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Origa Valves

Catalog 0952

Parker

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Warning, Offer of Sale

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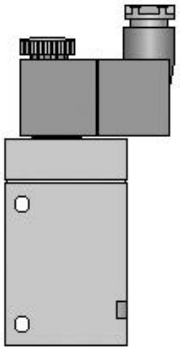
Characteristics to VDI 3290	Pressures quoted as gauge pressure			
Characteristics	Symbol	Unit	Description	
General Features				
Type			Spool valve	
Mounting			2 screws M6 (M3)	
Tube connection			Thread	
Port size		NPT (G)	1/8	
Weight (mass)		lbs. (kg)	.54 (0.247) Single solenoid .84 (0.382) Double solenoid	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 158 (+70)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication[1)]	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	87 (6)	
Operating pressure range	p_{min} p_{max}	psi (bar)	Single solenoid 29 (2) 145 (10)	
	p_{min} p_{max}	psi (bar)	Double solenoid 22 (1.5) 145 (10)	
Nominal flow	Q_N	Cv (l/min)	.45 (450)	
Actuation				
Electrical			Pilot operated	
Voltage			AC	DC
Nominal voltage* Standard version	U_n	V	220	24
Initial power consumption Standard version		VA (W)	8.5	2.5
Continuous consumption Standard version		VA (W)	6.0	2.5
Duty cycle	ED	%	Continuous Duty	
Electrical protection			IP65 to DIN 40050 (with plug)	
Insulating material			VDE 0580	
Connection			Plug to DIN 43650 form B	

1) We recommend the use of mineral oil type VG32 to ISO 3448

3/2-Way Valve
1/8

Actuation: Solenoid

- **Single Solenoid**
- **Double Solenoid**



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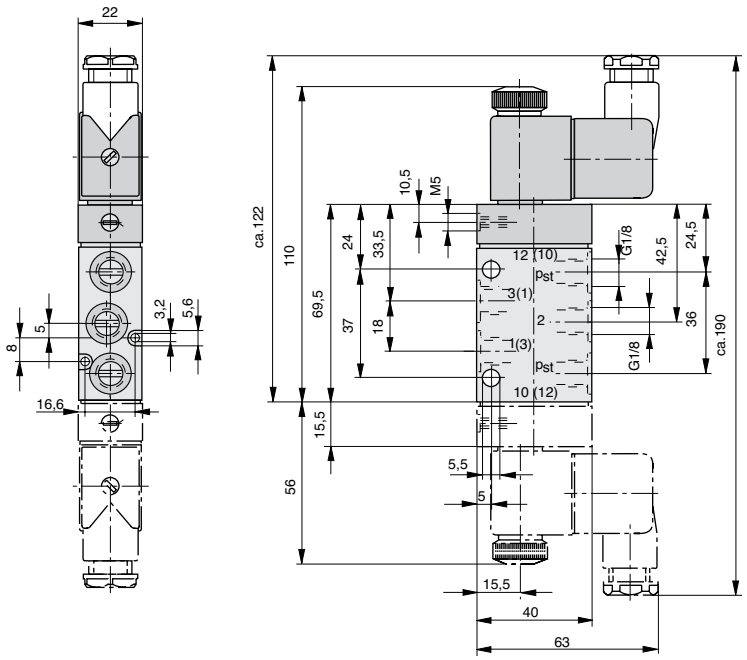
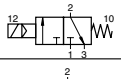
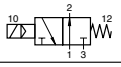
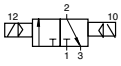
Dimensions (mm)



Version 1/8		Metric Version		NPT Version	
Actuation	**Symbol**	**Type Number**	**Order Number**	**Type Number**	**Order Number**
3/2 Single Solenoid/Spring Return		S9 381RF-1/8-NG-..	PA 10297-..33	S9 381RF-1/8U-NG-..	PD 43295-..33
3/2 Single Solenoid/Spring Return		S9 381RF-1/8-NO-..	PA 10298-..33	S9 381RF-1/8U-NO-..	PD 45459-..33
3/2 Double Solenoid		S9 381-1/8-..	PA 10299-..33	S9 381-1/8U-..	PD 45460-..33

Voltage Range		Coil Number	Order Code
Nominal	**Secondary**		
12 vDC	--	KZ 3674	**01**
24 vDC	60 50/60Hz	KZ 3673	**02**
110 50/60Hz	48 vDC	KZ 3669	**57**
220 50/60Hz	110 vDC	KZ 3672	**61**
24 50/60Hz	--	KZ 3675	**51**

CE

- Other voltages available. Contact factory.
- Explosion proof coils available. Contact factory.
- UL/CSA rated coils available. Contact factory.

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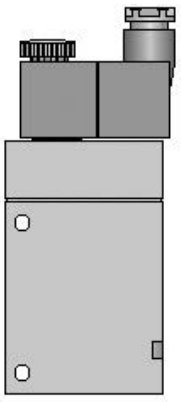
3/2-Way Valve
1/4

Actuation: Solenoid

- Single Solenoid
- Double Solenoid

Characteristics to VDI 3290	Pressures quoted as gauge pressure			
Characteristics	Symbol	Unit	Description	
General Features				
Type			Spool valve	
Mounting			2 screws M6 (M4)	
Tube connection			Thread	
Port size		NPT (G)	1/4	
Weight (mass)		lbs. (kg)	1.1 (0.5) Single solenoid 1.32 (0.6) Double solenoid	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 158 (+70)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication[1)]	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	87 (6)	
Operating pressure range	p_{min} p_{max}	psi (bar)	Single solenoid 29 (2) 145 (10)	
	p_{min} p_{max}	psi (bar)	Double solenoid 22 (1.5) 145 (10)	
Nominal flow	Q_N	Cv (l/min)	1.3 (1300)	
Actuation				
Electrical			Pilot operated	
Voltage			AC	DC
Nominal voltage* Standard version	U_n	V	220	24
Initial power consumption Standard version		VA (W)	8.5	2.5
Continuous consumption Standard version		VA (W)	6.0	2.5
Duty cycle	ED	%	Continuous Duty	
Electrical protection			IP65 to DIN 40050 (with plug)	
Insulating material			VDE 0580	
Connection			Plug to DIN 43650 form B	

