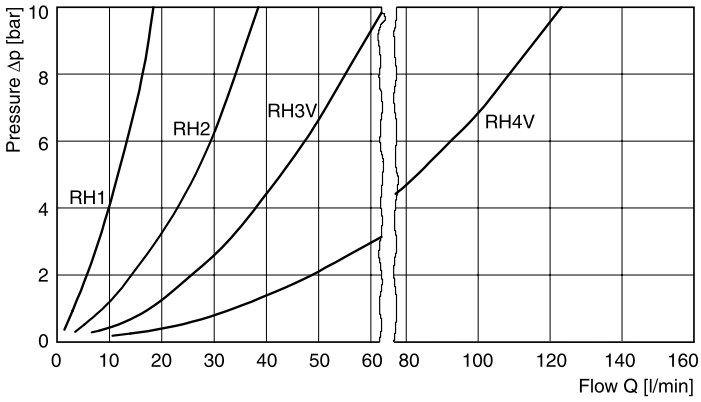
Pilot pressure p_{St} for pilot operation of pre-discharging



for keeping open		
p_{St}		$p_B + \Delta p + k$
p_B	[bar]	pressure on side B
Δp	[bar]	flow resistance A to B as per $\Delta p/Q$ performance curve
k		10 at RH 1 and RH 2
		7 at RH 3 V
		8 at RH 4 V

10

Performance curves $\Delta p/Q$ (valid for flow polarity B to A and pilot operated direction A to B)



Opening pressure B to A 0.2...0.3 bar

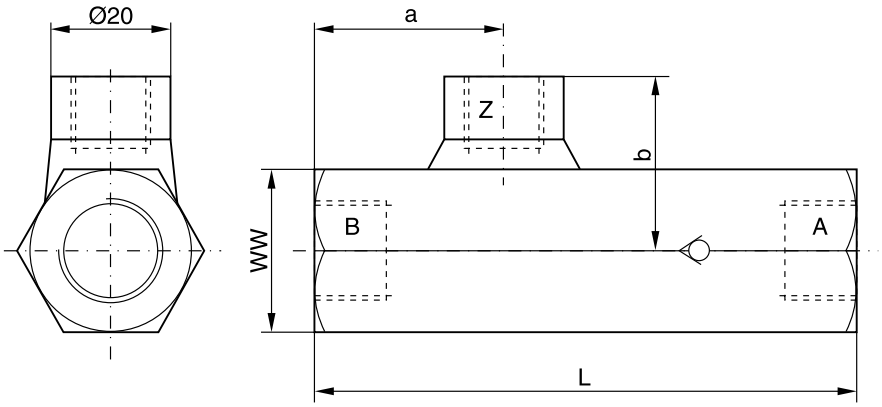
Oil viscosity during the measurement, 60 mm²/s

For viscosities over approx. 500 mm²/s, a strong Δp-increase is to be expected for smaller types (RH1...RH3).

RH_UK.INDD RH_26.11.07

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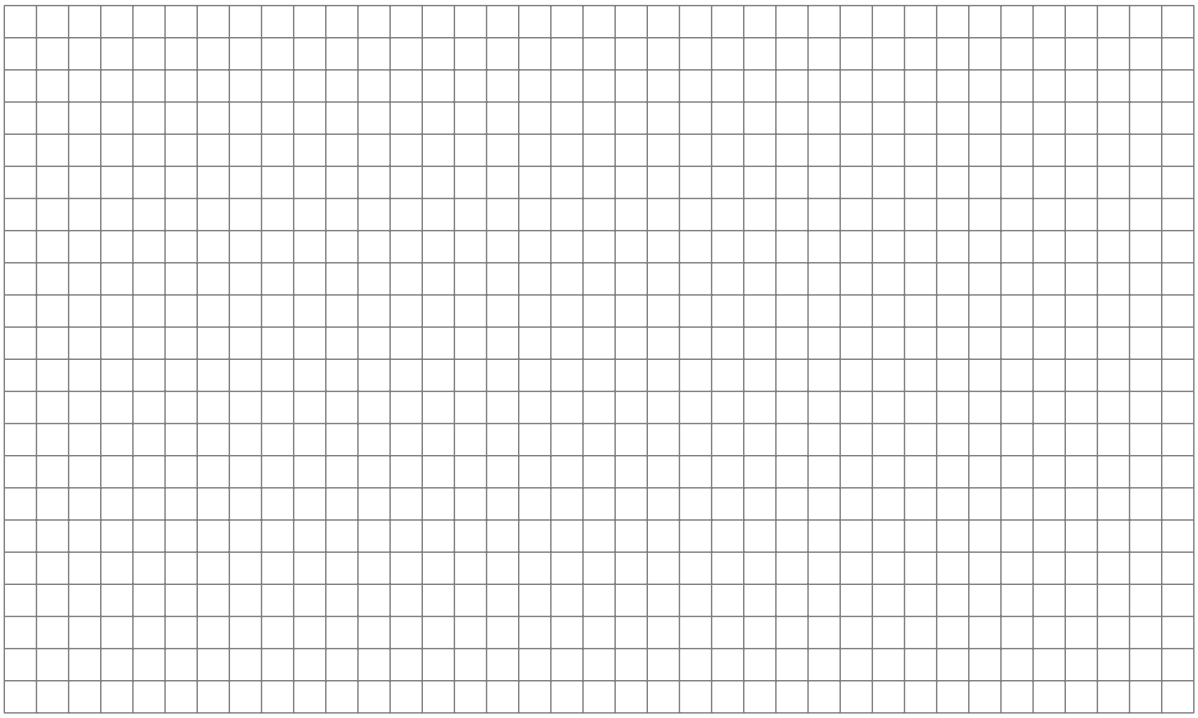
Type	Port *		L	a	b	SW
	A, B	Z				
RH 1	G 1/4	G 1/4	84	31.5	27	24
RH 2	G 3/8	G 1/4	90	32	28.5	27
RH 3 V	G 1/2	G 1/4	100	36.5	31	32
RH 4 V	G 3/4	G 1/4	126	45	35.5	41

* as per DIN 228/1, suitable for pipe connections with thread studs form B as per DIN 3852 page 2.

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Notes

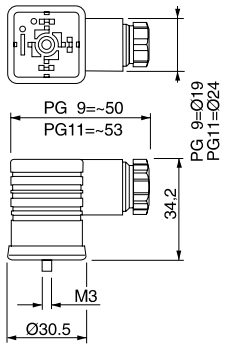


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Description	Threaded cable joint	Body colour coding	Figures switching	Order no.
Plug DIN 43650, design type AF, protection class IP 65 Voltages up to 250 V	PG 9	black, B grey, A	Fig. 1	**5001710** **5001711**
	PG11	black, B grey, A	Fig. 1	**5001716** **5001717**

Fig. 1



Other plugs on request

10

Notes

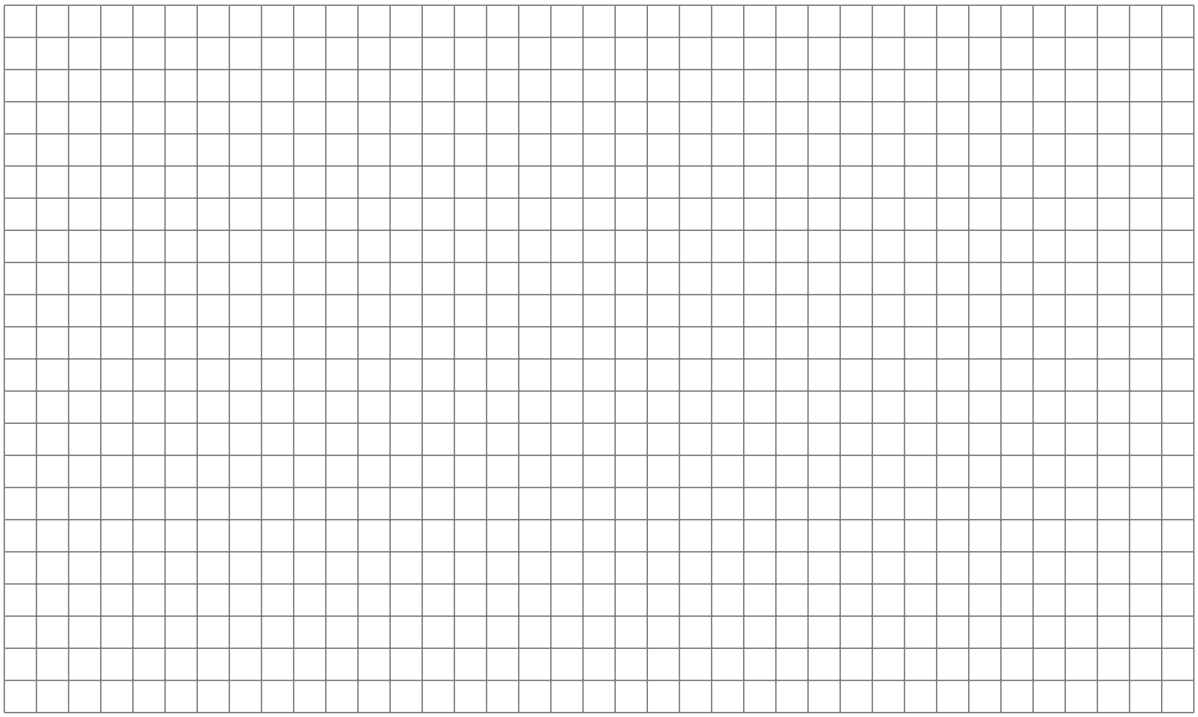
Series	Description	For use with												Page
		D*FB	4DP*	D*1FW	D*1FT	D*1FH	D*FP	RE*W / R4V	RE06M / 4VP01	V*Y	PE*W / R4R	TDL, TDA, TEA	DUR	*RPM	
	Amplifiers for proportional valves														
PWD00	For valves w/o position transducer	•	•	•											11-3
PWDXX	For valves with position transducer or valves in closed loop systems														11-7
PCD00	For up to 2 single solenoid valves w/o transducer							•	•	•	•	•	•	•	11-11
	Electronics for command signal processing														
PZD00	Min/Max adjustment, 6 command channels, 6+1 ramps				•	•	•	•							11-15
	Axis controller														
PID00	For position, pressure and speed control in closed loop systems	•	•	•	•	•	•	•	•	•	•	•	•	•	11-19
Compax 3F	Multifunctional axis controller for basic and high end applications					•		•							11-23
Compax 3F Accessories	Terminal strips, cables, PIOs														11-35
	Accessories														
EX-N08	Power supply														11-39
EX-M03	Test unit for items with integrated electronics, excepting D*FP														11-41

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Notes

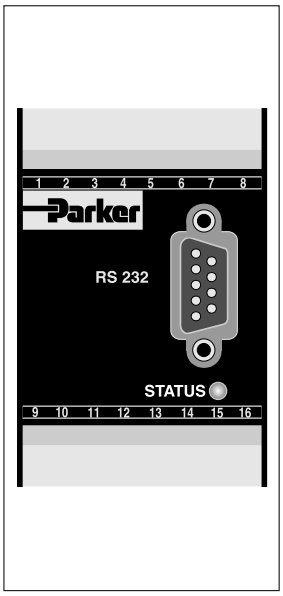


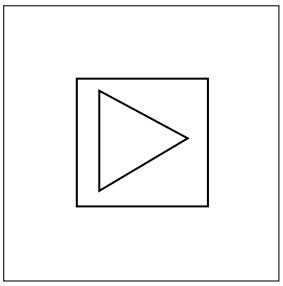
content11.INDD CM_18.01.08.1

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Parker electronic modules PWD00A-400 for rail mounting are compact, easy to install and provide time-saving wiring by disconnectable terminals. The digital design of the circuit results in good accuracy and optimal adaption for proportional directional control valves by a comfortable interface program.







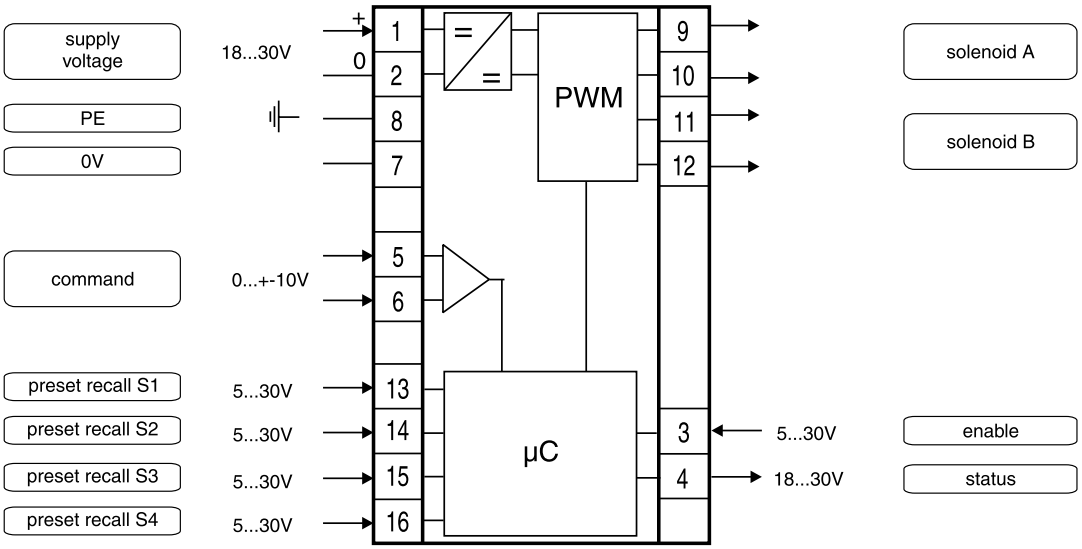
CE

Features

The described electronic unit combines all necessary functions for the optimal operation of proportional directional control valves without position sensor (series D*FB, D*FW, 4DP*). The most important features are:

- Digital circuit design
- Four parameterizable preset recall channels
- Constant current control
- Differential input stage
- Status output
- Four-quadrant ramp function
- Enable input for solenoid driver
- Status indicator
- Parametering by serial interface RS-232C
- Connection by disconnectable terminals
- Compatible to the relevant European EMC standards
- Comfortable interface, see Parker freeware: **www.parker.com/euro_hcd** → **Services** → **Downloads**

Block diagram



11

Technical data

General			
Model		Module package for snap-on mounting on EN 50022 rail	
Package material		Polycarbonate	
Inflammability class		V2..V0 acc. UL 94	
Installation position		Any	
Ambient temperature range	[°C]	-20...+60	
Protection class		IP 20 acc. EN 60529	
Weight	[g]	160	
Electrical			
Duty ratio	[%]	100	
Supply voltage	[VDC]	18...30, ripple < 5% eff., surge free *	
Switch-on current typ.	[A]	22 for 0.2 ms	
Current consumption max.	[A]	2.0	
Pre-fusing	[A]	2.5 A medium lag	
Command signal	[V]	+10...0...-10, ripple < 0.01 % eff., surge free, Ri = 150 kOhm	
Input signal resolution	[%]	0.025	
Differential input voltage max.	[V]	30 for terminals 5 und 6 against PE (terminal 8)	
Enable signal	[V]	0...5.0: Off / 8,5...30: On / Ri = 30 kOhm	
Channel recall signal	[V]	0...5.0: Off / 8,5...30: On / Ri = 30 kOhm	
Status signal	[V]	0...0.5: Off / Us: On / rated max. 15 mA	
Adjustment ranges			
Min	[%]	0...50	preset 0...100
Max	[%]	50...100	preset 0...100
Ramp	[s]	0...32.5	preset 0...32.5
Zero offset	[%]	+75...-75	preset +100...-100
Current	[A]	0.8/1.3/1.8/2.7/3.5	preset 0/4/3/2/1
Interface		RS 232C, DSub 9p. male for null modem cable	
EMC		EN 50081-2, EN 50082-2	
Connection		Screw terminals 0.2...2.5 mm², disconnectable	
Cable specification	[AWG]	16 overall braid shield for supply voltage and solenoids	
	[AWG]	20 overall braid shield for sensor and signal	
Cable length	[m]	50	

* If solenoids with a nominal voltage of 24V are connected, the supply voltage has to be raised to 29V.

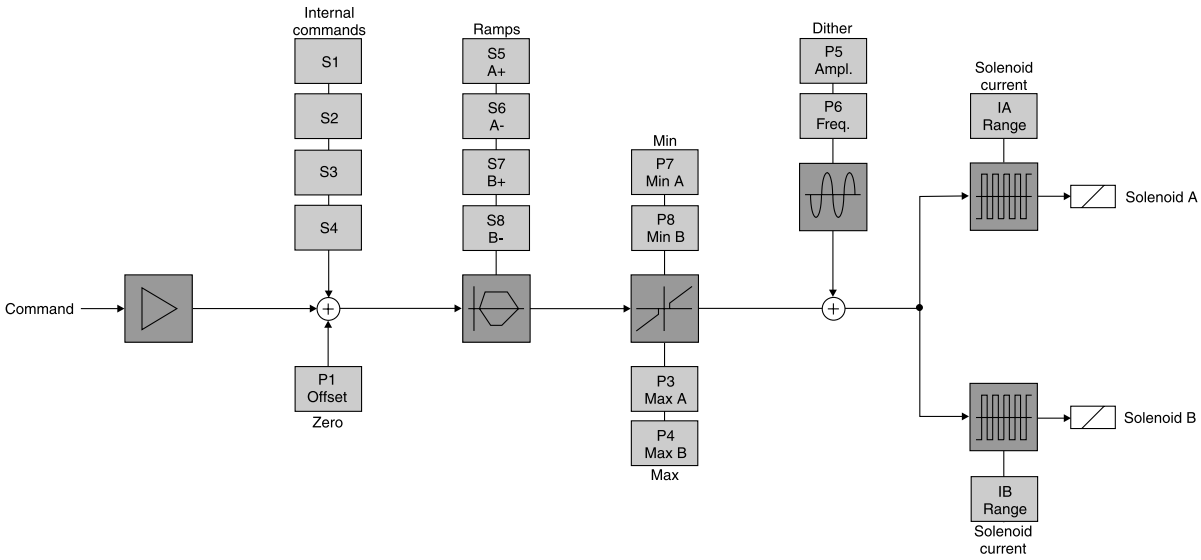
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Ordering code

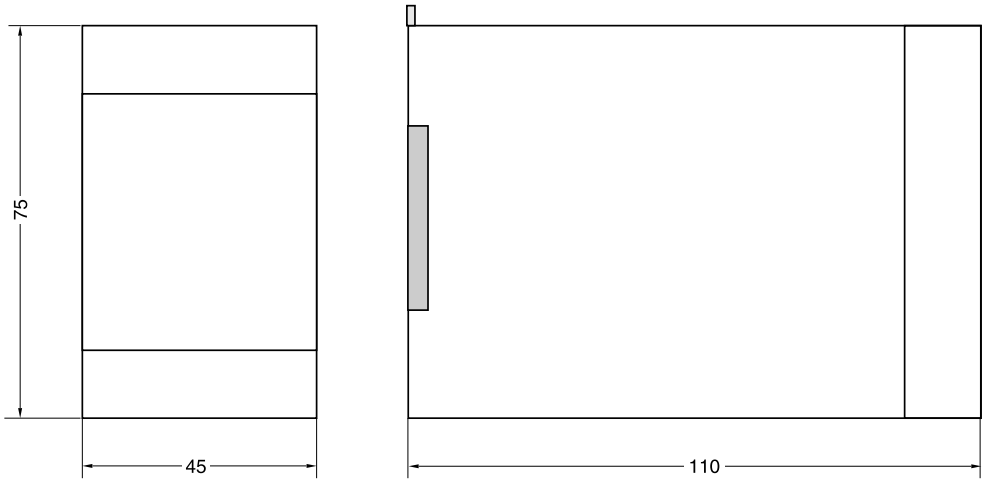
PWD	00	A	–	400	–	
Electronic module directional control valves	Universal			Amplifier min/max adjustment accel/decel ramps command input		Design series

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Signal flow diagram



Dimensions



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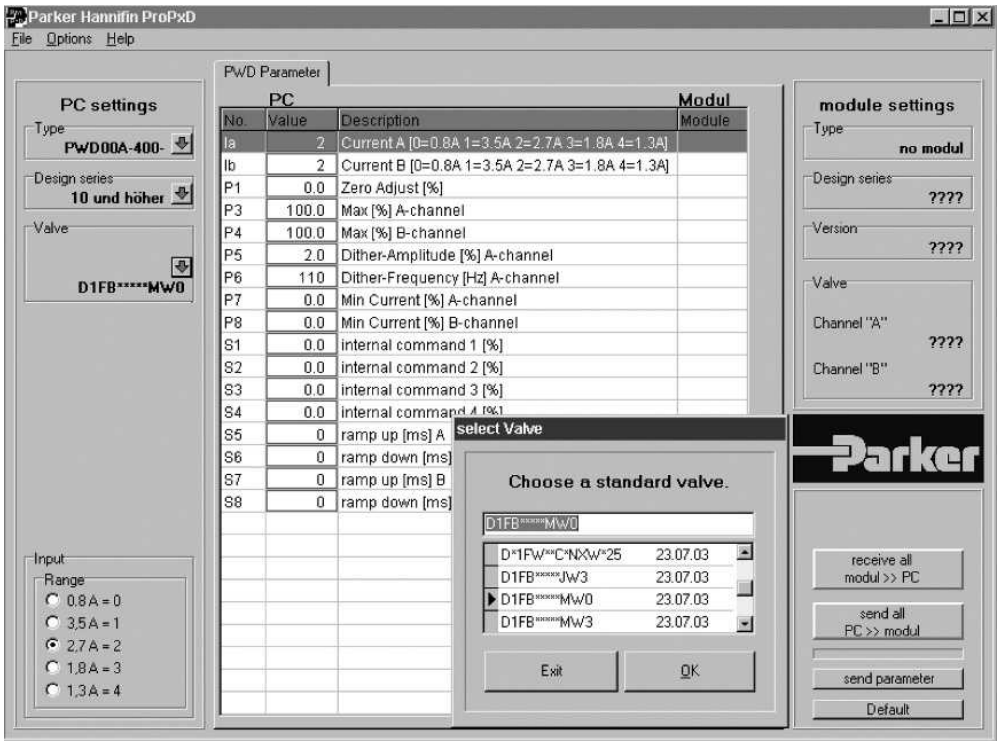
ProPxD interface program

The new ProPxD software permits comfortable parameter setting for the electronic module series PCD, PWD, PZD, PID and PWDXX.

Via the clearly arranged entry mask the parameters can be displayed and modified. Storage of complete parameter sets is possible as well as print-out or record as text file for further documentation. Stored parameter sets may be loaded anytime and transmitted to the electronic module in the same manner as the basic parameters which are available for all usable valve series. Inside the electronic a nonvolatile memory stores the data with the option for recalling or modification.

Features

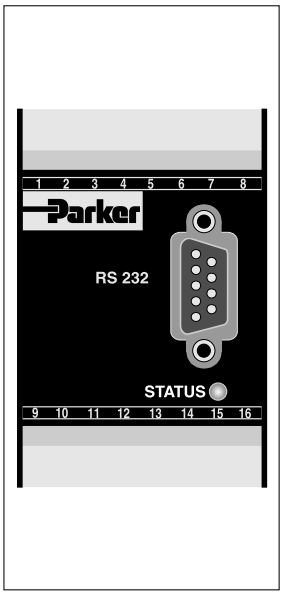
- Comfortable editing of all parameters
- Depiction and documentation of parameter sets
- Storage and loading of optimized parameter adjustments
- Executable with all actual Windows® operating systems from Windows® 95 upwards
- Plain communication between PC and electronic via serial interface RS-323 and null modem cable
- Comfortable interface, see Parker freeware: **www.parker.com/euro_hcd → Services → Downloads**

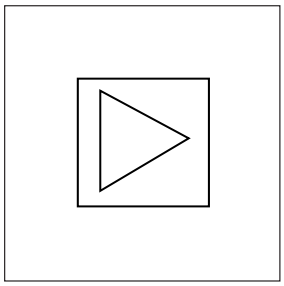


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Parker electronic modules PWDXXA-40* for rail mounting are compact, easy to install and provide time-saving wiring by disconnectable terminals. The digital design of the circuit results in good accuracy and optimal adaption for proportional directional control valves with position sensor by a comfortable interface program.







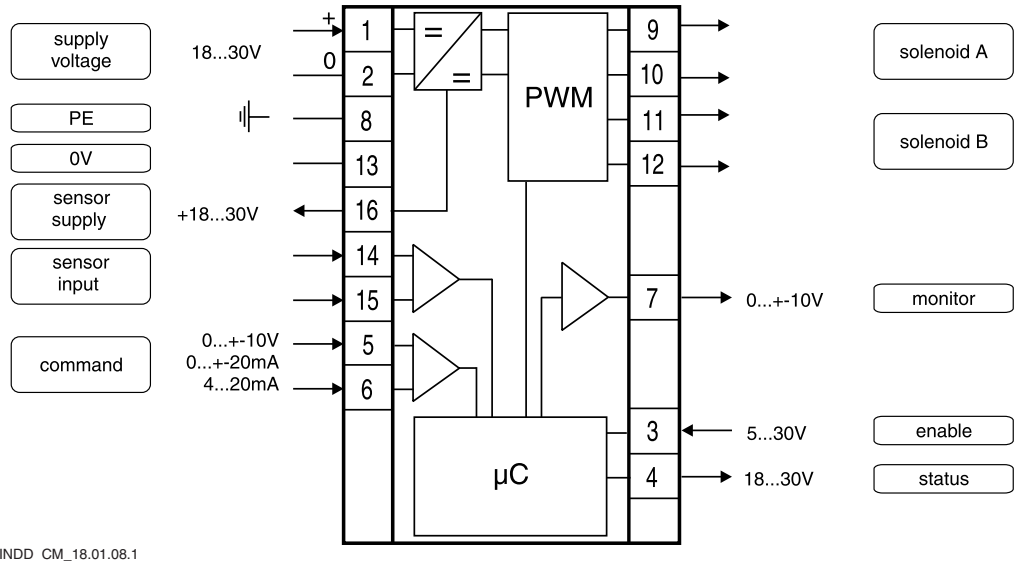
CE

Features

The described electronic unit combines all necessary functions for the optimal operation of proportional directional control valves with position transducer or valves in closed loop systems (series D1FC, D*1FS). The most important features are:

- Digital circuit design
- Parameterizable position control of valve spool
- Constant current control
- Differential input stage with different signal options
- Monitor output for spool stroke
- Four-quadrant ramp function
- Enable input for solenoid driver
- Status indicator
- Parametering by serial interface RS-232C
- Connection by disconnectable terminals
- In combination with valves without spool feedback
  - Pressure control with proportional pressure valve and pressure sensor
  - Position control with proportional DC valve and actuator position transducer
- Optional technology function "linearization"
- Comfortable interface, see Parker freeware:
- **www.parker.com/euro_hcd → Services → Downloads**

Block diagram



PWDXX_UK.INDD CM_18.01.08.1

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Technical data

General		
Model		Module package for snap-on mounting on EN 50022 rail
Package material		Polycarbonate
Inflammability class		V2..V0 acc. UL 94
Installation position		Any
Ambient temperature range	[°C]	-20...+60
Protection class		IP 20 acc. EN 60529
Weight	[g]	160
Electrical		
Duty ratio	[%]	100
Supply voltage	[VDC]	18...30, ripple < 5% eff., surge free
Switch-on current typ.	[A]	22 for 0.2 ms
Current consumption max.	[A]	2.0
Pre-fusing	[A]	2.5 A medium lag
Command signal options	[V] [mA] [mA]	+10...0...-10, ripple <0.01 % eff., surge free, Ri = 100 kOhm +20...0...-20, ripple <0.01 % eff., surge free, Ri = 200 Ohm 4...12...20, ripple <0.01 % eff., surge free, Ri = 200 Ohm <3.6 mA = solenoid output off, >3.8 mA = solenoid output on (acc. NAMUR NE43)
Input signal resolution	[%]	0.025
Differential input voltage max.	[V]	30 for terminals 5 und 6 against PE (terminal 8)
Enable signal	[V]	0...2.5: Off / 5...30: On / Ri = 100 kOhm
Status signal	[V]	0...0.5: Off / Us: On / rated max. 15 mA
Monitor signal	[V]	+10...0...-10, rated max. 5 mA, signal resolution 0.4 %
Adjustment ranges		
Min	[%]	0...50
Max	[%]	50...100
Ramp	[s]	0...32.5
Zero offset	[%]	+100...-100
Current	[A]	1.3 / 2.7 / 3.5
Initial current	[%]	0...25
Interface		RS 232C, DSub 9p. male for null modem cable
EMC		EN 50081-2, EN 50082-2
Connection		Screw terminals 0.2...2.5 mm², disconnectable
Cable specification	[AWG] [AWG]	16 overall braid shield for supply voltage and solenoids 20 overall braid shield for sensor and signal
Cable length	[m]	50
Options		
Technology function	Code1	Software adjustable transfer function with 10 compensation points for linearization of valve behaviour.

11

Ordering code

PWD	XX	A	–	40	–		–	
Electronic module proportional valves	Closed loop control universal			Amplifier min/max adjustment accel/decel ramps command input		Technology function		Design series

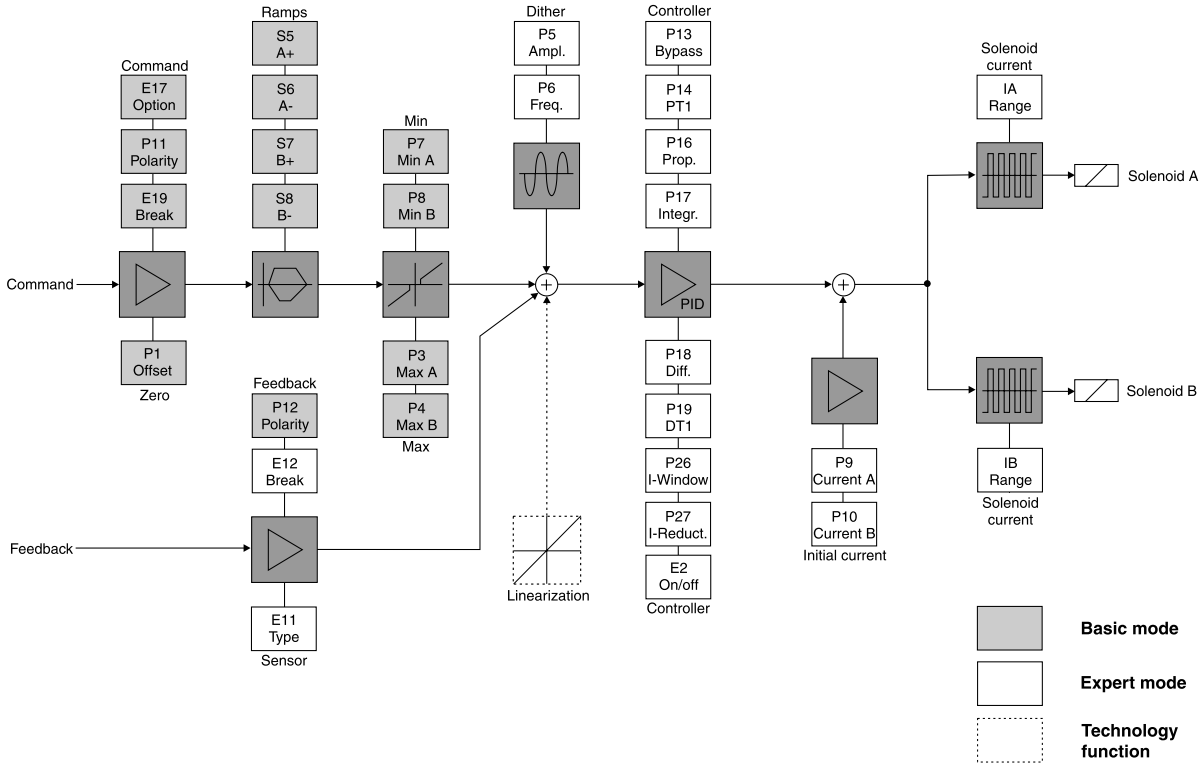
Code	Function
0	Standard
1	Linearization option

PWDXX_UK.INDD CM_18.01.08.1

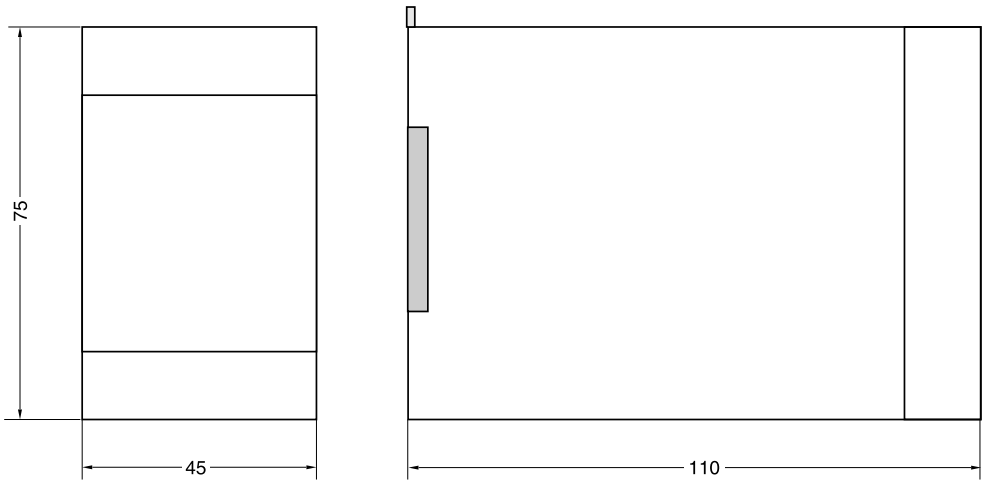
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Hydraulic Controls Division
Kaarst, Germany

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Signal flow diagram



Dimensions



11

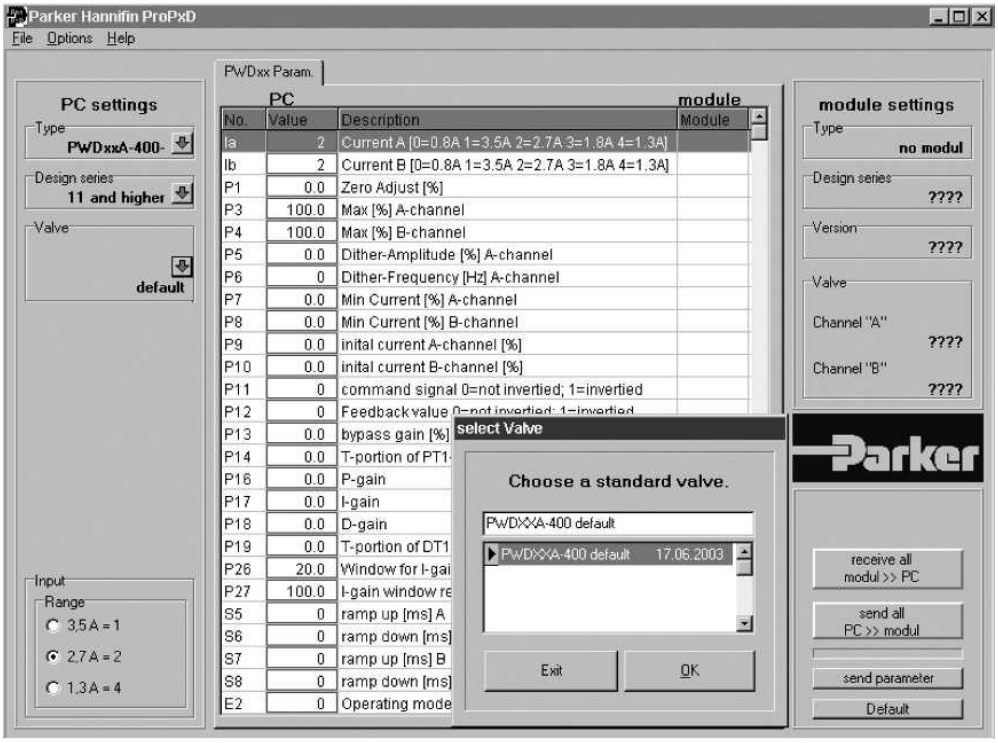
ProPxD interface program

The new ProPxD software permits comfortable parameter setting for the electronic module series PCD, PWD, PZD, PID and PWDXX.

Via the clearly arranged entry mask the parameters can be displayed and modified. Storage of complete parameter sets is possible as well as print-out or record as text file for further documentation. Stored parameter sets may be loaded anytime and transmitted to the electronic module in the same manner as the basic parameters which are available for all usable valve series. Inside the electronic a nonvolatile memory stores the data with the option for recalling or modification.

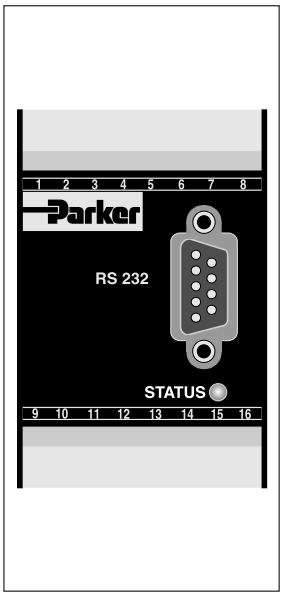
Features

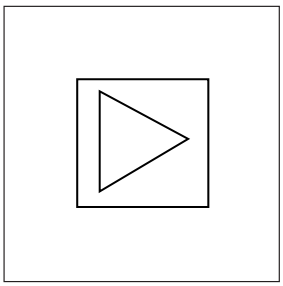
- Comfortable editing of all parameters
- Depiction and documentation of parameter sets
- Storage and loading of optimized parameter adjustments
- Executable with all actual Windows® operating systems from Windows® 95 upwards
- Plain communication between PC and electronic via serial interface RS-323 and null modem cable
- Comfortable interface, see Parker freeware:
- **www.parker.com/euro_hcd → Services → Downloads**



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Parker electronic modules series PCD00A-400 for rail mounting are compact, easy to install and provide time-saving wiring by disconnectable terminals. The digital design of the circuit results in good accuracy and optimal adaption for proportional pressure/flow control valves by a comfortable interface program.







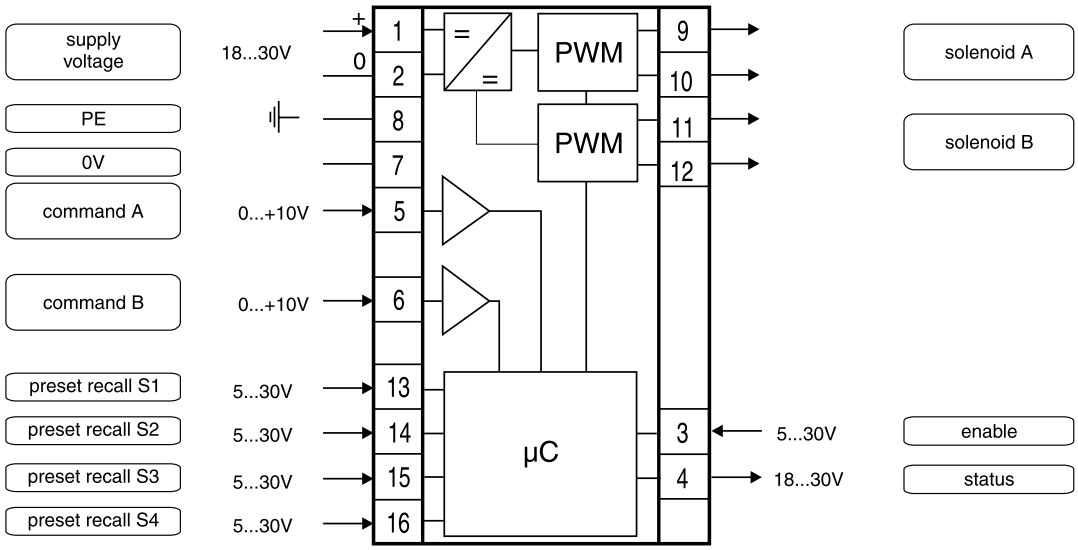
CE

Features

The described electronic unit combines all necessary functions for the optimal operation of two proportional pressure/flow control valves (series RE*W, DSAE, VBY, VMY, TDA, TEA). The most important features are:

- Digital circuit design
- Two independent operable amplifiers
- Four parameterizable preset recall channels
- Constant current control
- Two input stages 0...10V
- Status output
- Two up/down ramp functions
- Enable input for solenoid driver
- Status indicator
- Parametering by serial interface RS-232C
- Connection by disconnectable terminals
- Compatible to the relevant European EMC standards
- Comfortable interface, see Parker freeware: **www.parker.com/euro_hcd** → **Services** → **Downloads**

Block diagram



11

Technical data

General			
Model		Module package for snap-on mounting on EN 50022 rail	
Package material		Polycarbonate	
Inflammability class		V2..V0 acc. UL 94	
Installation position		Any	
Ambient temperature range	[°C]	-20...+60	
Protection class		IP 20 acc. EN 60529	
Weight	[g]	160	
Electrical			
Duty ratio	[%]	100	
Supply voltage	[VDC]	18...30, ripple < 5% eff., surge free *	
Switch-on current typ.	[A]	22 for 0.2 ms	
Current consumption max.	[A]	5.0	
Pre-fusing	[A]	6.3 A medium lag	
Command signal	[V]	0...+10, ripple < 0.01 % eff., surge free, Ri = 150 kOhm	
Input signal resolution	[%]	0.025	
Differential input voltage max.	[V]	30 for terminals 5 und 6 against PE (terminal 8)	
Enable signal	[V]	0...5.0: Off / 8,5...30: On / Ri = 30 kOhm	
Channel recall signal	[V]	0...5.0: Off / 8,5...30: On / Ri = 30 kOhm	
Status signal	[V]	0...0.5: Off / Us: On / rated max. 15 mA	
Adjustment ranges			
Min	[%]	0...50	preset 0...100
Max	[%]	50...100	preset 0...100
Ramp	[s]	0...32.5	preset 0...32.5
Current	[A]	0.8/1.3/1.8/2.7/3.5	preset 0/4/3/2/1
Interface		RS 232C, DSub 9p. male for null modem cable	
EMC		EN 50081-2, EN 50082-2	
Connection		Screw terminals 0.2...2.5 mm², disconnectable	
Cable specification	[AWG] [AWG]	16 overall braid shield for supply voltage and solenoids 20 overall braid shield for sensor and signal	
Cable length	[m]	50	

* If solenoids with a nominal voltage of 24V are connected, the supply voltage has to be raised to 29V.

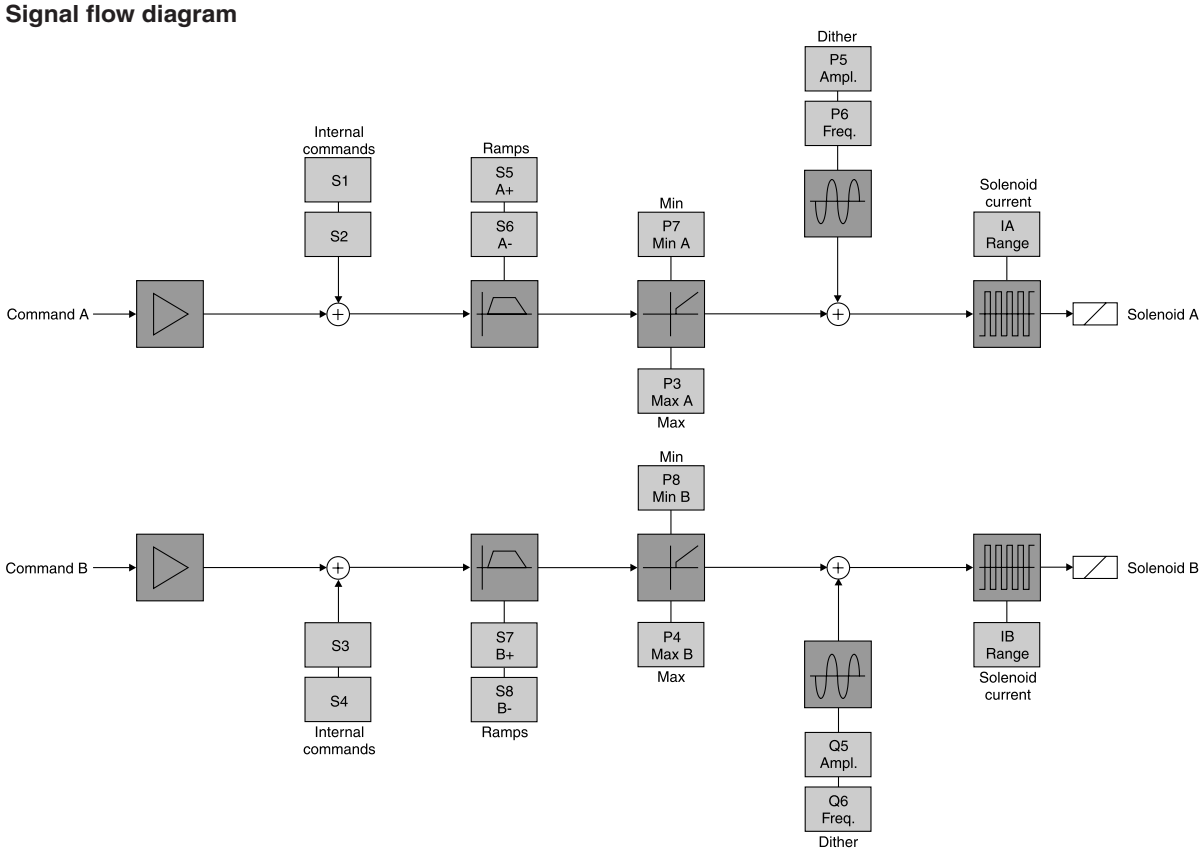
Ordering code

11

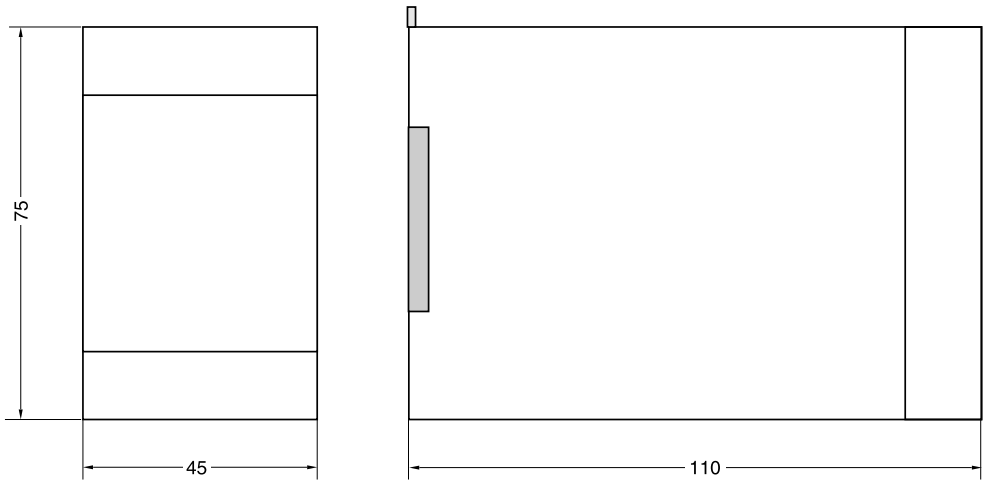
PCD	00	A	–	400	–	
Electronic module pressure/flow valves	Without position control universal			2 Amplifiers min/max adjustment accel/decel ramps command inputs 4 command signal presets		Design series

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Signal flow diagram



Dimensions



11

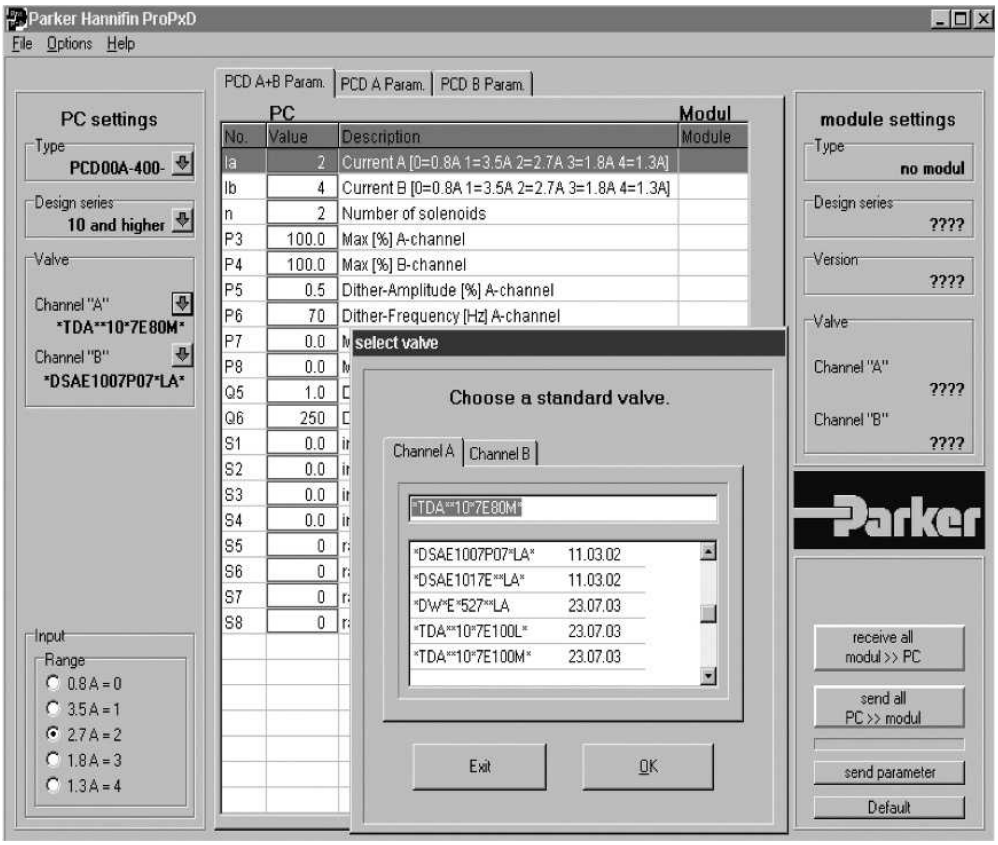
ProPxD interface program

The new ProPxD software permits comfortable parameter setting for the electronic module series PCD, PWD, PZD, PID and PWDXX.

Via the clearly arranged entry mask the parameters can be displayed and modified. Storage of complete parameter sets is possible as well as print-out or record as text file for further documentation. Stored parameter sets may be loaded anytime and transmitted to the electronic module in the same manner as the basic parameters which are available for all usable valve series. Inside the electronic a nonvolatile memory stores the data with the option for recalling or modification.

Features

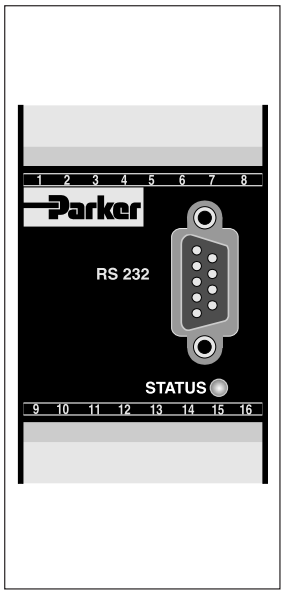
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- Plain communication between PC and electronic via serial interface RS-323 and null modem cable
- Comfortable interface, see Parker freeware: **www.parker.com/euro_hcd → Services → Downloads**

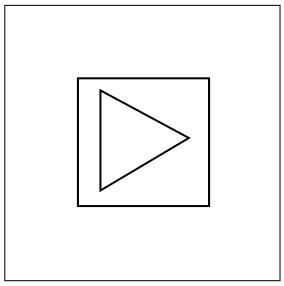


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Parker electronic modules PZD00A-40* for rail mounting are compact, easy to install and provide time-saving wiring by disconnectable terminals. The digital design of the circuit results in good accuracy and optimal adaption for command signal processing by a comfortable interface program. The electronic unit may be connected in series to proportional valves with onboard electronic as well as to amplifier modules P*D.





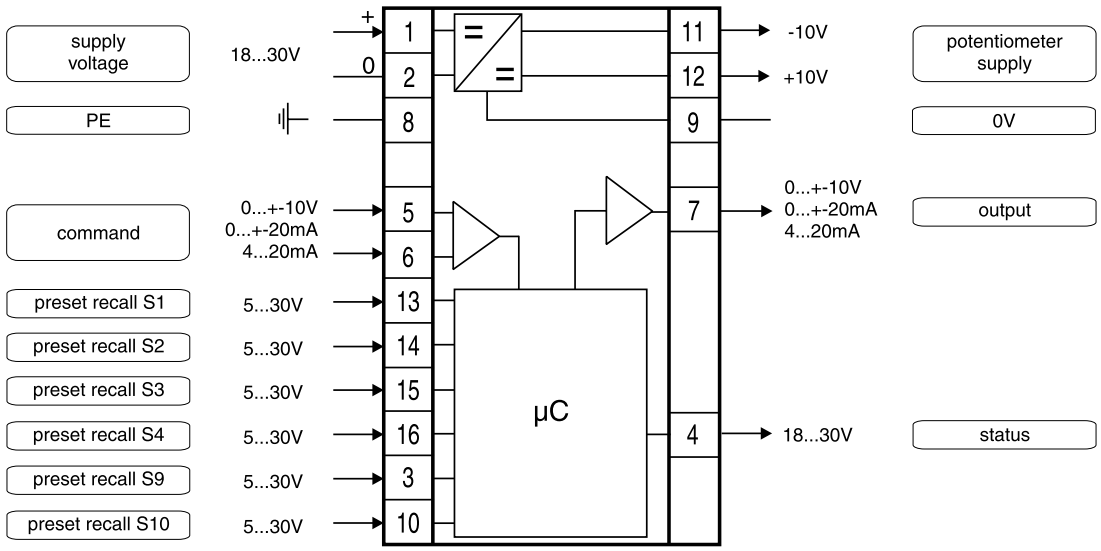


CE

Features

- Digital circuit design
- Six parameterizable preset recall channels with optional additive or priority dependent signal processing
- Output stage with different signal options
- Input stage with different signal options
- Status output
- Four-quadrant ramp function
- Reference output for potentiometer supply
- Status indicator
- Parametering by serial interface RS-232C
- Connection by disconnectable terminals
- Compatible to the relevant European EMC standards
- Optional technology function "linearization"
- Comfortable interface, see Parker freeware: **www.parker.com/euro_hcd** → **Services** → **Downloads**

Block diagram



Technical data

General		
Model		Module package for snap-on mounting on EN 50022 rail
Package material		Polycarbonate
Inflammability class		V2..V0 acc. UL 94
Installation position		Any
Amb. temperature range	[°C]	-20...+60
Protection class		IP 20 acc. EN 60529
Weight	[g]	160
Electrical		
Duty ratio	[%]	100
Supply voltage	[VDC]	18...30, ripple < 5% eff., surge free
Current consumption max.	[mA]	100
Pre-fusing	[mA]	500 medium lag
Command signal options	[V] [mA] [mA]	+10...0...-10, ripple <0.01 % eff., surge free, Ri = 100 kOhm +20...0...-20, ripple <0.01 % eff., surge free, Ri = 200 Ohm 4...12...20, ripple <0.01 % eff., surge free, Ri = 200 Ohm <3.6 mA = output signal 0 V / 0 mA / 12 mA acc. to output option >3.8 mA = output signal on (acc. NAMUR NE43)
Input signal resolution	[%]	0.025
Differential input max.	[V]	30 for terminals 5 und 6 against PE (terminal 8)
Channel recall signal	[V]	0...2.5: Off / 5...30: On / Ri = 100 kOhm
Status signal	[V]	0...0.5: Off / Us: On / rated max. 15 mA
Output signal options	[V] [mA] [mA]	+10...0...-10, rated max. 15 mA +20...0...-20, Ro < 500 Ohm 4...12...20, Ro < 500 Ohm
Output signal resolution	[%]	0.025
Reference output	[V]	+10 / -10, 2 %, rated max. 15 mA
Adjustment ranges		
Min	[%]	0...50
Max	[%]	50...100
Cmd channels	[%]	+100...-100
Ramp	[s]	0...32.5
Zero offset	[%]	+100...-100
Interface		RS 232C, DSub 9p. male for null modem cable
EMC		EN 50081-2, EN 50082-2
Connection		Screw terminals 0.2...2.5 mm², disconnectable
Cable specification	[AWG]	20 overall braid shield
Cable length	[m]	50
Options		
Technology function	Code1	Software adjustable transfer function with 10 compensation points for linearization of valve behaviour.

11

Ordering code

PZD	00	A	–	40	–		–	
Electronic module auxiliary function	Universal			6 Command signal presets command input accel/decel ramps		Technology function		Design series

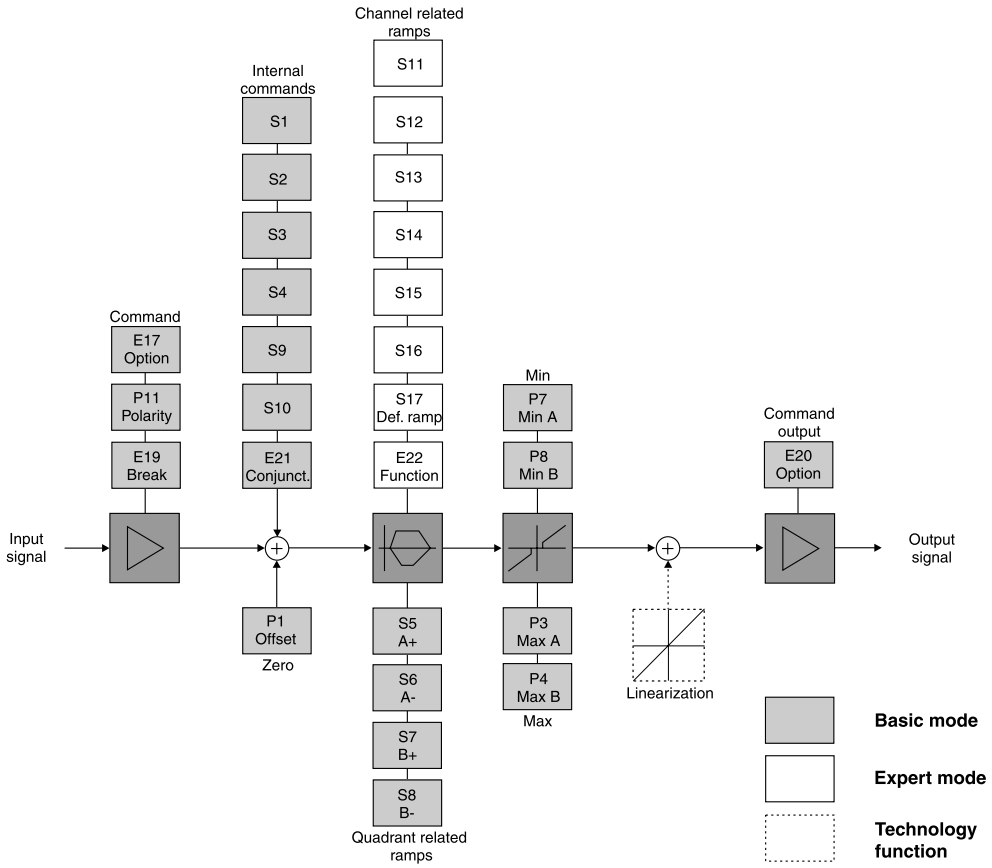
Code	Function
0	Standard
1	Linearization option

PZD00_UK.INDD CM_18.01.08.1

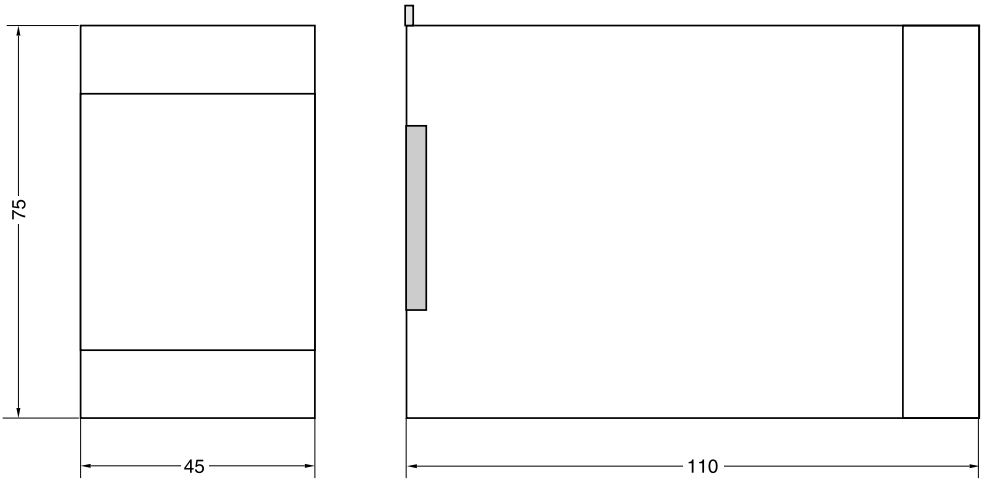
Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

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Signal flow diagram



Dimensions



PZD00_UK.INDD CM_18.01.08.1

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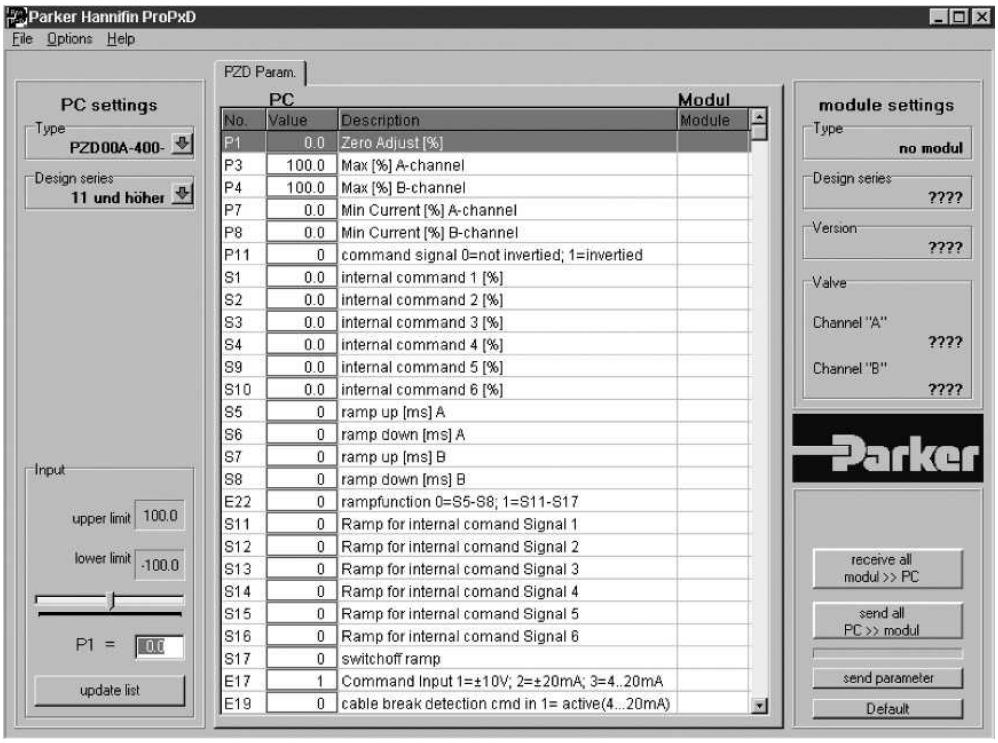
ProPxD interface program

The new ProPxD software permits comfortable parameter setting for the electronic module series PCD, PWD, PZD, PID and PWDXX.

Via the clearly arranged entry mask the parameters can be displayed and modified. Storage of complete parameter sets is possible as well as print-out or record as text file for further documentation. Stored parameter sets may be loaded anytime and transmitted to the electronic module in the same manner as the basic parameters which are available for all usable valve series. Inside the electronic a nonvolatile memory stores the data with the option for recalling or modification.

Features

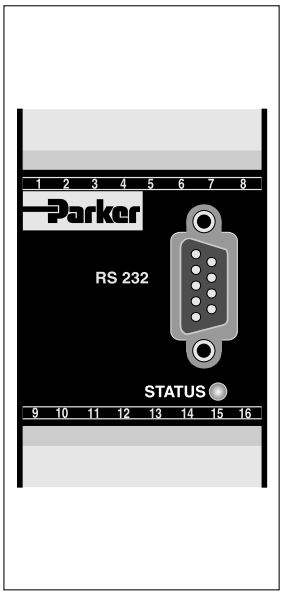
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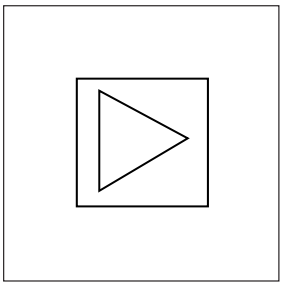


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Parker electronic modules PID00A-40* for rail mounting are compact, easy to install and provide time-saving wiring by disconnectable terminals. The digital design of the circuit results in good accuracy and optimal adaption for closed loop controls by a comfortable interface program.







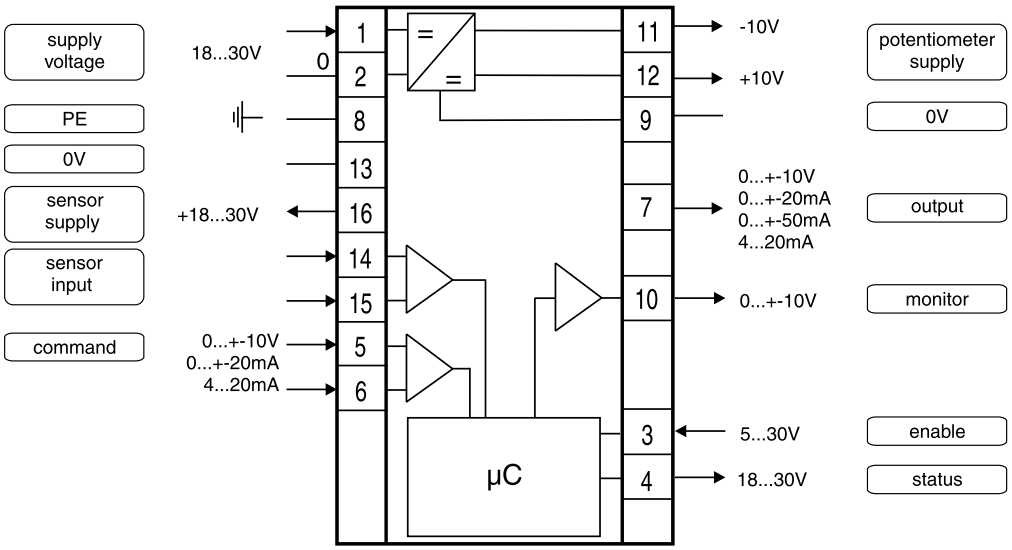
CE

Features

The described electronic unit combines all necessary functions for the optimal operation of closed loop controls. The most important features are:

- Extended PID controls
- Speed control with position feedback
- Differential input stage with different signal options
- Output stage with different output options
- Four-quadrant ramp function
- Status indicator
- Digital circuit design
- Parametering by serial interface RS-232C
- Connection by disconnectable terminals
- Compatible to the relevant European EMC standards
- Optional technology function "linearization"
- Comfortable interface, see Parker freeware: **www.parker.com/euro_hcd → Services → Downloads**

Block diagram



11

Technical data

General		
Model		Module package for snap-on mounting on EN 50022 rail
Package material		Polycarbonate
Inflammability class		V2..V0 acc. UL 94
Installation position		Any
Ambient temperature range	[°C]	-20...+60
Protection class		IP 20 acc. EN 60529
Weight	[g]	160
Electrical		
Duty ratio	[%]	100
Supply voltage	[VDC]	18...30, ripple < 5% eff., surge free
Current consumption max.	[mA]	100
Pre-fusing	[mA]	500
Command signal options	[V] [mA] [mA]	+10...0...-10, ripple <0.01 % eff., surge free, Ri = 100 kOhm +20...0...-20, ripple <0.01 % eff., surge free, Ri = 200 Ohm 4...12...20, ripple <0.01 % eff., surge free, Ri = 200 Ohm <3.6 mA = solenoid output off, >3.8 mA = solenoid output on (acc. NAMUR NE43)
Input signal resolution	[%]	0.025
Differential input voltage max.	[V]	30 for terminals 5 und 6 against PE (terminal 8)
Enable signal	[V]	0...2.5: Off / 5...30: On / Ri = 100 kOhm
Status signal	[V]	0...0.5: Off / Us: On / rated max. 15 mA
Monitor signal	[V]	+10...0...-10, rated max. 5 mA, signal resolution 0.025 %
Adjustment ranges Min	[%]	0...50
Max	[%]	50...100
Ramp	[s]	0...32.5
Zero offset	[%]	+100...-100
Interface		RS 232C, DSub 9p. male for null modem cable
EMC		EN 50081-2, EN 50082-2
Connection		Screw terminals 0.2...2.5 mm², disconnectable
Cable specification	[AWG]	20 overall braid shield
Cable length	[m]	50
Options		
Technology function	Code1	Software adjustable transfer function with 10 compensation points for linearization of valve behaviour.

11

Ordering code

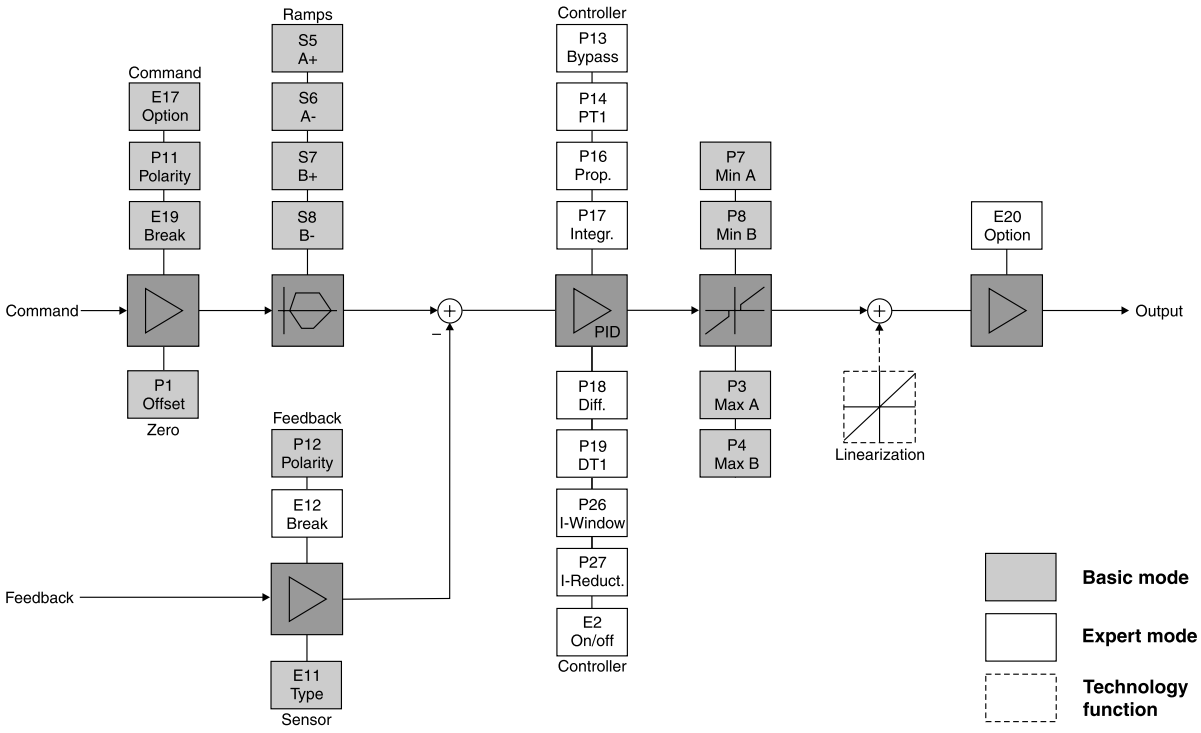
PID	00	A	–	40	–		–	
Electronic module closed loop control	Universal			Min/Max adjustment accel/decel ramps command input		Technology function		Design series

Code	Function
0	Standard
1	Linearization option

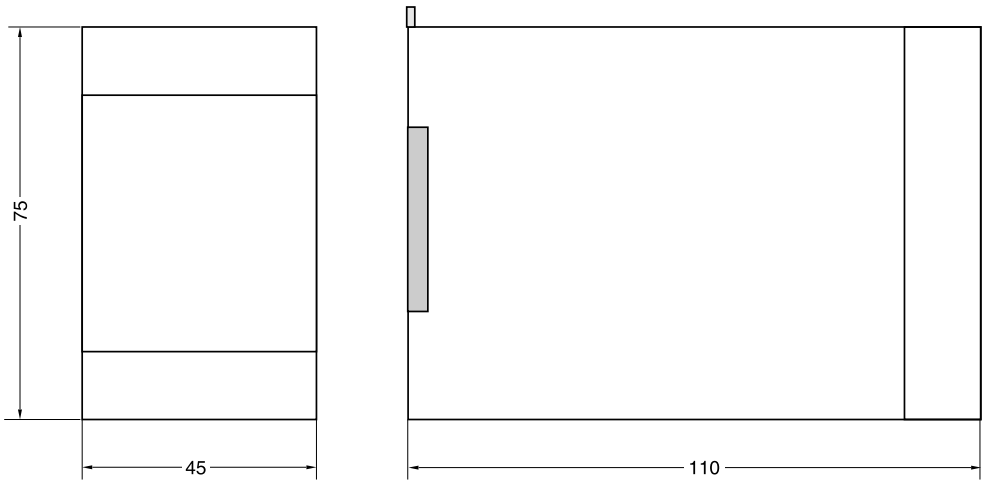
Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

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Signal flow diagram



Dimensions



11

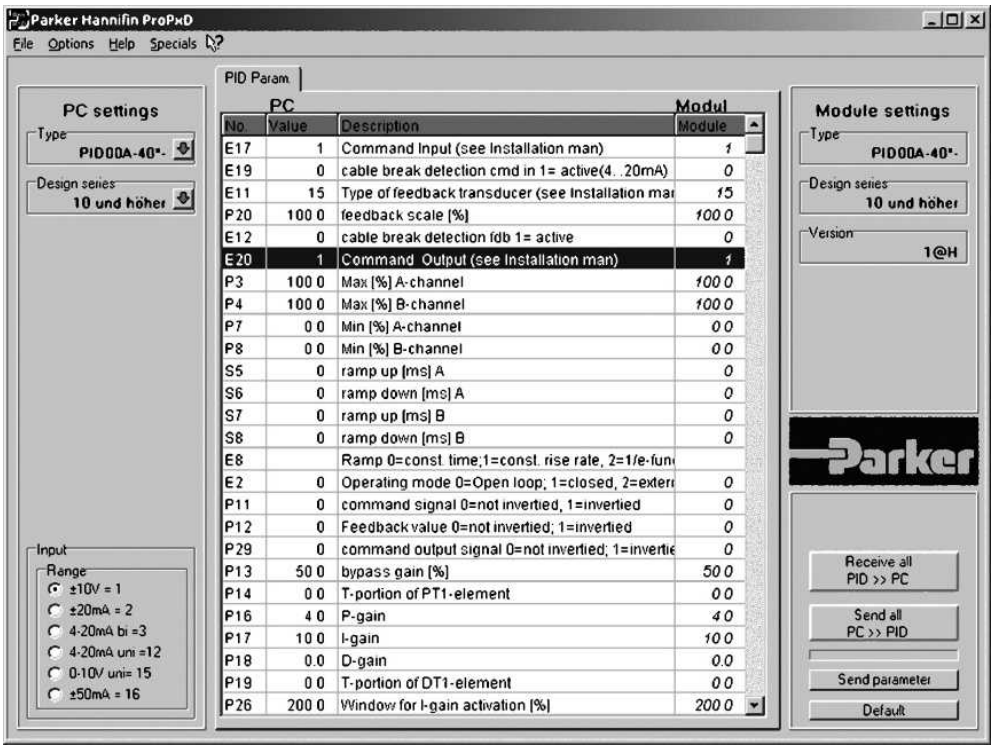
ProPxD interface program

The new ProPxD software permits comfortable parameter setting for the electronic module series PCD, PWD, PZD and PID.

Via the clearly arranged entry mask the parameters can be displayed and modified. Storage of complete parameter sets is possible as well as print-out or record as text file for further documentation. Stored parameter sets may be loaded anytime and transmitted to the electronic module in the same manner as the basic parameters which are available for all usable valve series. Inside the electronic a nonvolatile memory stores the data with the option for recalling or modification.

Features

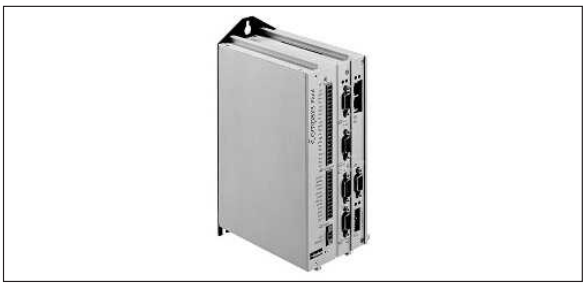
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The Compax3F is the new member of the servo drive family of Parker Hannifin. It is especially designed for the requirements of electrohydraulic systems and in particular for position und force control of electrohydraulic axis.



Attention:
For application support and customized software, please contact your local Parker representative.

Large drive range

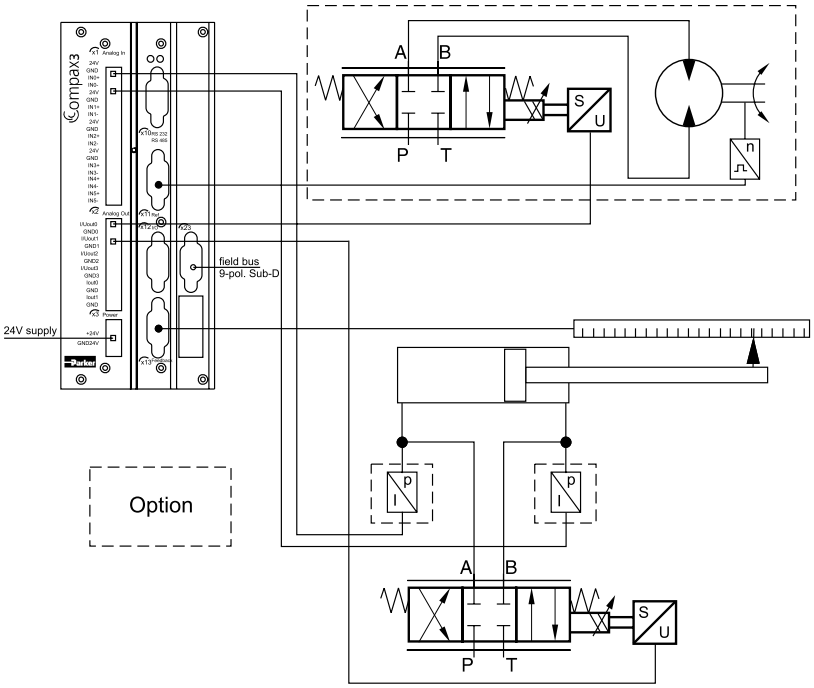
- Valves:
  - Proportional direction control valves
  - Proportional pressure relief- and pressure reducing valves
  - Flow valves
- Drives:
  - Cylinders
  - Rotary drives
  - Motors

Range of application

- Closed loop position and force control of linear cylinders and rotary drives
- Switching between position and force control
- Synchronous run with up to 64 axes

Typical applications

- Feeder axis
- Position and force control of press cylinders in material forming machines
- Roller clearance control in roller presses
- Die casting machines



11

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Project development, commissioning and programming

PC Tools - open and transparent

- Compax3 ServoManager
  - Intuitively understandable user interface
  - Wizard technology
  - Online help
  - Oscilloscope function
  - Optimized co-ordination of complete mechatronic systems
- Valve and Drive manager
  - All technical data of Parker valves, cylinders and drives available
- IEC61131-3 debugging facility
- CoDeSys programming system

Additionally support through the Compax3F Hydraulics-Manager by configuration of user defined valves and drives.

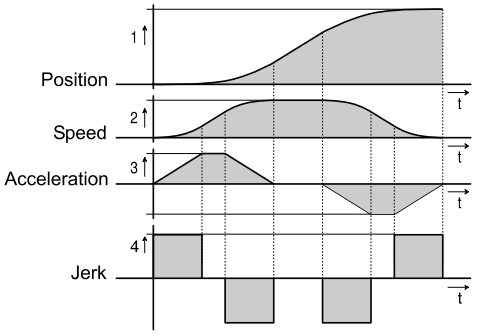
Flexible service and maintenance

Operating module

- Backlit plug-in module, text display with two sixteen-character lines
- Simple menu navigation with 4 keys
  - Display of status values and
  - clear text error messages
- Used for changing parameters and manual operation

Jerk-limited set point generation, resulting in

- Gentle handling of the items being moved
- Increased service life of mechanical components
- Overshoot-free positioning
- Reduced excitation of mechanical resonance frequencies



Control

- 2 control loops for each axis for combined position and force/pressure control

Position control

- Automatic controller design
  - User-oriented optimization of parameters
  - Robust controller setting
- Feed forward control of speed and acceleration which results in:
  - Optimization of the response behaviour
  - Minimization of the following error

Force/Pressure controller

- PID controller with feed forward control of speed

2-axis synchronous run

- 2 operation modes:
- Master slave
- Average of actual value

Hydraulic specific functions

- Realization of many different circuit concepts with up to 4 proportional valves possible
- Linearization functions:
  - Consideration of the area of differential cylinders
  - Inverting of the valve set value
  - Compensation of the load pressure (additional pressure sensors necessary)
  - Correction of the nonlinear flow characteristic of the valve
  - Overlap compensation
  - Valve zero point correction
  - Valve set value filters
  - Valve set value limitation
  - For each valve individually available
  - Automatic configuration by component selection in the Compax3 ServoManager
- Hydraulic corner power limitation
  - Limitation of the maximum hydraulic power consumption, intelligent energy management

Set up controller optimization

- Compax3F HydraulicsManager
  - All necessary technical data of Parker valves and drives are available
- Test movement for automatic controller attitude
- Optimization with integrated oscilloscope function

Real-time signal processing

- Oversampling of the speed and current signals which result in:
  - Reduction of the quantization noise
  - Increase in signal resolution
- Online feedback error compensation corrects for offset and gain errors
- 14 bits increase in resolution
  - By interpolation of sine-cosine feedback signals

Interface

Field bus

- Profibus DP
- CANopen (CiADS402)
- DeviceNet
- PowerLink
- Address configurable via Dip switch

Connection of external inputs/outputs
Parker I/O - System (PIO)

Additional external digital and analog inputs and outputs can be integrated via the CANopen.

Integration with the Office environment

ActiveX plug-in

- Office and industrial environments are constantly growing closer together.
- The use of ActiveX technology allows simple integration into Office application.

Monitoring and control

Operator Panels

Control equipment for all text and graphics applications in industrial environments using Profibus DP, CANopen, DeviceNET and Interbus-S field busses. From two-line displays to touch-panels. For further information please refer to catalogue 192-081011.

In addition to drivers for Compax3/Compax3 powerPLmC, drivers for other PLC products can be integrated on request.

International standards in programming

Advantages offered by integrated standards

- Programming system
  - CoDeSys
- Programming language
  - IEC61131-3
  - Function modules based on PLCopen

Ordering Code



Code	Interface
I11	Digital inputs/outputs
I20	Profibus DP V0/V1/V2 (12Mbit/s)
I21	CANopen
I22	DeviceNet
I30	PowerLink

Code	Options
M00	Standards
M10	Extension 12 digital I/Os & HEDA (motion bus)
M11	HEDA (motionbus)
M12	Extension 12 digital I/Os

Code	Technology functions
T30	Programmable motion control according to IEC61131
T40	Electronic Cam

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Function	Motion control with motion profils. Suitable for position and force/pressure control
Housing / protection class	closed metal housing, isolation according to VDE 0160 / IP 20
Supply voltage [VDC] Current requirements [A]	21...27VDC, ripple <1VSS 0,8 for the device, digital outputs 100mA each
Supported feedback-Systems	• Analog 0..20mA, 4..20mA, ±10V • Start-Stop-Interface • SSI-Interface • EnDat2.1-Interface • 1VSS (max. 400kHz) Interface, 13.5Bit / Distance coding • TTL (RS422) (max. 5MHz), internal post-quadrature resolution
Set point generator	• Jerk-limited ramps • Travel data in increments, mm, inches or variable by scale factor • Specification of speed, acceleration, delay and jerk factor • Force/pressure inputs in N, psi, etc. variable by scale factor
Monitoring functions	• Power/auxiliary supply range • Following error monitoring • Hard- and Software switches
Inputs and Outputs	• 8 control inputs: 24V DC / 10kOhm. • 4 control inputs Active HIGH / short-circuit protected / 24V / 100mA. • 4 analog current input (14Bit). • 2 analog voltage input (14Bit). • 4 analog output (16Bit, current or voltage).
RS232 / RS485 (switchable) RS232: RS485 (2 or 4-wire):	 • 115200Baud • Word length 8 bits, 1 start bit, 1 stop bit • Hardware handshake XON, XOFF • 9600, 19200, 38400, 57600 or 115200 Baud • Word length 7/8Bit, 1 Start-, 1 Stop bit • Parity (switchable) even/odd
Bus systems	• Profibus DP V0-V2 (I20), 12Mbit/s, PROFIdrive-Profil Drive technology • CANopen (CiADS402) (I21) • DeviceNet (I22) • PowerLink (I30)
CE Compliance	• EMC interference emission/limit values for industrial utilization according to EN61 800-3 first environment (commercial and residential area), class A via integrated mains filter for up to 10mCable length, otherwise with external mains filter • EMC immunity/limit values for industrial utilization according to EN61 800-3
Insulation requirements	• Protection class I according to EN 50178 (VDE 0160 part 1) • Contact protection: according to DIN VDE 0106, part 100 • Overvoltage: Voltage class III according to HD 625 (VDE 0110-1) • Degree of contamination 2 according to HD 625 (VDE 0110 part 1) and EN 50178 (VDE 0160 part 1)
Environmental conditions General environmental conditions acc. to EN 60 721-3-1 to 3-3 Permissible ambient temperature Tolerated humidity: non condensing Elevation of operating site: <=1000m above sea level for 100% load ratings	 • Climate (temperature / humidity / barometric pressure) • Class 3K3 • Operation: 0 to +45 °C class 3K3 • Storage: -25 to +70 °C class 2K3 • Transport: -25 to +70 °C class 2K3 • Operation: <= 85% class 2K3 • Storage: <= 95% class 3K3 (relative humidity) • Transport: <= 95% class 2K3 • Please inquire for greater elevations Protection class IP20 according EN 60 529
EMC directives and harmonised EC norms	• EC low voltage directive 73/23/EEC and RL 93/68/EEC: EN 50 178, General industrial safety norm Equipping electric power systems with electronic operating equipment HD 625, general electrical safety. Insulation principles for electrical operating equipment EN 60 204-1, Machinery norm, partly applied • EC-EMC directive 89/336/EEC: EN 61 800-3, EMC norm Product standard for variable speed drives EN 50 081-2 ... 50 082-2, EN 61 000-4-2 ...61 000-4-5
UL-Certification	USL according to UL508 (listed) / CNL according to C22.2 No: 142-M1987 (listed) Certified: E-File-No: E198563
Weight [kg]	2.0

C3F_UK.INDD CM_18.01.08.1

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Hydraulic Controls Division
Kaarst, Germany

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Compax3 T30 Motion control according to PLCopen

Function range T30

General

Due to its high flexibility and efficiency the Compax3 motion control according to PLCopen is for most applications the optimal basis for decentralized motion control.

Positioning with function modules based on PLCopen

- Programmable based on IEC61131-3
- Programming system: CoDeSys
- Up to 5000 instructions
- 500 16-bit variables / 150 32-bit variables
- Recipe table with 288 variables
- 3 16-bit saved variables (power failure protected) / 3 32-bit saved variables (power failure protected)
- PLCopen-function modules:
  - Positioning: absolute, relative, additive and continuous
  - Machine Zero.
  - Stop, energizing the power stage, quit
  - Position, device status, reading axis error
  - Electronic gearbox (Mc_GearIn)
- IEC61131-3-standard modules:
  - Up to 8 timers (TON, TOF, TP)
  - Trigger (R_TRIG, F_TRIG)
  - Flip-flops (RS, SR)
  - Counters (CTU, CTD, CTUD)
- Device-specific function modules:
  - C3_Input: generates an input process image
  - C3_Output: generates an output process image
  - C3_ReadArray: access to recipe table
- Inputs/outputs:
  - 8 digital inputs (24V level)
  - 4 digital outputs (24V level)
  - 6 analog inputs (14 bits)
  - 4 analog outputs (16 bits)
  - Optional addition of 12 digital inputs/outputs

PLCopen function blocks

- Absolute positioning
- Relative positioning
- Additive positioning
- Continuous positioning
- Stop
- Machine zero
- Energizing the power output stage
- Reading device status
- Reading axis error
- Acknowledging errors
- Reading the current position
- Electronic gearbox (gearing)

Additional function range

- Absolute force control
- Combined position and force control
- Control mode switching between position and force/ pressure control
- 2-axis-syncronous-run

Absolute/Relative positioning MoveAbs und MoveRel

One motion set defines a complete motion profile with the parameters:
1: Target position
2: Velocity
3: Maximum acceleration
4: Maximum deceleration
5: Maximum jerk

Stop motion Stop

The Stop set interrupts the current motion set.