1) We recommend the use of mineral oil type VG32 to ISO 3448



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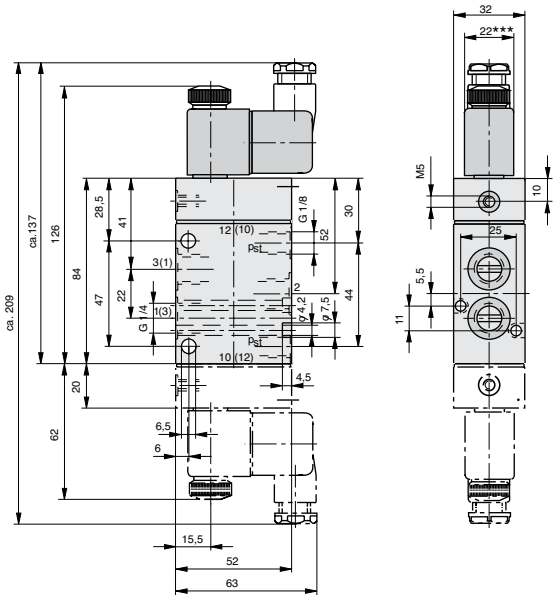
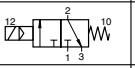
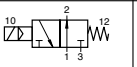
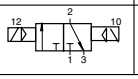
Dimensions (mm)



Version 1/4		Metric Version		NPT Version	
Actuation	**Symbol**	**Type Number**	**Order Number**	**Type Number**	**Order Number**
3/2 Single Solenoid/Spring Return		S9 381RF-1/4-NG-..	PA 12716-..33	S9 381RF-1/4U-NG-..	PD 45461-..33
3/2 Single Solenoid/Spring Return		S9 381RF-1/4-NO-..	PA 12717-..33	S9 381RF-1/4U-NO-..	PD 45462-..33
3/2 Double Solenoid		S9 381-1/4-..	PA 12718-..33	S9 381-1/4U-..	PD 45463-..33

Voltage Range		Coil Number	Order Code
Nominal	**Secondary**		
12 vDC	--	KZ 3674	**01**
24 vDC	60 50/60Hz	KZ 3673	**02**
110 50/60Hz	48 vDC	KZ 3669	**57**
220 50/60Hz	110 vDC	KZ 3672	**61**
24 50/60Hz	--	KZ 3675	**51**

CE

- Other voltages available. Contact factory.
- Explosion proof coils available. Contact factory.
- UL/CSA rated coils available. Contact factory.

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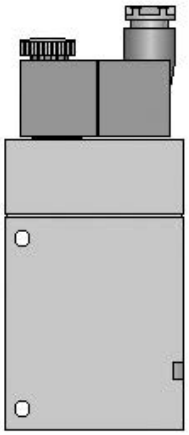
3/2-Way Valve
1/2

Actuation: Solenoid

- **Single Solenoid**
- **Double Solenoid**

Characteristics to VDI 3290 Pressures quoted as gauge pressure				
Characteristics	Symbol	Unit	Description	
General Features				
Type			Spool valve	
Mounting			2 screws M6	
Tube connection			Thread	
Port size		NPT (G)	1/2	
Weight (mass)		lbs. (kg)	1.69 (0.77) Single solenoid 1.32 (0.60) Double solenoid	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 158 (+70)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication[1)]	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	87 (6)	
Operating pressure range	p_{min} p_{max}	psi (bar)	Single solenoid 29 (2) 145 (10)	
	p_{min} p_{max}	psi (bar)	Double solenoid 22 (1.5) 145 (10)	
Nominal flow	Q_N	Cv (l/min)	3.5 (3500)	
Actuation				
Electrical			Pilot operated	
Voltage			AC	DC
Nominal voltage* Standard version	U_n	V	220	24
Initial power consumption Standard version		VA (W)	11	4.8
Continuous consumption Standard version		VA (W)	8.5	4.8
Duty cycle	ED	%	Continuous Duty	
Electrical protection			IP65 to DIN 40050 (with plug)	
Insulating material			VDE 0580	
Connection			Plug to DIN 43650 form B	

[1)] We recommend the use of mineral oil type VG32 to ISO 3448



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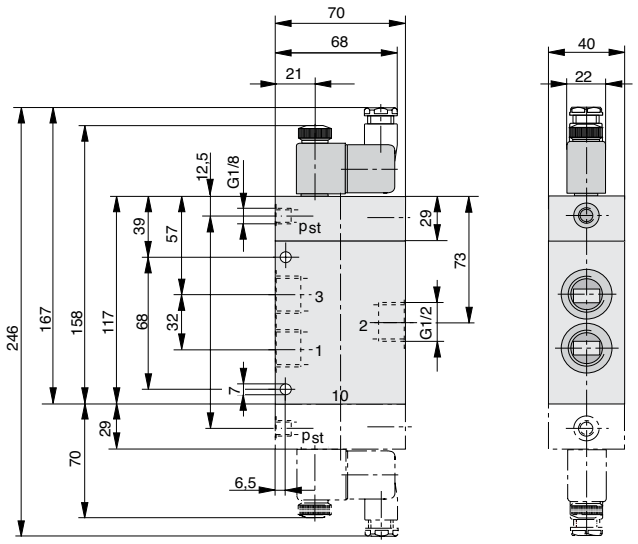
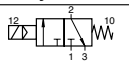
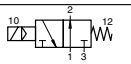
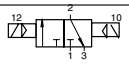
Dimensions (mm)



Version 1/2		Metric Version		NPT Version	
Actuation	**Symbol**	**Type Number**	**Order Number**	**Type Number**	**Order Number**
3/2 Single Solenoid/Spring Return		S9 381RF-1/2-NG-..	PA 16412-..33	S9 381RF-1/2U-NG-..	PD 45464-..33
3/2 Single Solenoid/Spring Return		S9 381RF-1/2-NO-..	PA 16413-..33	S9 381RF-1/2U-NO-..	PD 45465-..33
3/2 Double Solenoid		S9 381-1/2-..	PA 16414-..33	S9 381-1/2U-..	PD 45466-..33

Voltage Range		Coil Number	Order Code
Nominal	**Secondary**		
12 vDC	--	KZ 3518	**01**
24 vDC	60 50/60Hz	KZ 3519	**02**
110 50/60Hz	48 vDC	KZ 3521	**57**
220 50/60Hz	110 vDC	KZ 3522	**61**

CE

- Other voltages available. Contact factory.
- Explosion proof coils available. Contact factory.
- UL/CSA rated coils available. Contact factory.