Mark-related positioning: RegSearch, RegMove

For mark-related positioning, two operating modes are available:

- RegSearch: Search for an external signal e.g. a registration mark on a product.
- RegMove: The external signal interrupts the search move and the second move follows without interruption
- Precision of the registration mark detection: <1µs

Electronic gearbox Gearing

Motion synchronized to a master axis with any transmission ratio. The position of the master axis can be detected via:

- +/-10V analog input
- Step/direction command input
- The encoder input or HEDA bus, using a Compax3 master.

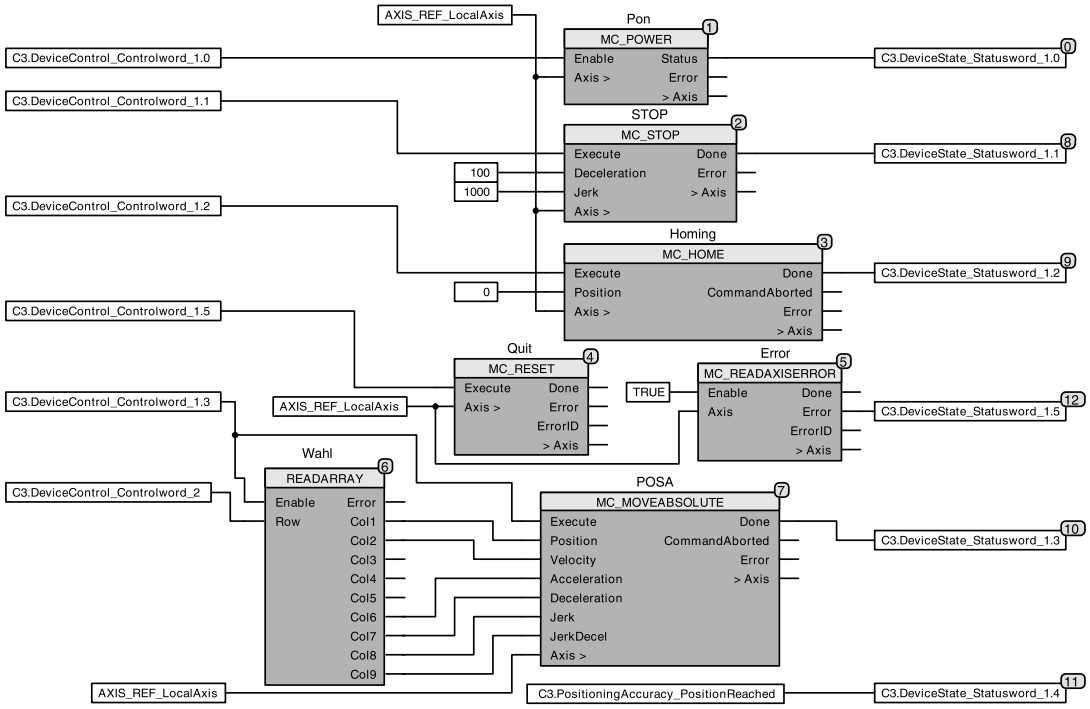
Dynamic positioning

A new motion profile can be selected during a positioning sequence – a smooth transition takes place.

Example of an field bus interface controlled IEC61131-application

- 2 control words are placed on the cyclic channel of the bus.
- The position data records (position, speed, acceleration etc.) are stored in a table (array).
- The desired position data record is selected with Controlword_2.
- The individual bits of Controlword_1 control positioning.
- A return message is sent via a status word on the cyclic channel of the bus.

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Example of a bus interface controlled IEC61131 application

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Compax3 T40 IEC61131-3 positioning with cam function modules

T40 function range

General

Compax3 T40 is able to simulate mechanical cams and cam switching mechanisms electronically. The T40 electronic cam was especially optimized for:

- The packaging machine industry
- For the printing industry
- All applications, where a mechanical cam is to be replaced by a flexible, cyclic electronic solution

This helps to solve discontinuous material supply, flying-knive and similar drive applications using distributed drive technology.

Compax3 T40 supports both real and virtual master movements. In addition, the user can switch to other cam profiles or cam segments ‚on the fly'.

Programming is carried out in the well-known IEC61131-3 environment.

With the aid of the cam function modules and CamDesigner, cam applications can be implemented very easily.

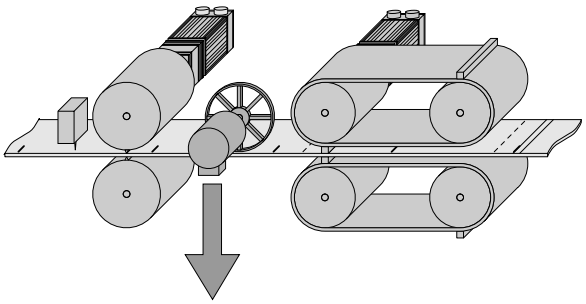
Function T40

- Technology functions of the T30 version fully integrated and available
- Master position acquisition
- Mark synchronization
- Cam switching mechanism
- Coupling and decoupling function
- Cam profiles
- Cam memory
- Cam creation with CamDesigner

Master position acquisition

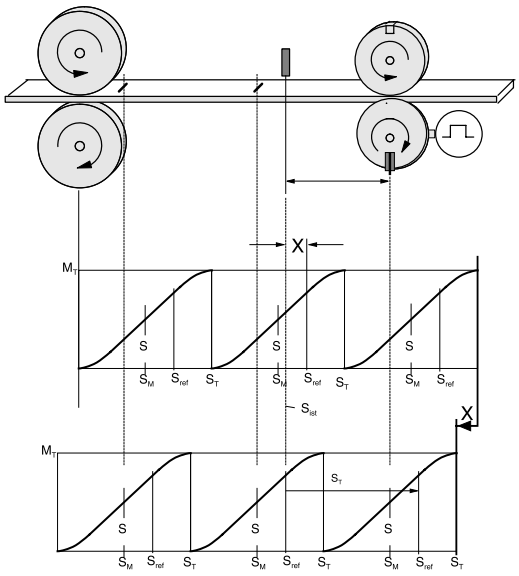
- Acquisition by incremental encoder
- Acquisition by the HEDA real-time bus
- Virtual Master:

A second axis in the IEC program can be used to program a motion profile, which serves as a master for one or several axes.



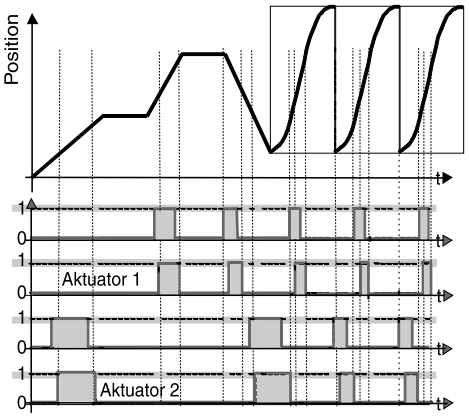
Mark synchronization

- Master or slave oriented (simultaneous, cam-independent)
- Highly-precise mark recognition (accuracy <1µs; Touchprobe)



Cam switching mechanism

- 36 cams with individual profiles
- 4 fast cams (125µs per cam) standard: 500µs
- 32 serial cams, 16ms/cam cycle (0.5ms/cam)
- Delay-time compensated cams: Compax3 can advance the cam to compensate for delays in switching elements.

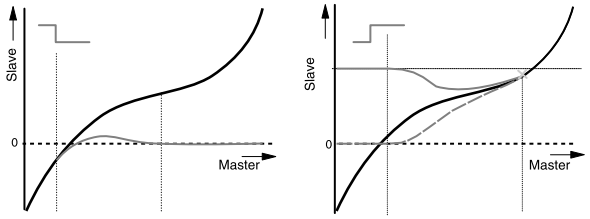


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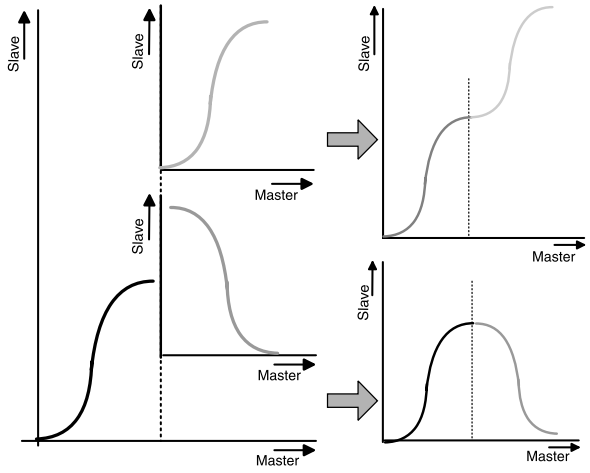
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Coupling and decoupling functions

- By means of a set point generator
- By means of a change-over function
- Without overspeeding by coupling over several master cycles
- Virtually free set-up of the coupling and decoupling movement
- Master-guided coupling movement
- Random standstill position

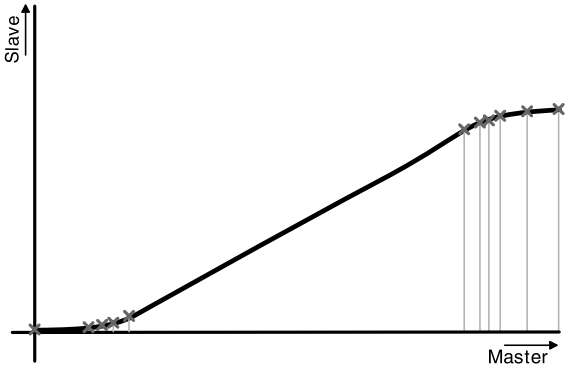


- **Cam profiles**
- Up to 20 cam segments can be produced by:
- Virtually random cam links (forwards and backwards)
- Freely programmable event-controlled cam branches
- Scalable cam segments and complete cam profiles



Cam memory

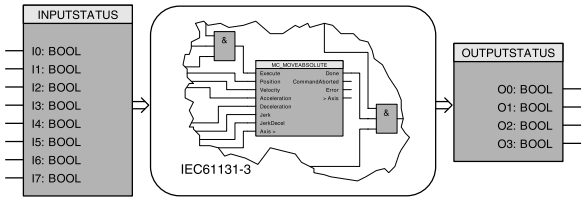
- 10,000 points (Master/Slave) in 24-bit format
- High-precision profile generation:
  - Variable point spacing with full backup of the current master and slave coordinates (even if the power fails)
  - Linear interpolation between points
- Cam memory for up to 20 curves



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Connection of high-level controllers

Control via digital inputs/outputs Compax3 I11T30 / I11T40



The digital I/Os can be optionally extended by 12 I/Os (M10 and M12 option).

Control via Profibus, Compax3 I20T30 / I20T40 Profibus-ratings

DP-Versions	DPV0 / DPV1
Baud rate [MBit/s]	up to 12
Profibus ID	C320

Control via CANopen, Compax3 I21T30 / I21T40 CANopen-ratings

Baud rate [kBit/s]	20, 50, 100, 125, 250, 500, 800, 1000
Service-Data-Object	SDO1
Process-Data-Objects	PDO1, ... PDO4

Control via DeviceNet, Compax3 I22T30 / I22T40

DeviceNet ratings	
I/O - data	up to 32 bytes
Baud rate [kBit/s]	125...500
Nodes	up to 63 Slaves

Control via Ethernet Powerlink, Compax3 I30T30 / I30T40

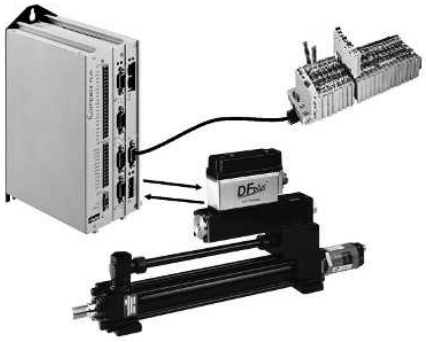
Ethernet Powerlink ratings	
Baud rate	100Mbits (FastEthernet)
Cycle time	<200µs; to 240 nodes

Decentralized control via CANopen, I21T30 / I21T40

With external inputs/outputs (PIO)

Additional external digital and analog inputs and outputs can be integrated via the CANopen master function. For this purpose we offer the Parker I/O system (PIO):

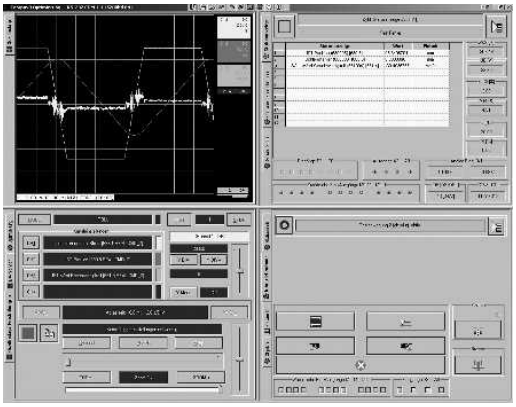
- CANopen field bus coupler: 650mA/5V, 1650mA/5V
- Digital input terminals: 2-, 4-, and 8-channel
- Analog input terminals: 2-channel (0-10V), 4-channel (0-20mA)
- Digital output terminals: 2-, 4-, and 8-channel
- Analog output terminals: 2-channel (0-10V, 0-20mA, +/-10V)



11

Simple, wizard-guided configuration and commissioning
Compax3 ServoManager
Software Tool C3 ServoManager
Configuration is carried out on a PC using the Compax3 ServoManager.

- Wizard-guided configuration
  - Automatic querying of all necessary entries
  - Graphically supported selection
- Setup mode
  - Moving individual axes
  - Predefined profiles
  - Convenient operation
  - Storage of defined profiles
- Integrated 4-channel oscilloscope
  - Signal tracing directly on the PC
  - Various modes (single/normal/auto/roll)
  - Zoom function
  - Export as image or table (for example to Excel)



C3 ServoManager with oscilloscope

Software Tool HydraulicsManager

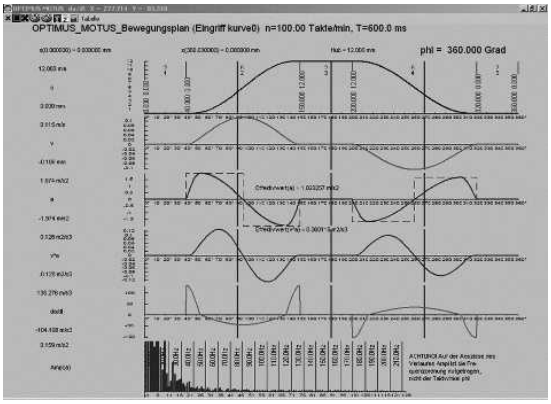
- Simple set up of customer valves, cylinders and drives.
- Technical data of all Parker valves, cylinders and drives available.



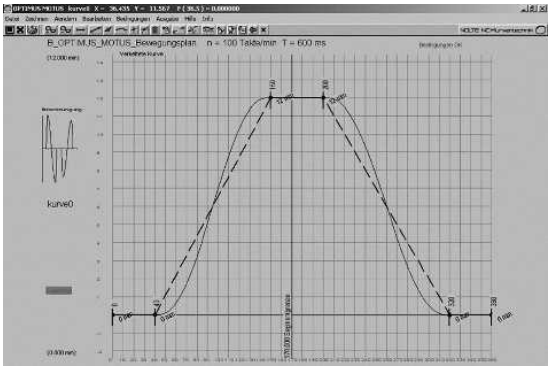
C3 HydraulicsManager valve database

Cam creation with CamDesigner
Software Tool CamDesigner

- Standardized Nolte cam generating tool with:
  - Standard or extended range of functions
  - Evaluation of the motion profiles
  - Verification of the drive sizing
- Transition laws from VDI directive 2143:
  - Selection of motion laws
  - The CamDesigner basic version features 15 motion laws (based on the dwell-to-dwell (interpolation method)



Evaluation of the motion profile



Cam generation with the integrated CamEditor

Advantages offered by international standards in programming
IEC61131-3 Programming language
IEC61131-3 is the only company- and product-independent programming language with worldwide support for industrial automation devices.

- IEC61131-3 includes graphical and textual programming languages:
  - Instruction list
  - Structured text
  - Ladder diagram
  - Sequential function chart
  - Function block diagram

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- Integrated standards offer:
  - A trusted programming environment
  - Standardized programming
- Integrated standards reduce:
  - The overhead of development
  - Maintenance costs
  - Software upkeep
  - Training overhead
- Integrated standards increase:
  - Productivity
  - Software quality
  - Concentration on core competence

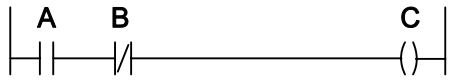
Program development in IL



Instruction list (IL)

```
LD      A
ANDN    B
ST      C
```

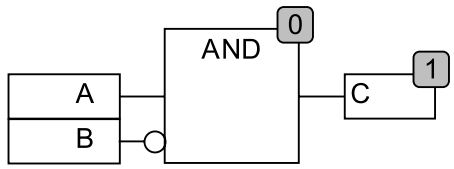
Ladder diagram



Structured text

```
C := A AND NOT B
```

Function plan



C3F_UK.INDD CM_18.01.08.1

Function modules based on PLCopen

PLCopen is a product- and company independent organization that plays a significant role in supporting the IEC61131-3 programming language. Its specific tasks also include defining basic processes relevant to motion. The PLCopen organization consists of both users and manufacturers of automation components.

Parker Hannifin is an active member of the “Motion Control“ task force. This is a great advantage for the users of Parker drive technology, since they are constantly able to profit directly from the latest developments in PLCopen.

Professional development tool CoDeSys

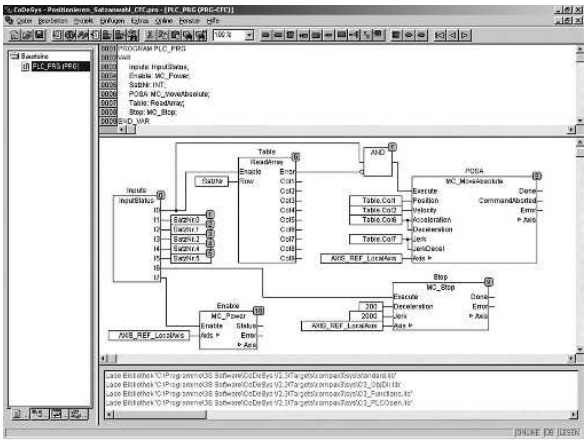
CoDeSys is a development environment for programming that saves a significant amount of time as applications are created.

- One of the most powerful development environments available, established world-wide
- Universal programming platform for various devices
- Visual elements
- Library management for user-defined applications
- Context-sensitive help wizard
- Data exchange between devices from different manufacturers
- Complete online functionality
- Sophisticated technological features
- . . . and all this for no additional cost

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Program development in CFC



Project management

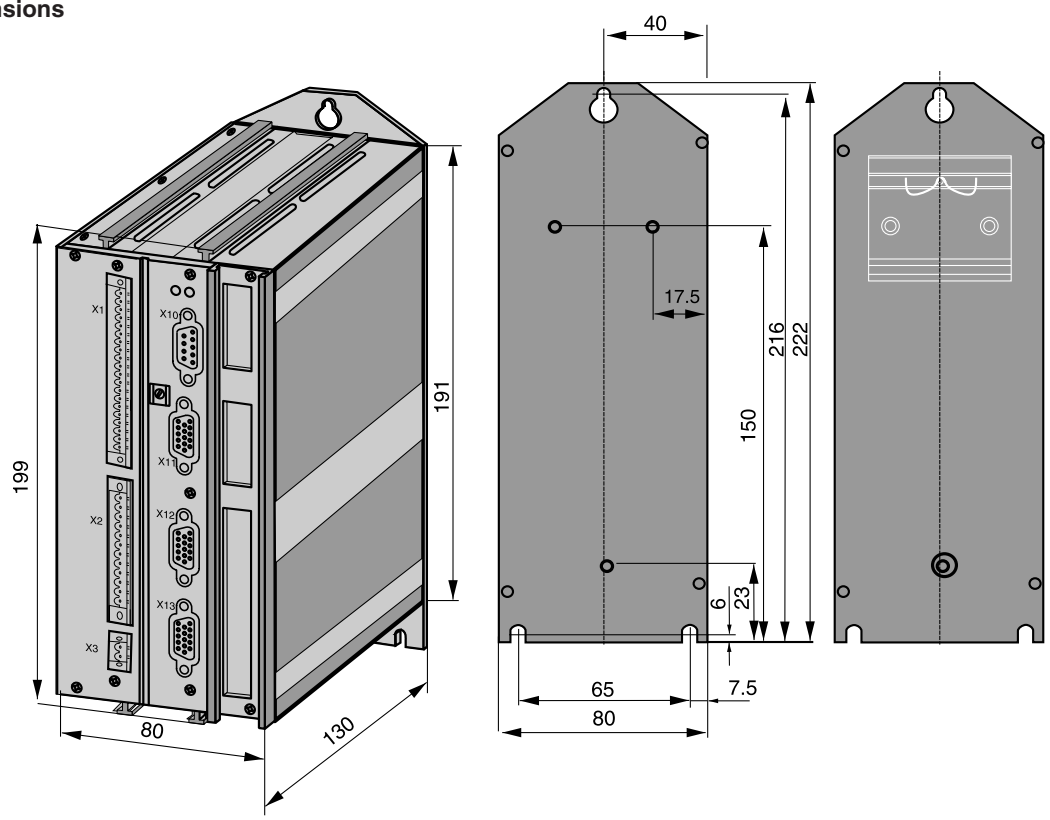
Saving an entire project (source file) including symbols and comments to make service calls easier, because there is no need for any project data on the device itself

- Archiving projects as ZIP files
- Creating user-specific libraries that can be reused as tested sections of programs
  - These libraries can be protected
  - Examples include winders, synchronization components etc.
- Various user levels make it possible to lock sections of the program with passwords
- Depending on the task at hand, users can select from among 5 IEC languages plus CFC. These languages can also be mixed

Parker is a member of the “CoDeSys Automation Alliance“.

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Dimensions



Connection set ZBH02/04

Complete kit with mating plug connectors (X1, X2 and X3) for Compax3 connectors and special shield connecting terminal

Feedback cable GBK../..

- Connection to the Motor:

Under the designation "REK.. + GBK.." (Feedback cable) we can deliver feedback connecting cables in various lengths to order.

- Prefabricated with plug and cable eye
- The plugs of the Parker motor and feedback cables contain a special surface area screening.
- Cable plans, if you wish to make up your own cables



Terminal block EAM06/..

- For additional wiring of the inputs and outputs:
- Available with or without LED display
- Can be mounted in the control cabinet on a supporting rail
- Connection EAM06/.. via SSK23/..to X11, SSK24/.. to X12



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RS232 cable SSK01/..

(in various lengths).
Configuration:
Via a PC with the aid of the Compax3 ServoManager.
Communication:
Communication with Compax3 either via RS232 or via RS485 in order to read or write into objects.



Profibus plug BUS08/01

- BUS08/01 with 2 cable inputs (1x BUS08/01 incoming, 1x BUS08/01 continuing) and screw terminals, as well as a switch for activating the terminating resistor. Set to ON for first and last bus node terminating resistor activated.
- **Profibus cable: SSL01/.. not prefabricated**
- Special cable in any length for Profibus wiring (colors according to DESINA).



Operating module BDM01/01

- For display and diagnosis purposes:
- Can be plugged in during operation
- Power supply via Compax3 servo control
- For displaying and changing values



HEDA Bus

- HEDA bus terminal connector (RJ45) BUS07/01:
- For the first and last Compax3 in the HEDA bus.
- HEDA cable: SSK28/.. prefabricated in various lengths:
- Cable for HEDA bus wiring from Compax3-to-Compax3 or PC-to-Compax3 powerPLmC.



CANbus plug BUS10/01

- BUS10/01 with 2 cable inputs (1x BUS10/01 incoming, 1x BUS10/01 continuing) and screw terminals, as well as a switch for activating the terminating resistor. Set to ON for first and last bus node terminating resistor activated

CANbus cable SSL02/.. not prefabricated

- Special cable in any length for CANbus wiring (colours according to DESINA)



External Inputs/Outputs PIO...

For Compax3 I21 from technology function T30 onwards via CANopen:

- Integration of additional external input and output modules (digital and analog)



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Connection set for Compax 3										
for C3F001 D2 F12xxx	ZBH 02/04	Z	B	H	0	2	/		0	4
Operating module										
Operating module		B	D	M	0	1	/		0	1
Terminal block										
for I/Os without luminous indicator	for X11, X12	E	A	M	0	6	/		0	1
for I/Os with luminous indicator	for X12	E	A	M	0	6	/		0	2
Interface cables and connectors										
PC-Compax3 (RS232)		S	S	K	0	1	/		...	...[1]
on X11/X13 (Transducer)	With flying leads	S	S	K	2	1	/		...	...[1]
on X12 (I/O digital)	With flying leads	S	S	K	2	2	/		...	...[1]
on X11(Ref/Analog)	For I/O terminal	S	S	K	2	3	/		...	...[1]
on X12 (I/Os digital)	For I/O terminal	S	S	K	2	4	/		...	...[1]
PC - POP (RS232)		S	S	K	2	5	/		...	...[1]
Compax3 - POP (RS485)		S	S	K	2	7	/	../	...	...[3]
Compax3 HEDA - Compax3 HEDA or PC - C3powerPLmC		S	S	K	2	8	/		...	...[2]
Compax3 X11 - Compax3 X11 (Encoder coupling of 2 axes)		S	S	K	2	9	/		...	...[1]
HEDA bus terminal connector (for the 1st and the last Compax3 in the HEDA Bus)		B	U	S	0	7	/		0	1
Feedback cable for Balluff SSI transducer and start/stop		G	B	K	4	0	/		...	...[1]
Profibus cable [4]	Not prefabricated	S	S	L	0	1	/		...	...[1]
Profibus connector		B	U	S	0	8	/		0	1
CAN-Bus cable [4]	Not prefabricated	S	S	L	0	2	/		...	...[1]
CAN-Bus connector		B	U	S	1	0	/		0	1

[1] Length code

Length code 1 (Example: SSK01/09: Length 25m)

Length [m]	1.0	2.5	5.0	7.5	10.0	12.5	15	20	25	30	50
Code	01	02	03	04	05	06	07	08	09	10	14

[2] Length code for SSK28

Length code 2 (Example: SSK28/22: Length 3m)

Length [m]	0.25	0.5	1.0	3.0	5.0	10.0
Code	20	21	01	22	03	05

[3] Length code for SSK27

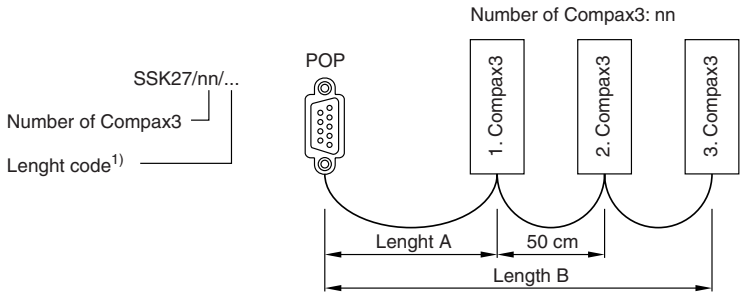
Length A: Cable or connection from POP with **one** Compax3 (POP - 1.Compax3), variable length according to length code[1]
(Example: SSK27/01/01: Length 1.0m)

Length B: Cable or connection from POP with **more than one** Compax3 (nn > 01) (1.Compax3 - 2.Compax3 - …), length between Compax connectors is fixed to 50cm, variable length A from POP with first Compax according to length code[1]
(Example: SSK27/03/01: Length 1.0m)

[4] Colours according to DESINA

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Length code for SSK27



Decentralized Input terminals								
PIO 2DI 24V DC 3.0ms	2-Channel Digital-Input terminal		P	I	O	4	0	0
PIO 4DI 24V DC 3.0ms	4-Channel Digital-Input terminal		P	I	O	4	0	2
PIO 8DI 24V DC 3.0ms	8-Channel Digital-Input terminal		P	I	O	4	3	0
PIO 2AI DC ±10V	2-Channel Analog-Input terminal	(± 10V Differential input)	P	I	O	4	5	6
PIO 4AI 0-10V DC S.E.	4-Channel Analog-Input terminal	(0-10V Signal voltage)	P	I	O	4	6	8
PIO 2AI 0-20mA	2-Channel Analog-Input terminal	(0 - 20mA Differential input)	P	I	O	4	8	0
Decentralized Output terminals								
PIO 2DO 24V DC 0.5A	2-Channel Digital-Output terminal	(Output current 0.5A)	P	I	O	5	0	1
PIO 4DO 24V DC 0.5A	4-Channel Digital-Output terminal	(Output current 0.5A)	P	I	O	5	0	4
PIO 8DO 24V DC 0.5A	8-Channel Digital-Output terminal	(Output current 0.5A)	P	I	O	5	3	0
PIO 2AO 0-10V DC	2-Channel Analog-Output terminal	(0-10V Signal voltage)	P	I	O	5	5	0
PIO 4AO 0-20mA	2-Channel Analog-Output terminal	(0-20mA Signal voltage)	P	I	O	5	5	2
PIO 2AO DC ±10V	2-Channel Analog-Output terminal	(±10V Signal voltage)	P	I	O	5	5	6
CANopen Fieldbus coupler								
CANopen Standard			P	I	O	3	3	7
CANopen ECO			P	I	O	3	4	7

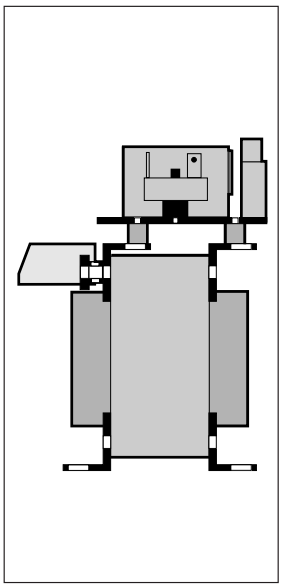
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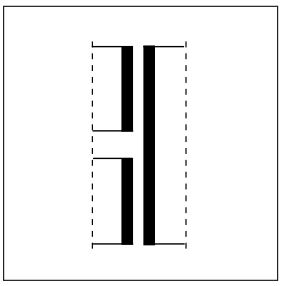
Single-phase power units providing direct current are preferable and suitable for the power supply to electronic modules and proportional valves. The windings of these transformers are separated for safety and provided with isolated screened windings with earthing.

Features

- Safety transformer to EN 60742 with integrated fuse
- Primary and secondary windings fitted with shielded windings with earth connection
- Optimal voltage accommodation with ±10V tappings
- Low ripple of 5% at full load
- Integrated LED operational indicator of output voltage

CE







Characteristics

Nominal input voltage	[VAC]	110/230
Regulation/Tappings at	[V]	+/-10
Frequency	[Hz]	50/60
Operating temperature	[°C]	-20 to +60
Nominal output voltage	[VDC]	24
Output voltage at zero load	[VDC]	30.5
Output voltage at full load	[VDC]	22.4
Ripple	[%]	below 5
Protection		IP 00
Construction		VBG 4
Regulations / Test voltages		EN 60742

Ordering code

EX **00** – ☐ **10**

Electronic module | **Module type** | **Design series**

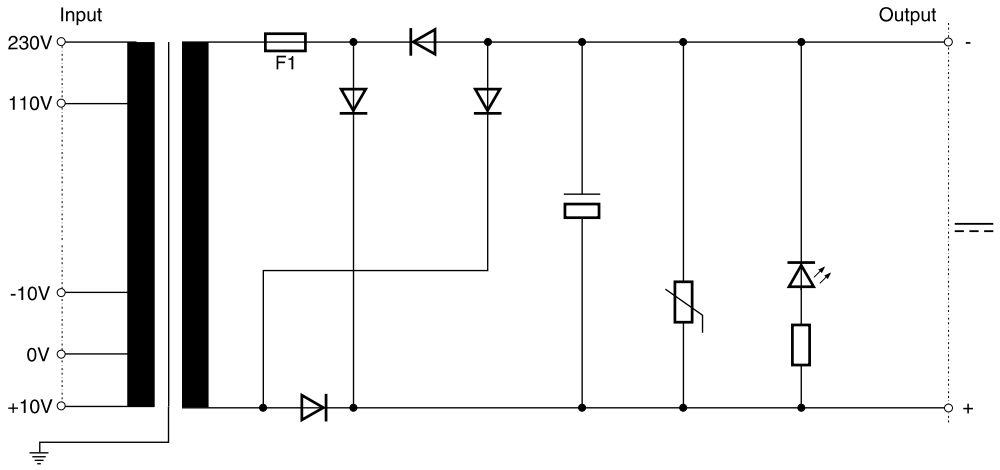
Code	Power (VA)	Nominal current/ In (A) AC [1]	Nominal current/ Out (A) DC
N08	**240VA**	**3.4/1.6**	**10.0**

[1] at 110/230V AC

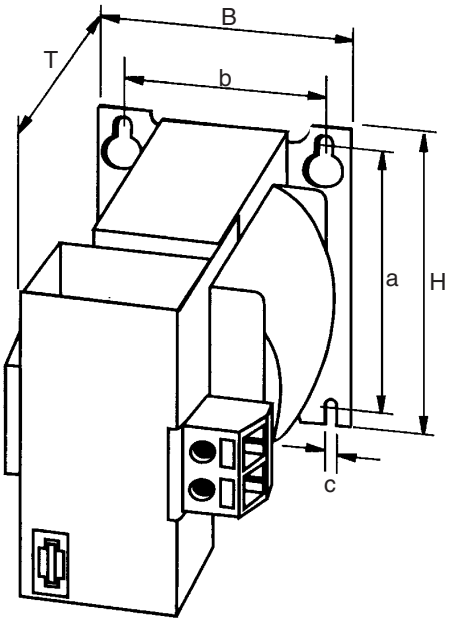
Bold letters =
Short-term availability

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Block diagram



Dimensions



Code	H	B	T	a	b	c	kg
EX00-N08	120	113	173	90	94.5	5.8	6.3

Note

To guarantee air convection the module has to be mounted in a hanging position.

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Test Unit
Series EX-M03

The test unit EX00-M03 is suitable for the control of proportional valves incorporating integrated electronics. It provides commissioning and function tests independently of the machine control system. The test unit is provided with all necessary signal and measurement taps, making it possible to proceed initial operation and diagnosis.



Features

- Control of valves incorporating integrated electronics and central plug acc. DIN 43563 (6p.+PE)*
- Mains connection selectable 230/115VAC
- Built-in fuses
- Cord set included
- Integrated digital voltmeter with
- test point selector switch
- Test jacks
- Rugged metal enclosure with handles

* not usable for D*FP valve series

EMC

EN 50081-1
EN 50082-2

Technical data

Design			Aluminium die cast enclosure
Supply voltage		[V]	115/230, 50...60Hz
Power consumption		[VA]	max. 80
Current consumption max.		[A]	0.7 / 0.35
Mains input fuse		[A]	2 time lag
Valve output fuse		[A]	3 time lag
Required mains supply fuse		[A]	16
Protection class			IP40
Valve central connection			
	Valve supply	[V]	24 (±20%)
	Command voltage	[V]	0...±10 (±1%)
	Diagnostic output	[V]	0...±10
	Enable signal	[V]	7.5 (±10%)
Measurement terminals			For multimeter with Ri min = 10kOhm
Display			
	Display digits		3
	Resolution	[mV]	100
Mains cord			
	Unit site		Cold inlet connector IEC320
	Mains site		CEE 7/7 plug
	Cord length	[m]	2
Valve cord			
	Unit site		Cable mount inlet DIN 40 040 Amphenol SV70
	Valve site		Cable mount outlet DIN 43 563
	Cord length	[m]	3
Ambient temperature		[°C]	0...40
Weight		[kg]	3.2
Dimensions		[mm]	L 220 x B 120 x H 90 (without handles)

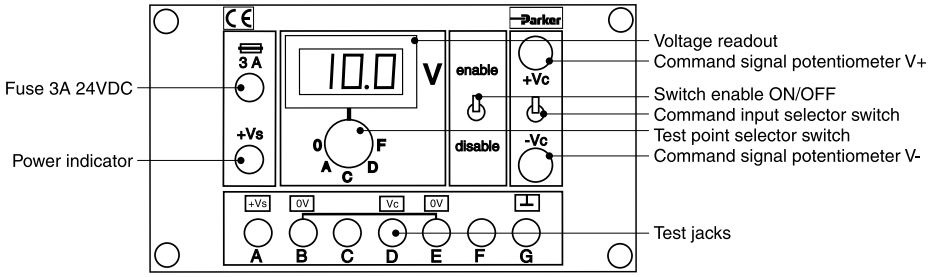
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Ordering code

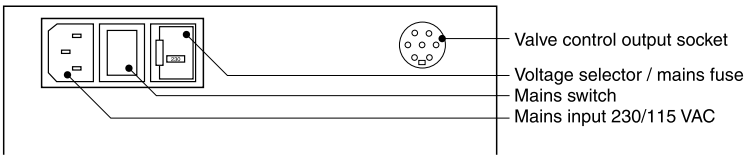


Operator panel

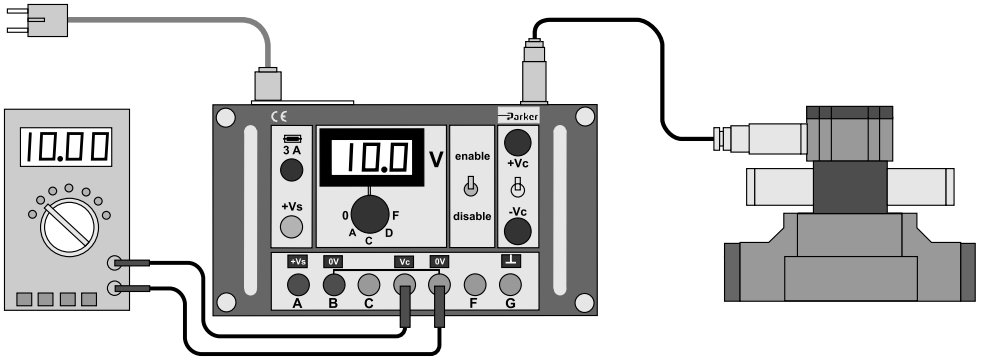
Front



Rear



Wiring configuration



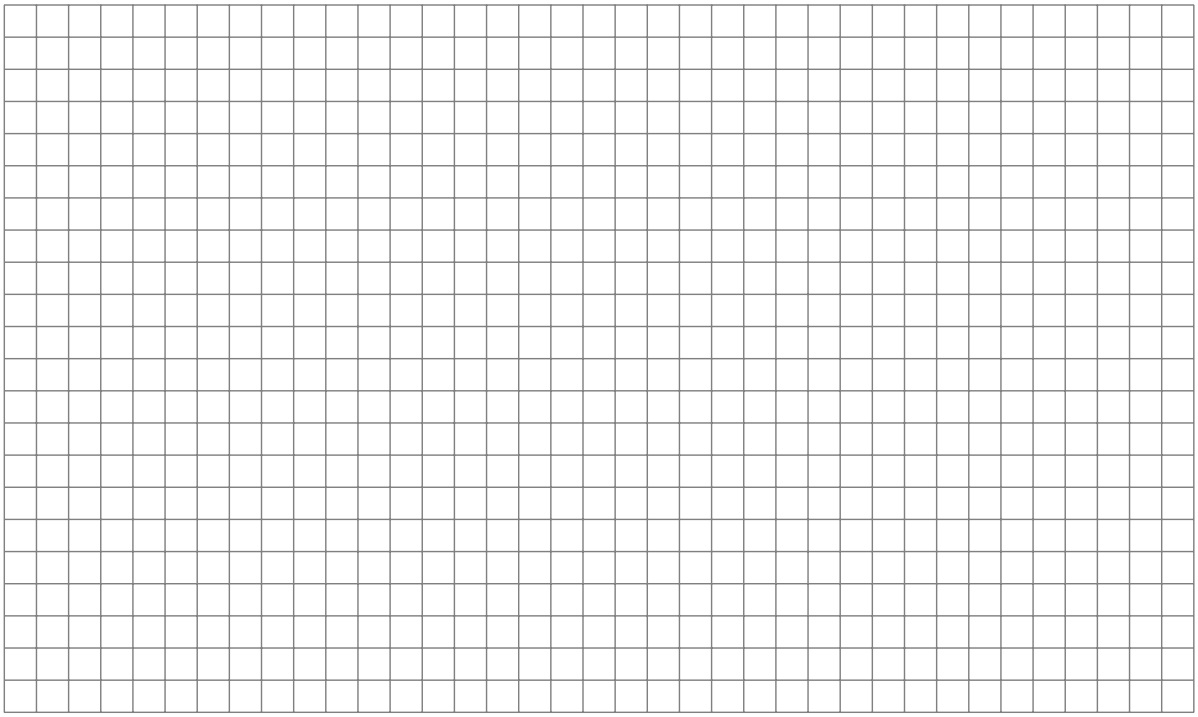
11

Series	Description	Size									Page
	DIN / ISO	06	10	16	25	32	40	50	63	80	
	Subplates, manifolds, adaptor-, sandwich- and cover plates										
SPD	Subplates, BSPP threads, DC valves	•	•	•	•						12- 3
A	Subplates, metric threads, DC valves	•	•								12- 8
SPP	Subplates, BSPP threads, pressure valves, DIN / ISO		•		•	•					12- 9
A102	Subplates for pressure valves, styles VB and VM		•								12- 12
MSP	Multi-station manifold, DC valves	•	•								12- 13
	Symbols for cover, sandwich and adaptor plates										12- 21
PADA	Sandwich and adaptor plates	•	•								12- 23
H06	Sandwich plates	•									12- 25
CS	Sandwich and cover plates	•									12- 29
D51	Cover plates	•	•								12- 31
CB	Cartridge manifold block			•	•	•	•	•	•	•	12- 33
	Accessories for manifolds and systems										
BK	Bolt kits										12- 35
TK	Tie rod kits										12- 36
	Pressure gauge valves										
WM	Pressure gauge selector valve										12- 37
	Pressure switches										
PSB	Pressure switches										12- 39
SCPSD	Electronic pressure switch										12- 45
	Pressure intensifiers										
SD500											12- 51

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Notes

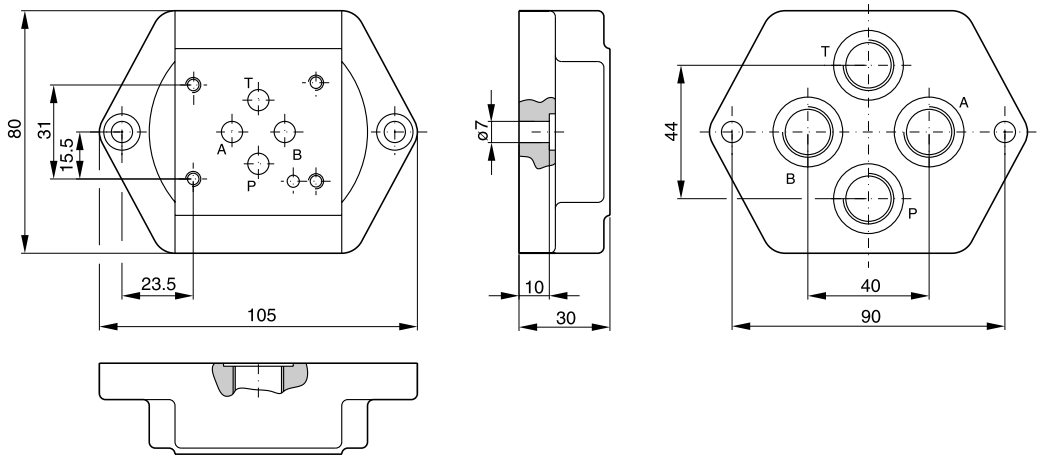


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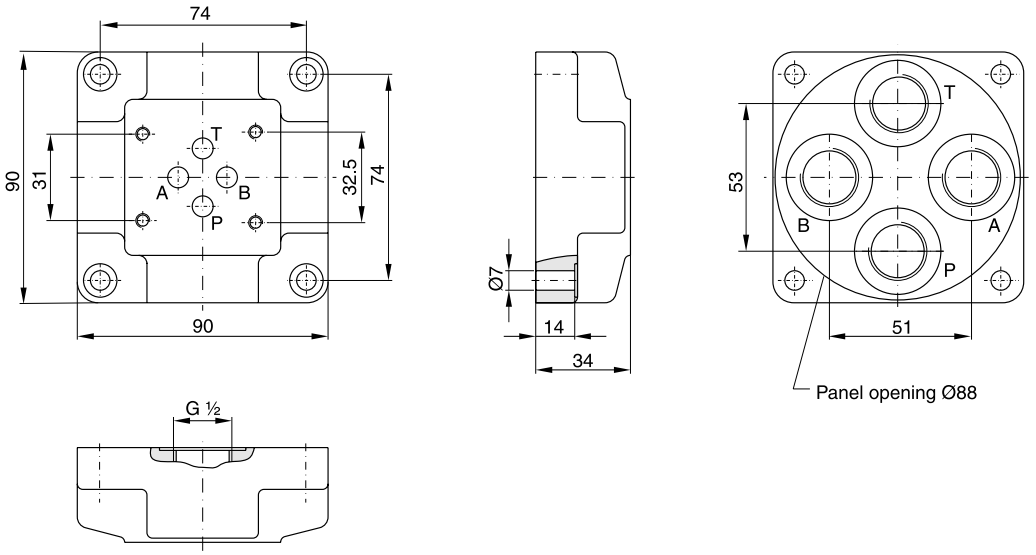
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Valve size DIN NG06, CETOP 03, NFPA D03



Ordering code	
SPD 22 B 910	P, A, B and T = G 1/4
SPD 23 B 910	P, A, B and T = G 3/8

Valve size DIN NG06, CETOP 03, NFPA D03

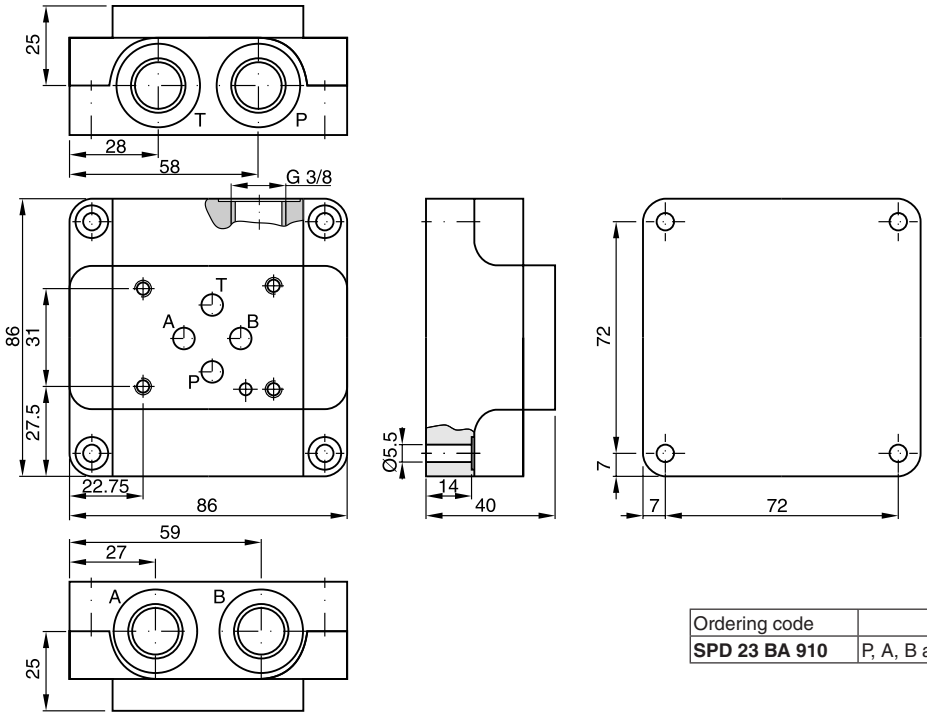


Ordering code	
SPD 24 B 910	P, A, B and T = G 1/2

Bold letters =
Short-term availability

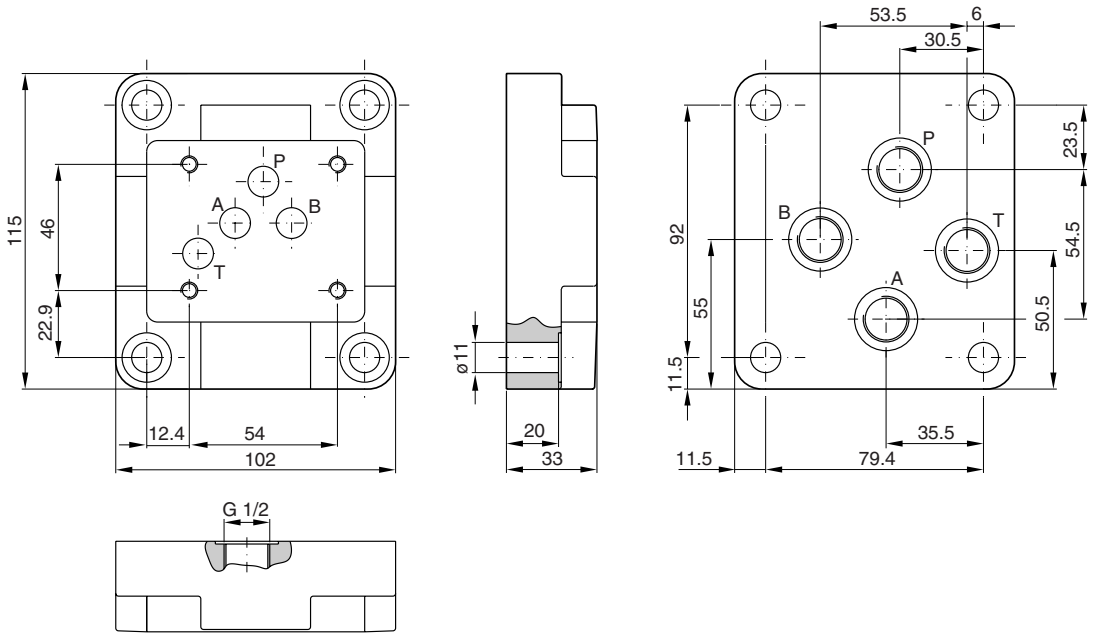
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Valve size DIN NG06, CETOP 03, NFPA D03



Ordering code	
SPD 23 BA 910	P, A, B and T = G 3/8

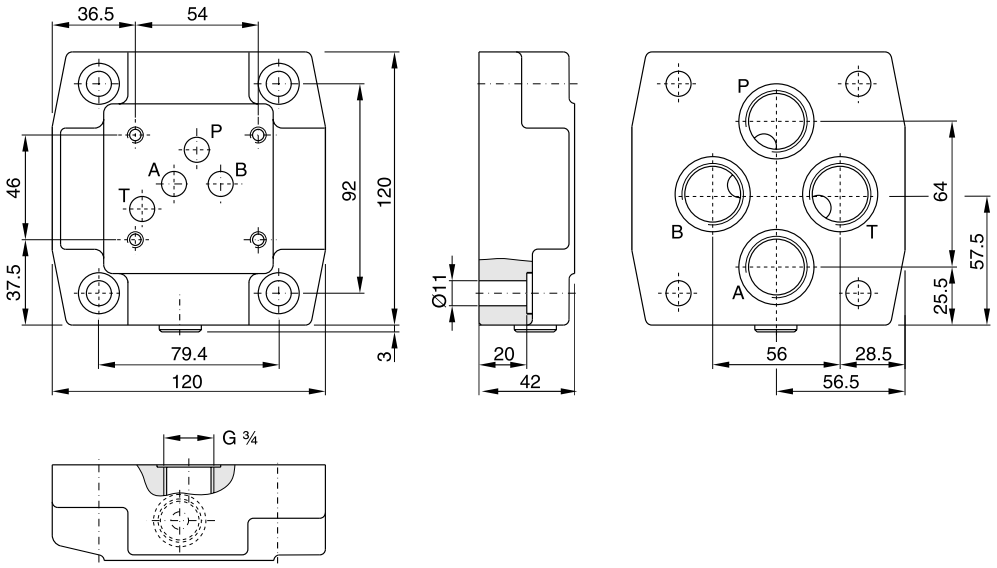
Valve size DIN NG10, CETOP 05, NFPA D05



Ordering code	
SPD 34 B 920	P, A, B and T = G 1/2

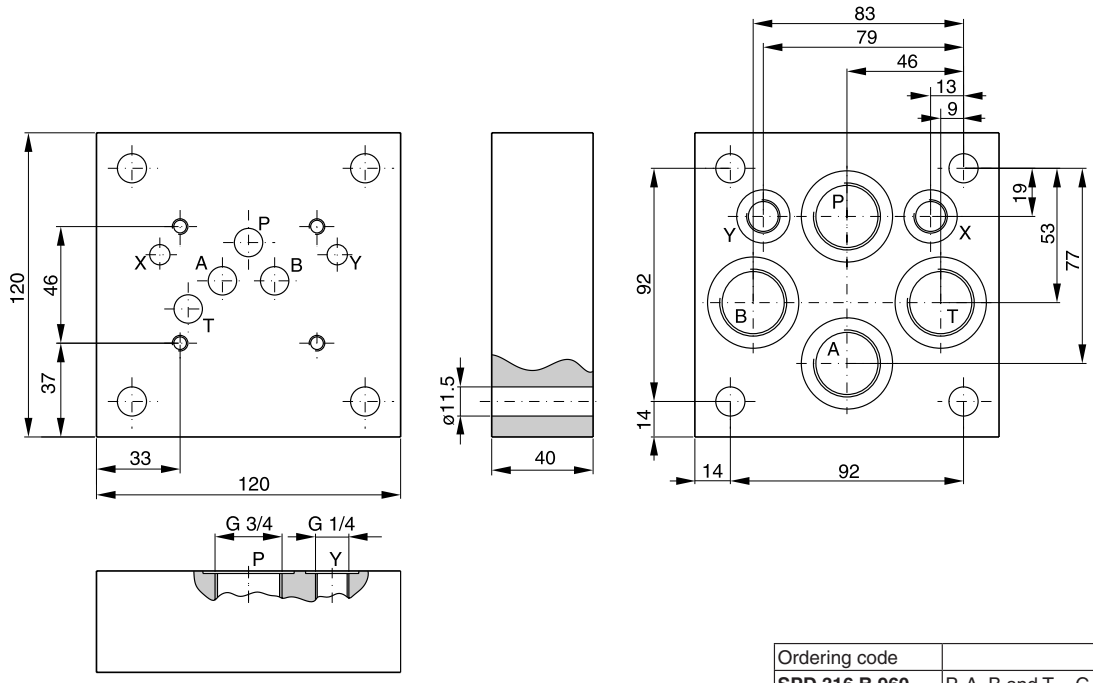
Bold letters =
Short-term availability

Valve size DIN NG10, CETOP 05, NFPA D05



Ordering code	
SPD 36 B 920	P, A, B and T = G 3/4

Valve size DIN NG10, CETOP 05, NFPA D05



Ordering code	
SPD 316 B 960	P, A, B and T = G 3/4 X and Y = G 1/4

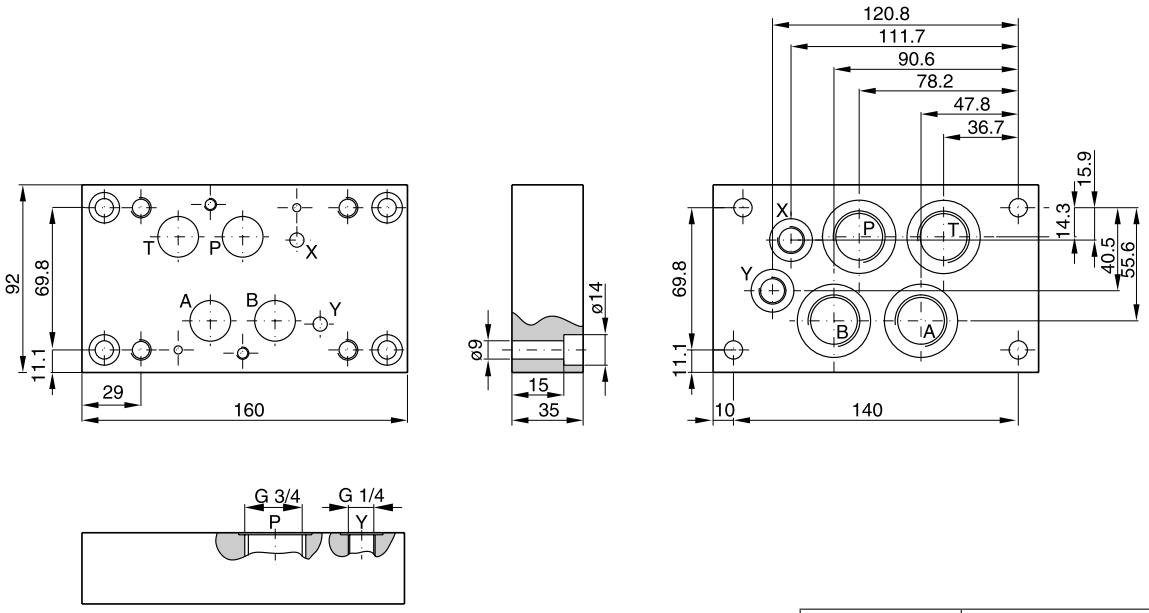
Bold letters =
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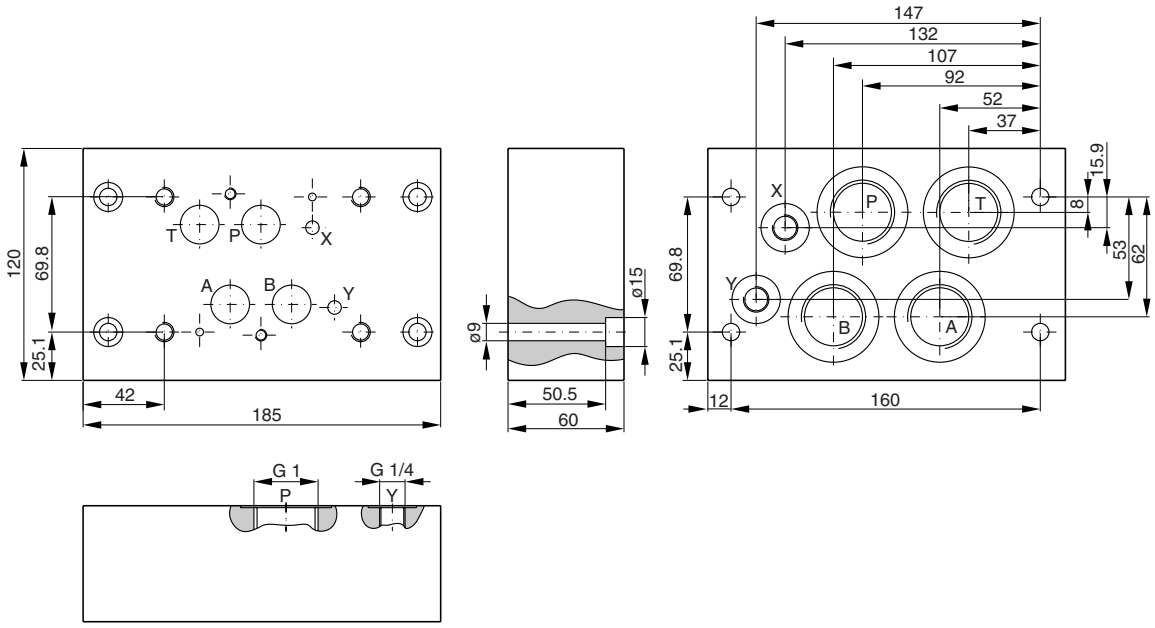
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Valve size DIN NG16, CETOP 07, NFPA D07



Ordering code	
SPD 46 B 910	P, A, B and T = G 3/4 X and Y = G 1/4

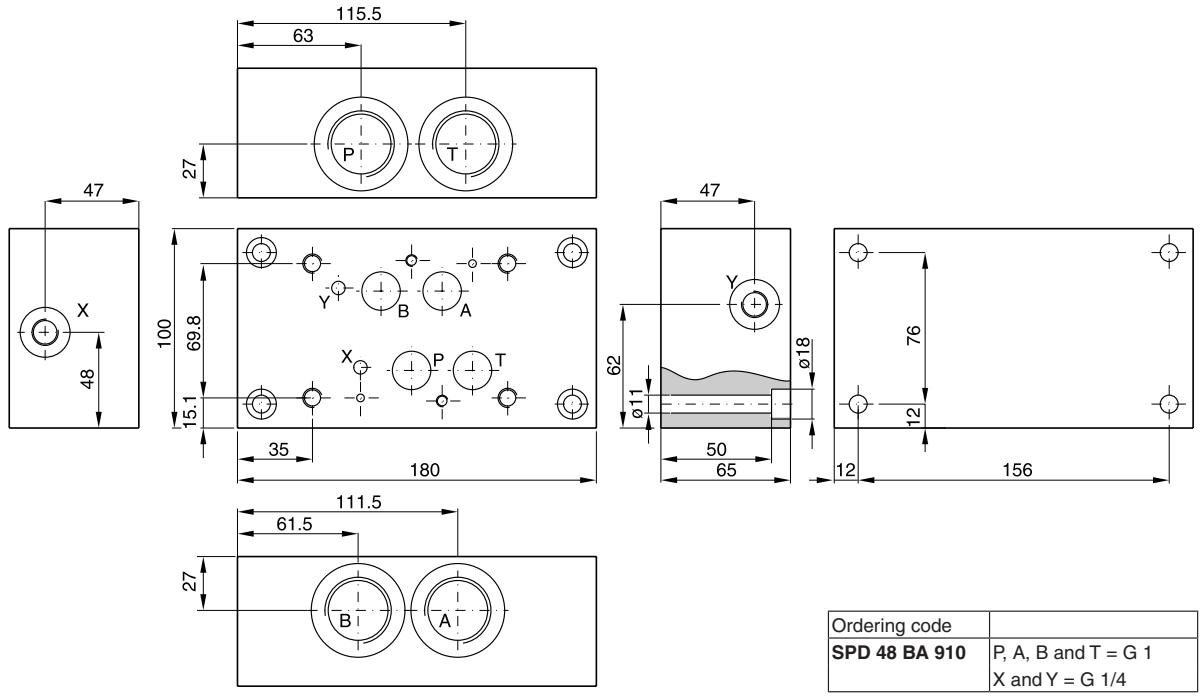
Valve size DIN NG16, CETOP 07, NFPA D07



Ordering code	
SPD 48 B 910	P, A, B and T = G 1 X and Y = G 1/4

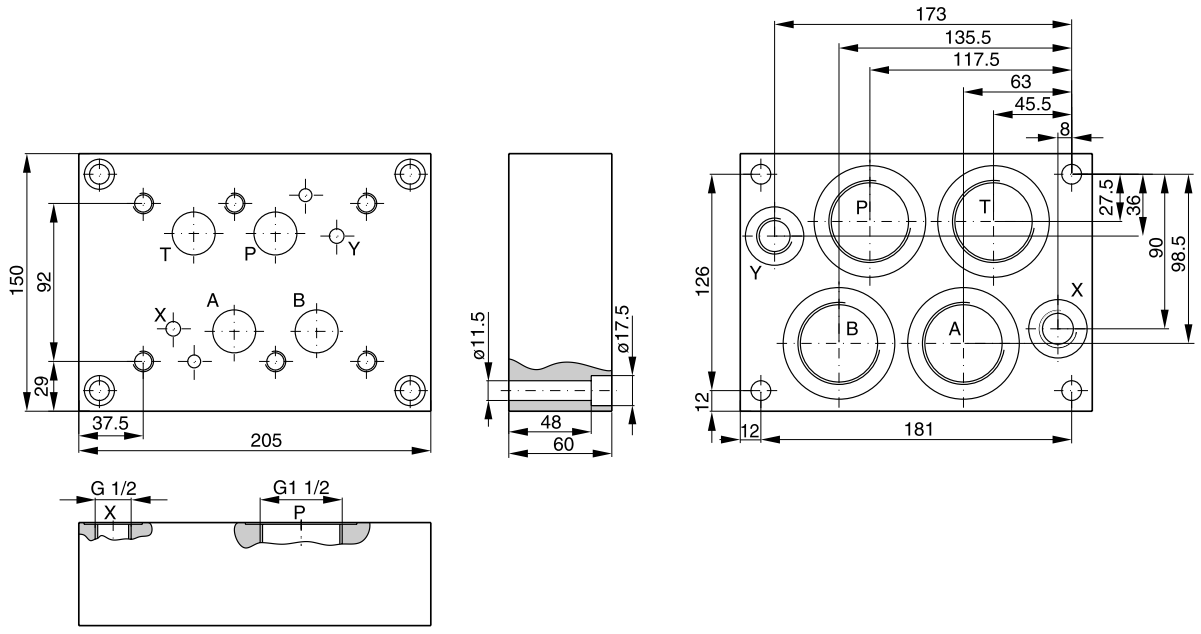
Bold letters =
Short-term availability

Valve size DIN NG16, CETOP 07, NFPA D07



Ordering code	
SPD 48 BA 910	P, A, B and T = G 1 X and Y = G 1/4

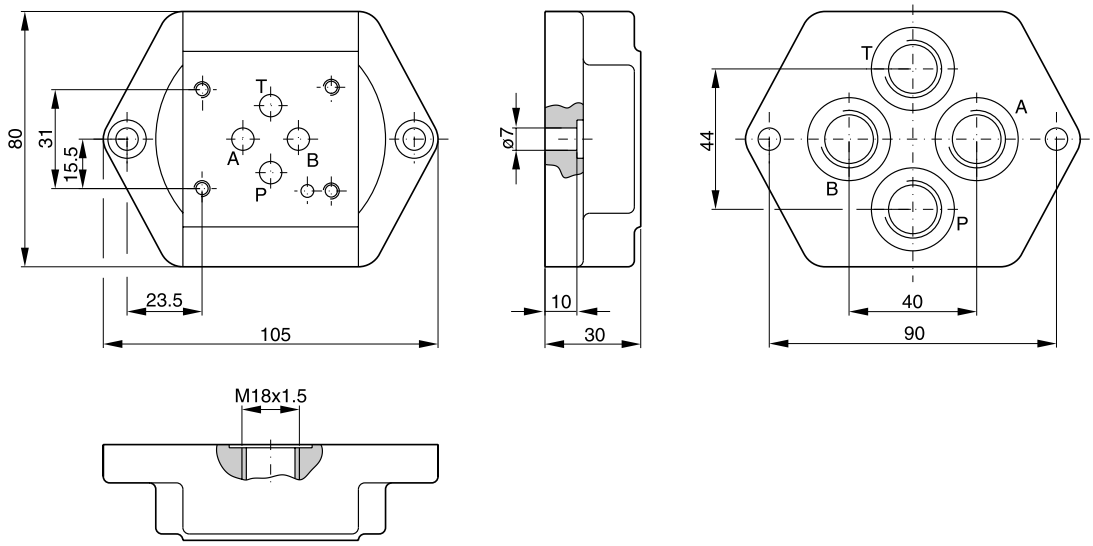
Valve size DIN NG25, CETOP 08, NFPA D08



Ordering code	
SPD 612 B 930	P, A, B and T = G 1 1/2 X and Y = G 1/2

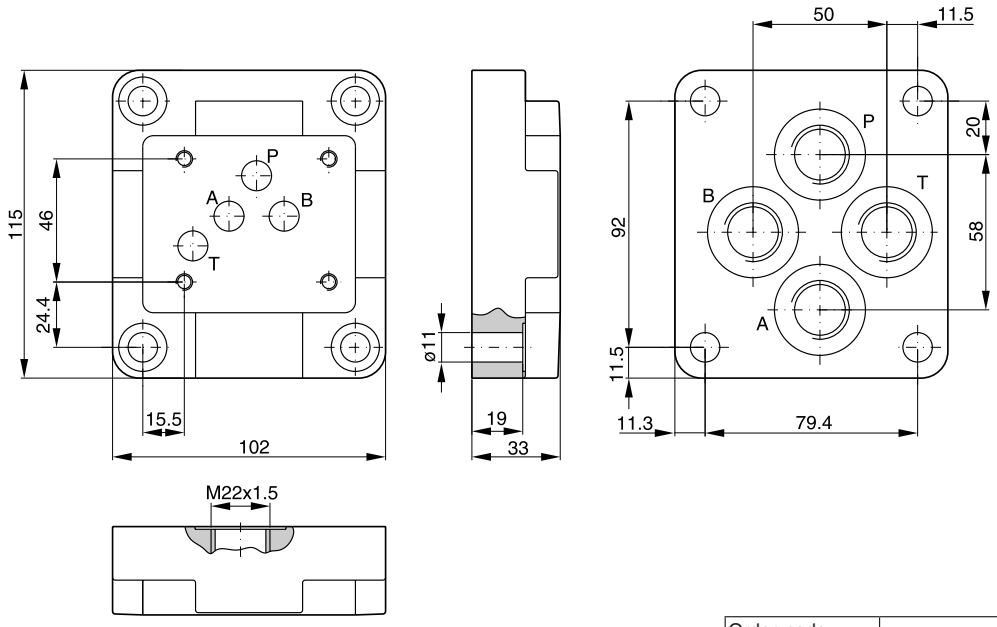
Bold letters =
Short-term availability

Valve size DIN NG06, CETOP 03, NFPA D03



Order. code	
A 064 M	P, A, B and T = M18x1.5 as per ISO 6149

Valve size DIN NG10, CETOP 05, NFPA D05

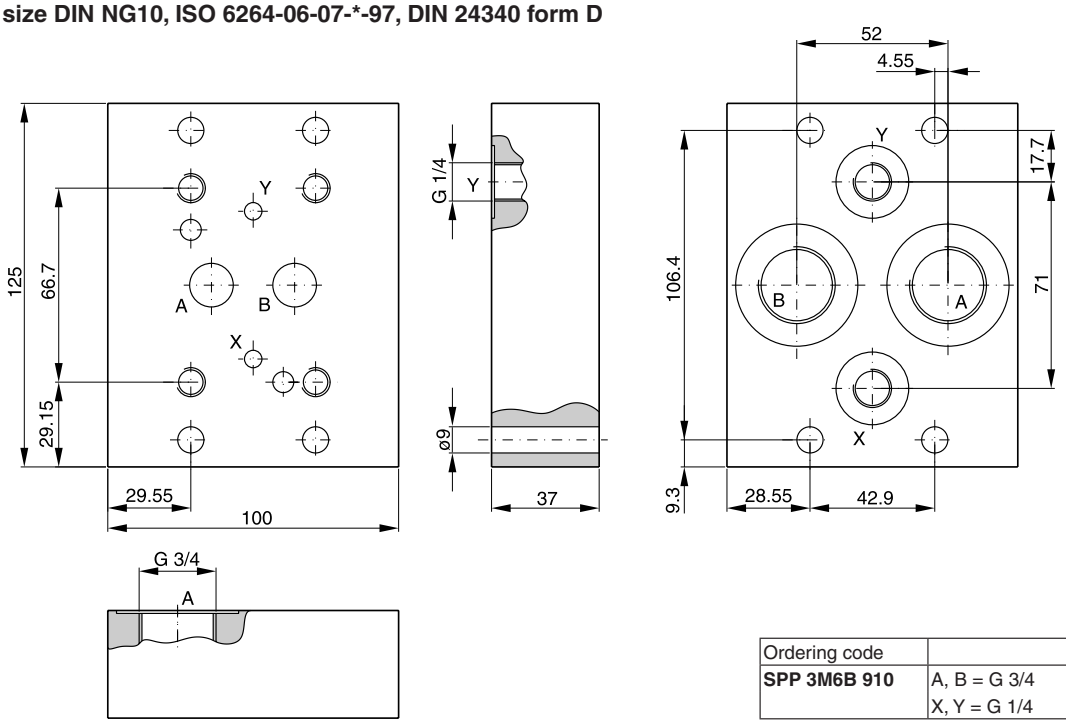


Order. code	
A 104 M	P, A, B and T = M22x1.5 as per ISO 6149

Bold letters =
Short-term availability

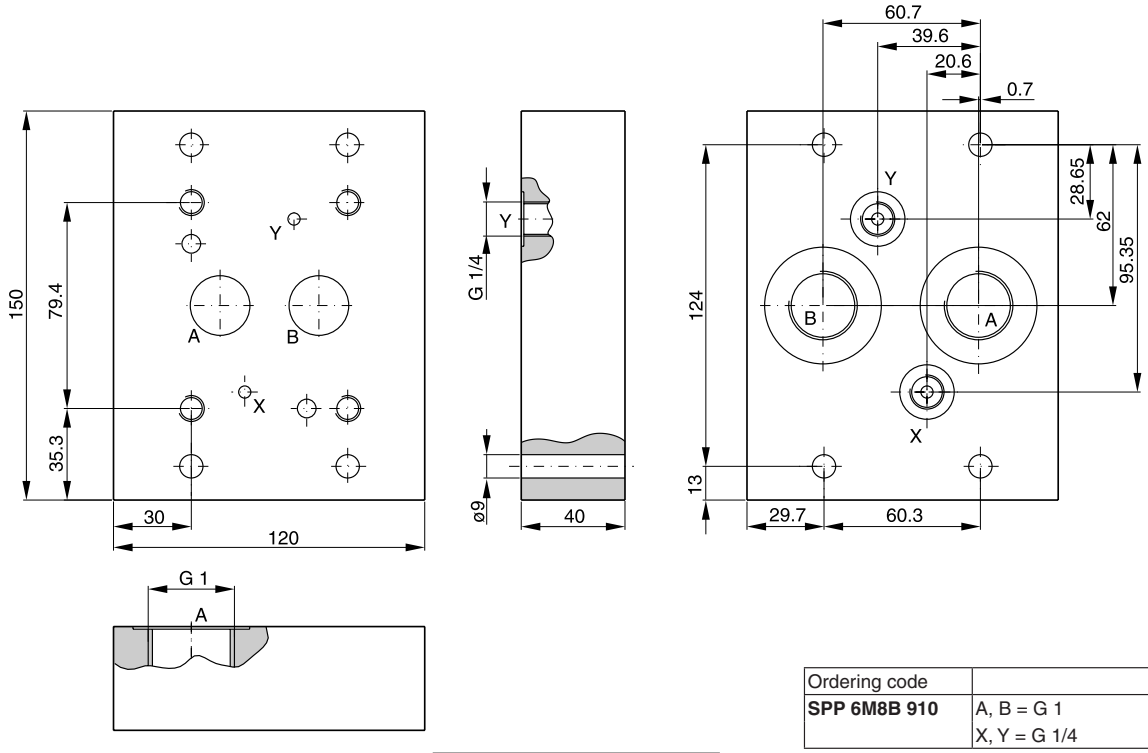
12

Valve size DIN NG10, ISO 6264-06-07-*-97, DIN 24340 form D



Ordering code	
SPP 3M6B 910	A, B = G 3/4 X, Y = G 1/4

Valve size DIN NG25, ISO 6264-08-11-*-97, DIN 24340 form D

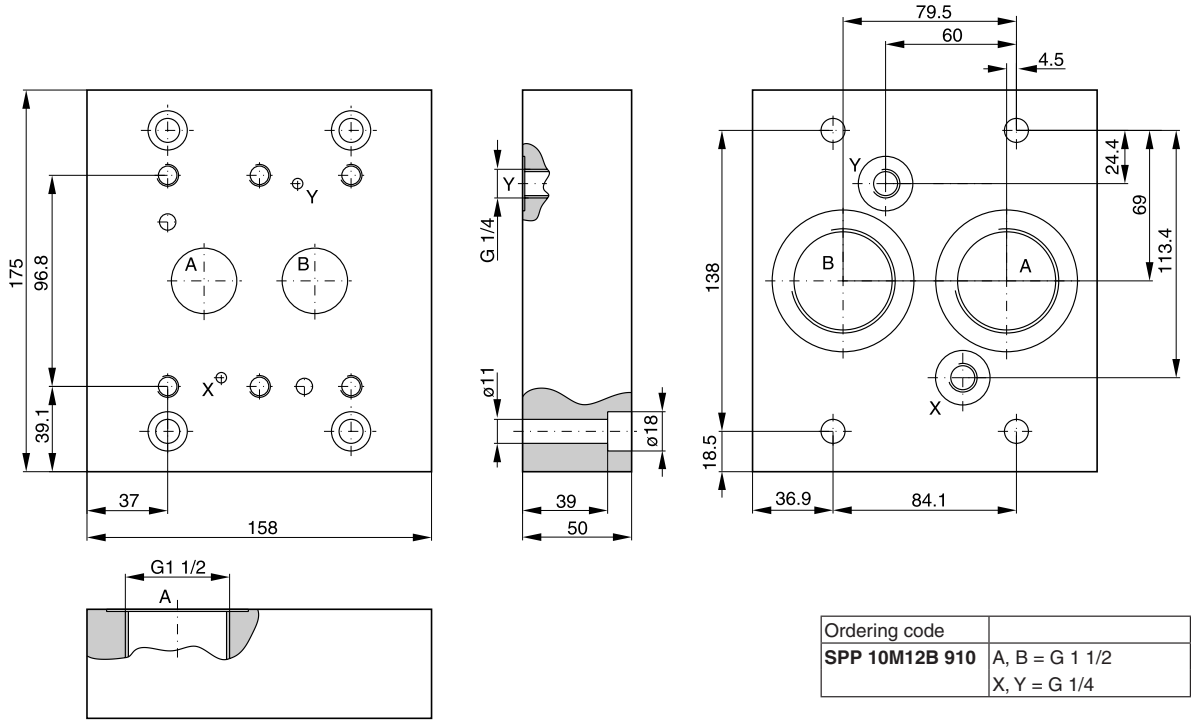


Ordering code	
SPP 6M8B 910	A, B = G 1 X, Y = G 1/4

Bold letters =
Short-term availability

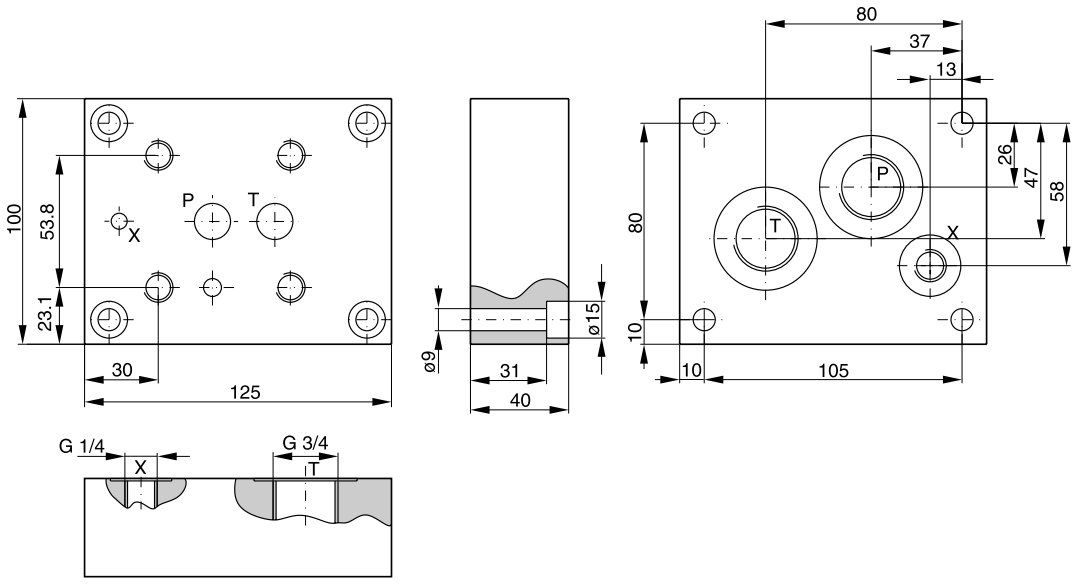
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Valve size DIN NG32, ISO 6264-10-15-*-97, DIN 24340 form D



Ordering code	
SPP 10M12B 910	A, B = G 1 1/2 X, Y = G 1/4

Valve size DIN NG10, ISO 6264-06-09-*-97, DIN 24340 form E



Ordering code	
SPP 3R6B 910	P, T = G 3/4 X = G 1/4

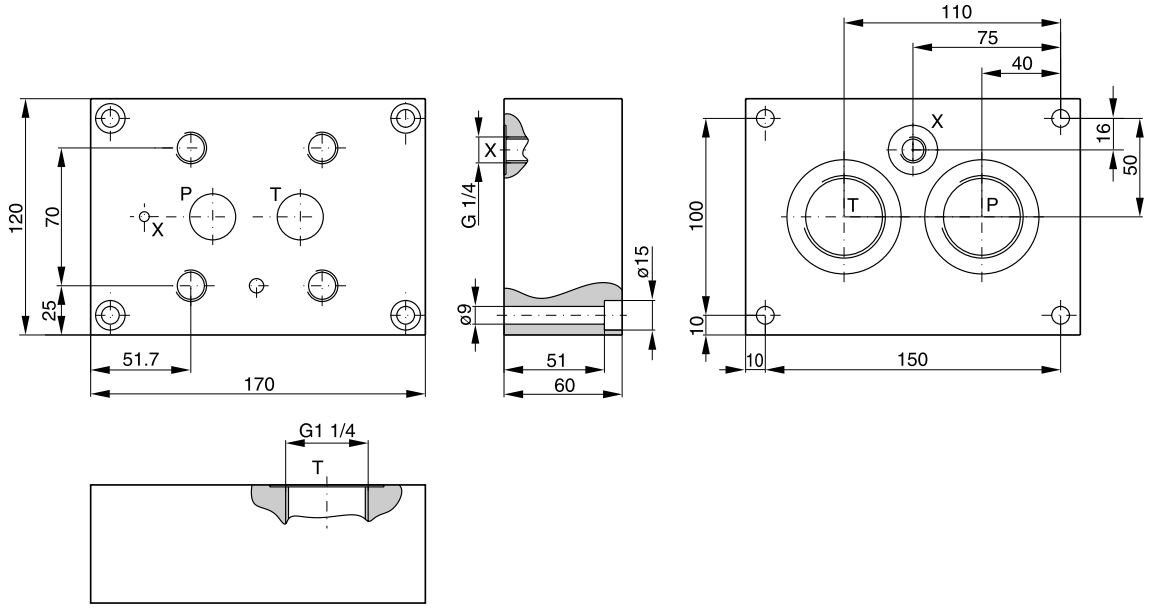
Bold letters =
Short-term availability

SPP_UK.INDD RH_11.12.07

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Hydraulic Controls Division
Kaarst, Germany

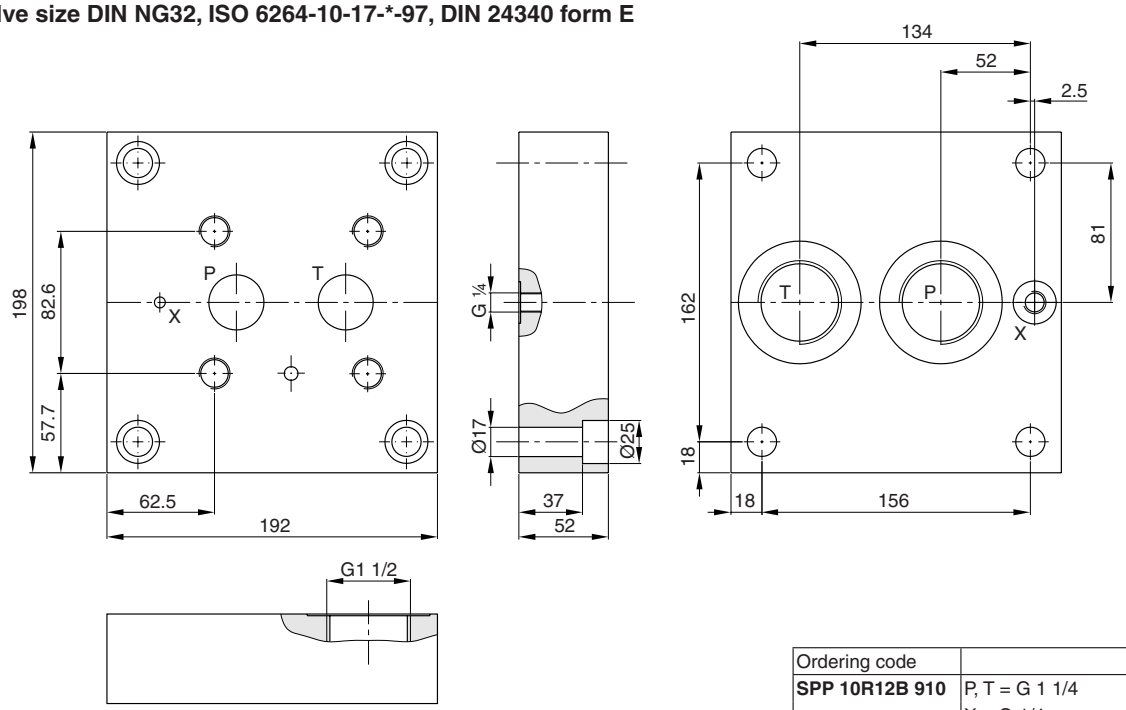
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Valve size DIN NG25, ISO 6264-08-13-*-97, DIN 24340 form E



Ordering code	
SPP 6R10B 910	P, T = G 1 1/4 X = G 1/4

Valve size DIN NG32, ISO 6264-10-17-*-97, DIN 24340 form E



Ordering code	
SPP 10R12B 910	P, T = G 1 1/4 X = G 1/4

Bold letters =
Short-term availability

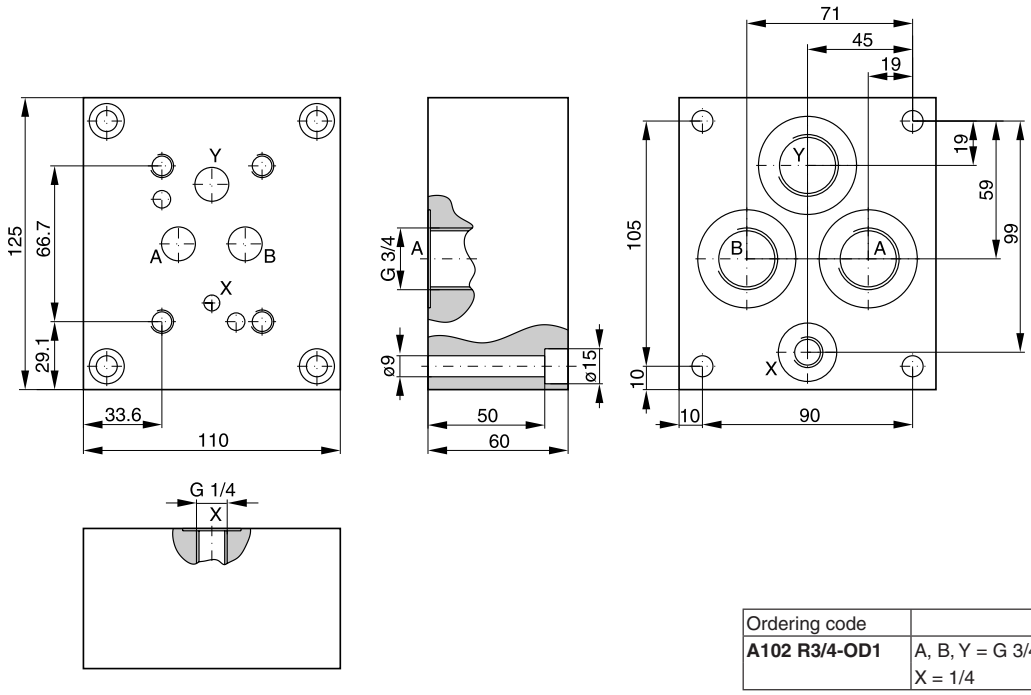
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SPP_UK.INDD RH_11.12.07

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Valve size DIN NG10, for pressure valves VB and VM



Ordering code	
A102 R3/4-OD1	A, B, Y = G 3/4 X = 1/4

12

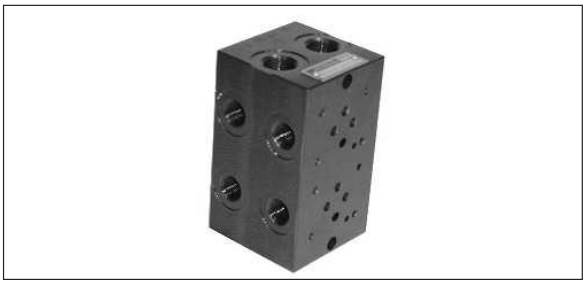
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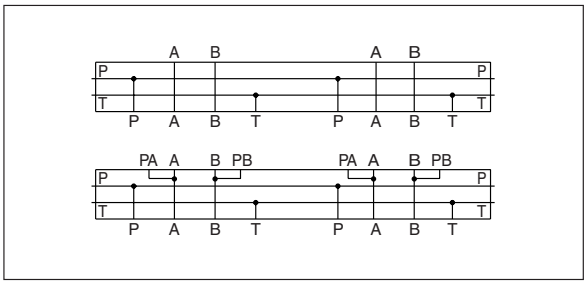
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Multi-station manifolds are used to save space when connecting several directional control valves to a common pressure and return line.

Diverse switching arrangements are possible in combination with sandwich and directional control valves. Plugs without designations must not be removed.