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5/2-Way Valve
5/3-Way Valve
1/8 • 1/4 • 1/2

Actuation: Solenoid

- **Single Solenoid**
- **Double Solenoid**

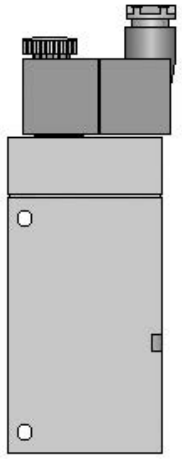
Features				
Type			Spool Valve	
Mounting			2 Screws	
Port connection			Threaded	
Port size		G/NPT	1/8 • 1/4 • 1/2	
Installation			In Any Position	
Ambient temperature range	min max		14°F (-10°C) 140°F (+60°C)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	min max		14°F (-10°C) 158°F (+70°C)	
Medium			Filtered Compressed Air	
Lubrication			With or Without Oil Mist Lubrication [1]	

Pneumatic Characteristics				
Body Size		5/2 Position Single	5/2 Position Double	5/3 Position Double
1/8	Minimum Pressure psi (bar) Maximum Pressure psi (bar) Flow Cv (l/min) Weight lbs. (kg)	29 (2) 145 (10) 0.5 (500) 0.62 (0.28)	22 (1.5) 145 (10) 0.5 (500) 0.91 (0.415)	29 (2) 145 (10) 0.6 (600) 0.94 (0.425)
1/4	Minimum Pressure psi (bar) Maximum Pressure psi (bar) Flow Cv (l/min) Weight lbs. (kg)	29 (2) 145 (10) 1.3 (1300) 1.32 (0.6)	22 (1.5) 145 (10) 1.3 (1300) 1.54 (0.7)	29 (2) 145 (10) RFG,RFB:1.3(1300) RFE:1.0 (1000) 1.54 (0.7)
1/2	Minimum Pressure psi (bar) Maximum Pressure psi (bar) Flow Cv (l/min) Weight lbs. (kg)	32 (2.2) 145 (10) 3.5 (3500) 2.2 (1.0)	22 (1.5) 145 (10) 3.5 (3500) 2.43 (1.1)	36 (2.5) 145 (10) RFE:3.3 (3300) RFG:3.5 (3500) RFB:3.6 (3600) 2.43 (1.1)

Voltage			**AC**	**DC**
Nominal Voltage	Standard Version	V	24, 110, 220	12, 24
			Others Contact Factory	

Power Consumption							
Inrush	Body Size: 1/8 • 1/4			Body Size: 1/2			
	AC		DC	AC		DC	
	50 HZ	60 HZ		50 HZ	60 HZ		
12	—	—	2.8 W	10.4VA	10.4VA	4.5 W	
24	8.5VA	8.5VA	2.5 W	10.4VA	10.4VA	4.5 W	
110	8.5VA	8.5VA	2.7 W	10.4VA	10.4VA	5.5 W	
220	8.5VA	8.5VA	3.5 W	10.4VA	10.4VA	4.9 W	
Holding	Body Size: 1/8 • 1/4			Body Size: 1/2			
	AC		DC	AC		DC	
	50 HZ	60 HZ		50 HZ	60 HZ		
12	—	—	2.8 W	8.5VA	8.5VA	4.5 W	
24	6.0VA	6.0VA	2.5 W	8.5VA	8.5VA	4.5 W	
110	6.0VA	4.9VA	2.7 W	8.2VA	6.6VA	5.5 W	
220	6.0VA	4.9VA	3.5 W	8.5VA	6.9VA	4.9 W	
Duty cycle		ED	%	Continuous Duty			
Electrical protection				IP65 to DIN 40050 (with plug)			
Installing material				VDE 0580			
Connection				Plug to DIN 43650 Form B			

[1] We recommend the use of mineral oil type VG32 to ISO 3448



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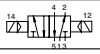
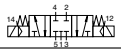
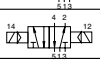
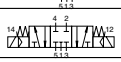
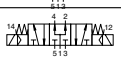
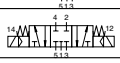
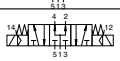
VERSION 1/8		Metric Version		NPT Version	
Actuation	**Symbol**	**Type Number**	**Order Number**	**Type Number**	**Order Number**
5/2 Single Solenoid/Spring Return		S9 581RF-1/8-..	**PA 10312-..33**	S9 581RF-1/8 U-..	**PD 40663-..33**
5/2 Double Solenoid		S9 581-1/8-..	**PA 10313-..33**	S9 581-1/8 U-..	**PD 40664-..33**
5/3 Double Solenoid/Center Blocked		S9 581RFG-1/8-..	**PA 10333-..33**	S9 581RFG-1/8 U-..	**PD 40736-..33**
5/3 Double Solenoid/Center Exhaust		S9 581RFE-1/8-..	**PA 10334-..33**	S9 581RFE-1/8 U-..	**PD 40737-..33**
5/3 Double Solenoid/Dual Center		S9 581RFB-1/8-..	**PA 10335-..33**	S9 581RFB-1/8 U-..	**PD 40738-..33**
VERSION 1/4		**Metric Version**		**NPT Version**	
Actuation	**Symbol**	**Type Number**	**Order Number**	**Type Number**	**Order Number**
5/2 Single Solenoid/Spring Return		S9 581RF-1/4-..	**PA 12679-..33**	S9 581RF-1/4 U-..	**PD 40665-..33**
5/2 Double Solenoid		S9 581-1/4-..	**PA 12680-..33**	S9 581-1/4 U-..	**PD 40666-..33**
5/3 Double Solenoid/Center Blocked		S9 581RFG-1/4-..	**PA 12705-..33**	S9 581RFG-1/4 U-..	**PD 40739-..33**
5/3 Double Solenoid/Center Exhaust		S9 581RFE-1/4-..	**PA 12706-..33**	S9 581RFE-1/4 U-..	**PD 40740-..33**
5/3 Double Solenoid/Dual Center		S9 581RFB-1/4-..	**PA 12707-..33**	S9 581RFB-1/4 U-..	**PD 40741-..33**

Voltage Range		Coil Number	Order Code
Nominal	**Secondary**		
12 vDC	--	KZ 3674	**01**
24 vDC	60 50/60Hz	KZ 3673	**02**
110 50/60Hz	48 vDC	KZ 3669	**57**
220 50/60Hz	110 vDC	KZ 3672	**61**
24 50/60Hz	--	KZ 3675	**51**

- Other voltages available. Contact factory.
- Explosion proof coils available. Contact factory.
- UL/CSA rated coils available. Contact factory.

CE

VERSION 1/2		Metric Version		NPT Version	
Actuation	**Symbol**	**Type Number**	**Order Number**	**Type Number**	**Order Number**
5/2 Single Solenoid/Spring Return		S9 581RF-1/2-..	**PA 16171-..33**	S9 581RF-1/2U-..	**PD 37950-..33**
5/2 Double Solenoid		S9 581-1/2-..	**PA 16172-..33**	S9 581-1/2U-..	**PD 37951-..33**
5/3 Double Solenoid/Center Blocked		S9 581RFG-1/2-..	**PA 16176-..33**	S9 581RFG-1/2U-..	**PD 37971-..33**
5/3 Double Solenoid/Center Exhaust		S9 581RFE-1/2-..	**PA 16177-..33**	S9 581RFE-1/2U-..	**PD 37972-..33**
5/3 Double Solenoid/Dual Center		S9 581RFB-1/2-..	**PA 16178-..33**	S9 581RFB-1/2U-..	**PD 37973-..33**

Voltage Range		Coil Number	Order Code
Nominal	**Secondary**		
12 vDC	--	KZ 3518	**01**
24 vDC	60 50/60Hz	KZ 3519	**02**
110 50/60Hz	48 vDC	KZ 3521	**57**
220 50/60Hz	110 vDC	KZ 3522	**61**

- Other voltages available. Contact factory.
- Explosion proof coils available. Contact factory.
- UL/CSA rated coils available. Contact factory.