Features

- Very low pressure drop due to large drilling parameters
- P- and T-ports on both faces
- Also available with gauge ports G¼
- Separation in P or T channel optional - please consult your distributor

Technical data

Interface		DIN 24340, Form A, CETOP, ISO
Mounting position		unrestricted (valve axis preferably horizontal)
Working pressure	[bar]	max. 350

Ordering code

MSP				B		9		
Multiple subplate, standard	Stations	Nominal size	Port size	BSPP Port thread	Port location	Metric fastening screws	Design series	Gauge port

Code	Stations
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8

Code	Size
D2	NG06 / CETOP 03
D3	NG10 / CETOP 05

Code	Gauge port
omit	**without**
C	Port G¼

Code	Design series
10	**CETOP 03, NG06**
30	**CETOP 05, NG10**

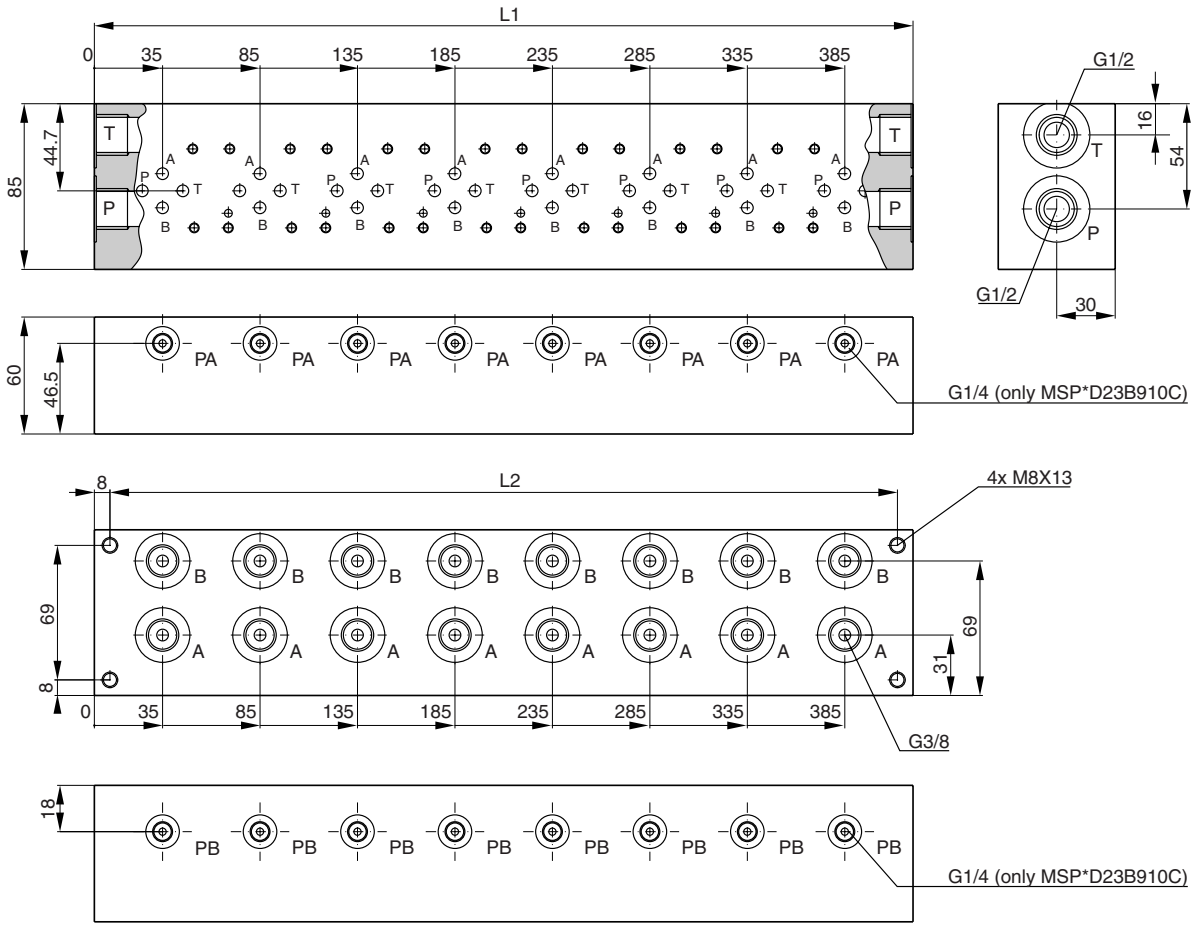
Code	Port location
omit	**A + B rear**
A	**A + B side**

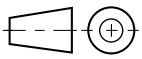
Code	Port size
3	**CETOP 03** **A + B = G 3/8** **P + T = G 1/2**
4	**CETOP 05** **A + B = G 1/2** **P = G 3/4** **T = G1**

Bold letters =
Short-term availability

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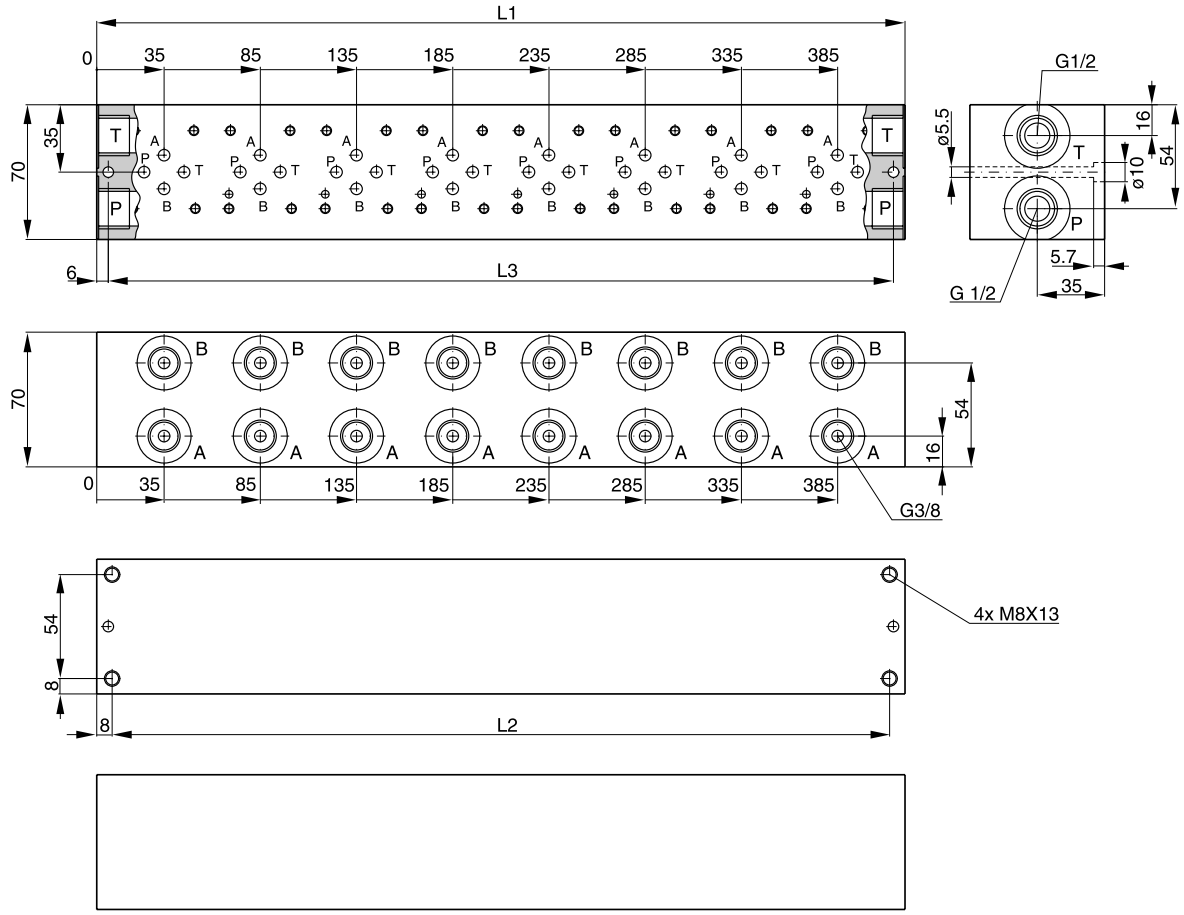
MSP*D23 B910*





Code	Nominal size	Stations	L1 [mm]	L2 [mm]	Port		Gauge port	Weight [kg]
					P, T	A, B		
MSP1 D23 B910*	NG06 CETOP 03	1	70	54	G1/2	G3/8	G¼ (only MSP*D23B910C)	2.4
MSP2 D23 B910*		2	120	104				4.0
MSP3 D23 B910*		3	170	154				5.8
MSP4 D23 B910*		4	220	204				7.5
MSP5 D23 B910*		5	270	254				9.2
MSP6 D23 B910*		6	320	304				10.9
MSP7 D23 B910*		7	370	354				12.6
MSP8 D23 B910*		8	420	404				14.3

MSP*D23 BA910

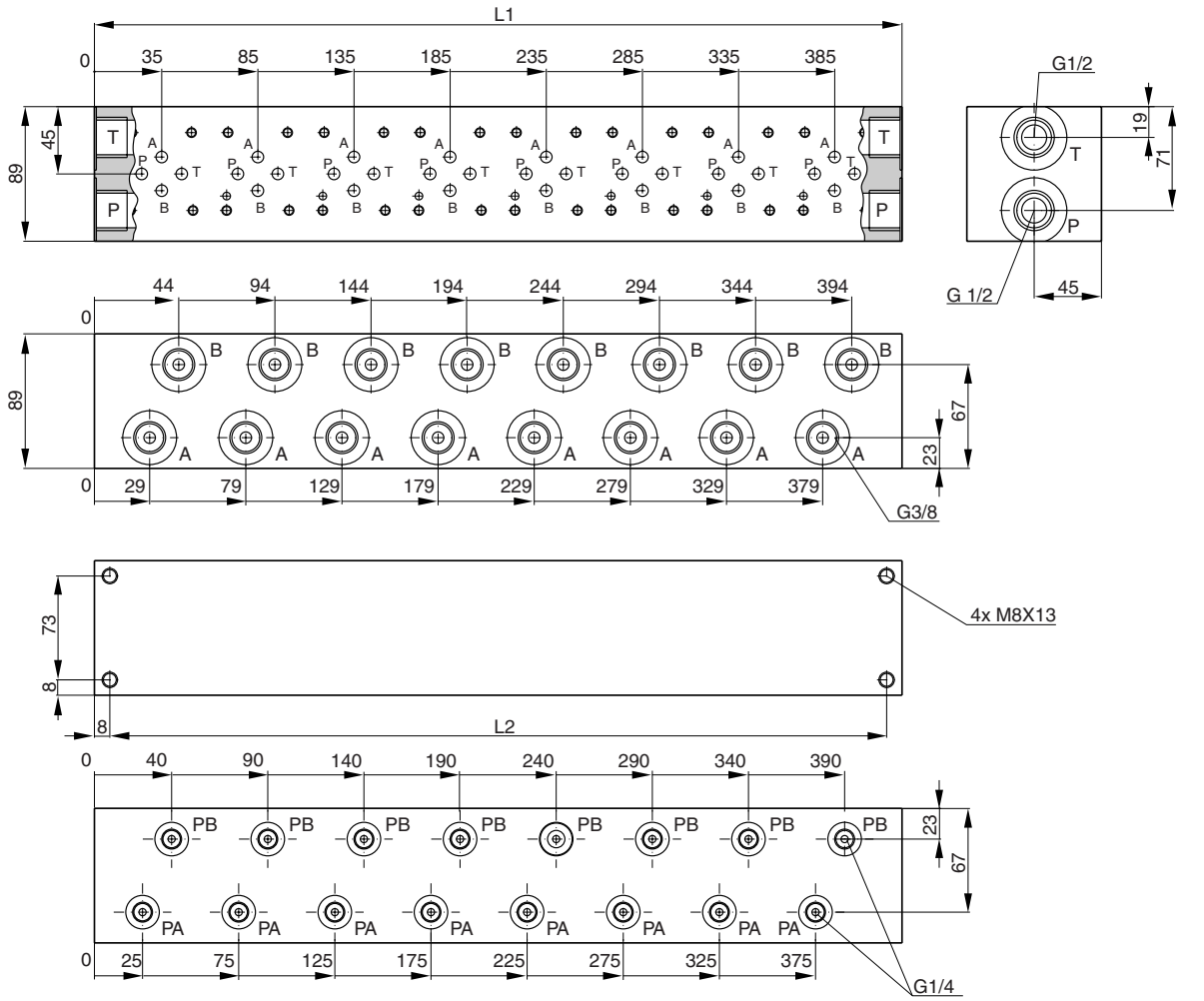


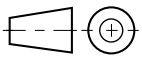
Code	Nominal size	Stations	L1 [mm]	L2 [mm]	L3 [mm]	Port		Gauge port	Weight [kg]
						P, T	A, B		
MSP1 D23 BA910	NG06 CETOP 3	1	70	54	58	G1/2	G3/8	—	2.3
MSP2 D23 BA910		2	120	104	108				3.9
MSP3 D23 BA910		3	170	154	158				5.5
MSP4 D23 BA910		4	220	204	208				7.2
MSP5 D23 BA910		5	270	254	258				8.8
MSP6 D23 BA910		6	320	304	308				10.5
MSP7 D23 BA910		7	370	354	358				12.1
MSP8 D23 BA910		8	420	404	408				13.7

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MSP*D23 BA910C



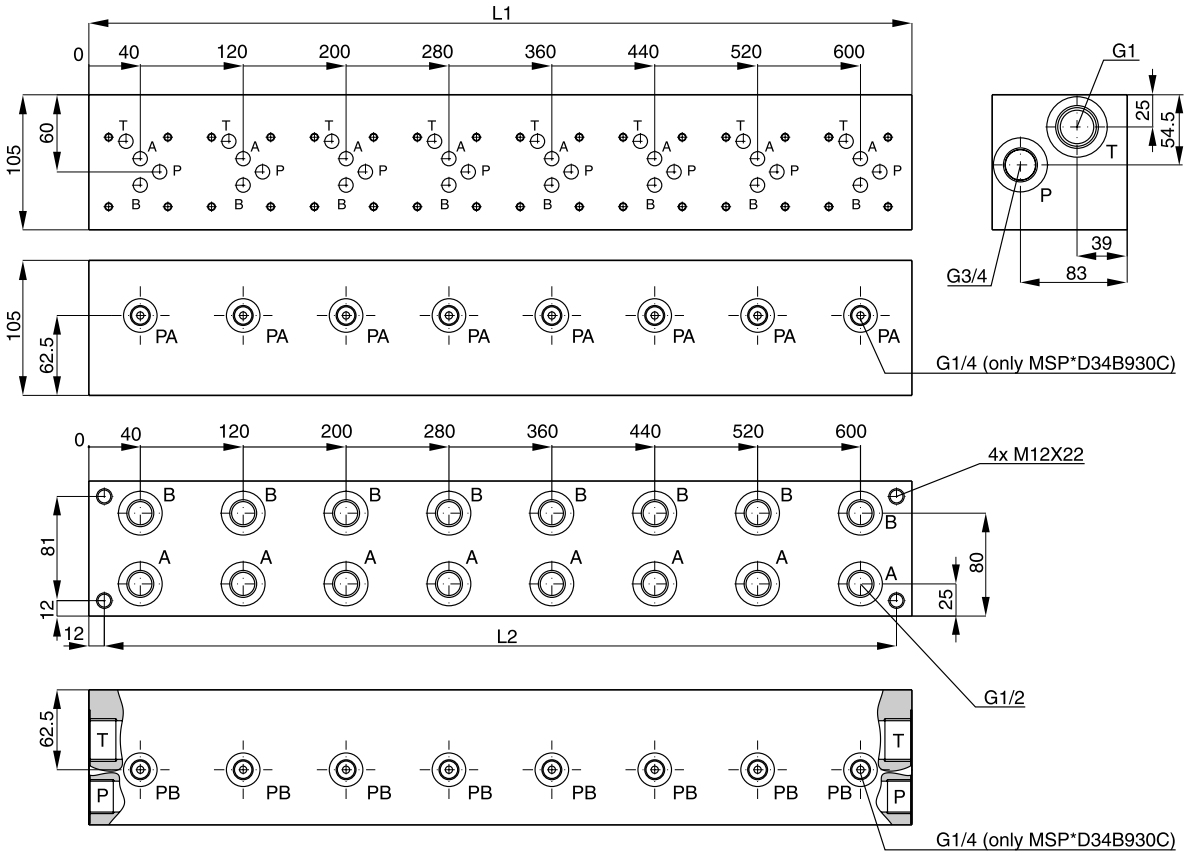


Code	Nominal size	Stations	L1 [mm]	L2 [mm]	Port		Gauge port	Weight [kg]
					P, T	A, B		
MSP1 D23 BA910C	NG06 CETOP 3	1	70	54	G1/2	G3/8	G¼	3.5
MSP2 D23 BA910C		2	120	104				6.0
MSP3 D23 BA910C		3	170	154				8.5
MSP4 D23 BA910C		4	220	204				11.0
MSP5 D23 BA910C		5	270	254				13.5
MSP6 D23 BA910C		6	320	304				16.0
MSP7 D23 BA910C		7	370	354				18.5
MSP8 D23 BA910C		8	420	404				21.0

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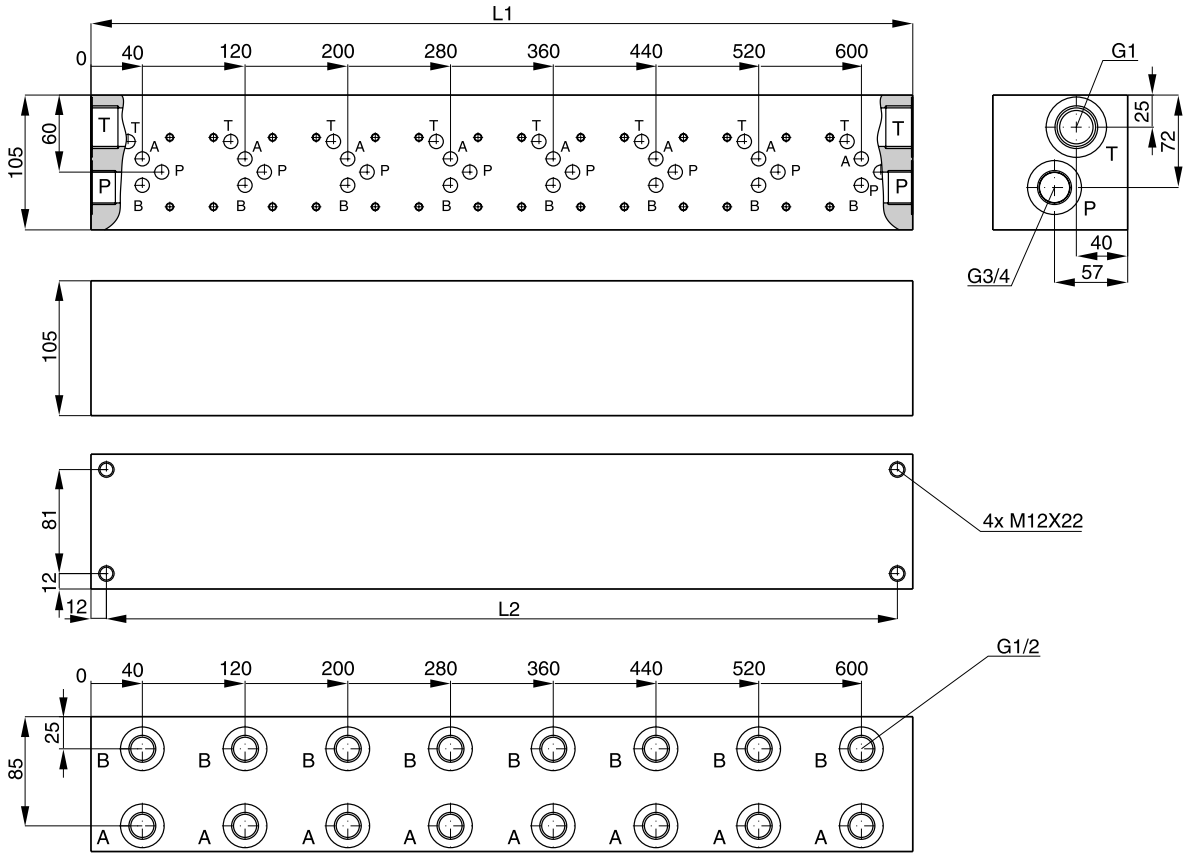
MSP*D34 B930*

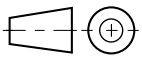


Code	Nominal size	Stations	L1 [mm]	L2 [mm]	Port			Gauge port	Weight [kg]
					P	T	A, B		
MSP1 D34 B930*	NG10 CETOP 5	1	80	56	G3/4	G1	G1/2	G¼ (only MSP*D34B930C)	5.9
MSP2 D34 B930*		2	160	136					11.8
MSP3 D34 B930*		3	240	216					17.7
MSP4 D34 B930*		4	320	296					23.5
MSP5 D34 B930*		5	400	376					29.4
MSP6 D34 B930*		6	480	456					35.3
MSP7 D34 B930*		7	560	536					41.2
MSP8 D34 B930*		8	640	616					47.1

12

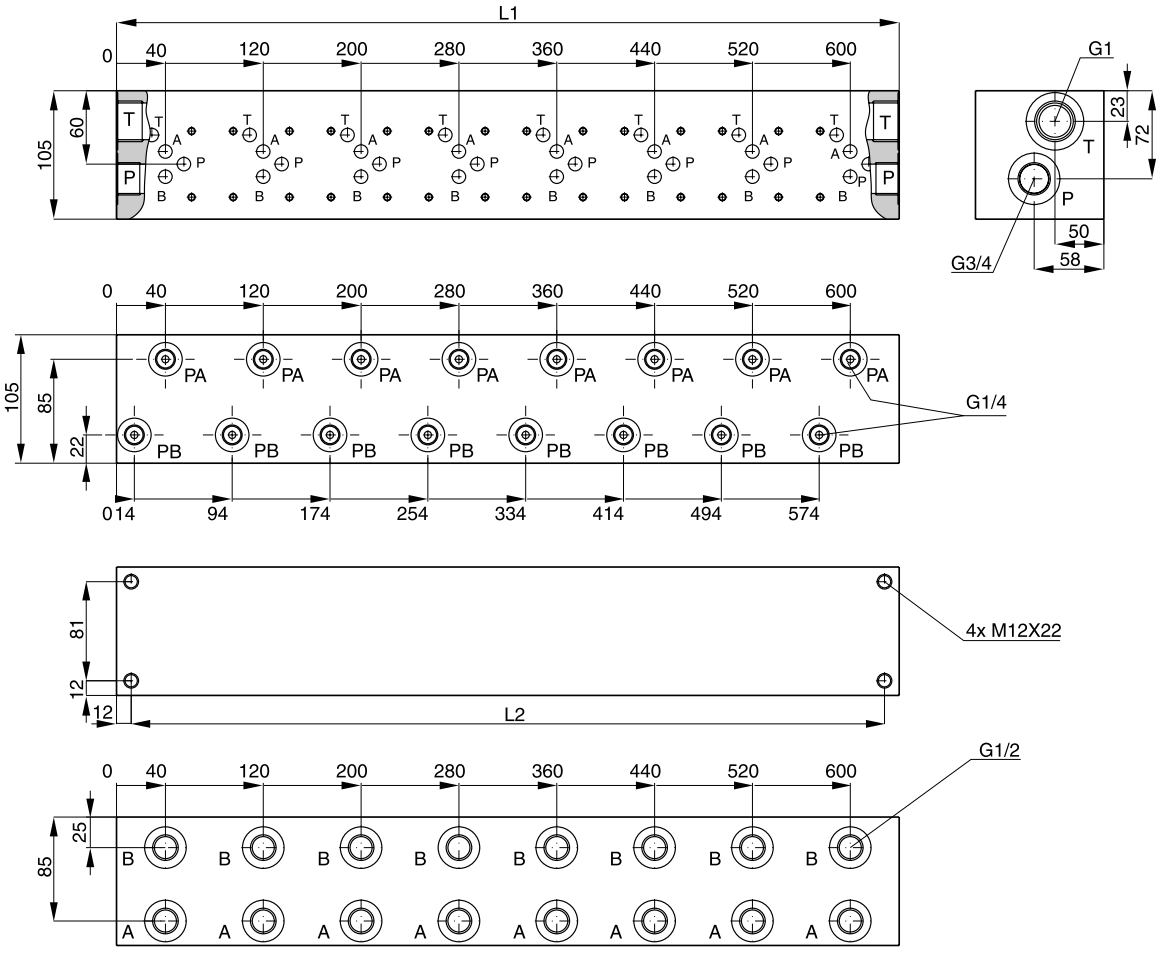
MSP*D34 BA930





Code	Nominal size	Stations	L1 [mm]	L2 [mm]	Port			Gauge port	Weight [kg]
					P	T	A, B		
MSP1 D34 BA930	NG10 CETOP 5	1	80	56	G3/4	G1	G1/2	—	5.9
MSP2 D34 BA930		2	160	136					11.8
MSP3 D34 BA930		3	240	216					17.7
MSP4 D34 BA930		4	320	296					23.5
MSP5 D34 BA930		5	400	376					29.4
MSP6 D34 BA930		6	480	456					35.3
MSP7 D34 BA930		7	560	536					41.2
MSP8 D34 BA930		8	640	616					47.1

MSP*D34 BA930C

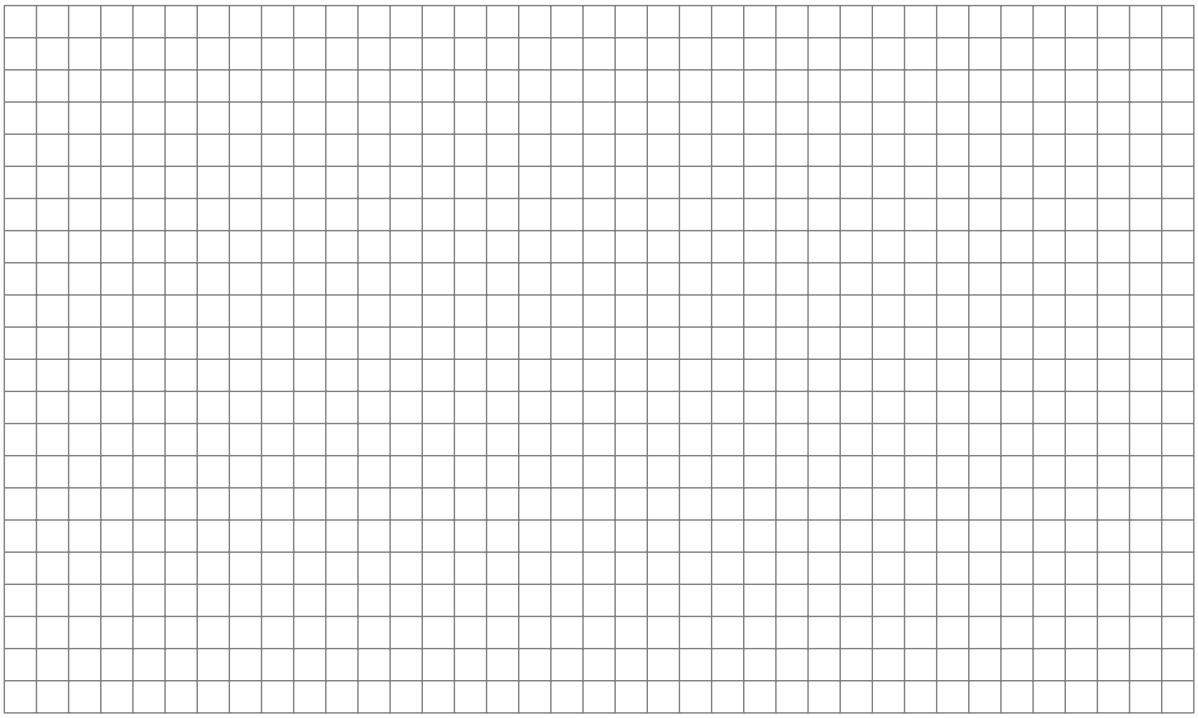


Code	Nominal size	Stations	L1 [mm]	L2 [mm]	Port			Gauge port	Weight [kg]
					P	T	A, B		
MSP1 D34 BA930C	NG10 CETOP 5	1	80	56	G¾	G1	G½	G¼	5.9
MSP2 D34 BA930C		2	160	136					11.8
MSP3 D34 BA930C		3	240	216					17.7
MSP4 D34 BA930C		4	320	296					23.5
MSP5 D34 BA930C		5	400	376					29.4
MSP6 D34 BA930C		6	480	456					35.3
MSP7 D34 BA930C		7	560	536					41.2
MSP8 D34 BA930C		8	640	616					47.1

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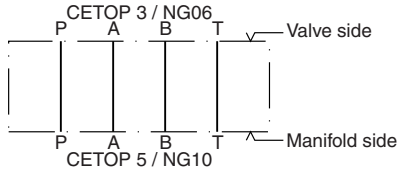
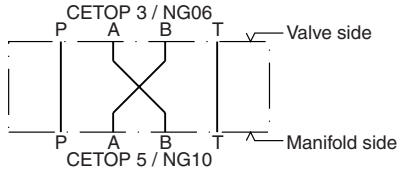
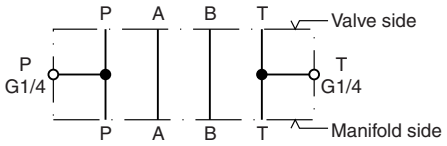
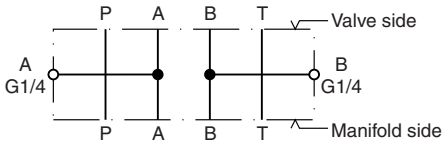
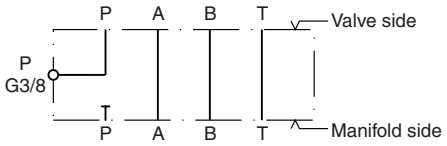
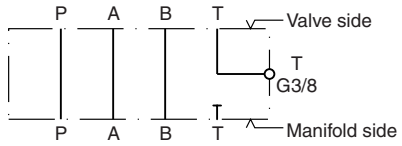
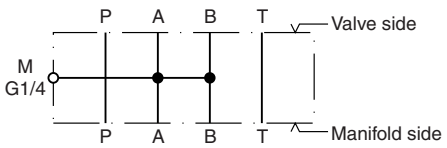
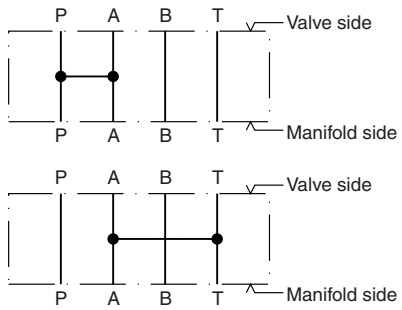
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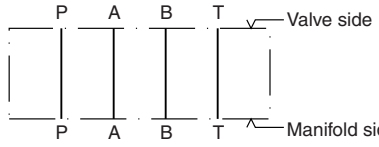
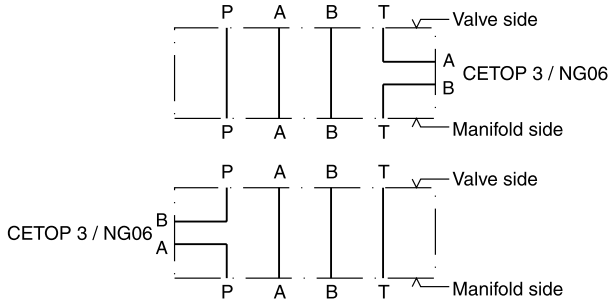
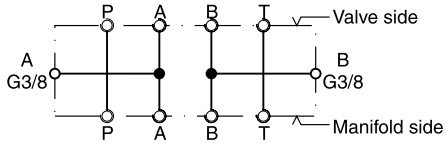
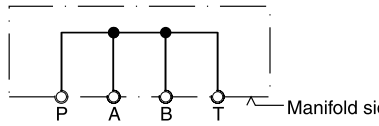
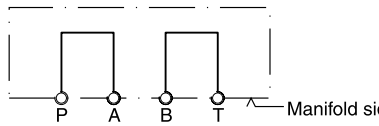
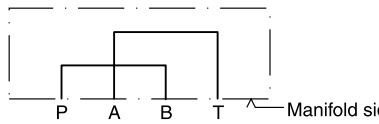
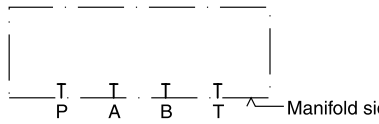
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Symbol	Type	Size	Hight
	**PADA 1007-AA-BB**	NG10-NG06	—
	**PADA 1007/A-B/B-A**	NG10-NG06	—
	H06-1044	NG06	30
	**H06-1039**	NG06	30
	**H06-504**	NG06	30
	**H06-711**	NG06	30
	H06-1274	NG06	30
	**H06-1040**	NG06	30

Attention:
Details for cover-, sandwich- and adaptor plates see chapter 12.

symbols12.INDD RH_15.01.08

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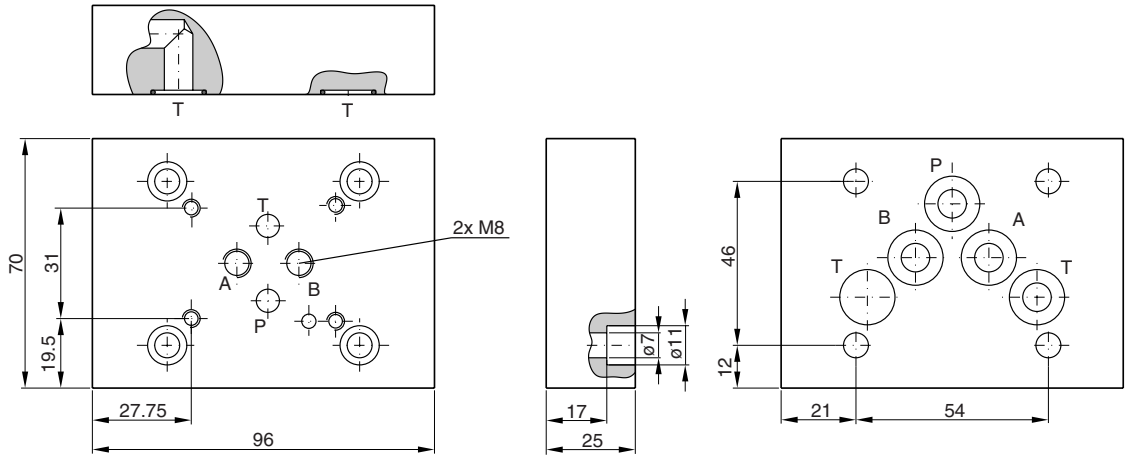
Symbol	Type	Size	Hight
	**H06DO-1291**	NG06	10
	H06DU-814	NG06	71.3
 All ports can be equiped with orifices or plugs (1/16NPT)	CS06040N	NG06	40
 All ports can be equiped with orifices or plugs (1/16NPT)	CS06082N	NG06	—
 All ports can be equiped with orifices or plugs (1/16NPT)	CS06080N	NG06	—
	**D51DC071D**	NG06	—
	**D51VP071C** **D51VP101D**	NG06 NG10	—

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Attention:
Details for cover-, sandwich- and adaptor plates see chapter 12.

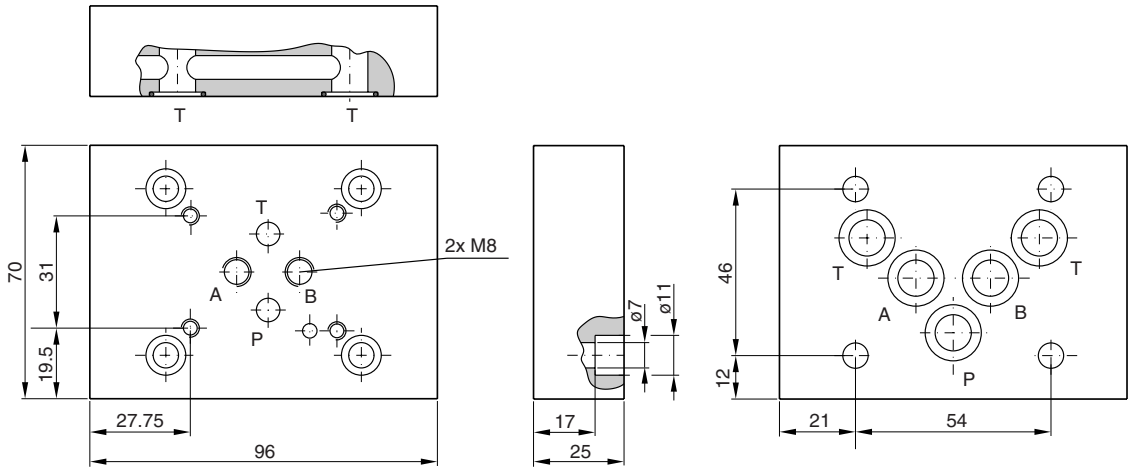
Bold letters =
Short-term availability

Adaptor plate PADA 1007-AA-BB, CETOP 5/3, nominal size NG10 to NG06



Symbol	Ordering code	Bolt Kit	Bolt dimensions	Torque
CETOP 3 / NG06 P A B T Valve side P A B T Manifold side CETOP 5 / NG10	**PADA1007-AA-BB** CETOP 3 / 5 (O-rings included in delivery)	BK 408	4x M16x25 DIN 912 12.9	13.2 Nm ±15%

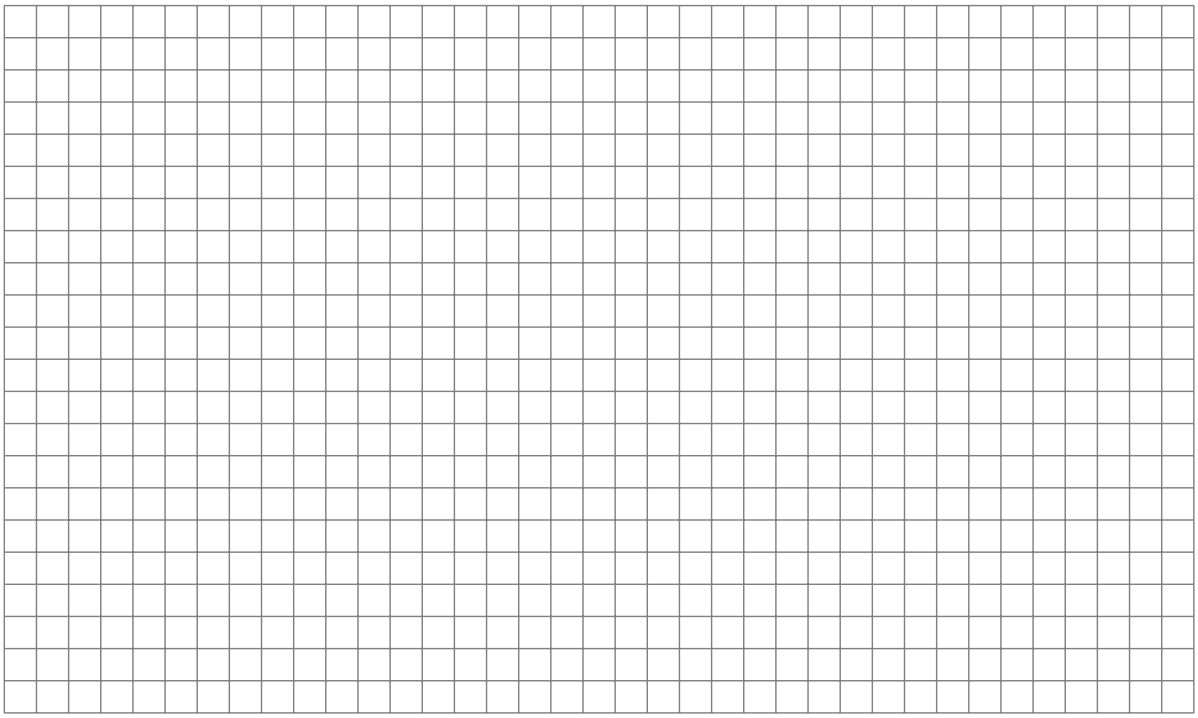
Adaptor plate PADA 1007/A-B/B-A, CETOP 3/5, nominal size NG10 to NG06



Symbol	Ordering code	Bolt Kit	Bolt dimensions	Torque
CETOP 3 / NG06 P A B T Valve side P A B T Manifold side CETOP 5 / NG10	**PADA1007/A-B/B-A** CETOP 3 / 5 (O-rings included in delivery)	BK 408	4x M16x25 DIN 912 12.9	13.2 Nm ±15%

Bold letters =
Short-term availability

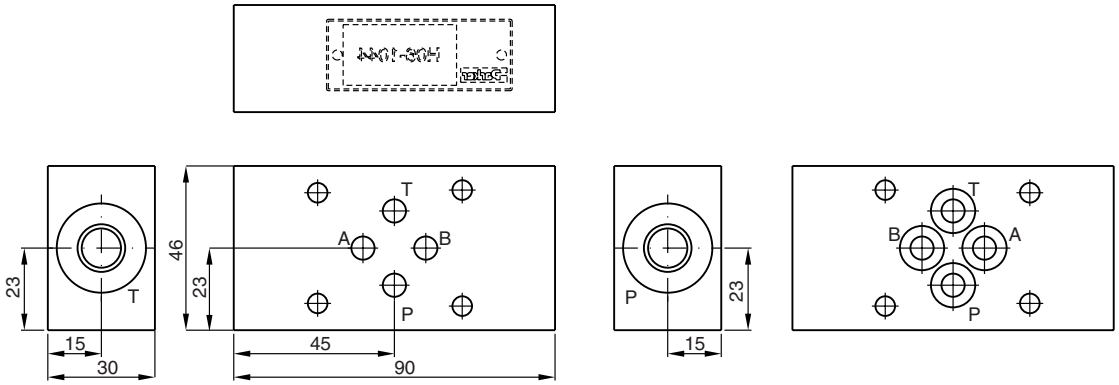
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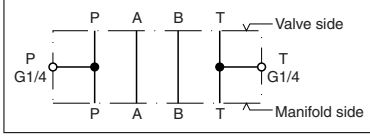


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Hydraulic Controls Division
Kaarst, Germany

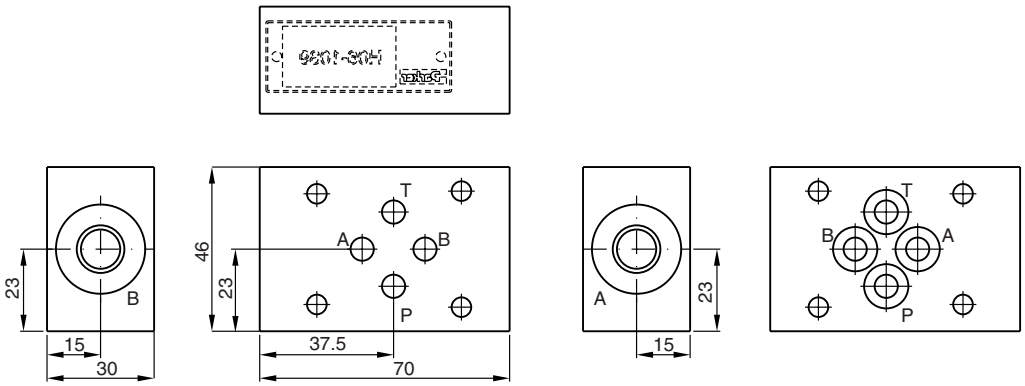
Tel: +45 63 12 83 00 | Email: ps@hymatik.com | www.hymatik.com | Hvidkaervej 27a, DK-5250 Odense SV, Denmark

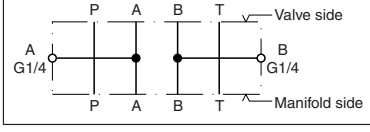
Sandwich plate H06-1044, CETOP 3 / NG06



Symbol	Ordering code
	**H06-1044** CETOP 3 (O-rings included in delivery)

Sandwich plate H06-1039, CETOP 3 / NG06

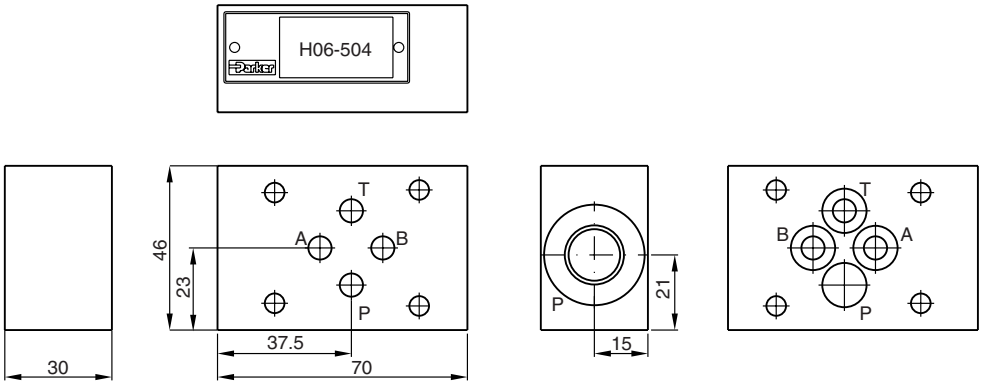


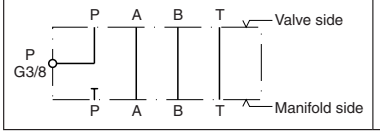
Symbol	Ordering code
	**H06-1039** CETOP 3 (O-rings included in delivery)

H06.INDD RH_15.01.08

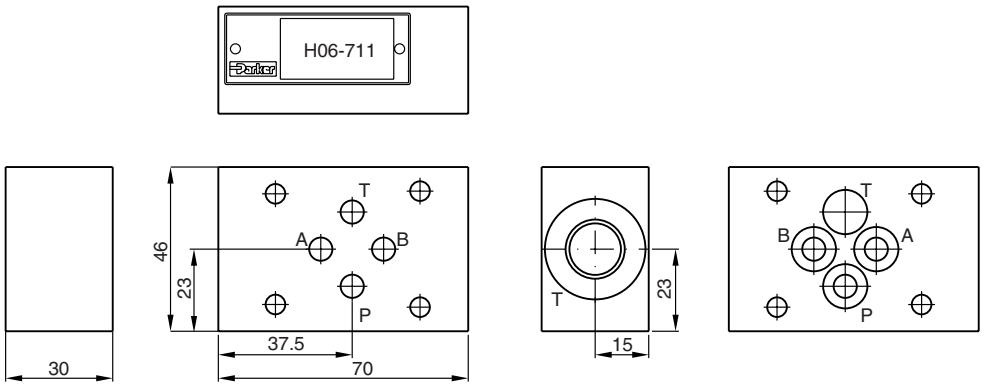
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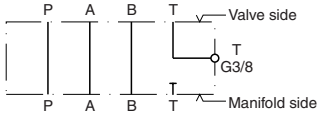
Sandwich plate H06-504, CETOP 3 / NG06



Symbol	Ordering code
	**H06-504** CETOP 3 (O-rings included in delivery)

Sandwich plate H06-711, CETOP 3 / NG06



Symbol	Ordering code
	**H06-711** CETOP 3 (O-rings included in delivery)

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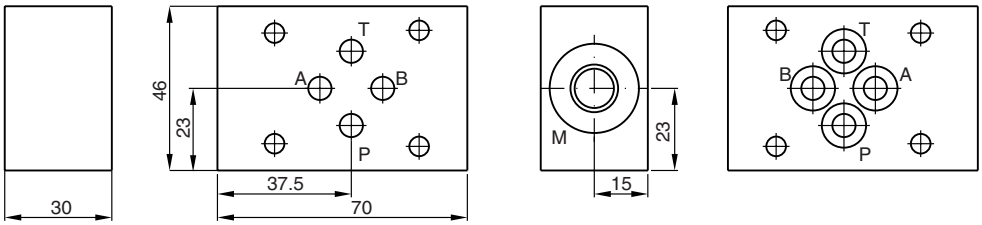
H06.INDD RH_15.01.08

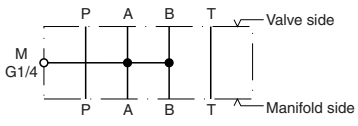
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Sandwich plate H06-1274, CETOP 3 / NG06

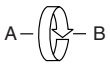


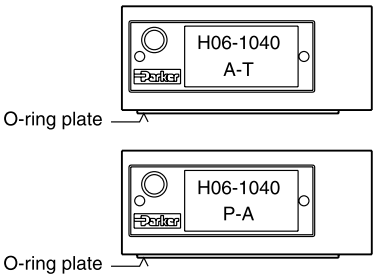


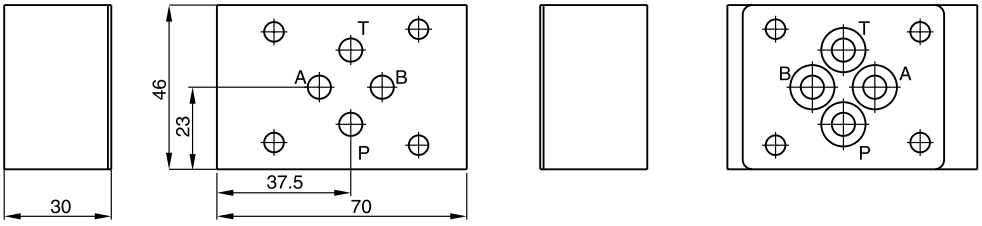
Symbol	Ordering code
	**H06-1274** CETOP 3 (O-rings included in delivery)

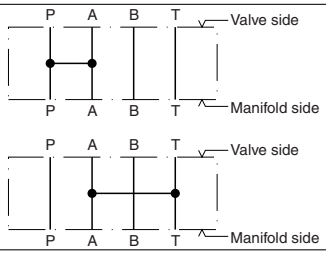
Sandwich plate H06-1040, CETOP 3 / NG06

The functional change is achieved by rotating the mounting position of the valve 180° about axis A-B





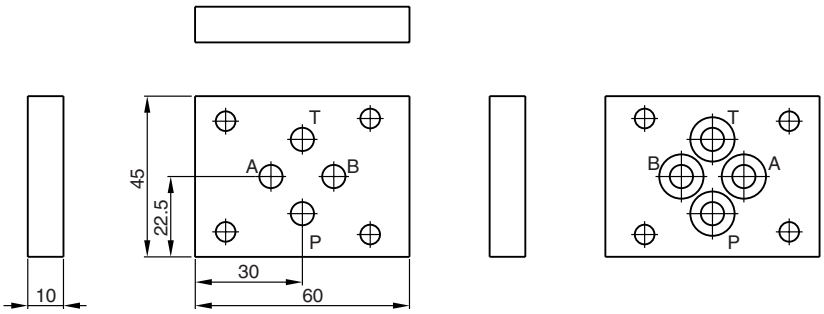


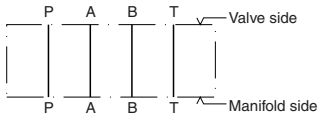
Symbol	Ordering code
	**H06-1040** CETOP 3 (O-rings and O-ring plate included in delivery)

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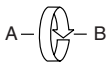
Sandwich plate H06DO-1291, CETOP 3 / NG06

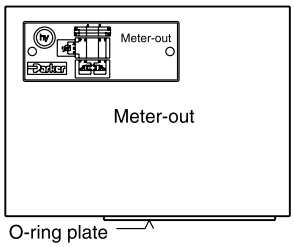


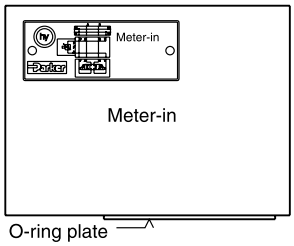
Symbol	Ordering code
	**H06DO-1291** CETOP 3 (O-rings included in delivery)

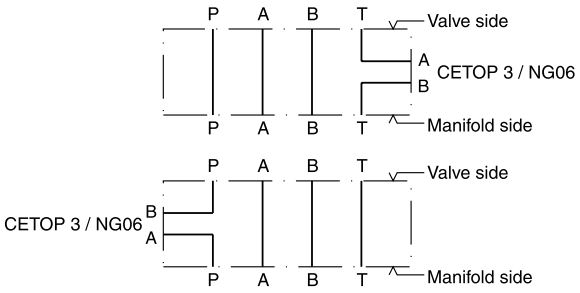
Sandwich plate H06DU-814, CETOP 3 / NG06

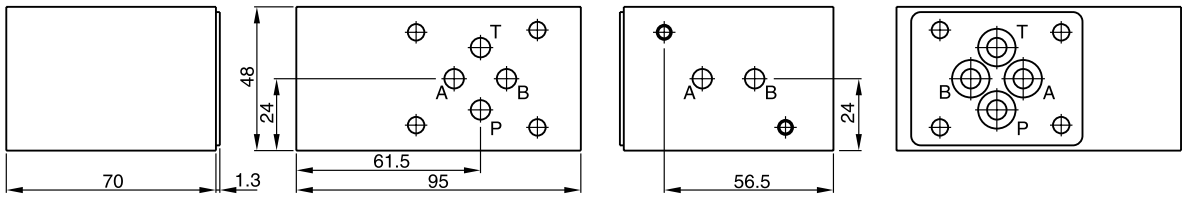
To mount a flow control valve GFG for meter-in (code P) or meter-out (code S) control. The functional change is achieved by rotating the mounting position of the valve 180° about axis A-B











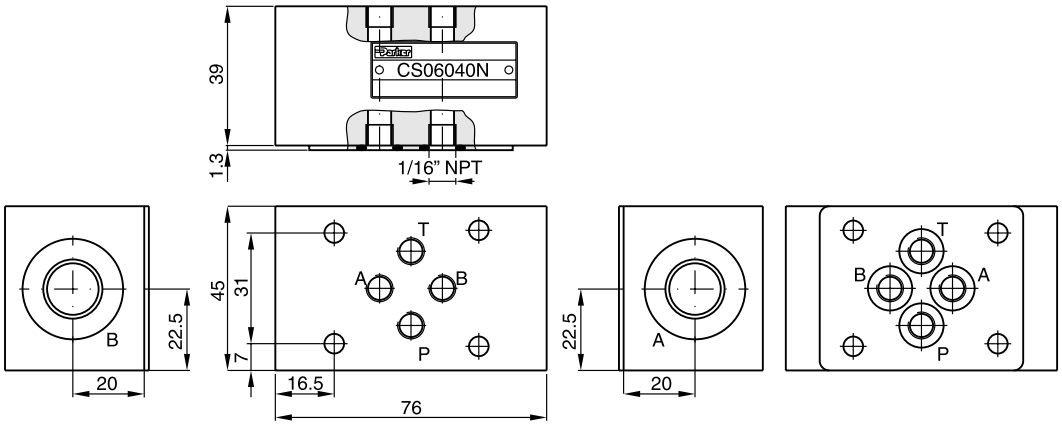
Ordering code
H06DU-814 CETOP 3 (O-rings and O-ring plate included in delivery)

H06.INDD RH_15.01.08

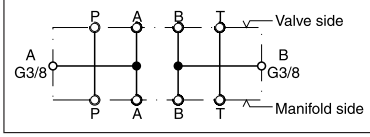
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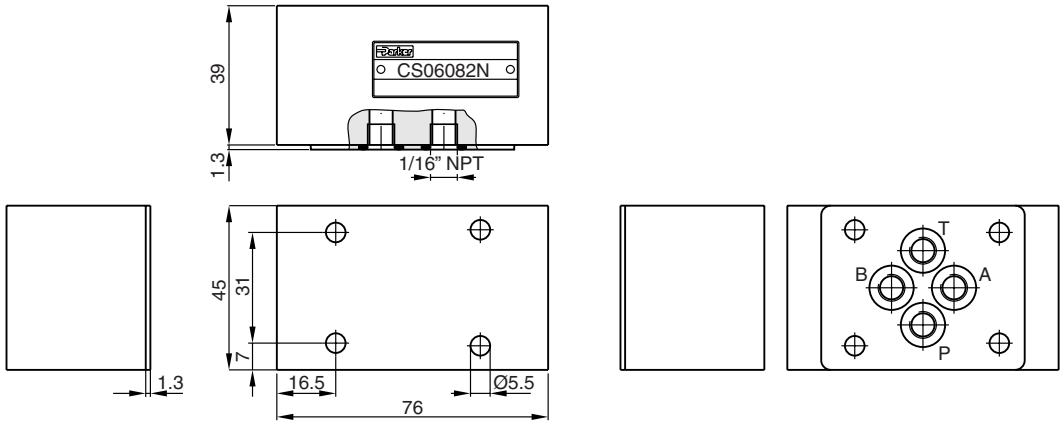
Sandwich plate CS06040N, CETOP 3 / NG06



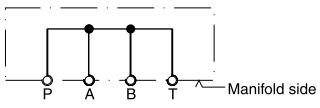
All ports on valve side and manifold side can be equiped with orifices or plugs (1/16 NPT)
For orifice kits see "Accessories" in chapter 8.

Symbol	Ordering code
	**CS06040N** CETOP 3 (O-rings and O-ring plate included in delivery)

Cover plate CS06082N, CETOP 3 / NG06



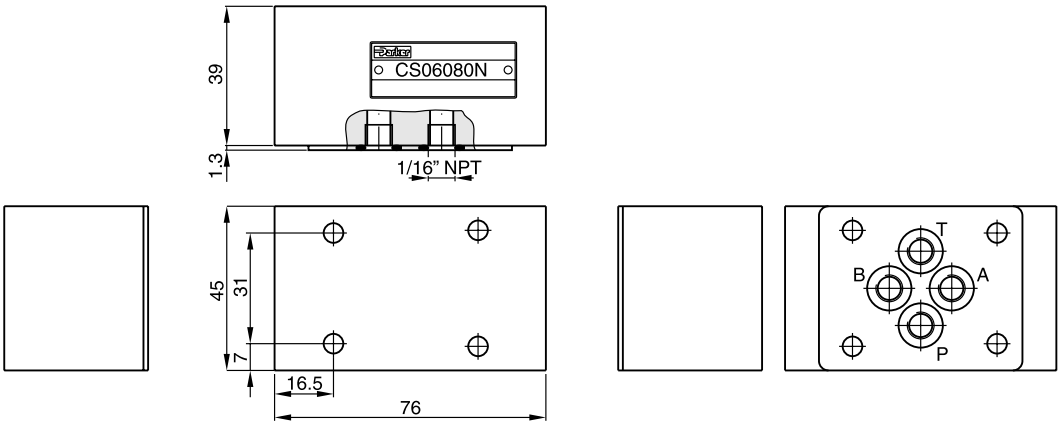
All ports on manifold side can be equiped with orifices or plugs (1/16 NPT)
For orifice kits see "Accessories" in chapter 8.

Symbol	Ordering code	Bolt Kit	Bolt dimensions	Torque
	**CS06082N** CETOP 3 (O-rings and O-ring plate included in delivery)	BK 300	4x M5x50	7.6 Nm ±15%

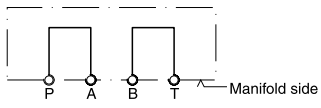
12

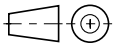
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Cover plate CS06080N, CETOP 3 / NG06



All ports on manifold side can be equiped with orifices or plugs (1/16 NPT)
For orifice kits see "Accessories" in chapter 8.

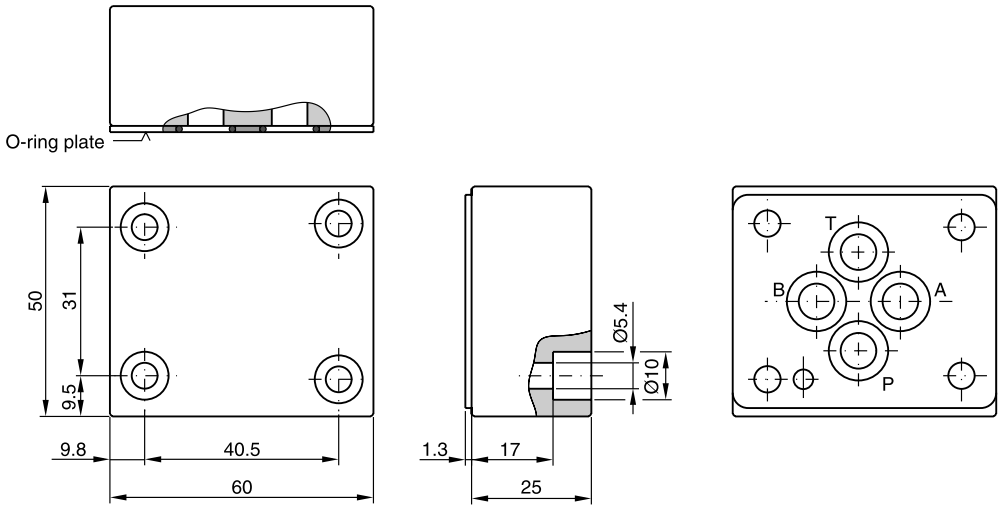
Symbol	Ordering code	Bolt Kit	Bolt dimensions	Torque
	**CS06080N** CETOP 3 (O-rings and O-ring plate included in delivery)	BK 300	4x M5x50	7.6 Nm ±15%

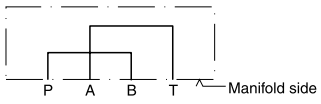


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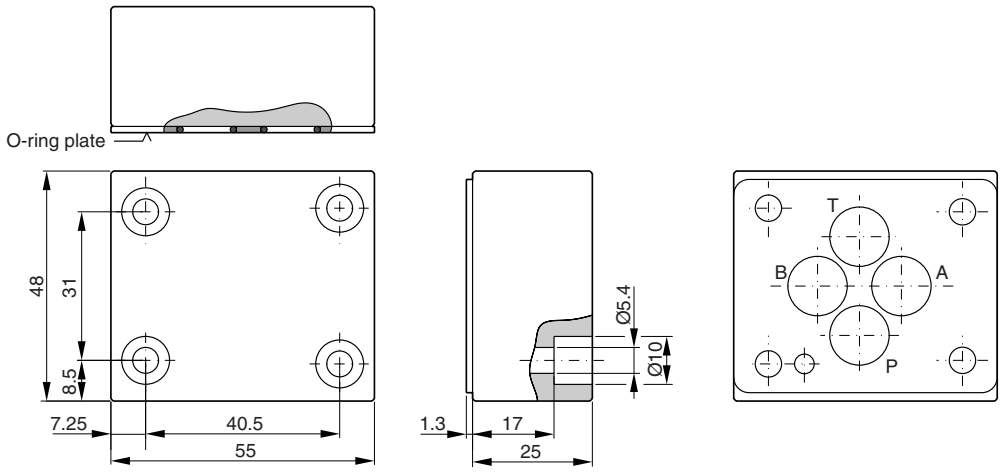
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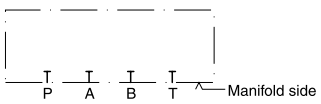
Cover plate D51DC071D, CETOP 3 / NG06



Symbol	Ordering code	Bolt Kit	Bolt dimensions	Torque
	**D51DC071D** CETOP 3 (O-rings and O-ring plate included in delivery)	BK 399	M5x25 DIN 912 12.9	7.6 Nm ±15%

Cover plate D51VP071C, CETOP 3 / NG06

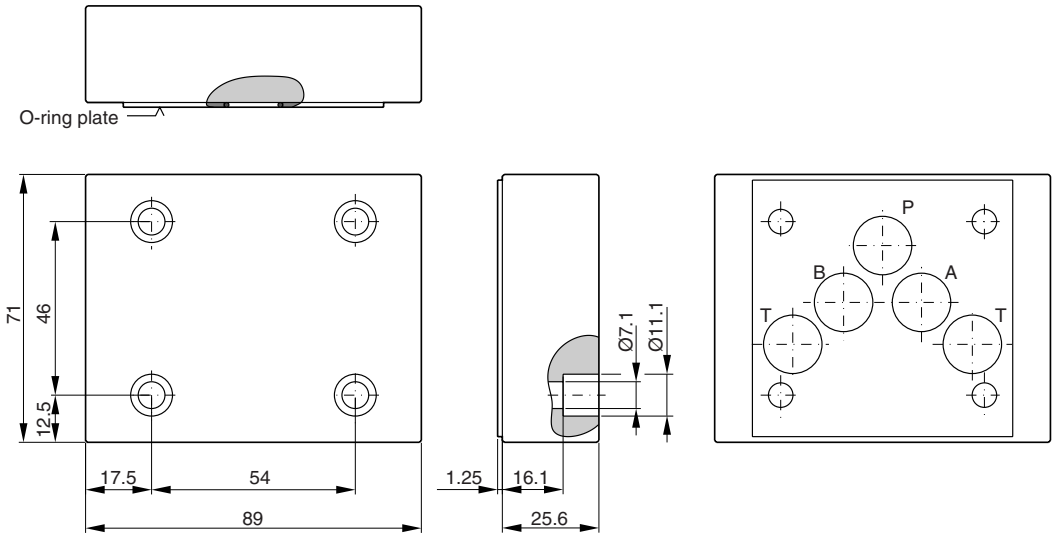


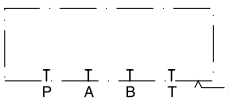
Symbol	Ordering code	Bolt Kit	Bolt dimensions	Torque
	**D51VP071C** CETOP 3 (O-rings and O-ring plate included in delivery)	BK 399	M5x25 DIN 912 12.9	7.6 Nm ±15%

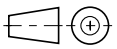
12

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Cover plate D51VP101D, CETOP 5 / NG06



Symbol	Ordering code	Bolt Kit	Bolt dimensions	Torque
	**D51VP101D** CETOP 5 (O-rings and O-ring plate included in delivery)	BK 408	4x M6x25 DIN 912 12.9	13.2 Nm ±15%



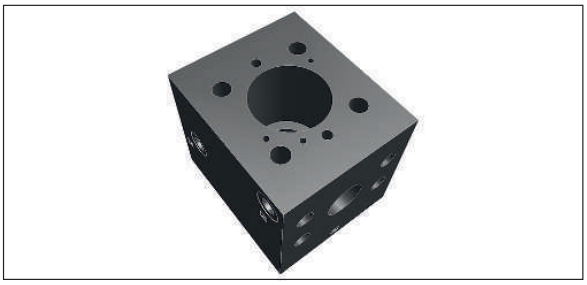
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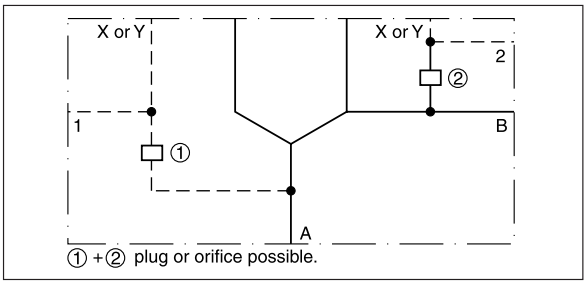
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Cartridge manifold blocks are bodies for 2/2-way slip-in cartridge valves. They are used in systems with only one cartridge valve without the need to design a specific manifold block.

The pilot ports X and Y can either be connected to A and B or vice versa by changing the mounting position of the cartridge cover.

The wide range of Parker slip-in cartridge valves allows to design solutions for all hydraulic requirements.





Features

- Flanges SAE61 or SAE62 respectively CETOP square flange
- 2 options for pilot oil supply and drain
- 7 sizes

Technical data

Mounting interface		ISO 7368-B*-*-2-A/B
Mounting position		unrestricted [1]
Max. operating pressure	[bar]	138 to 350 (depending on p_{max} of flanges)
Flanges		SAE61 (3000 PSI series), SAE62 (6000 PSI series) ISO 6162, CETOP-square flange (400 bar series)

[1] Cartrigde manifold blocks are usable for all cartridge covers exept C*A, C*B, C1DB and C10D.

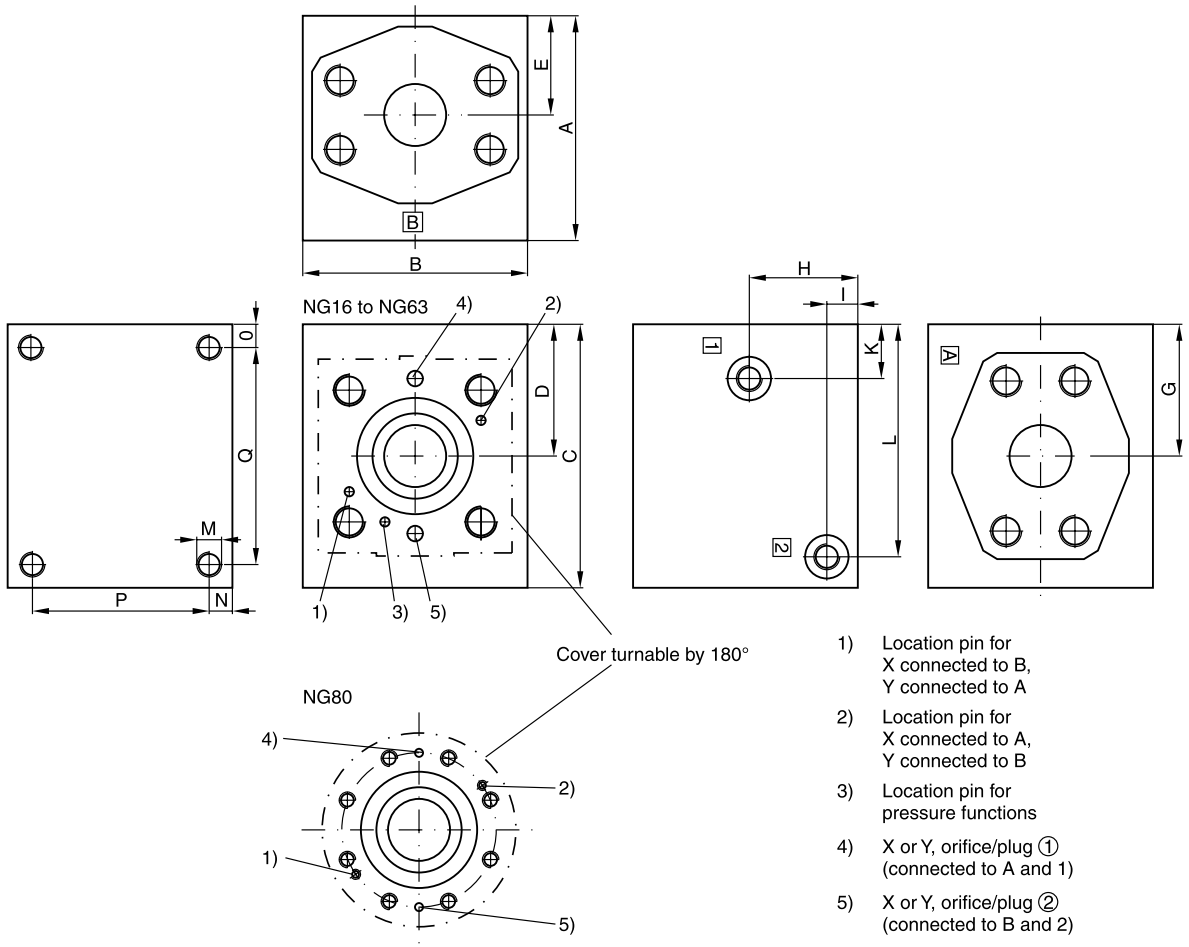
Ordering code

CB		A	1		10	W
Cartridge manifold block	Nominal size	Function In - Out	Manifold for 1 cartridge	Flange size	Design series	Without assembly

Code	Size
016	NG16
025	NG25
032	NG32
040	NG40
050	NG50
063	NG63
080	NG80

Code	Size	Flange
34	016	1" SAE61
35	025	1 1/4" SAE61
36	032	1 1/2" SAE61
38	040	2" SAE61
310	050	2 1/2" SAE61
312	063	3" SAE61
64	016	1" SAE62
65	025	1 1/4" SAE62
66	032	1 1/2" SAE62
68	040/050	2" SAE62
70	063	3 1/2" PN400
80	080	4" PN400

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1) Location pin for X connected to B, Y connected to A
2) Location pin for X connected to A, Y connected to B
3) Location pin for pressure functions
4) X or Y, orifice/plug ① (connected to A and 1)
5) X or Y, orifice/plug ② (connected to B and 2)

Ordering code	Max. operating pressure [bar]	A	B	C	D	E	G	H	I	K	L	M	N	O	P	Q	Port A and B	Port 1 and 2	Orifice thread ① and ②	Weight [kg]
CB 016 A 1 34 10 W	350	105	80	105	38,5	34	38,5	45	13	13,5	75,5	M8 x 16	10	10	85	85	1“ SAE 61	G1/4	M5	6
CB 016 A 1 64 10 W	350	105	80	105	38,5	34	38,5	45	13	13,5	75,5	M8 x 16	10	10	85	85	1“ SAE 62	G1/4	M5	6
CB 025 A 1 35 10 W	280	125	100	125	50	43	50	55	15	17	94,5	M10 x 18	10	10	105	105	1-1/4“ SAE 61	G1/4	M6	11
CB 025 A 1 65 10 W	350	125	100	125	50	43	50	55	15	17	94,5	M10 x 18	10	10	105	105	1-1/4“ SAE 62	G1/4	M6	11
CB 032 A 1 36 10 W	210	125	125	145	72,5	51	72,5	55	15	31,5	125	M16 x 30	15	15	95	115	1-1/2“ SAE 61	G1/4	M6	16
CB 032 A 1 66 10 W	350	125	125	145	72,5	51	72,5	55	15	31,5	125	M16 x 30	15	15	95	115	1-1/2“ SAE 62	G1/4	M6	16
CB 040 A 1 38 10 W	210	145	145	170	85	65	85	70	20	35	150	M16 x 30	15	15	115	140	2“ SAE 61	G3/8	M8	25
CB 040 A 1 68 10 W	350	145	145	170	85	65	85	70	20	35	150	M16 x 30	15	15	115	140	2“ SAE 62	G3/8	M8	25
CB 050 A 1 310 10 W	172	155	155	190	95	70	95	70	20	37	170	M16 x 30	15	15	125	160	2-1/2“ SAE 61	G3/8	M8	32
CB 050 A 1 68 10 W	350	155	155	190	95	70	95	70	20	37	170	M16 x 30	15	15	125	160	2“ SAE 62	G3/8	M8	32
CB 063 A 1 312 10 W	138	192	192	240	120	86,5	120	86,5	20	45	220	M16 x 30	15	15	165	210	3“ SAE 61	G3/8	M8	63
CB 063 A 1 70 10 W	350	192	192	240	120	86,5	120	86,5	20	45	220	M16 x 30	15	15	162	210	3-1/2“ PN 400	G3/8	M8	63
CB 080 A 1 80 10 W	350	270	270	270	135	120	135	120	20	35	250	M16 x 30	15	15	240	240	4“ PN 400	G3/8	M8	139

Cartridge manifold blocks are supplied with a set of plugs and orifices

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Hydraulic Controls Division
Kaarst, Germany

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BK bolt kits

Socket head cap screws as per DIN 912-12.9

Ordering code	Description
BK 399	**Bolt kit M5x25**
BK 375	**Bolt kit M5x30**
BK 443	**Bolt kit M5x45**
BK 300	**Bolt kit M5x50**
BK 380	**Bolt kit M5x60**
BK 463	**Bolt kit M5x60**
BK 421	**Bolt kit M5x65**
BK 400	**Bolt kit M5x70**
BK 401	**Bolt kit M5x75**
BK 402	**Bolt kit M5x80**
BK 444	Bolt kit M5x85
BK 471	Bolt kit M5x85
BK 403	**Bolt kit M5x90**
BK 468	Bolt kit M5x95
BK 404	**Bolt kit M5x100**
BK 466	Bolt kit M5x100 2 pcs.
BK 405	**Bolt kit M5x110**
BK 406	**Bolt kit M5x115**
BK 424	**Bolt kit M5x130**
BK 408	**Bolt kit M6x25**
BK 385	**Bolt kit M6x40**
BK 310	**Bolt kit M6x55**
BK 422	Bolt kit M6x75
BK 412	**Bolt kit M6x90**
BK 508	Bolt kit M6x100
BK 311	**Bolt kit M6x105**
BK 430	**Bolt kit M6x105**
BK 414	**Bolt kit M8x40**
BK 441	Bolt kit M8x50
BK 505	Bolt kit M10x35
BK 388	**Bolt kit M10x40**
BK 485	**Bolt kit M10x45**
BK 506	Bolt kit M10x45 6 pcs.
BK 389	**Bolt kit M10x50**
BK 390	**Bolt kit M10x50 6 pcs.**
BK 320	**Bolt kit M10x60 4 pcs. / M6x55 2 pcs.**
BK 484	**Bolt kit M10x65**
BK 395	**Bolt kit M10x100**
BK 494	Bolt kit M12x45
BK 391	**Bolt kit M12x50**
BK 486	Bolt kit M12x70
BK 360	**Bolt kit M12x75 6 pcs.**
BK 460	Bolt kit M12x145 6 pcs.
BK 415	**Bolt kit M16x55**
BK 366	Bolt kit M16x70
BK 487	Bolt kit M16x110
BK 507	Bolt kit M18x75
BK 417	Bolt kit M20x75
BK 386	Bolt kit M20x90 6 pcs.

If no other specification is indicated, 1 bolt kit contains 4 screws.

Threads length

Threads	M5	M6	M10	M12
Thread length	1.5 x Ø thread			

Note

The torque for bolt kits or tie rod kits is according to valve type/product. Consult product chapters.

Bold letters =
Short-term availability

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TK tie rod kits

Tie rod kits as per DIN 835-10.9

Ordering code	Description	recommended stacking length min.	max.
TK 1455	**Tie rod kit M5x70**	**56**	**62**
TK 1482	**Tie rod kit M5x80**	**66**	**72**
TK 1453	Tie rod kit M5x90	76	82
TK 1484	**Tie rod kit M5x100**	**86**	**92**
TK 1446	**Tie rod kit M5x110**	**96**	**102**
TK 1473	**Tie rod kit M5x120**	**106**	**112**
TK 1474	**Tie rod kit M5x130**	**112**	**122**
TK 1405	**Tie rod kit M5x140**	**122**	**132**
TK 1450	**Tie rod kit M5x150**	**132**	**142**
TK 1409	**Tie rod kit M5x160**	**142**	**152**
TK 1411	**Tie rod kit M5x170**	**152**	**162**
TK 1454	**Tie rod kit M5x180**	**162**	**172**
TK 1415	**Tie rod kit M5x190**	**172**	**182**
TK 1416	**Tie rod kit M5x200**	**182**	**192**
TK 1475	**Tie rod kit M5x210**	**192**	**202**
TK 1407	Tie rod kit M5x220	202	212
TK 1413	Tie rod kit M5x230	212	222
TK 1434	Tie rod kit M5x240	222	232
TK 1436	Tie rod kit M5x250	232	242
TK 1438	Tie rod kit M5x260	242	252
TK 1476	Tie rod kit M5x270	252	262
TK 1485	Tie rod kit M6x80	66	71
TK 1486	**Tie rod kit M6x90**	**76**	**81**
TK 1487	**Tie rod kit M6x100**	**86**	**91**
TK 1418	**Tie rod kit M6x110**	**96**	**101**
TK 1488	Tie rod kit M6x120	106	111
TK 1489	**Tie rod kit M6x130**	**112**	**121**
TK 1490	**Tie rod kit M6x140**	**122**	**131**
TK 1422	**Tie rod kit M6x150**	**132**	**141**
TK 1491	**Tie rod kit M6x160**	**142**	**151**
TK 1423	**Tie rod kit M6x170**	**152**	**161**
TK 1492	**Tie rod kit M6x180**	**162**	**171**
TK 1493	**Tie rod kit M6x190**	**172**	**181**
TK 1427	**Tie rod kit M6x200**	**182**	**191**
TK 1494	**Tie rod kit M6x210**	**192**	**201**
TK 1428	Tie rod kit M6x220	202	211
TK 1460	Tie rod kit M6x230	212	221
TK 1495	Tie rod kit M6x240	222	231
TK 1432	Tie rod kit M6x250	232	241
TK 1496	**Tie rod kit M6x260**	**242**	**251**
TK 1497	Tie rod kit M6x270	252	261
TK 1469	Tie rod kit 4 x M10x170 / 2 x M6x170	152	155
TK 1478	Tie rod kit 4 x M10x190 / 2 x M6x190	172	175
TK 1470	Tie rod kit 4 x M10x220 / 2 x M6x220	202	205
TK 1479	Tie rod kit 4 x M10x250 / 2 x M6x250	232	235

TK-M5 NUT	Nut M5 (10 pcs.)
TK-M6 NUT	Nut M6 (10 pcs.)
TK-M10 NUT	Nut M10 (10 pcs.)

If no other specification is indicated, 1 tie rod kit contains 4 bolts and 4 nuts.

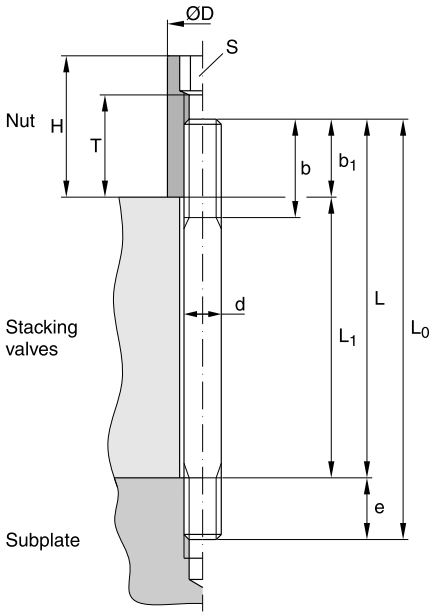
d	D	S	H	T	e	b [1]	b [2]	b [3]
M5	9	5	25	20	10	16	22	22
M6	10	6	25	20	12	18	24	24
M10	17	10	25	15	15	26	32	45

b [1] L ≤ 120 mm
b [2] 130 mm ≤ L ≤ 200 mm
b [3] 200 mm < L

Note

The torque for bolt kits or tie rod kits is according to valve type/product. Consult product chapters.

$b_1 \geq 1.5d$
$b_1 < b$
$b_1 < T$



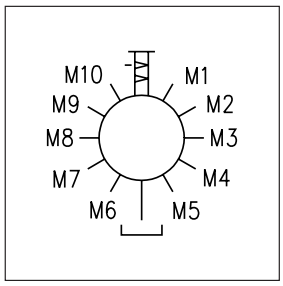
Example:

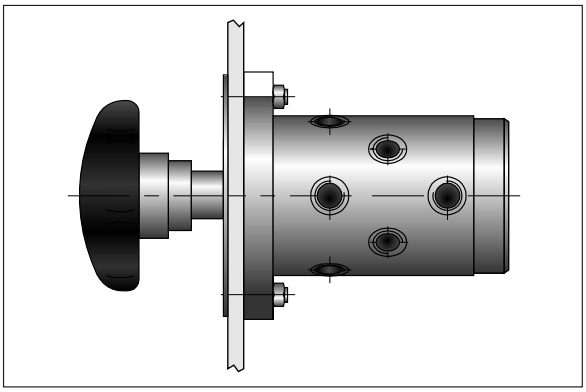
TK1411: M5 x 170 DIN835 =
nominal stud length L = 170mm,
stacking length L_1 = 160mm
total stud length L_0 = 180mm

Bold letters =
Short-term availability

By using the pressure gauge selector valve in hydraulic systems, up to 5 or 10 measuring points can be connected to one pressure gauge. When measuring is completed, the gauge is pressure-relieved to prevent it from being damaged by pressure surges. The accuracy and life of the pressure gauge are thus increased considerably.







Design
Pressure gauge selector valve with locking, pressure-relieving piston. Measuring point selection by marked rotary handle and graduated dial.

Function
To select one of the measuring points from 1 to 5 or 1 to 10, the rotary handle is pulled out fully, and turned to the left or right. When the measuring point is selected by means of the handle marking and the dial, the handle is pushed in and the pressure gauge loaded with the pressure present. The piston is locked in the measuring position by a catch. When measuring is completed, the handle is pulled out, to relieve the pressure gauge via the drain line.

Features
- 5 or 10 measuring positions optional
- Extends the service life of the manometer by unloading the pressure.

Technical data

Mounting position		unrestricted
Mounting		panel mounted
Connections		G1/8
Operation		by hand
Seals		fluorocarbon
Measuring position selection		by turning handle
Weight	[kg]	1.8
Max. operating pressure	[bar]	315
Viscosity range	[cSt]/[mm²/s]	12...230
Max. pressure in drain port Le	[bar]	1.0

Ordering code

WM	☐	A	☐
Pressure gauge selector valve	Measuring points	Design	Design series

Code	Measuring pos.
5	**5 points**
10	**10 points**

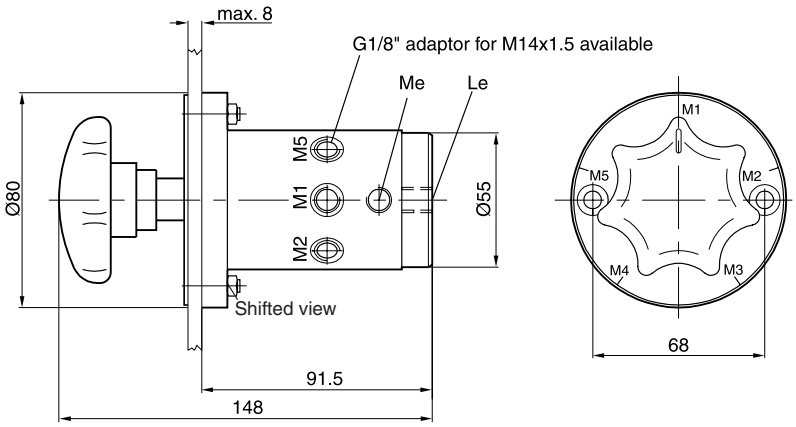
Bold letters =
Short-term availability

WM_UK.INDD RH_02.01.08

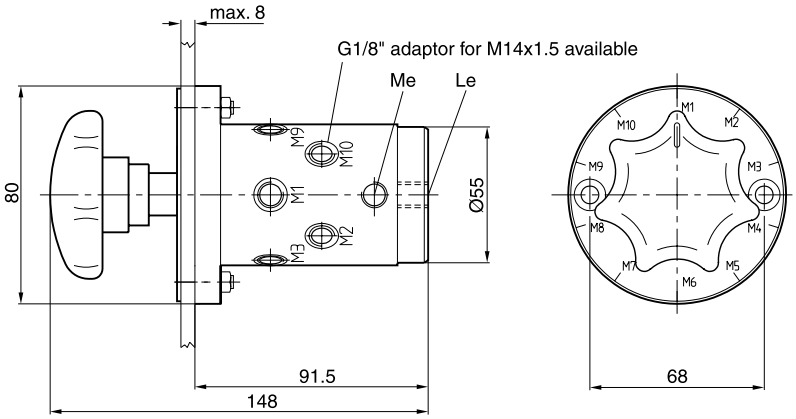
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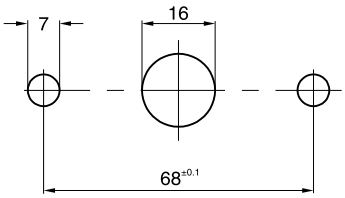
WM 5 A *



WM 10 A *



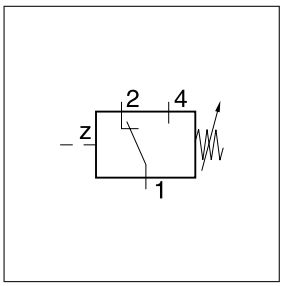
Mounting opening

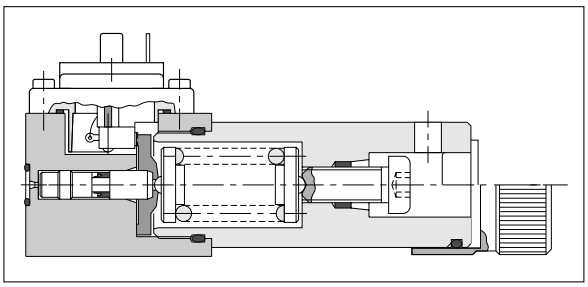


12

The electro-hydraulic pressure switch provides an electric signal when the sensed pressure goes above or below the selected setting.







Function

The spring loaded piston is hydraulically dampened. The PSB provides a very accurate hysteresis between the switching points (see diagram).

The required operating pressure is adjusted by the set-screw. Unauthorised adjustments can be prevented by the optional cylinder lock. The electric element is a micro switch with snap-action contact. Three terminals permit application as "On", "Off" or "Changeover" switch.

The electrical connection is made with a 3-pole plug-in connector to EN 175301-803 with ground.

Note

For inductive DC loads a spark discharger should be used to increase service life.