CE

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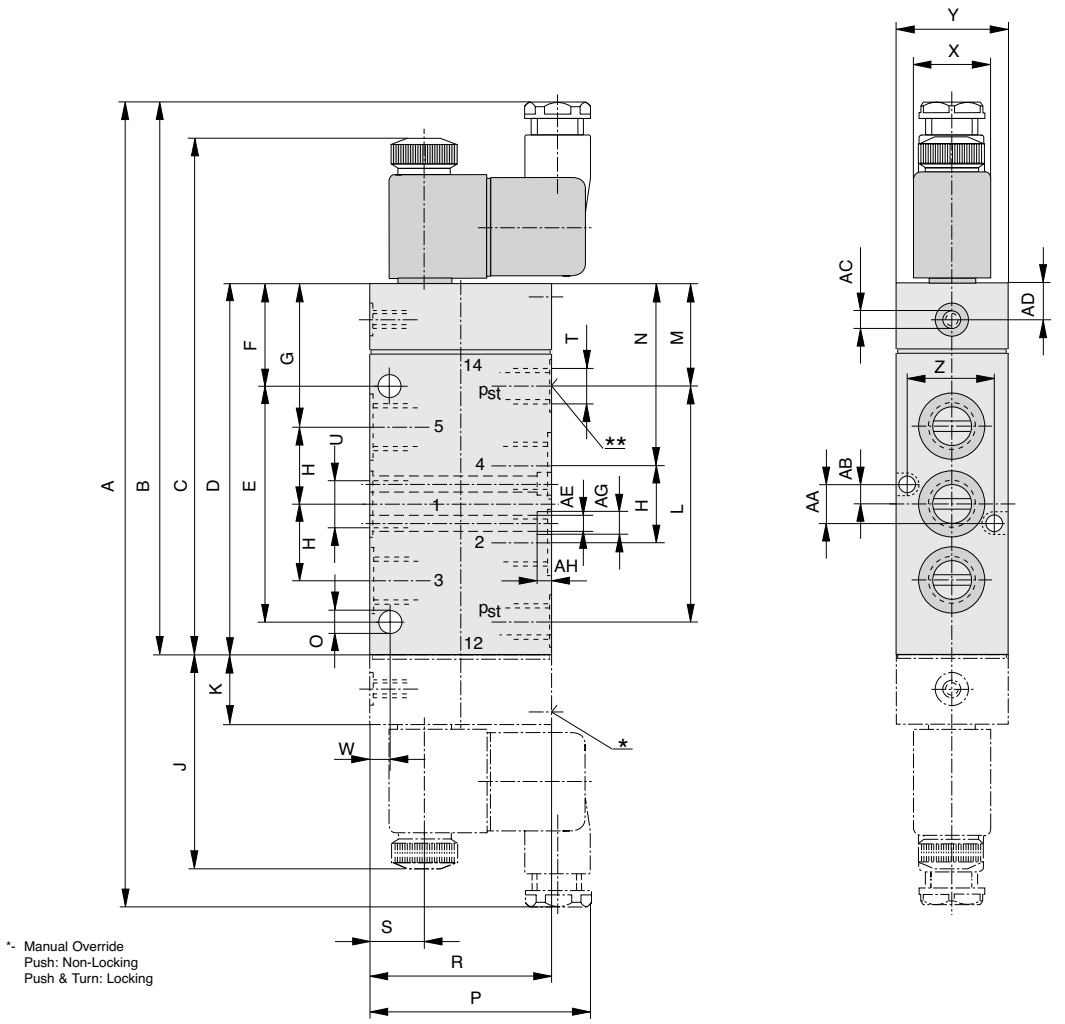
Sizes: 1/8 & 1/4



	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P
1/8	**8.19** 208	**5.51** 140	**5.04** 128	**3.44** 87.5	**2.19** 55.5	**0.94** 24	**1.32** 33.5	**0.71** 18	**2.20** 56	**0.61** 15.5	**2.13** 54	**0.96** 24.5	**1.67** 42.5	**0.22** 5.5	**2.48** 63
1/4	**9.09** 231	**6.26** 159	**5.83** 148	**4.17** 106	**2.64** 67	**1.16** 29.5	**1.61** 41	**0.87** 22	**2.44** 62	**0.79** 20	**2.60** 66	**1.18** 30	**2.05** 52	**0.26** 6.5	**2.48** 63
	R	**S**	**T**	**U**	**W**	**X**	**Y**	**Z**	**AA**	**AB**	**AC**	**AD**	**AE**	**AF**	**AG**
1/8	**1.57** 40	**0.61** 15.5	**1/8 npt** G 1/8	**1/8 npt** G 1/8	**0.20** 5	**- -** - -	**0.87** 22	**0.65** 16.6	**0.31** 8	**0.20** 5	**M5** M5	**0.41** 10.5	**- -** - -	**0.13** 3.2	**0.22** 5.6
1/4	**2.05** 52	**0.61** 15.5	**1/8 npt** G 1/8	**1/4 npt** G 1/4	**0.24** 6	**0.87** 22	**1.26** 32	**0.98** 25	**0.43** 11	**0.22** 5.5	**M5** M5	**0.39** 10	**- -** - -	**- -** - --	**- -** - -

Dimensions: BOLD= Inches; STANDARD= mm

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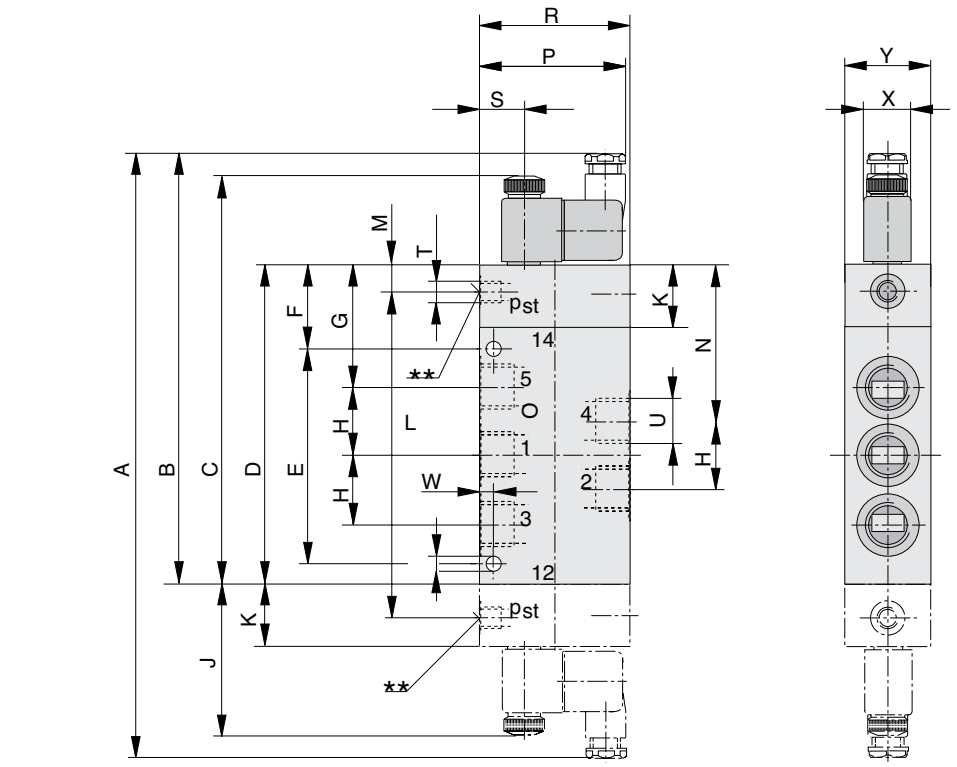
Size: 1/2



*- Manual Override
Push: Non-Locking
Push & Turn: Locking

	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P
1/2	**11.14** 283	**7.93** 201.5	**7.48** 190	**5.87** 149	**3.94** 100	**1.54** 39	**2.24** 57	**1.26** 32	**2.76** 70	**1.14** 29	**- -** - -	**0.49** 12.5	**2.87** 73	**0.28** 7	**2.68** 68
	R	**S**	**T**	**U**	**W**	**X**	**Y**	**Z**	**AA**	**AB**	**AC**	**AD**	**AE**	**AF**	**AG**
1/2	**2.76** 70	**0.83** 21	**1/8 npt** G 1/8	**1/2 npt** G 1/2	**0.26** 6.5	**0.87** 22	**1.57** 40	**- -** - -	**- -** - -	**- -** - -	**- -** - -	**- -** - -	**- -** - -	**- -** - -	**- -** - -

Dimensions: BOLD= Inches; STANDARD= mm

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5/2-Way Valve
1/8

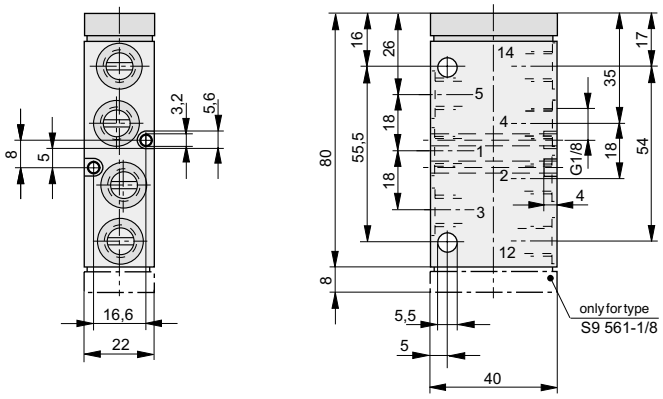
Actuation: Air Pilot

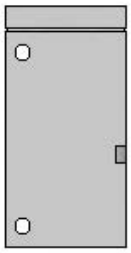
- **Single Air Pilot**
- **Double Air Pilot**

Characteristics to VDI 3290	Pressures quoted as gauge pressure			
Characteristics	Symbol	Unit	Description	
General Features				
Type			Spool valve	
Mounting			2 screws M5	
Tube connection			Thread	
Port size		NPT (G)	1/8	
Weight (mass)		lbs. (kg)	.35 (.160) Single Air Pilot .37 (.170) Double Air Pilot	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 158 (+70)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication[1)]	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	87 (6)	
Operating pressure range	p_{min} p_{max}	psi (bar)	0 (0) 145 (10)	
Nominal flow	Q_N	Cv (l/min)	.5 (500)	
Actuation				
Air Pilot			Direct	
Actuation Pressure Range	p_{min} p_{max}	psi (bar)	30 (2) 145 (10)	Single Air Pilot
	p_{min} p_{max}	psi (bar)	22 (1.5) 145 (10)	Double Air Pilot

1) We recommend the use of mineral oil type VG32 to ISO 3448

Dimensions (mm)





Version 1/8	**Metric Version**		**NPT Version**	
Actuation	**Type Number**	**Order Number**	**Type Number**	**Order Number**
5/2 Single Air Pilot/Spring Return	S9 561RF-1/8	PA 10310	S9 561RF-1/8U	PD 47240
5/2 Double Air Pilot	S9 561-1/8	PA 10311	S9 561-1/8U	PD 47239

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5/2-Way Valve
1/4

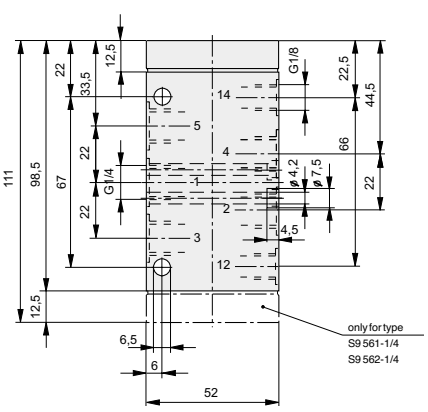
Actuation: Air Pilot

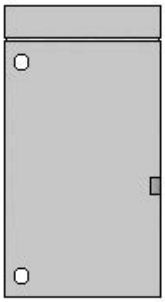
- **Single Air Pilot**
- **Double Air Pilot**

Characteristics to VDI 3290		Pressures quoted as gauge pressure		
Characteristics	Symbol	Unit	Description	
General Features				
Type			Spool valve	
Mounting			2 screws M5	
Tube connection			Thread	
Port size		NPT (G)	1/8	
Weight (mass)		lbs. (kg)	1.08 (.49) Single Air Pilot 1.12 (.51) Double Air Pilot	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 158 (+70)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication[1)]	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	87 (6)	
Operating pressure range	p_{min} p_{max}	psi (bar)	0 (0) 145 (10)	
Nominal flow	Q_N	Cv (l/min)	1.3 (1300)	
Actuation				
Air Pilot			Direct	
Actuation Pressure Range	p_{min} p_{max}	psi (bar)	30 (2) 145 (10)	Single Air Pilot
	p_{min} p_{max}	psi (bar)	22 (1.5) 145 (10)	Double Air Pilot

[1)] We recommend the use of mineral oil type VG32 to ISO 3448

Dimensions (mm)





Version 1/4	**Metric Version**		**NPT Version**	
Actuation	**Type Number**	**Order Number**	**Type Number**	**Order Number**
5/2 Single Air Pilot/Spring Return	S9 561RF-1/4	PA 12676	S9 561RF-1/4U	PD 47242
5/2 Double Air Pilot	S9 561-1/4	PA 12677	S9 561-1/4U	PD 47241