Features

- Flange or pipe mounting
- 4 pressure ranges
- Can be used as opener or closer
- Cylinder lock optional

Technical data

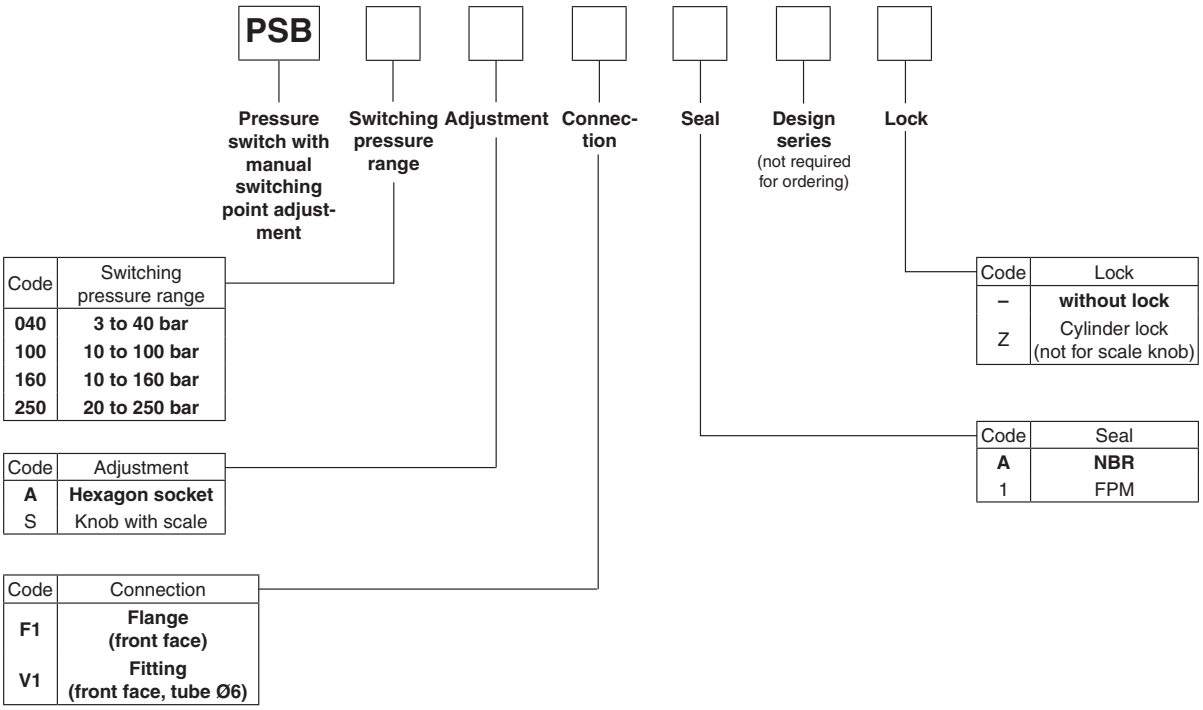
Symbol		DIN 24340	
Design		plunger type switch	
Mounting		PSB*F1*	flange (front face)
		PSB*V1	pipe mounting
Mounting position		as desired	
Weight	[kg]	1.0	
Operating pressure	[bar]	to 315	
Actuating pressure difference		see diagram	
Duty cycle		max. 1/s	
Pressure fluid		mineral oil (HL, HLP) as per DIN 51524, other pressure fluid on request	
Temperature range	[°C]	0...80	
Viscosity range	[mm²/s]	12...400	
Electrical connection		plug-in connector to EN 175301-803	
Insulation		IP65 as per EN 60529	
Contact load carrying capacity		5A at 250VAC; 1A at 50VDC; 0.2A at 250VDC	

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Ordering Code / Installation Examples

Series PSB



Code	Switching pressure range
040	**3 to 40 bar**
100	**10 to 100 bar**
160	**10 to 160 bar**
250	**20 to 250 bar**

Code	Adjustment
A	**Hexagon socket**
S	Knob with scale

Code	Connection
F1	**Flange (front face)**
V1	**Fitting (front face, tube Ø6)**

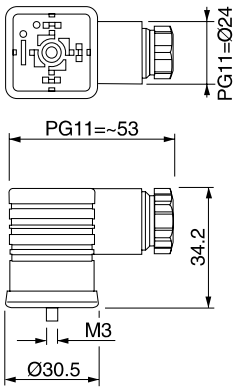
Code	Lock
–	**without lock**
Z	Cylinder lock (not for scale knob)

Code	Seal
A	**NBR**
1	FPM

Bold letters =
Short-term availability

Plug EN 175301-803

Description	Threaded cable joint	Ordering code
Plug EN 175301-803, design type AF, protection class IP 65	PG11	**HR 21500157**



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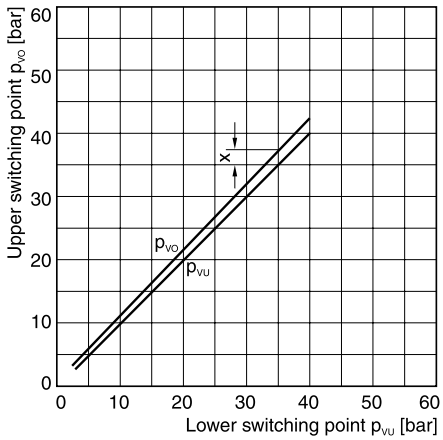
PSB_UK.INDD RH_02.01.08

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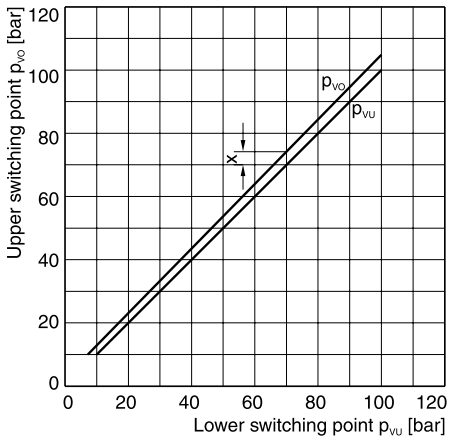
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Switching pressure difference

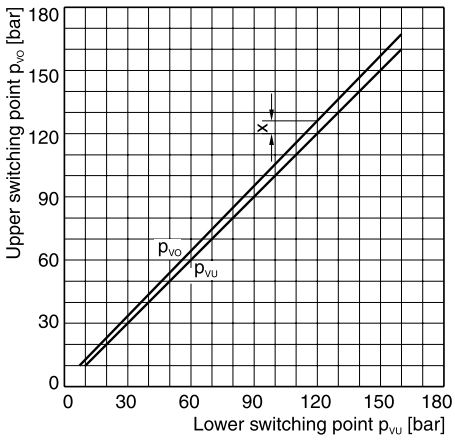
PSB040



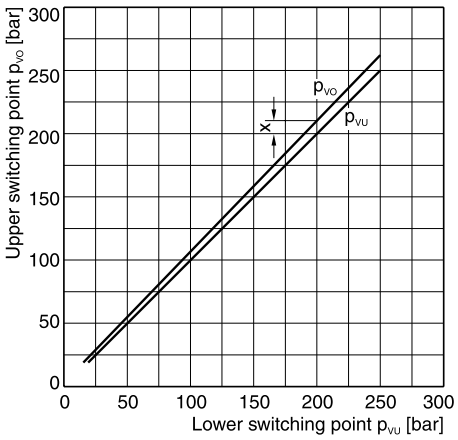
PSB100



PSB160

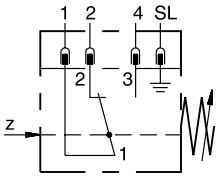


PSB250



X = switching differential

Electrical connections

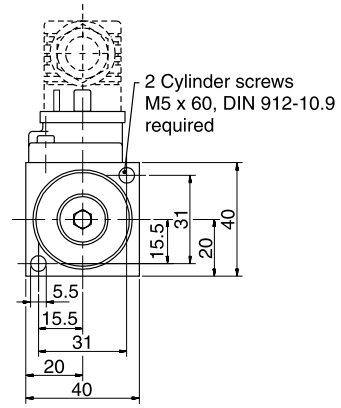


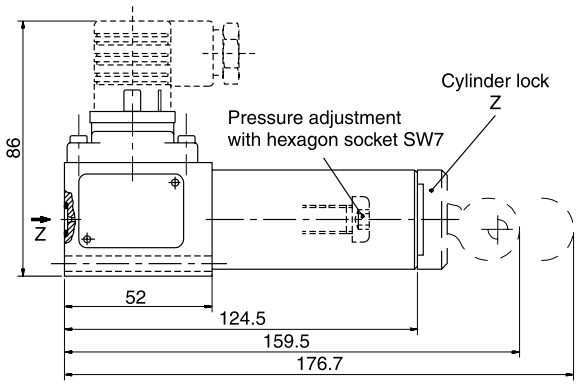
Electrical connection EN175301-803

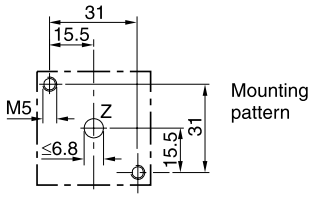
12

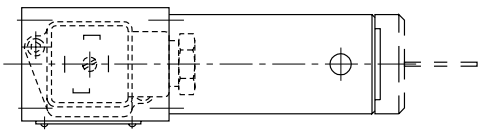
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Type PSB*F1*

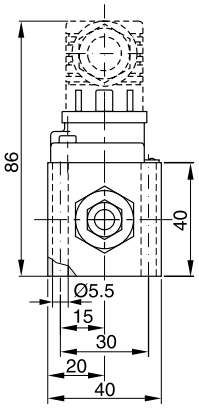


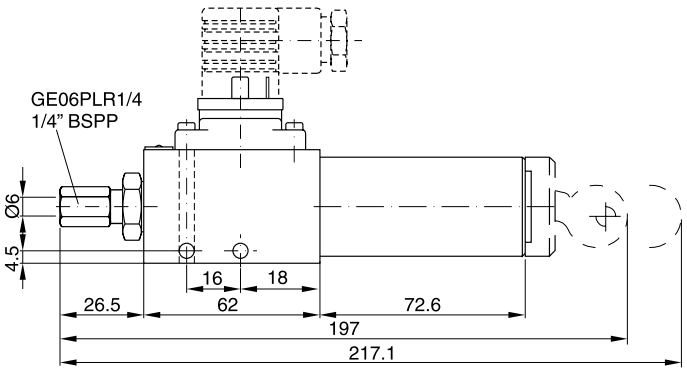


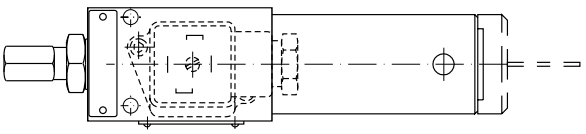


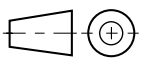


Type PSB*V1*



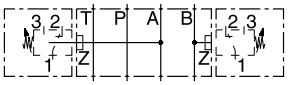
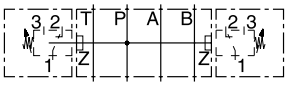






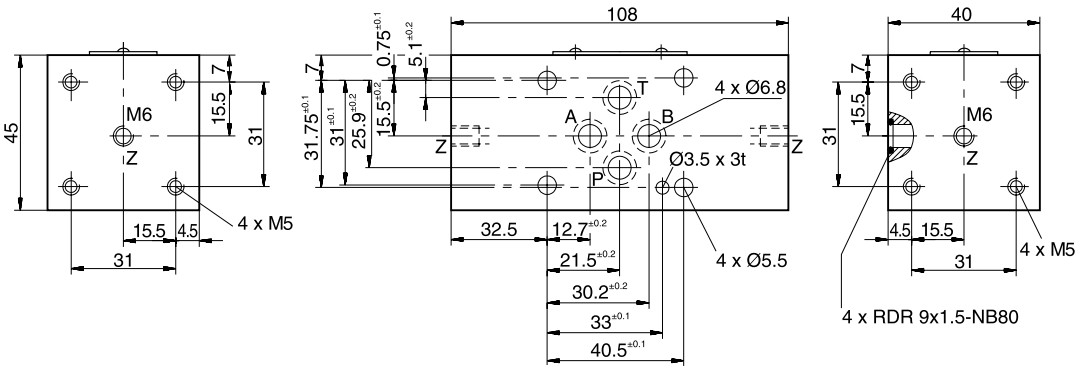
12

Technical Data

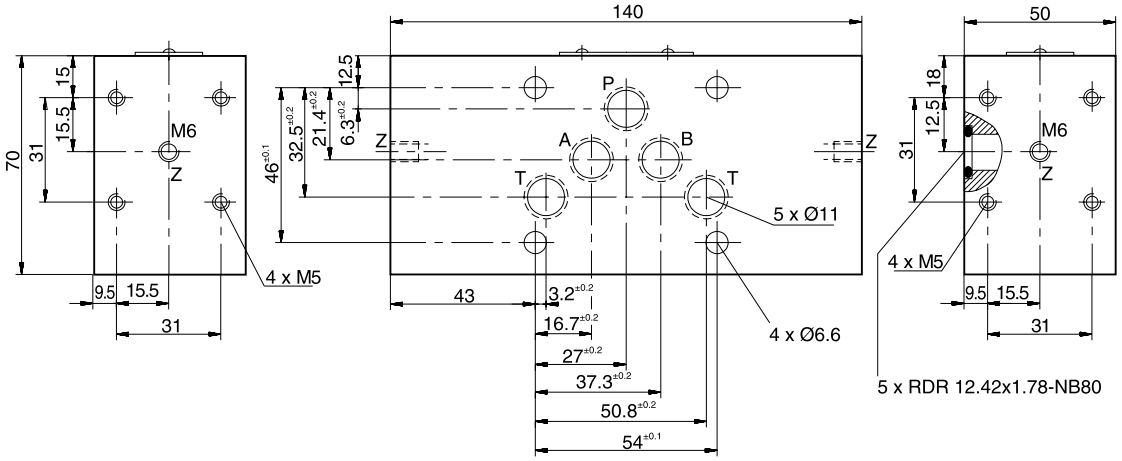
Switch code	Ordering code	Nominal size	Function
	**H06PSB-994**	**06**	**Pressure switch connection to A or B or A and B: Connections not used are closed by plug.**
	H10PSB-996	**10**	
	H06PSB-993	06	Pressure switch connection to P (left or right mounting is possible). Connection not used is closed by plug.
	H10PSB-995	10	

Bold letters =
Short-term availability

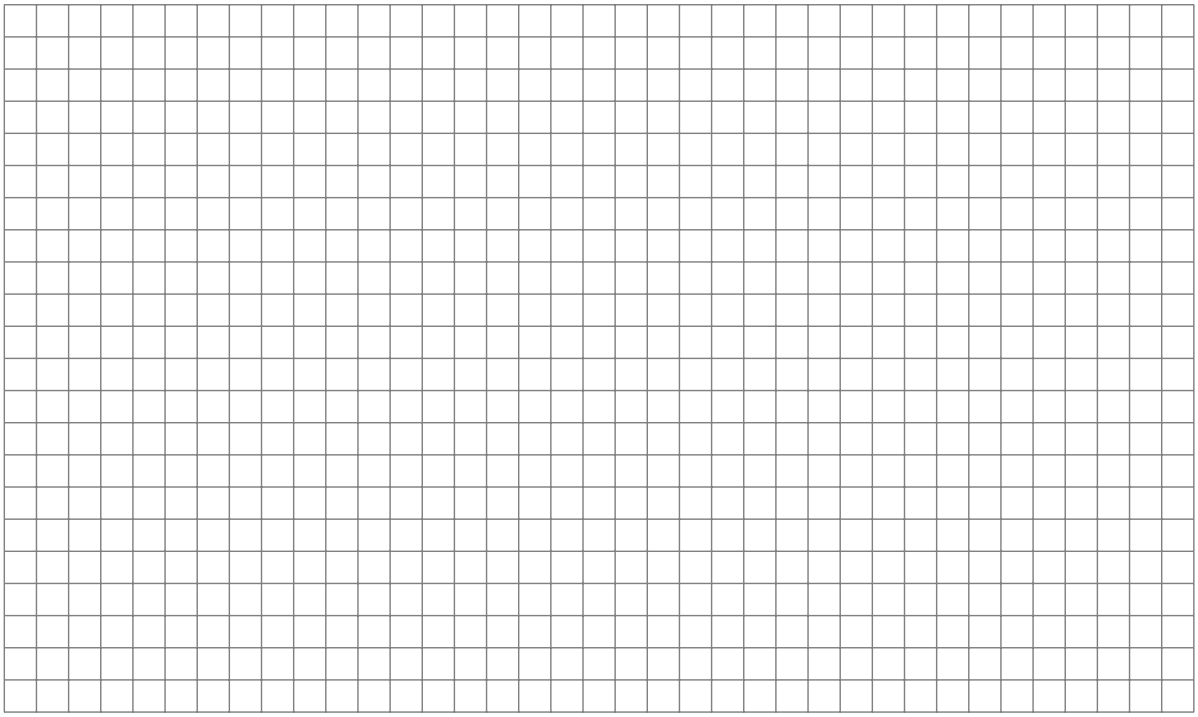
Dimensions NG06



Dimensions NG10



Notes



PSB_UK.INDD RH_02.01.08

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Hydraulic Controls Division
Kaarst, Germany

- Compact
- Rugged
- Reliable
- Easy operation
- Long-term stability
- Excellent interference resistance
- Metal housing
- High protection class
- Many variants
- Rotatable
- Analogue output
- Password
- MPa, bar, psi



The Pressure Controller combines the functions of a pressure switch, a pressure sensor and a display instrument:

- Pressure display (manometer)
- Switching outputs
- Analogue signal

Simple operation, compact design and high reliability are the most important features of the SCPSD. The Pressure Controller offers excellent technical performance and optimum pressure management. It is ideal for permanent use in industrial applications.

Easy to operate

Parameter setting is carried out via the keys or with a programming module.

High functionality

Every switching output can be set individually:

- Normally closed/normally open contacts
- On and off switching pressures
- Delay times
- Hysteresis/window function
- Damping

Intelligent settings which are not possible with a mechanical switch can be achieved with these convenient switch functions. Several switches can be replaced by a single controller.

The analogue output is individually settable

- 0/4…20 mA switchable
- Settable initial pressure
- Settable final pressure

Reliable/safe

Pressure is captured by a measuring cell with long-term stability. Any functional error is monitored and can be processed in accordance with DESINA. Thanks to a password, unauthorised change of parameters is prevented.

Rugged

The housing is made of metal and is resistant to humidity, shock and vibrations. The electronics are protected from reverse polarity, overvoltage and short circuits.

Everything within view

The large illuminated display is readable even from a considerable distance. Pressures are shown in MPa, bar or psi.

Optimum installation possibilities

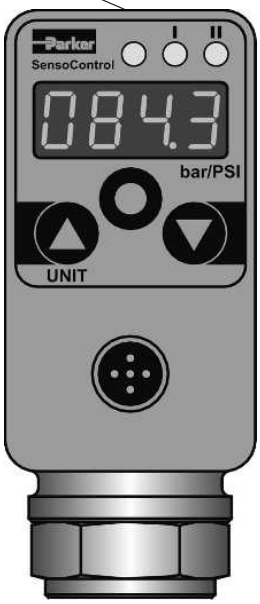
With its compact design and excellent interference resistance the SCPSD is suitable for installation under critical conditions.

With its directionally settable housing, the display can always be read very easily.

Universal

Many versions are available to suit a wide variety of applications.

- Optical interface
- Switch status display



Everything in view
- Chamfered display
- Digital display
- Large
- Luminescent
- Display
- psi/bar/Mpa
- Actual pressure
- Minimum pressure
- Maximum pressure
- Switching points

Easy to operate
- 3 large keys
- Display of units

Pressure connection
- Stainless steel
- Measuring cell stable long-term
- Wide media tolerance

Rugged
- Metal housing
- Watertight
- High interference resistance
- Vibration resistant
- Shockproof

Flexible installation
- Compact
- Rotatable 290°



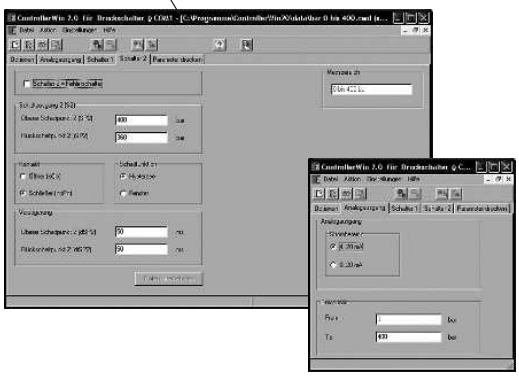
Thread
- Internal thread
- External thread



Tube clamp
- Safe mounting with a rugged SCSD-S27 clamp

Programming module
- Can be set with ControllerWIN software





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SCPSD	004	010	016	060	100	250	400	600
pressure range P_n (bar)	-1...4	-1…10	-1...16	0…60	0…100	0…250	0…400	0…600
overload pressure P_{max} (bar)	10	20	40	120	200	500	800	1200
burst pressure P_{burst} (bar)	12	25	50	550	800	1200	1700	2200
measuring element	ceramic low pressure			DMS thin film high pressure				

Input quantities	
reversing cycles	≥ 100 Mio.
scanning rate	≥ 5 ms
connecting thread	G1/4 BSPP; ED soft seal NBR [1] (DIN 3852 T2, form X); ED (DIN3852 T11, form E)
torque	35 Nm
parts in contact with media	low pressure: 1.4404 stainless steel; AL2O3 ceramic; NBR high pressure: stainless steels 1.4404; 1.4542
temperature range of medium	-20 …+85 °C
weight	approx. 300 g
Output quantities	
accuracy	± 0,5 % FS typ.; ± 1 % FS max.
temperature drift	± 0,02 % FS/°K typ. (at -20…+85 °C) ± 0,03 % FS/°K max.
long-term stability	± 0,2 % FS/a
repeat accuracy	± 0,25 % FS
switching point accuracy	± 0,5 % FS typ.; ± 1 % FS max.
display accuracy	± 0,5 % FS typ. ± 1 Digit ± 1 % FS max. ± 1 Digit
Response speed	
switching output	≤ 10 ms
analogue output	≤ 10 ms
Electrical connection	
power supply	15…30 VDC nominal 24 VDC; protection class 3
electrical connection	M12x1; 4-pole; 5-pole with gold-plated contacts. appliance inlet connector DIN EN 175301-803 form A (formerly DIN43650)
short circuit protection	yes
reverse polarity protection	yes
overload protection	yes
current consumption	< 100 mA

Housing	
	directionally adjustable up to 290°
material	pressure die-casting Z 410; painted
foil material	polyester
display	4-figure 7-segment LED; red; digit height 9 mm
protection class	IP67 DIN EN 60529; IP65 with plug-in connector DIN EN 175301-803 form A (formerly DIN43650)
Environmental conditions	
environmental temperature range	-20…+85 °C
storage temperature range	-40…+100 °C
vibration resistance	20 g; 10…500 Hz IEC60068-2-6 [2]
shock resistance	50 g; 11 ms IEC60068-2-29 [2]
EM compatibility	
interference emissions	EN 61000-6-3
interference resistance	EN 61000-6-2
Outputs	
switching outputs	2 MOSFET high side switches (PNP)
contact functions	normally open/normally closed; window/hysteresis; freely settable function
switching voltage	power supply - 1,5 VDC
switching current max.	0,5 A per switch
short circuit current	2,4 A per switch
analogue output	0/4…20 mA; programmable; freely scalable; RL ≤ (power supply - 8 V)/ 20 mA (≤ 500 Ω)

[1] other sealing materials (FPM, EPDM etc.) on request

[2] Does not apply to DIN EN 175301-803 form A (formerly DIN43650) version

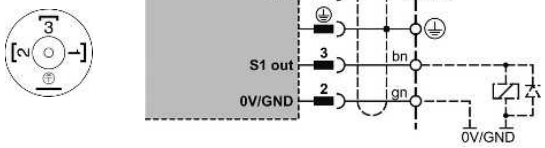
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Connection designation

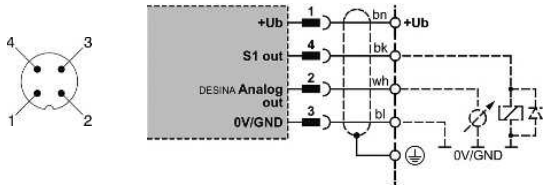
SCPSD-xxx-04-x6

1 switching output;
DIN EN 175301-803 form A (formerly DIN43650)



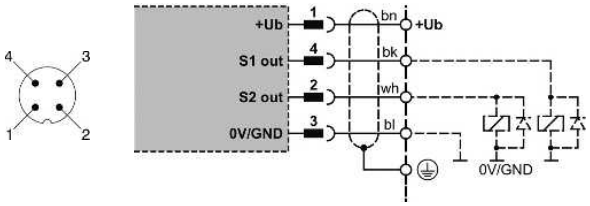
SCPSD-xxx-04-x7

2 switching outputs;
M12x1; 4-pole



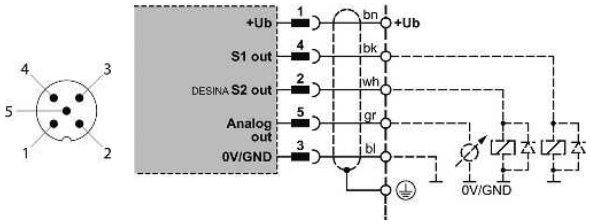
SCPSD-xxx-14-x7

1 switching output;
1 analogue output;
M12x1; 5-pole



SCPSD-xxx-14-x5

2 switching outputs;
1 analogue output;
M12x1; 5-pole



ye = yellow gn = green wh = white gr = grey
bn = brown bk = black bl = blue

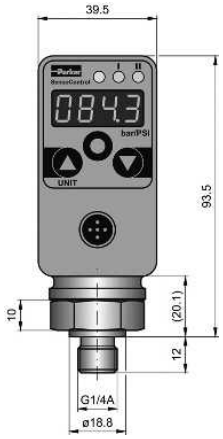
Measurement range (bar)	Display resolution increment (bar)	Smallest reverse switch value RSP	Greatest switch value SP	Smallest settable difference between SP and RSP (SP-RSP)
-1…4	0,01	-1	4	0,08
-1…10	0,01	-1	10	0,05
-1…16	0,01	-1	16	0,09
0…60	0,1	0	60	0,3
0…100	0,1	0	100	0,6
0…250	1	0	250	2
0…400	1	0	400	3
0…600	1	0	600	3

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Pressure range selection

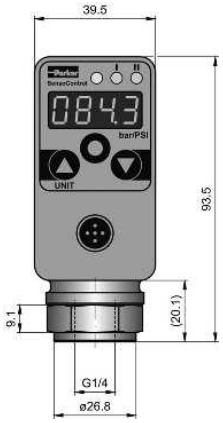
With pressure switches the settable pressure is very relevant.
Because a 400 bar pressure switch shows the same resolution (1 bar) as a 600 bar pressure switch (also 1 bar), a 600 bar pressure switch can be deployed even at a smaller nominal pressure (eg. 315 bar).
The positive effects of this are the same accuracy with higher safety and fewer product variants.

External thread
SCPSD-xxx-x4-1x

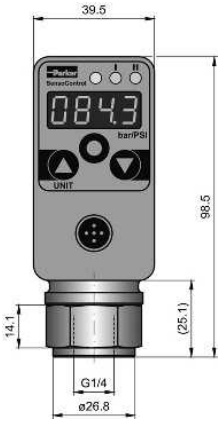


High and low pressure
DMS/ceramic

Internal thread
SCPSD-xxx-x4-2x

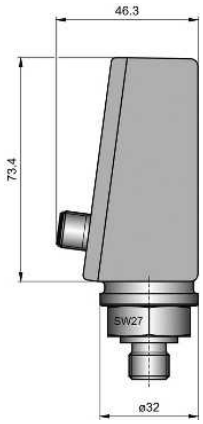


High pressure (from 60 bar)
DMS

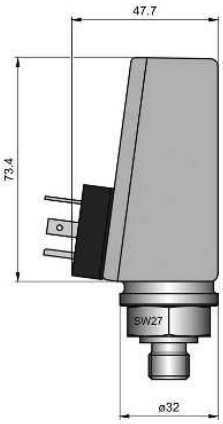


Low pressure (up to 16 bar)
Ceramic

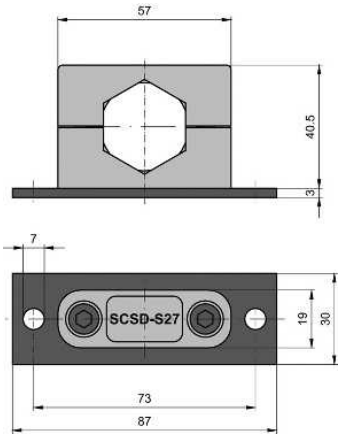
M12 plug-in connector
SCPSD-xxx-x4-x5



DIN EN 175301-803 form A
(formerly DIN43650))
SCPSD-xxx-04-x6



Accessories
Clamp



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SCPSD digital pressure switch

Pressure range 004; 010; 016; 060; 100; 160, 400; 600 bar	
1 switching output; without analogue output DIN EN 175301-803 form A (formerly DIN 43650) plug-in connector	SCPSD - xxx - 04 - x 6
2 switching outputs; without analogue output M12x1 plug-in connector; 4-pole	SCPSD - xxx - 04 - x 7
1 switching output; with analogue output M12x1 plug-in connector; 4-pole	SCPSD - xxx - 14 - x 7
2 switching outputs; with analogue output M12x1 plug-in connector; 5-pole	SCPSD - xxx - 14 - x 5
Type G1/4 BSPP external thread = 1 G1/4 BSPP internal thread = 2	

Ordering examples

SCPSD-100-04-27
Pressure range 100 bar
2 switching outputs
G1/4 BSPP internal thread
M12 plug-in connector

SCPSD-60-14-27
Pressure range 60 bar
1 switching output
1 analogue output
G1/4 BSPP internal thread
M12 plug-in connector

SCPSD-004-14-17
Pressure range 4 bar
2 switching outputs
1 analogue output
G1/4 BSPP external thread
M12 plug-in connector

Accessories

PC programming kit	SCSD-PRG-KIT
Fixing clamp	SCSD-S27
Reducing adaptor M22x1,5	SCA-1/4-M22x1.5-ED
Reducing adaptor G1/2 BSPP	SCA-1/4-ED-1/2-ED
Damping adaptor	SCA-1/X-EDX-1/X-D
Flange adaptor for mechanical pressure switch	SCAF-1/4-40

Connecting cable and separate plugs

Connecting cable, ready-made (open cable end)	SCK-400-xx-xx
Cable length in m 02 2 m 05 5 m 10 10 m	
Plug-in connector 45 M12 cable socket; straight 55 M12 cable socket; 90° angled 56 DIN EN 175301-803 form A plug connector (formerly DIN 43650)	

Separate plugs

M12 cable socket; straight	SCK-145
M12 cable socket; 90° angled	SCK-155
DIN EN 175301-803 Form A plug connector (formerly DIN 43650)	SCK-006

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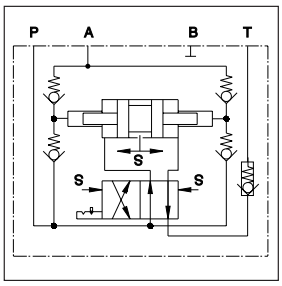
SCPSD_UK.INDD RH_02.01.08

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Pressure intensifiers are used wherever a particular section of a hydraulic system has to be pressurised to a substantially higher pressure than the available primary pressure allows (clamping functions). With an intensification ratio of 1 : 4 (1 : 2, 1 : 6) it enables a cost-effective system solution especially in clamping applications, with primary pressures up to 125 bar. A pilot operated check valve can be flanged underneath the pressure intensifier for quick filling and decompression of the high pressure section.





Design

Main functional parts of the pressure intensifier:
piston, rocker mechanism, slide valve with lock,
4 check valves which separate the high pressure section from the low pressure section,
check valve in the tank port to partition of the tank section from the primary pressure.

Features

- Mounting pattern NG6, DIN 24 340 Design A, CETOP, ISO
- Check valve attachable to bottom flange
- High pressure up to 500 bar
- Volume flow formed with low pulsation
- Compact design

Function

After the high pressure section is filled with oil, (e.g. extension of a clamping cylinder), the pressure intensifier begins operation: The low pressure moves the intensifier piston because of the surface ratio and compresses the oil column in the high pressure section.

At the end of the intensifier's piston stroke, the rocker mechanism switches the directional slide valve to the crossed switching position, and the intensifier piston pumps oil from the piston rod area into the high pressure section. The process repeats itself until the pressure ratio corresponding to the surface ratio has lead to a balance of force on the intensifier piston.

The pressure intensifier switches itself off and immediately on again when the high pressure (e.g. due to external leakage) begins to drop (pay attention to the flow characteristic). The switching speed of the slide valve is dependent on the operating speed of the intensifier piston.

Note

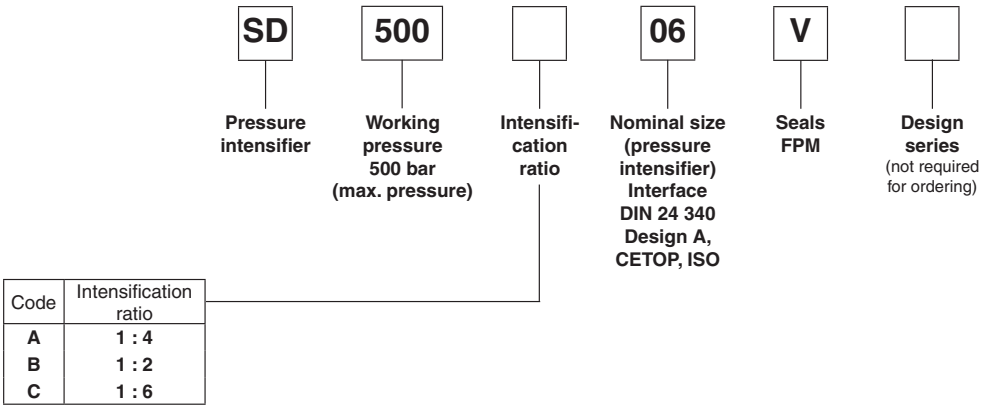
- To avoid exceeding the admissible maximum pressure, a pressure relief or pressure control valve must be fitted on the primary side (pressure setting, max. 125 bar / 1 : 4, max. 250 bar / 1 : 2 or max. 83 bar / 1 : 6).
- There must be no pressure peak on the primary side when operating in the maximum pressure range.
- It is recommended to mount a 10µm filter on the primary side to ensure damage-free operation.

Technical data

General		
Symbol		DIN 24 300
Design		piston and poppet valve in body
Mounting type		NG6, DIN 24 340, design A, CETOP, ISO
Ports		subplate
Mounting position		as desired
Ambient temp.	[°C]	max. 50
Weight	[kg]	3.0 kg
Hydraulic		
Max. operating pressure		
Port A	[bar]	500,
Port P, B, T	[bar]	125 (ratio 1:4), 250 (ratio 1:2)
Press. fluid temp.	[°C]	+ 10°C...+70
Viscosity range	[mm²/s]	12....230
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638:7)
Flow		see performance curve
Intensification ratio		$p_P : p_A$ = 1 : 4, 1 : 2, 1 : 6
Flow volume		$Q_P : Q_A$ = 4 : 1, 2: 1, 6 : 1
Stroke volume	[cm³]	3 (per double stroke)
Operating		hydraulic-mechanic automatic control

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Code	Intensification ratio
A	**1 : 4**
B	**1 : 2**
C	**1 : 6**

Accessories

Type	Description	Number
SD 500*06V	Seals	
	9.25 x 1.78	3
	10.82 x 1.78	1
	M5 x 75-12.9 DIN 912	4

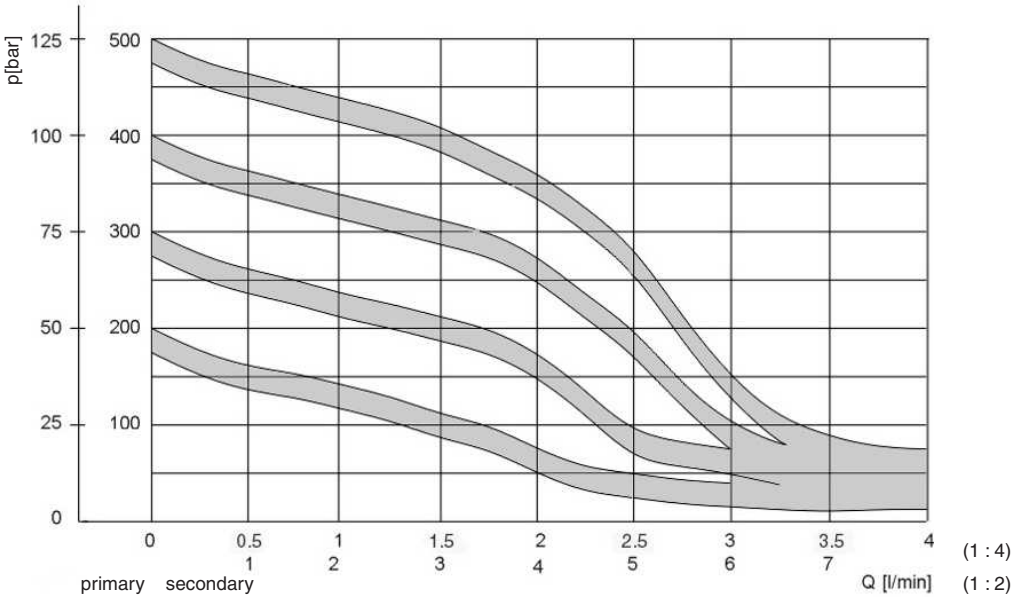
Seals are included in delivery.
Mounting screws are not included in delivery.

Bold letters =
Short-term availability

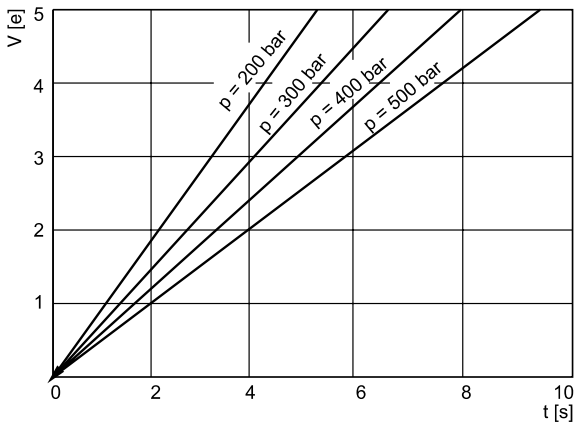
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Surface finish	Kit		
R_{max}6.3 0.01/100	BK401	DIN 912 12.9	9.0 Nm

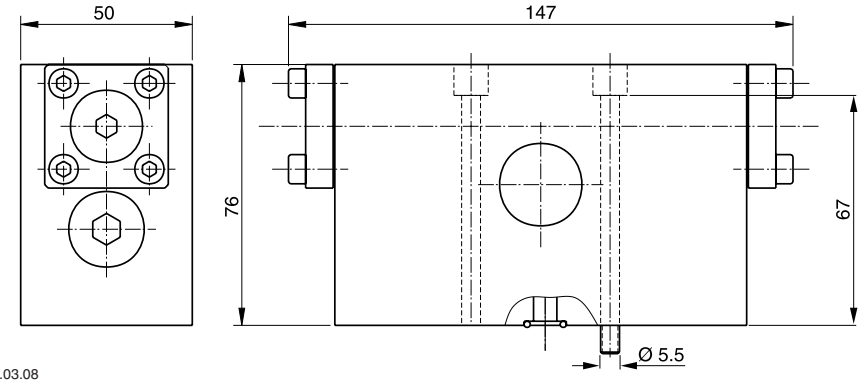
Flow characteristics



Approximate values of the compression time for compressing a filled volume to target pressure (1 : 4)



Dimensions



SD500_UK.INDD RH_13.03.08

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Pilot operated check valve plate NG06

Description

Pilot operated check valve plates are flanged under the pressure intensifier for quick filling and decompression.

Design

The check valve plate is equipped with a hydraulic, pilot operated check valve.

Opening ratio: Main valve 2.5 : 1
Pilot ratio 10 : 1

Ordering code
H06 SDV

Bold letters =
Short-term availability

Accessories

Type	Description	Number
H06SDV	Seals	
	9.25 x 1.78	4
	M5 x 115-12.9 DIN 912	4

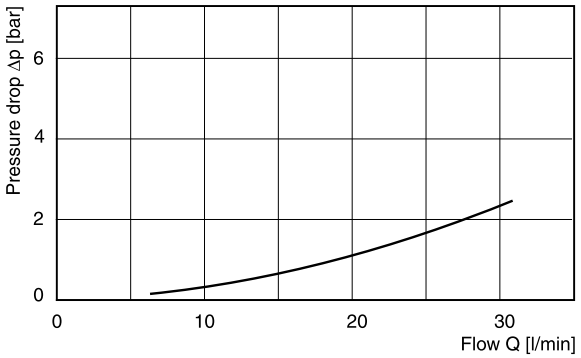
Seals are included in delivery.
Mounting screws are not included in delivery.

Technical data

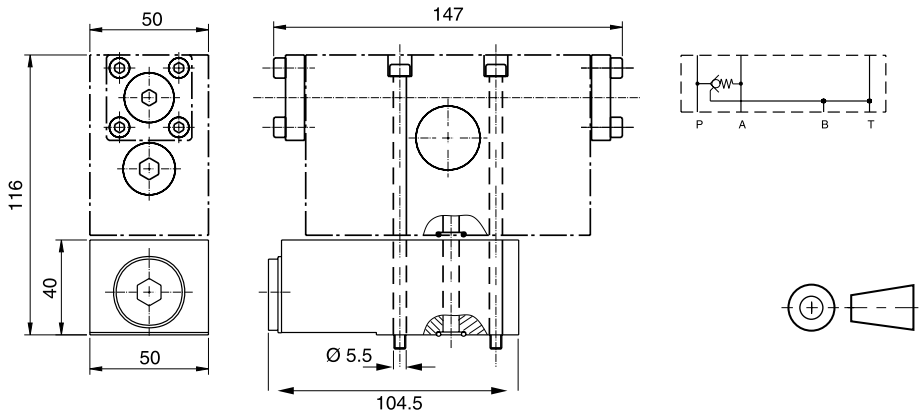
General		
Design		spring loaded ball seat valve
Mounting type		flange
Mounting position		any
Ambient temp.	[°C]	max. 50
Weight	[kg]	1.3
Hydraulic		
Operat. press. range		
Port A	[bar]	max. 500,
Port P, B, T		max. 125 / 1:4 and 250 / 1:2
Fluid temperature	[°C]	+ 10...+70
Viscosity range	[mm²/s]	12....230
Flow		see characteristic curve
Pilot ratio		main valve 2.5:1, pre-discharge 10:1
Opening pressure	[bar]	approx. 0.5

Characteristic Curve

Pilot operated check valve



Dimensions



Surface finish	Kit		
R_{max}6.3 0.01/100	BK401	DIN 912 12.9	9.0 Nm

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Pilot operated check valve plate NG10

Description

Pilot operated check valve plates are flanged under the pressure intensifier for quick filling and decompression.

Design

The check valve plate is equipped with a hydraulic, pilot operated check valve.

Opening ratio: Main valve 2.5 : 1
Pilot ratio 10 : 1

Ordering code

H10 SDV

Accessories

Type	Description	Number
H10SDV	Seals	
	12.24 x 1.78	4
	M5 x 75-12.9 DIN 912	4
	M6 x 50-12.9 DIN 912	4

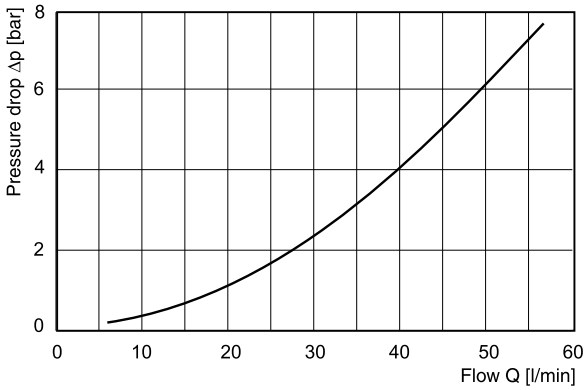
Seals are included in delivery.
Mounting screws are not included in delivery.