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3/2-Way Valve
1/8

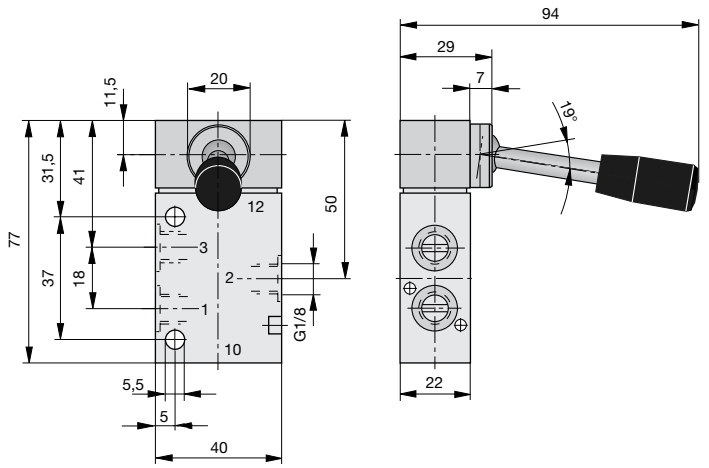
Actuation: Hand lever

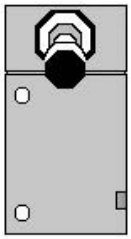
- **Detent**
- **Spring Return**

Characteristics to VDI 3290 Pressures quoted as gauge pressure				
Characteristics	Symbol	Unit	Description	
General Features				
Type			Spool valve	
Mounting			2 screws M5	
Tube connection			Thread	
Port size		NPT (G)	1/8	
Weight (mass)		lbs. (kg)	.356 (.162)	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 158 (+70)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication[1)]	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	131 (6)	
Operating pressure range	p_{min} p_{max}	psi (bar)	0 (0) 145 (10)	
Nominal flow	Q_N	Cv (l/min)	4.5 (450)	
Actuation				
Manual control			Direct	
Stroke		in (mm)	.177 (4.5)	
Actuation force	F_b	lbf (N)	1.57 (7) detent 2.25 (10) spring	

[1)] We recommend the use of mineral oil type VG32 to ISO 3448

Dimensions (mm)





Version 1/8	**Metric Version**		**NPT Version**	
Actuation	**Type Number**	**Order Number**	**Type Number**	**Order Number**
3/2 Hand Lever/Detent	S9 311-1/8	PA 10293	S9 311-1/8U	PD 45467
3/2 Hand Lever/Spring Return	S9 311RF-1/8	PA 10294	S9 311RF-1/8U	PD 45468

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5/2-Way Valve
1/8

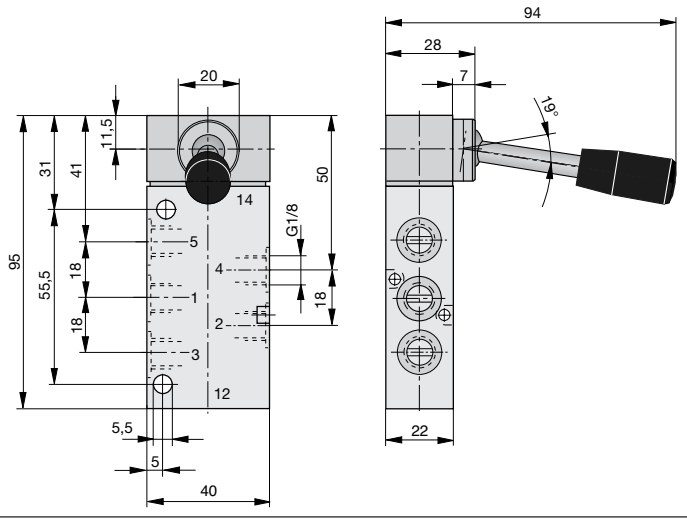
Actuation: Hand lever

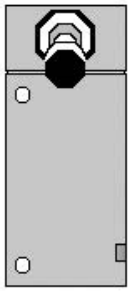
- **Detent**
- **Spring Return**

Characteristics to VDI 3290	Pressures quoted as gauge pressure			
Characteristics	Symbol	Unit	Description	
General Features				
Type			Spool valve	
Mounting			2 screws M5	
Tube connection			Thread	
Port size		NPT (G)	1/8	
Weight (mass)		lbs. (kg)	.429 (.195)	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 158 (+70)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication[1)]	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	87 (6)	
Operating pressure range	p_{min} p_{max}	psi (bar)	0 (0) 145 (10)	
Nominal flow	Q_N	Cv (l/min)	.5 (500)	
Actuation				
Manual control			Direct	
Stroke		in (mm)	.177 (4.5)	
Actuation force	F_b	lbf (N)	1.57 (7) detent 2.25 (10) spring	

[1)] We recommend the use of mineral oil type VG32 to ISO 3448

Dimensions (mm)





Version 1/8	**Metric Version**		**NPT Version**	
Actuation	**Type Number**	**Order Number**	**Type Number**	**Order Number**
5/2 Hand Lever/Detent	S9 511-1/8	PA 10308	S9 511-1/8U	PD 45469
5/2 Hand Lever/Spring Return	S9 511RF-1/8	PA 10309	S9 511RF-1/8U	PD 45470

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3/2-Way Valve
1/4

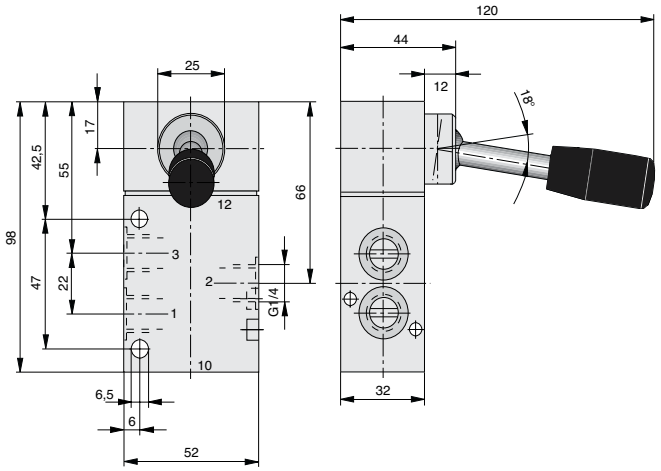
Actuation: Hand lever

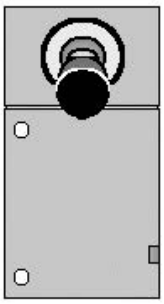
- **Detent**
- **Spring Return**
- **Safety Detent**

Characteristics to VDI 3290	Pressures quoted as gauge pressure			
Characteristics	Symbol	Unit	Description	
General Features				
Type			Spool valve	
Mounting			2 screws M6	
Tube connection			Thread	
Port size		NPT (G)	1/4	
Weight (mass)		lbs. (kg)	.81 (.37)	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 158 (+70)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication[1)]	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	87 (6)	
Operating pressure range	p_{min} p_{max}	psi (bar)	0 (0) 145 (10)	
Nominal flow	Q_N	Cv (l/min)	1.3 (1300)	
Actuation				
Manual control			Direct	
Stroke		in (mm)	.256 (6.5)	
Actuation force	F_b	lbf (N)	2.25 (10) detent & safety detent 3.37 (15) spring	

[1)] We recommend the use of mineral oil type VG32 to ISO 3448

Dimensions (mm)





Version 1/4	**Metric Version**		**NPT Version**	
Actuation	**Type Number**	**Order Number**	**Type Number**	**Order Number**
3/2 Hand Lever/Detent	S9 311-1/4	PA 12708	S9 311-1/4U	PD 45477
3/2 Hand Lever/Spring Return	S9 311RF-1/4	PA 12709	S9 311RF-1/4U	PD 45478
3/2 Hand Lever/Detent (safety)	S9 311S-1/4	PA 12710	S9 311RF-1/4U	PD 45479

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5/2-Way Valve
1/4

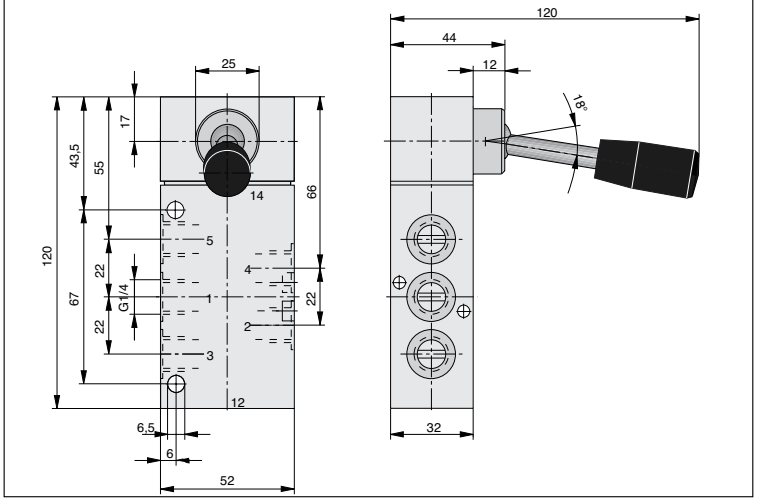
Actuation: Hand lever

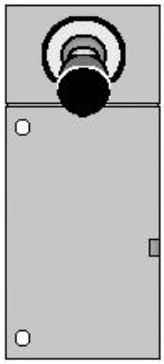
- **Detent**
- **Spring Return**
- **Safety Detent**

Characteristics to VDI 3290	Pressures quoted as gauge pressure			
Characteristics	Symbol	Unit	Description	
General Features				
Type			Spool valve	
Mounting			2 screws M6	
Tube connection			Thread	
Port size		NPT (G)	1/4	
Weight (mass)		lbs. (kg)	1.14 (.52)	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 158 (+70)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication[1)]	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	87 (6)	
Operating pressure range	p_{min} p_{max}	psi (bar)	0 (0) 145 (10)	
Nominal flow	Q_N	Cv (l/min)	1.3 (1300)	
Actuation				
Manual control			Direct	
Stroke		in (mm)	.256 (6.5)	
Actuation force	F_b	lbf (N)	2.25 (10) detent 3.37 (15) spring	

[1)] We recommend the use of mineral oil type VG32 to ISO 3448

Dimensions (mm)





Version 1/4	**Metric Version**		**NPT Version**	
Actuation	**Type Number**	**Order Number**	**Type Number**	**Order Number**
5/2 Hand Lever/Detent	S9 511-1/4	PA 12671	S9 511-1/4U	PD 45480
5/2 Hand Lever/Spring Return	S9 511RF-1/4	PA 12672	S9 511RF-1/4U	PD 45481
5/2 Hand Lever/Detent (safety)	S9 511S-1/4	PA 12673	S9 511S-1/4U	PD 45482

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3/2-Way Valve
1/2

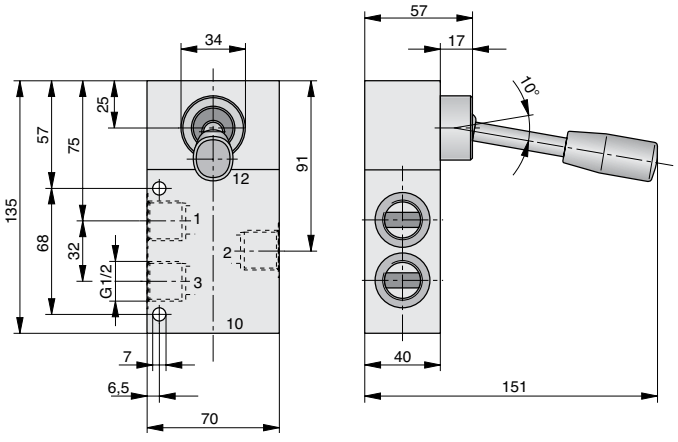
Actuation: Hand lever

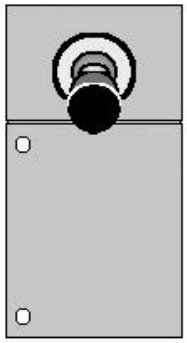
- **Detent**
- **Spring Return**

Characteristics to VDI 3290 Pressures quoted as gauge pressure				
Characteristics	Symbol	Unit	Description	
General Features				
Type			Spool valve	
Mounting			2 screws M6	
Tube connection			Thread	
Port size		NPT (G)	1/2	
Weight (mass)		lbs. (kg)	1.98 (.9)	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 158 (+70)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication[1)]	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	87 (6)	
Operating pressure range	p_{min} p_{max}	psi (bar)	0 (0) 145 (10)	
Nominal flow	Q_N	Cv (l/min)	3.5 (3500)	
Actuation				
Manual control			Direct	
Stroke		in (mm)	.370 (9.4)	
Actuation force	F_b	lbf (N)	3.37 (15) detent 8.99 (40) spring	

[1)] We recommend the use of mineral oil type VG32 to ISO 3448

Dimensions (mm)





Version 1/2	**Metric Version**		**NPT Version**	
Actuation	**Type Number**	**Order Number**	**Type Number**	**Order Number**
3/2 Hand Lever/Detent	S9 311-1/2	PA 16404	S9 311-1/2U	PD 45492
3/2 Hand Lever/Spring Return	S9 311RF-1/2	PA 16405	S9 311RF-1/2U	PD 45493