Technical data

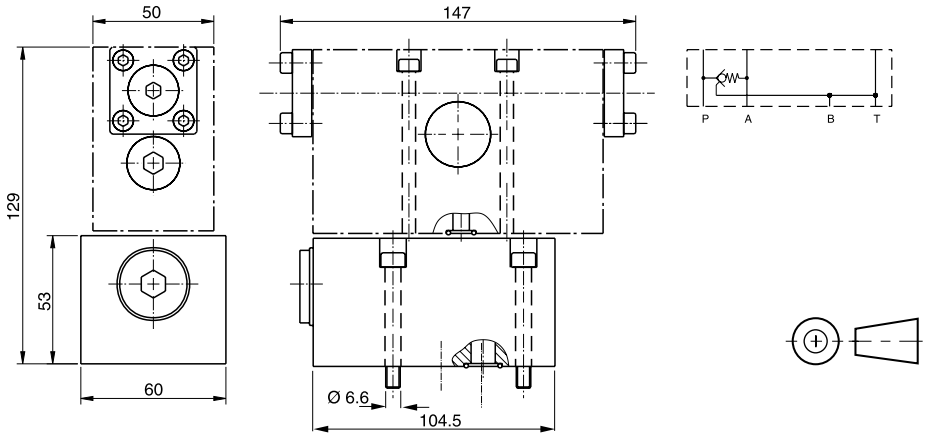
General		
Design		spring loaded ball seat valve
Mounting type		flange
Mounting position		any
Ambient temp.	[°C]	max. 50
Weight	[kg]	2.3
Hydraulic		
Operat. press. range		
Port A	[bar]	max. 500,
Port P, B, T		max. 125 / 1:4 and 250 / 1:2
Fluid temperature	[°C]	+ 10...+70
Viscosity range	[mm²/s]	12....230
Flow		see characteristic curve
Pilot ratio		main valve 2.5:1, pre-discharge 10:1
Opening pressure	[bar]	approx. 0.5

Characteristic curve

Pilot operated check valve



Dimensions



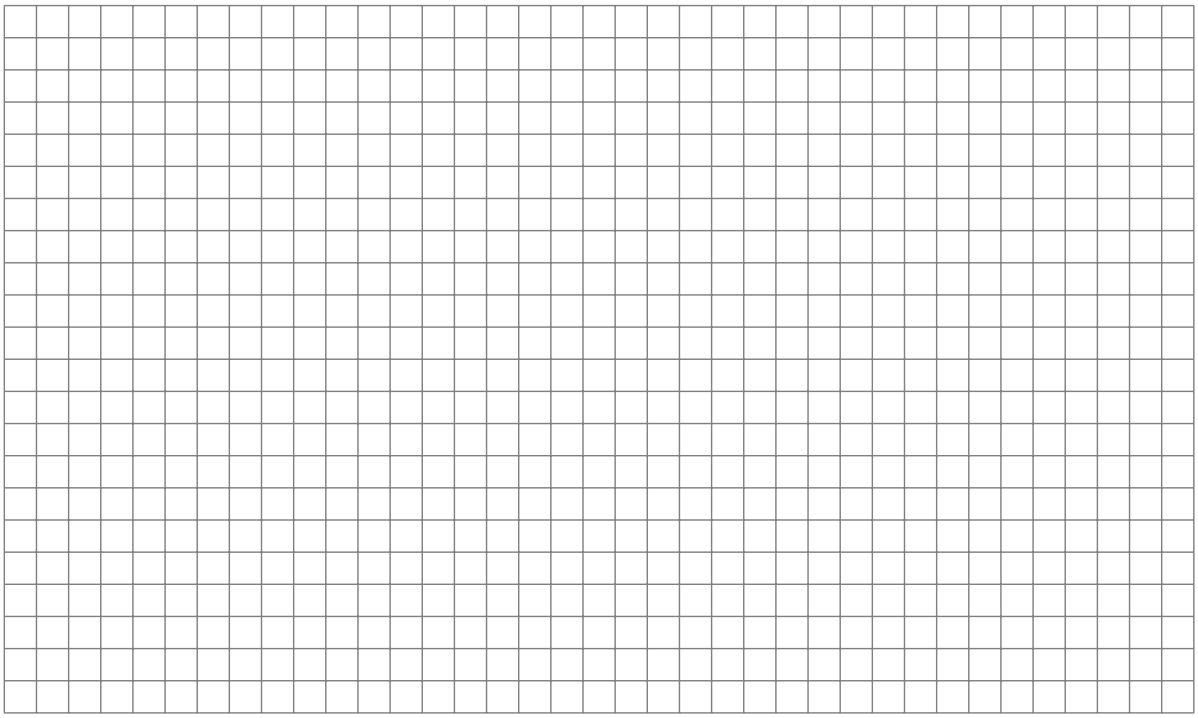
Surface finish	Kit		
R_{max}6.3 0.01/100	BK490	DIN 912 12.9	9.0 Nm 18.0 Nm

SD500_UK.INDD RH_13.03.08

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Notes



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Company portfolio	

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Notes

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A hydraulic system that operates economically, safely, and trouble-free requires careful planning, as well as proper installation and start-up. Conscientious maintenance has a considerable effect on the service life of the hydraulic elements.

The following methods are to be observed when starting up and performing maintenance. There are helpful tips for fault correction in the trouble-shooting section.

The information given in these instructions are of a general nature and require other professional procedures. The commissioning of the hydraulic equipment must be in accordance with the putting into operation of the entire machine or installation and shall be done by experts who have the special hydraulic knowledge. For a safe and successful start-up, the information for installation and commissioning of each component particularly must be observed.

Technical safety instructions

The hydraulic system is to be planned and executed so that personnel cannot be endangered during possible malfunctions. This requires that the diverse pumps and devices are operated within their specified operating pressure ranges. Possible damage to the system and the electrical control system must be limited to a minimum.

Welding performed afterwards on oil reservoir may only be carried out by specialists at their own risk. Remaining oil and the cleaning cover must be removed.

Preventive steps must be introduced to avoid danger through the welding work.

Further measures must be arranged, depending on where the hydraulic system is set up, such as whether an oil receiver must be provided in water protection areas, etc. Or whether hardly inflammable liquids must be used with an increased fire hazard.

Hydraulic accumulator

For putting in operation and using accumulators the national rules, guidelines and regulations must be observed.

⚠ **Hydraulic accumulators must be pre-charged only with nitrogen. Therefore the filling up of the accumulator must be done according to the instructions of the producer by using only the special tools.**

The testing documents of the hydraulic accumulators and safety valves must be stored separately. If necessary, they must be presented to the safety commissioner. It`s not allowed to remove the lead seal of the safety valves. Observe information signs.

Transport

The power unit or the completely mounted manifold was properly packed and handed over to the transport company. If there are damages, please contact the manufacturer or your transport company.

For further transportation the hydraulic must be handled with care.

Storage

The power unit, manifolds and components must be protected from contamination, and from mechanical and weather damage.

Suitable measures must be taken to prevent corrosion if they are stored for longer periods of time without final painting.

Mounting

The pipe connection joints of the unit must be connected with the externally mounted devices and manifolds or the machine according to the positions shown in the hydraulic scheme.

Particularly the following points are to be observed:

- Use cold-drawn precision steel pipes, with the exception of nominal widths bigger than or equal NW50.
- Observe pipe cross-sections and permissible working pressure.
- Remove plastic plugs immediately before beginning pipeline work.
- Assemble pipe bends using bending devices.
- The pipe cross-section may not be pinched when bending.
- The pipes, after being cut to their exact lengths, are to be thoroughly debarred and cleaned.
- Fittings corresponding to pressure and environmental conditions are to be used on the system, and the manufacturer's assembly instructions followed.
- Pipelines are to be lain and tightened without stress.
- Heat-treated pipes must be mechanically cleaned and descaled.
- Drain lines are not to be crimped, and if possible, at a falling angle to the tank, above the oil level.
- If hose lines must be used, they must be selected according to the pressure and the environmental conditions of the system. Note their stability, working pressure, and nominal width.
- The pipes must be sufficiently mounted with pipe brackets to avoid vibrations.
- It is advisable to provide venting connections at the highest position in the pipeline network.
- The power units, the manifolds and the connected parts of the system must be installed and mounted safely for operation.

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Fluids

In order to facilitate the selection of suitable fluids, we refer to the following chapter. This contains information about appropriate oil types. The fluids must meet the requirements of DIN 51524 sections 1 and 2.

Separate instructions must be observed for other fluids (e.g. compatibility with sealing materials).

Commissioning

⚠ **Start-up may only be carried out by specialists. Particularly the special instructions of the manufacturer and the producer of the components must be observed.**

The hydraulic scheme, the parts list, and the control system flow chart should be present. The planned pressure setting must be indicated for all pressure valves in the hydraulic scheme.

Starting-up safety instructions

Before start-up the assembly of the complete hydraulic equipment must be inspected by specialists. Particularly the following points are to be observed:

- Mounting of pipes including clamping
- Accurate connection of pressure and return pipes
- Accurate connection of the pilot pressure pipes
- Accurate assembly of the hydraulic components
- Accurate connection of the power unit
- Accurate connection of the manifolds
- Accurate connection of the cylinder and hydraulic motors
- Accurate connection of the electrics
- Hydraulic equipment must be mounted safely for the operation.
- Parts of the entire system where driven by the hydraulics must be mounted safely for the operation.

Before start-up of the hydraulic system the specialists must prepare all necessary requirements to protect individuals and parts of the system against damage.

The start-up must be done very carefully according to the safety regulation.

Filling

Before the hydraulic fluid is poured into the tank, its interior must be checked again for cleanliness, and be cleaned if necessary.

The tank is to be filled using a fine filter, so that the desired cleanliness class of the fluid is ensured when starting up. Special filling units or equipment provided with the system are especially suitable for this, e.g. the return line filter.

The oil type is indicated on a separate sign next to the filling opening.

Flushing

After filling the reservoir with fluid we recommend the flushing of the fluid inside the hydraulic system where the fluid flushes around many times in the reservoir.

Before starting the flushing the servo-valves and proportional-valves must be removed and replaced by flushing plates to avoid damages of these valves according contamination. Start-up up of the components and the function of the entire system should only begin once the required minimum cleanliness and the operating temperature are reached.

It is recommended to flush the long pipelines by short circuiting the pressure and return lines, especially for large, central pressure oil stations. This prevents the installation dirt from entering the pilot valves (especially important for servo and proportional valves) or the drives (cylinder, hydro-motors, etc.). The diverse measures should be coordinated during design.

Electrical connections

Are the correct current and voltage types available?

- Motor
  Check available current with the E-motor type plate.
- Solenoids
  Are the type of current (~ or =) and the voltage correct? Check the labels of these devices.
- Plugs
  The electronic connections must be done according to the technical rules by using the appropriate plugs.
- Grounding
  Power units, parts of the system and single mounted components must be grounded.

Pumps and devices

The pump case must be filled with the clean operating hydraulic fluid before start-up to lubricate the bearing with oil.

Particularly the special start-up instructions for pumps and hydraulic and electric devices must be observed.

The following section contains only the most important aspects.

- Pumps

  It is advantageous to keep the pressure setting low at first when starting the pump for the first time. The pressure compensator for variable displacement pumps and the pressure limiting valve for fixed displacement pumps are set to approx. 15 - 20 bar.

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- Pressure valves

  Depending on the machine function, first begin with a minimum pressure setting. Enter pressure onto the measuring location plate after the final pressure is established.

  An exception are the design-tested and preset accumulator safety valves.
- Pressure unloading valves

  For setting the pressure unloading valves according the pressure information in hydraulic schematic particularly the start-up instructions for this valve must be observed.
- Throttle valves

  Set every drive (cylinder etc.) in steps via the throttle or flow control valves at the desired speed or stroke time.
- Directional valves

  Select the direction using the electric control system for electrically operated valves.

⚠ **Manual override of the solenoid requires a suitable tool.**

- Proportional valves

  Proportional pressure flow and DC valves must be first started with a low electrical command signal.
- Hydraulic accumulators

  If hydraulic accumulators are assembled into the system, these must be verified at and/or filled up to the correct gas pre-load level. Suitable testing and filling equipment is necessary.

⚠ **Hydraulic accumulators may only be filled with nitrogen for reasons of safety. The pre-loading coordinated with the working pressure is indicated in the hydraulic scheme.**

In general, the following applies:

Gas pre-loading = min. working pressure x 0.9

After testing or filling, the hydro-storage can be switched into the system via ball valve.

Switch on

First the motor is quickly switched on and directly switched off to determine the rotation direction. The correct rotation direction is indicated by an arrow on the pump housing. If the rotation direction is incorrect, reverse the polarity of the e-motor. The pump is started by multiple short start-ups (on-off operation). After approx. 1 min run time, the working pressure can be set to its nominal value (see also **'Trouble-shooting'**. **1.1** and **1.2**).

Start-up information provided by the pump manufacturer has higher priority than these instructions.

Air bleeding

Air in the hydraulic system is very disadvantageous and undesirable for the control system. The system must be carefully vented, especially for the first start-up, for oil changes, or when lines and valves were opened. All functions are run through, one after the other, in no-load operation with low pressure and with full cylinder stroke.

The pipeline network is vented at its highest point. The fitting can be loosened a little so that the air can escape with only a small amount of oil escaping. When the oil is no longer foaming, the fitting is retightened.

If the air bleeding cylinder is provided with venting screws, these should be used for venting. It must be noted, however, that the full cylinder stroke must be travelled several times. These venting screws must be at the top for horizontally arranged cylinders.

After filling the cylinder, the oil level in the tank must be checked, and refilled as necessary.

Filter

The function and service life of pumps and hydro-devices are strongly affected by the cleanliness of the fluid. Dirt is the greatest enemy of hydraulic systems. There are three important sources of dirt to watch out for:

- Contamination arising during installation, installation dirt
- Contamination arising during operation, operation dirt
- Impurities from the environment

The correct filtering method is specified during system planning or determined by the necessary cleanliness class. Depending on requirements, pressure or return line filtering as well as additional bypass flow filtration is used. Only a return line filter with $\beta_{25} \geq 75$ (25 µm filter) is used for noncritical systems. Thus contamination of the tank is prevented, and the pump only sucks in clean oil. Pressure filters are used for systems with higher demands, e.g. smallest oil flows (Q > 200 cm³/min) or high, constant pressure on pressure valves.

Pressure filters are to be installed whenever proportional valves are used. Typically, filters with fineness of $\beta_{10} \geq 75$ (10 µm) or $\beta_3 \geq 75$ (3 µm) are used. Filters can only fulfil their function when built-in filter cartridges are cleaned or replaced in time, especially in the initial operating period. During operation, the level of pollution is checked by mechanical or electrical level. For further information, see **'Oil change'.**

Servicing and maintenance

Service work may only be carried out by specialists. This requires knowledge of the machine's functions regarding switching on and off, as well as measures of safety engineering.

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⚠ **Work on systems that include accumulators may only be carried out after the fluid pressure is unloaded.**

Regular inspection

The hydraulic system is subject to a simple inspection at short, regular intervals. An automatic monitoring system is already partly provided. Particularly the following is inspected:

- Oil level in the tank
- Working temperature is not to exceed 60ºC
- Condition of the fluid (visual inspection, colour and smell of the hydraulic oil)
- Working pressures
- Gas pre-load pressure on the accumulator
- Leaks on the pump, valves, and pipelines
- Filter elements, for cleanliness (see **'Filter'**)
- Hose must be checked according to conditions and age.
- All mechanical and electronic sensors must be checked on function.
- All parts of the entire system must be checked on damage.
- Cleanness must be checked.
- All safety equipment and labelling must be checked

Oil change

The frequency of oil changes is dependent on:

- Kind of liquid (ageing)
- Filtering
- Operating and environmental conditions (operating temperature)

Prescribed change intervals

The required cleanliness class as per ISO 4406 or NAS 1638 is dependent on the use of hydraulic components. It requires conscientious planning for filtering and periodic fluid inspection in order to guarantee the desired service life of the pumps and devices. Under these conditions, an oil change can be considerably delayed, or, depending on the evaluation of laboratory tests, completely omitted.

We refer to the service of well known oil or filter suppliers concerning fluid laboratory tests.

It is mandatory to inspect the breather filters regularly.

Spare parts

Original spare parts are to be used for repairs. For questions about purchasing spare parts or for malfunctions, please contact our After Sales Service.

Warrantry

Fault correction without charge is only possible within the framework of the arranged guarantee. The information given in these instructions are of a general nature and require other professional procedures. Assistance with installation, start-up, and maintenance by our personnel can be arranged according to our service conditions.

Additional regulations and guidelines

Particularly we recommend the following regulations and guidelines

- International standard ISO 4413
- German standard VDMA 24572

  Checklist for the inspection of hydraulic systems in industrial machines

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1. Excessive noise in the system

Cause	Reason	Remedy
1.1 Cavitation in the system	Suction filter is blocked.	Clean or recondition.
	Internal width of the suction line is too small. Or: Objects in the suction line.	Install pipes with larger internal width.
	Too many bends in the suction line.	Lay new pipes or use pipes with larger internal width.
	Local constrictions in the suction line, e.g. partially closed valve, spring is too strong in check valve, damaged pipe or kinked hose.	Make valves accessible or change pipes or hoses are to be repaired or replaced.
	Fluid is too cold.	Use electric heating to warm pressure fluid to the recommended temperature.
	Viscosity of fluid is too high.	Check fluid.
	Vapour forms.	Lower working temperature to the correct value: Refill fluid or replace with suitable fluid.
	Feed pump fails.	Repair feed pump or replace.
	Speed of pump is too high.	Check speed of the motor (see also specifications in the hydraulic plan).
	Completely sealed tank.	Install breather.
	Suction line is too small or too long.	Increase diameter of the suction line.
1.2 Foam or air in the fluid	Fluid level in the tank is too low.	Refill oil. For systems with strongly changing oil level: Only fill between the min. and max. oil level.
	Incorrect tank design.	Improve design.
	Return line ends in tank above the fluid level.	Lay return flow line lower than the fluid level.
	Incorrect fluid.	Replace with the correct fluid, if necessary, contact the system supplier.
	Shaft seal on pump allows air to penetrate.	Replace seal.
	Fitting in the suction line allows air to invade.	Tighten fitting or replace.
	Porous suction hose.	Recondition hose.
	Poor air bleeding.	Vent system.

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1. Excessive noise in the system

Cause	Reason	Remedy
1.3 Mechanical vibrations	Faulty alignment or loose coupling	Aligning or tightening
	Vibrations in the pipelines	Tighten or improve mounting.
	Pump defective or damaged	Repair or replace.
	Unsuitable pump type	Replace with more suitable pump type.
	Drive defective or damaged	Repair or replace.
	Unsuitable drive type	Replace with more suitable drive type.
	Pressure valve is unstable (oscillates).	Set correctly or replace with more suitable valve.

2. No pressure or insufficient pressure

Cause	Reason	Remedy
2.1 Pump does not deliver correctly.	Penetration of air into the suction lines	See error **1.2**
2.2 High pump temperature	Worn out or damaged pump	Repair or replace
	Too little fluid viscosity	See error **1.1**
	Insufficient or incorrectly adjusted cooling	Improve cooling line or adjust correctly. Ensure flow of cooling water.
2.3 Pump speed is too low or drive performance too small.	Coupling or belts slip or motor is faulty.	Remove defect parts.
	Motor is too small.	Use the correct driving motor.
2.4 Loss due to leakage from the pressure side in the return line	Incorrect pressure setting	Correct setting.
	Safety valve does not close because of dirt or there are defective parts.	Clean, repair or replace damaged parts.
	Directional valve or another valve is open because dirt or some other defective part is present, or due to electrical failure.	Damaged device is to be determined, adjusted, cleaned, repaired, or replaced.
	Damage to the cylinder hole, piston rod, or seal.	Damaged parts are to be repaired,replaced.
	Failure of piston seal, because the seal material is not suitable for the fluid used.	Use seals made of the correct material.
2.5 Feed pump fails (only for piston pump with feed pump).	Damaged pump, faulty drive, unsuitable fluid viscosity	See error **1.3**

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3. Pressure pulsations or flow fluctuations

Cause	Reason	Remedy
3.1 Cavitation in the pump	See error **1.1**	See error **1.1**
3.2 Foam or air in the fluid	See error **1.2**	See error **1.2**
3.3 Mechanical vibrations	See error **1.3**	See error **1.3**
3.4 Unstable pressure relief or safety valves	See error **1.3**	See error **1.3**
	Damaged valve seat.	Repair or replace.
	Valve has insufficient or no damping.	Install a more suitable device or damping equipment.
3.5 Valves stick.	Contamination	Drain fluid, clean system and parts, fill with clean fluid.
	Defective or warped	Replace device, remove warping.
3.6 Unsteady pump delivery	Unsuitable pump type or pump design	Replace with more suitable pump after contacting the pump system manufacturer.
3.7 Air in the system, which causes an irregular or yielding motion.	System is incompletely vented.	see error **1.2**
	Electrical system is defective e.g. valves switch constantly.	Find and remove faults.

4. Too little or no pressure flow

Cause	Reason	Remedy
4.1 Cavitation of the pump	See error **1.1**	See error **1.1**
4.2 Foam formation or air in the fluid	See error **1.2**	See error **1.2**
4.3 Defective pump	See error **1.2**	See error **1.2**
4.4 Pump speed is too low or drive performance too small.	See error **2.3**	See error **2.3**
4.5 Loss due to leakage from the pressure side to the return line	See error **2.4**	See error **2.4**
4.6 Pump runs in the wrong direction of rotation.	Motor rotation direction is incorrect.	Reverse the e-motor.

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5. Liquid temperature is too high

Cause	Reason	Remedy
5.1 Overflow losses	Pressure setting on pump is too high or safety valve is set too low.	Correct setting.
	Oil flows out at accumulator safety block.	Close accumulator drain valve on accumulator safety block.
5.2 Loss due to leakage from the pressure side in the return line	Valves function poorly and seals are faulty.	See error **2.4**
	Fluid has incorrect viscosity (viscosity is too low).	Remove fluid and fill up system with fluid that has viscosity recommended by the manufacturer.
5.3 Fluid is delivered under pressure via safety and pressure limiting circulation valve into the tank, although pressure fluid is not needed.	Design of switching for system is not correct.	Provide the correct control system, e.g. switching to depressurised.
	Faulty function of the air bleeding system as a result of dirt or faulty parts	Clean, or if necessary, repair.
	Safety pressure is set too low.	Correct setting.
5.4 Insufficient cooling	Failure of the cooling water supply	Check cooling water supply, temperature and function of shut-off valve.
	Failure of the ventilating fan	Check function of the oil-air-heat exchanger acc. to manufacturers instruction.
	Deposits in the cooling water line	Clean.
5.5 Insufficient carrying away of heat	System has insufficient cooling surface to carry off delivered heat.	Install cooling system and/or increase tank capacity and surface.
	An increase in machine performance without corresponding increase in the cooling capacity	Improve cooling system and/or tank capacity and surface.
5.6 Overheated pump	Wear in the pump.	Repair or replace.
	Working with fluid whose viscosity is too low	See error **5.2**
	Insufficient flushing of the pump	Increase diameter of the drain line and provide a flushing of the pump housing.
5.7 Fluid circulates too quickly.	Fluid supply is insufficient.	Increase fluid capacity.
	Fluid level is too low in the system.	Fill up system to the recommended level.
5.8 Too much viscous friction.	Cross-section is too small in the pipelines and valves.	Install pipes and valves that have the correct size.

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General

The hydraulic fluid is an important component of any operating hydraulic systems. The fluid covers several tasks

- Power transmission
- Wear protection resp. wear reduction
- Heat transfer.

The importance of the fluid may be seen in the following statement: “Statistical data indicate, that more than 80% of all failures of hydraulic components are causal related to an improper condition of the hydraulic fluid.

The selection and the maintenance and/or control of the fluid for a hydraulic system is of major importance. The main criteria for this selection are given in the following.

Power transmission

An important index for the power transmission behavior of a hydraulic fluid is the bulk module E_{oil}, measured in bar. It describes, how much the volume of a fluid content is reduced under pressure.

A „hard“ hydraulic fluid (high bulk module) transmits pressures very fast and leads to a stiff hydraulic system. This is appreciated in closed loop controlled systems. „Stiff“ systems are achieved by small pressurized volumes, hard surrounding walls (pipes instead of flexible hoses) and high viscose fluids. Beside that pressure increases the bulk module of mineral oil.

A „soft“ hydraulic system is more subject to instability, but it is in general quieter, because high frequent pressure ripple is damped better.

The air content of a fluid plays an important role. Mineral oil contains some 9% air in solution under atmospheric pressure . If caused by under pressure in a hydraulic circuit (pump inlet, high fluid velocity in orifices or by turbulences due to high return line speed into the reservoir), part of this air occurs as bubbles, the systems stiffness is drastically reduced, which can cause several problems. The viscosity of the hydraulic fluid has a high influence on the **dynamic power transmission**. A high viscosity, that means a „thick“ fluid, leads to a worse fluidity and that means:

- Higher pressure losses in pipes and components
- Reduction of hydraulic-mechanic efficiency,
- More pressure drop in suction line, filling losses, cavitation
- Sealing and lubrication gaps are not getting fully filled, loss of lubrication.

A too low viscosity leads to the following problems:

- Higher leakage across all sealing gaps in the pump and in valves
- Thinner lubrication film causes more direct metal-to-metal contact and more wear in glide and roller bearings.

For these reasons the selection of the right viscosity and the best viskositys-temperature index needs highest attention. Some of the selection criterias are:

- Function principle of hydraulic pumps and motors used in the system
- Nominal pressure, nominal temperature (and range)
- Environmental temperature (and range)
- Length of piping.

The following limits are to be considered:

- Optimum working viscosity regarding efficiency, economy and safety

  $\nu_{opt} = 20 – 40\ mm^2/s$
- Working viscosity for full operability

  $\nu_{operation} = 16 – 100\ mm^2/s$
- Viscosity limits for reduced operating conditions (speed of rotation, pressure, load cycle)

  $\nu_{limit} = 12 – 300\ mm^2/s$
- Lowest viscosity limit, start of the damaging metal-to-metal contact, only for short time and max. 50% nominal pressure

  $\nu_{min} = 8\ mm^2/s$
- Highest start up viscosity, suction limit of pumps, only for short time when suction line is short and straight

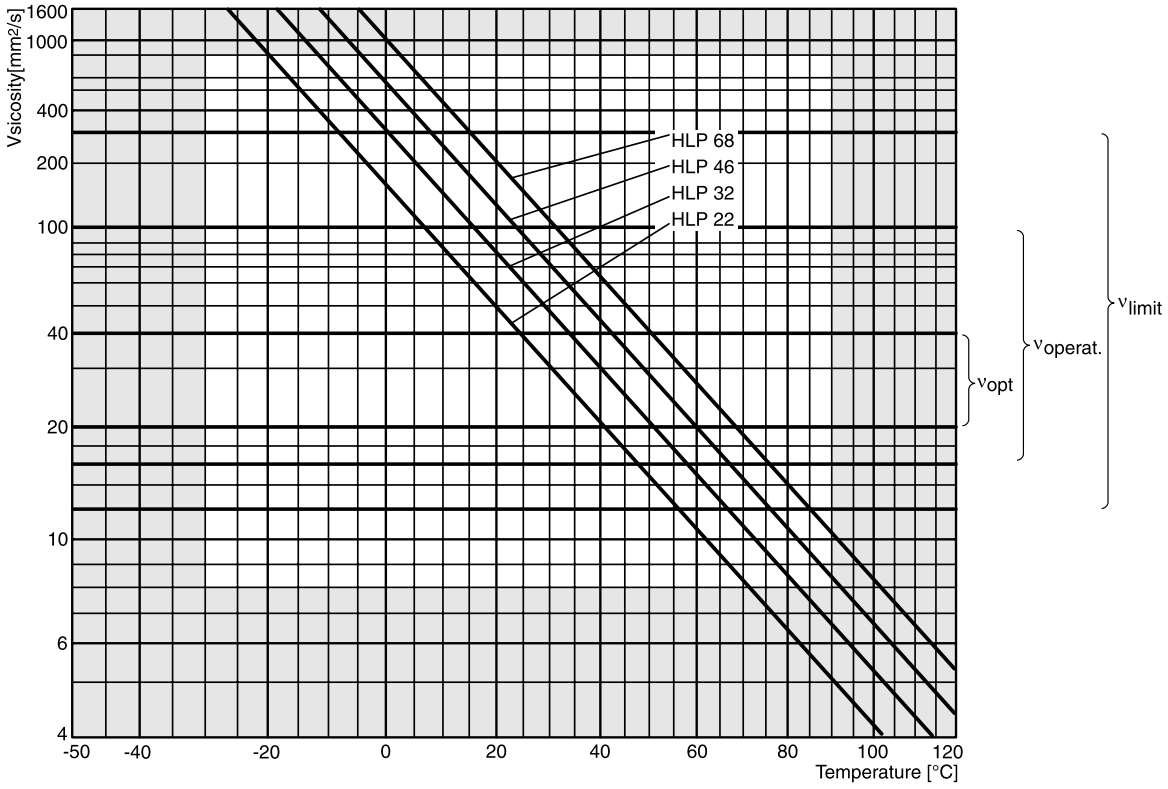
  $\nu_{Start} = 800\ mm^2/s$
- The recommended temperature range (fluid temperature) for the operation of a hydraulic system is between 30°C and 70°C, -30°C as the lowest and +90°C as the highest limit never should be exceeded depending on a fluid capable of these temperatures.

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Mineral oil is offered in different viscosity classes (VG, viscosity grade). The characteristic number describes the nominal viscosity in mm²/s at 40°C:

VG 22 arctic conditions, extremely long pipes;
VG 32 wintery conditions;
VG 46 normal conditions, closed buildings;
VG 68 tropical conditions.

Viscosity-temperature-diagram for mineral oil



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The correlation between viscosity and temperature usually is described in the double logarithmic Ubbelohde diagram.

Wear Protection / Wear Reduction

Wear protection resp. wear reduction

In hydraulic components there are many gliding contacts partly under high (side) loads. Beside the correct viscosity, which on one hand is responsible for the required supply of lubricating fluid to the gap, on the other hand assures a stable lubricating film, the wear reduction capability of the hydraulic fluid is of major importance.

The describing parameter, the „Schadenskraftstufe“ (load carrying capability), is determined in the FZG-normal test A/8.3/90 according to DIN 51 354 part 2 (gear transmission test rig, 12 defined load steps at 90°C start temperature and 8.3 m/s circumferance speed).

Depending on the nominal working pressure the following „Schadenskraftstufe“ is recommended

nominal pressure [bar]	"Schadenskraftstufe"
80 – 125	≥ 5
125 – 200	5 – 6
200 – 250	7 – 9
250 – 320	≥ 10
> 320	≥ 12

Max pressure limit: 1.25 x nominal pressure

Mineral oils are offered according to DIN 51 524 in different fluid types

- HL-fluids according to DIN 51 524 part 2, normal working load conditions, „Schadenskraftstufe“ 6 – 10
- HLP-fluids according to DIN 51 524 part 3, higher working load conditions, „Schadenskraftsstufe“ > 10

Modern HLP-fluids today usually come with a „Schadenskraftstufe“ >12. They are equipped with wear prohibiting additives, which ensure a high safety of operation even under severe working conditions.

Beside the wear reduction due to the elasto-hydrodynamic properties of the hydraulic fluid, which are expressed in the FZG value, the behavior of the fluid in a mixed friction situation is very important for the use of a fluid in heavy duty hydraulic applications. In hydraulic components mixed friction occurs permanently, because the velocity difference between two components in contact very often is below the minimum velocity for hydrodynamic lubrication.

During mixed friction, i. e.: at a direct metal-to-metal contact between two surfaces, the “lubricity” of a fluid is most important. The lubricity is measured according to DIN 51 347 and is expressed as a specific load in N/mm², at which wear does not yet occur. This value sometimes also is called the “Brugger-value”.

It is measured in a test device, which moves two cylindrical test elements under a defined load. On one of the test elements a wear mark is created. This wear mark grows during the first seconds of the test, but then stays for several minutes at a constant size. The size of this wear mark gives a reading for the specific “wear free” load for this particular fluid in N/mm².

For general applications

this value has to be at least

30 N/mm², measured in accordance to DIN 51 347-2.

For heavily loaded hydraulic equipment and fast cycling machines and/or high dynamic loads this value should not be below

50 N/mm², measured in accordance to DIN 51 347-2.

But a fluid can maintain its wear prohibiting capabilities only, when it is not contaminated with hard and aggressive particles. Therefore in the interest of a long functional life of all components the **filtration of the hydraulic fluid** need special attention.

The sealing and gliding gaps in hydraulic components typically are in the range of 3-10 µm. That means they are in the same size range as most of the particles found in a hydraulic fluid.

The smaller the number of particles in a hydraulic fluid, the lower the wear of the hydraulic components will be. And wear is by nearly 90% the root cause for failure of hydraulic pumps and motors.

To ensure a disruption free operation of a general hydraulic system, at least a fluid quality (cleanliness level) of 20/18/15 according to ISO 4406 is required. The characteristic values indicate, how many particles in the size range >2 µm (1. value), >5µm 2. value) and >15 µm (3. value) are present in one ml of a fluid. The value 20 stands for 5.000 – 10.000 particles per ml, the 18 stands for 1.300 - 2.500 particles per ml, and the 15 for 160 – 320 particles per ml.

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That illustrates, that a hydraulic fluid of the cleanliness level 20/18/15 still a huge number of particles is distributed in the fluid content. That also indicates, that this fluid quality only for general and low pressure applications is good enough.

When the requirements in functional safety and operational life are higher or at high pressure applications Parker recommends a cleanliness level 18/16/13 acc. ISO 4406. The fluid then is allowed to contain 1.300 – 2.500 particels >4µm, 320 – 640 particles >6µm and 40 – 80 particles >14 µm per ml.

To achieve a cleanliness level the hydraulic circuit must be equipped with a suitable filtration system. But it has to be considered that filters never perform an absolute cleaning of the fluid. A filter element with a β-value of e.g. $\beta_{10} \geq 75$ does not retain all particles larger than 10µm. Still 1/75 of all particles larger than 10µm will pass the element.

This review shows

- A reservoir filling of 100 l contains billions of contamination particles
- Even a „10µ-filter“ will let pass millions of particles >10 µm

On top of that it needs to be considered:

- across a breather and through the piston rod seal and wiper of a hydraulic cylinder particles can enter a hydraulic system
- wear on pumps, motors and valves adds more particles to the fluid
- mineral oil delivered in barrels typically has a cleanliness level of 21/19/16 according to ISO 4406 or worse.

Therefore it is very important, to pay highest attention also to the systems filtration in respect of its layout, its supervision and its maintenance.

The load to the fluid in hydraulic systems leads to its **aging**. Therefore the fluid needs to be checked for its perfect condition. This check should be performed at least twice a year and include as a minimum requirement the determination of neutralization number, viscosity, colour index and cleanliness level.

The operational life of the fluid depends very much on the operating pressure, the operating temperature, the circulation number (delivery of all pumps divided by the reservoir content) and the type of the fluid. General statements to the average time of usage therefore are impossible.

Heat dissipation

The temperature has an important influence on the properties of the hydraulic fluid. Viscosity, lubricity, aging and other significant features depend direct or indirectly on the temperature. That indicates, that the thermal balance of a hydraulic system needs to be considered during the layout and design. On one hand the fluid is stressed by a high temperature, on the other hand the fluid is the medium to transport the heat away from resistors, orifices and other throttling devices and friction zones. Therefore during layout it has to be made sure, that nowhere in the system a local overheating by dissipated heat can occur. That could destroy seals, lead to a failure of components due to lack of lubricity or finally lead to a destruction of the fluid itself.

A final comment to **seals**. A good hydraulic system should not show, that it operates with a fluid. There should be no leakage at all. In general hydraulic components are leak free. More than 90% of all problems occur at interfaces

- Ports
- Flange interfaces of valves
- Connectors

The assembly of the system is the main cause for problems in this area.

Nevertheless the system “hydraulic fluid & elasto- metric seal” is extremely sensitive. Temperature, chemical incompatibility and mechanical damages are the most frequent causes for a failure of this system. Please contact Parker if you have any question to this topic.

Parker does not give an explicit recommendation for a certain fluid product, fluid brand or fluid manufacturer. The permanent research and development in the field of hydraulic fluids and seal materials makes it impossible to test all possible combinations for compatibility with our components. The recommendations made here and the discussion of possible restrictions, relevant standards and other useful literature should help to select the right fluid for a hydraulic system and to design the power unit in a way that it is able to fulfill all requirements.

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Special fluids for environment protection

All statements made above are in principle also valid for these fluids. Regarding the selection/definition of the required viscosity level, the cleanliness level and the lubrication and wear protection behavior all criteria discussed in the mineral oil section have to be applied accordingly.

The following special fluid features and conditions are to be considered:

Fluids based on natural ingredients

- Good lubricaction, viscosity-temperature characteristics better than standard mineral oil.
- Density slightly higher than mineral oil, therefore check for good suction conditions!
- Pour point approx. – 30°, therefore not suitable for low temperature operation.
- Accelerated aging. First fluid change after 500 h, second change after another 1.000 h. Then all 2.000 h or annually, if less than 2.000 h annual operation.
- High affinity to water. The ingression of water has to be avoided under all conditions. At temperature above 50°C destroys the fluid if water is present.
- Can be mixed with mineral oil (under loss of biological degradability!)
- Internal coating of reservoirs etc. to be compatible with the fluid. Check with fluid supplier.

Fluids basing on esters (synthetical esters)

- The same remarks as for fluids based on natural ingredients

Fluids basing on polyglycol (not HFC/water glycol)

- Good lubricaction, viscosity-temperature characteristic better than standard mineral oil.
- Aging/durability according to actual knowledge similar to mineral oil.
- Pourpoint approx. – 40°C, be careful at low temperatures!
- Density significantly higher than at mineral oil. Therefore the max. input speeds for self priming pumps are to be reduced by 20%.
- Use fluorcarbon as seal material. Our hydraulic components are tested with mineral oil; they need to be completely made empty before installation!
- Normal paints and coatings are destroyed. Please contact fluid supplier!
- Never mix with mineral oil, solid sediments will develop and block filters, orifices etc.!

⚠ Note !

Even bio-degradable fluids need to be disposed according to special disposing rules (like mineral oil). Prior to the use of these fluids we recommend to contact our specialists.

Fluids according to DIN 51 502 (HF-Fluids)

These fluids are fire resistant. The following classes are used:

HFA	oil in water emulsion:	95 – 98% water
HFB	water in oil emulsion:	>40% water
HFC	water containing solutions: (poly-glycole)	35 – 55% water
HFD	water free fluids (mainly phosphor acid ester).	

The operation of Parker hydraulic components with HFD fluids within the limits of the fluid suppliers specification (temperature range, filtration, seal material compatibility) and the viscosity limits of our components is possible without restrictions.

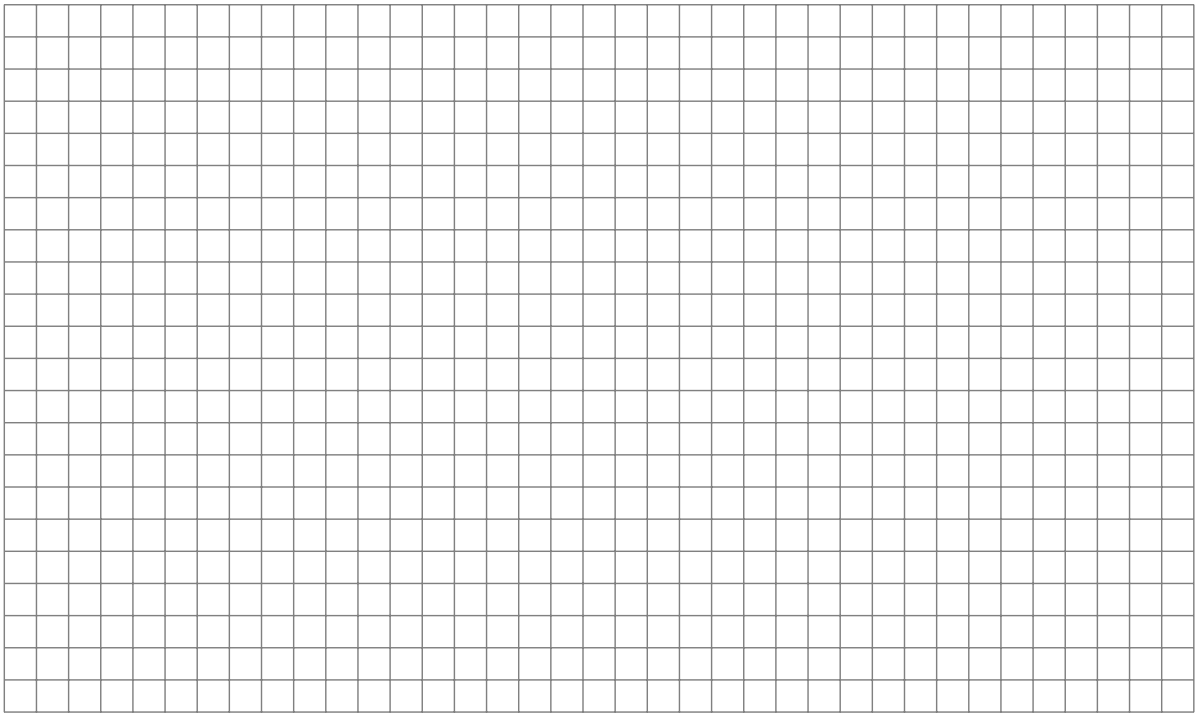
The operation with HFC involves certain restrictions regarding pressure limitation and bearing life reduction in rotating units. Please contact our specialists.
Parker does not give a general release for the operation with HFA and HFB fluids. In certain cases a special approval can be given upon request.

If you are not sure, wether our products can be used with a special fluid or not, please call us. Our specialists are glad to answer your questions and to give you any necessary support.

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Notes



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Notes

Please consult
your local Parker partner
for regulations
in effect.

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At Parker, we're guided by a relentless drive to help our customers become more productive and achieve higher levels of profitability by engineering the best systems for their requirements. It means looking at customer applications from many angles to find new ways to create value. Whatever the motion or control technology need, Parker has the experience, breadth of product and global reach to consistently deliver. No company knows more about motion and control technology than Parker. For further information call 00800 27 27 5374



AEROSPACE

Key Markets

- Aircraft engines
- Business & general aviation
- Commercial transports
- Land-based weapons systems
- Military aircraft
- Missiles & launch vehicles
- Regional transports
- Unmanned aerial vehicles

Key Products

- Flight control systems & components
- Fluid conveyance systems
- Fluid metering delivery & atomization devices
- Fuel systems & components
- Hydraulic systems & components
- Inert nitrogen generating systems
- Pneumatic systems & components
- Wheels & brakes



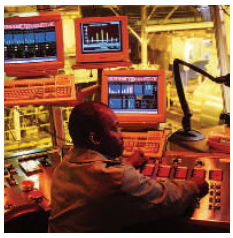
CLIMATE CONTROL

Key Markets

- Agriculture
- Air conditioning
- Food, beverage & dairy
- Life sciences & medical
- Precision cooling
- Processing
- Transportation

Key Products

- CO^2 controls
- Electronic controllers
- Filter driers
- Hand shut-off valves
- Hose & fittings
- Pressure regulating valves
- Refrigerant distributors
- Safety relief valves
- Solenoid valves
- Thermostatic expansion valves



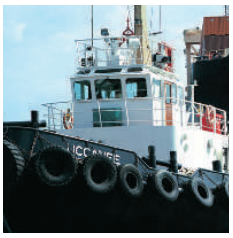
ELECTROMECHANICAL

Key Markets

- Aerospace
- Factory automation
- Life science & medical
- Machine tools
- Packaging machinery
- Paper machinery
- Plastics machinery & converting
- Primary metals
- Semiconductor & electronics
- Textile
- Wire & cable

Key Products

- AC/DC drives & systems
- Electric actuators, gantry robots & slides
- Electrohydrostatic actuation systems
- Electromechanical actuation systems
- Human machine interface
- Linear motors
- Stepper motors, servo motors, drives & controls
- Structural extrusions



FILTRATION

Key Markets

- Food & beverage
- Industrial machinery
- Life sciences
- Marine
- Mobile equipment
- Oil & gas
- Power generation
- Process
- Transportation

Key Products

- Analytical gas generators
- Compressed air & gas filters
- Condition monitoring
- Engine air, fuel & oil filtration & systems
- Hydraulic, lubrication & coolant filters
- Process, chemical, water & microfiltration filters
- Nitrogen, hydrogen & zero air generators



FLUID & GAS HANDLING

Key Markets

- Aerospace
- Agriculture
- Bulk chemical handling
- Construction machinery
- Food & beverage
- Fuel & gas delivery
- Industrial machinery
- Mobile
- Oil & gas
- Transportation
- Welding

Key Products

- Brass fittings & valves
- Diagnostic equipment
- Fluid conveyance systems
- Industrial hose
- PTFE & PFA hose, tubing & plastic fittings
- Rubber & thermoplastic hose & couplings
- Tube fittings & adapters
- Quick disconnects



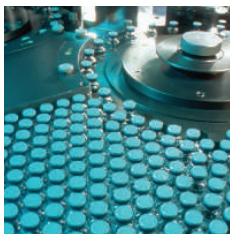
HYDRAULICS

Key Markets

- Aerospace
- Aerial lift
- Agriculture
- Construction machinery
- Forestry
- Industrial machinery
- Mining
- Oil & gas
- Power generation & energy
- Truck hydraulics

Key Products

- Diagnostic equipment
- Hydraulic cylinders & accumulators
- Hydraulic motors & pumps
- Hydraulic systems
- Hydraulic valves & controls
- Power take-offs
- Rubber & thermoplastic hose & couplings
- Tube fittings & adapters
- Quick disconnects



PNEUMATICS

Key Markets

- Aerospace
- Conveyor & material handling
- Factory automation
- Life science & medical
- Machine tools
- Packaging machinery
- Transportation & automotive

Key Products

- Air preparation
- Brass fittings & valves
- Manifolds
- Pneumatic accessories
- Pneumatic actuators & grippers
- Pneumatic valves & controls
- Quick disconnects
- Rotary actuators
- Rubber & thermoplastic hose & couplings
- Structural extrusions
- Thermoplastic tubing & fittings
- Vacuum generators, cups & sensors



PROCESS CONTROL

Key Markets

- Chemical & refining
- Food, beverage & dairy
- Medical & dental
- Microelectronics
- Oil & gas
- Power generation

Key Products

- Analytical sample conditioning products & systems
- Fluoropolymer chemical delivery fittings, valves & pumps
- High purity gas delivery fittings, valves & regulators
- Instrumentation fittings, valves & regulators
- Medium pressure fittings & valves
- Process control manifolds



SEALING & SHIELDING

Key Markets

- Aerospace
- Chemical processing
- Consumer
- Energy, oil & gas
- Fluid power
- General industrial
- Information technology
- Life sciences
- Military
- Semiconductor
- Telecommunications
- Transportation

Key Products

- Dynamic seals
- Elastomeric o-rings
- EMI shielding
- Extruded & precision-cut, fabricated elastomeric seals
- Homogeneous & inserted elastomeric shapes
- High temperature metal seals
- Metal & plastic retained composite seals
- Thermal management

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