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5/2-Way Valve
1/2

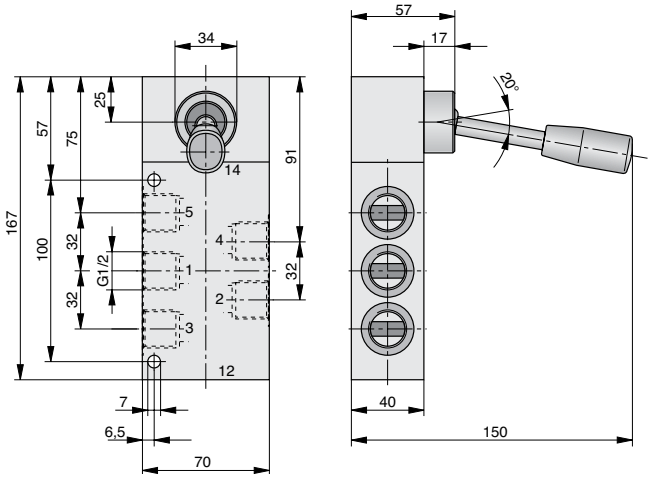
Actuation: Hand lever

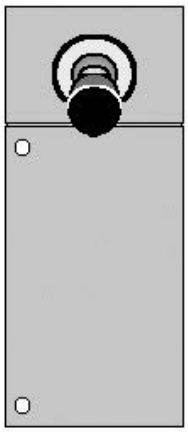
- **Detent**
- **Spring Return**

Characteristics to VDI 3290	Pressures quoted as gauge pressure			
Characteristics	Symbol	Unit	Description	
General Features				
Type			Spool valve	
Mounting			2 screws M6	
Tube connection			Thread	
Port size		NPT (G)	1/2	
Weight (mass)		lbs. (kg)	2.64 (1.20)	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 158 (+70)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication[1)]	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	87 (6)	
Operating pressure range	p_{min} p_{max}	psi (bar)	0 (0) 145 (10)	
Nominal flow	Q_N	Cv (l/min)	3.5 (3500)	
Actuation				
Manual control			Direct	
Stroke		in (mm)	.370 (9.4)	
Actuation force	F_b	lbf (N)	3.37 (15) detent 8.99 (40) spring	

[1)] We recommend the use of mineral oil type VG32 to ISO 3448

Dimensions (mm)





Version 1/2	**Metric Version**		**NPT Version**	
Actuation	**Type Number**	**Order Number**	**Type Number**	**Order Number**
5/2 Hand Lever/Detent	S9 511-1/2	PA 16367	S9 511-1/2U	PD 45495
5/2 Hand Lever/Spring Return	S9 511RF-1/2	PA 16366	S9 511RF-1/2U	PD 45494

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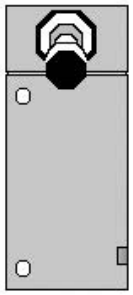
Characteristics to VDI 3290	Pressures quoted as gauge pressure			
Characteristics	Symbol	Unit	Description	
General Features				
Type			Spool valve	
Mounting			2 screws M5	
Tube connection			Thread	
Port size		NPT (G)	1/8	
Weight (mass)		lbs. (kg)	.429 (.195)	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 158 (+70)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication[1)]	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	87 (6)	
Operating pressure range	p_{min} p_{max}	psi (bar)	0 (0) 145 (10)	
Nominal flow	Q_N	Cv (l/min)	.5 (500)	
Actuation				
Manual control			Direct	
Stroke		in (mm)	.177 (4.5)	
Actuating force	F_b	lbf (N)	G,E,B: 1.57 (7) RFG, RFE, RFB: 2.25 (10)	

[1)] We recommend the use of mineral oil type VG32 to ISO 3448

5/3-Way Valve
1/8

Actuation: Hand lever

- **Detent**
- **Spring Center**



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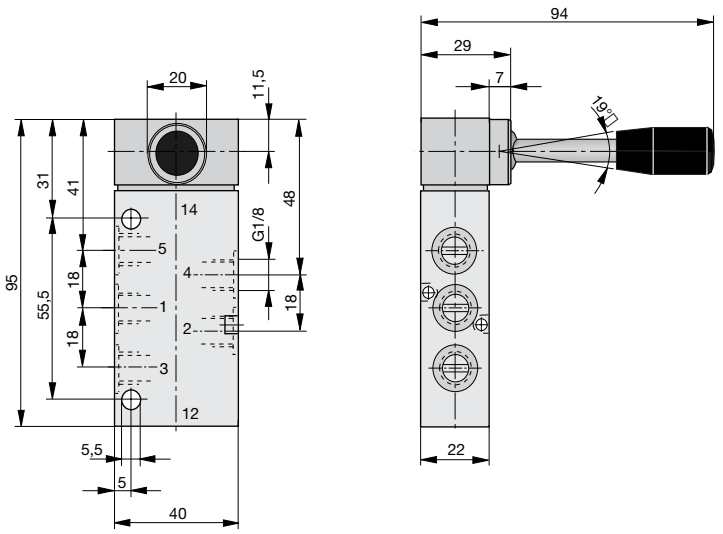
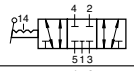
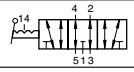
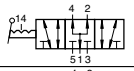
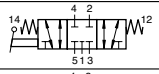
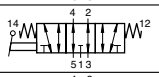
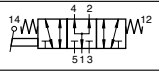
Dimensions (mm)



Version 1/8		Metric Version		NPT Version	
Actuation	**Symbol**	**Type Number**	**Order Number**	**Type Number**	**Order Number**
5/3-way Hand Lever/Detent; Blocked		S9 511G-1/8	PA 10321	S9 511G-1/8U	PD 45471
5/3-way Hand Lever/Detent; Exhausted		S9 511E-1/8	PA 10322	S9 511E-1/8U	PD 45472
5/3-way Hand Lever/Detent; Dual		S9 511B-1/8	PA 10323	S9 511B-1/8U	PD 45473
5/3-way Hand Lever/Spring; Blocked		S9 511RFG-1/8	PA 10324	S9 511RFG-1/8U	PD 45474
5/3-way Hand Lever/Spring; Exhausted		S9 511RFE-1/8	PA 10325	S9 511RFE-1/8U	PD 45475
5/3-way Hand Lever/Spring; Dual		S9 511RFB-1/8	PA 10326	S9 511RFB-1/8U	PD 45476

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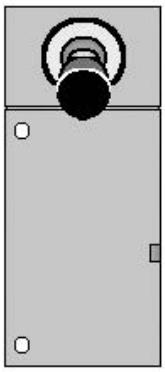
Characteristics to VDI 3290	Pressures quoted as gauge pressure			
Characteristics	Symbol	Unit	Description	
General Features				
Type			Spool valve	
Mounting			2 screws M6	
Tube connection			Thread	
Port size		NPT (G)	1/4	
Weight (mass)		lbs. (kg)	1.14 (.52)	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 158 (+70)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication[1)]	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	87 (6)	
Operating pressure range	p_{min} p_{max}	psi (bar)	0 (0) 145 (10)	
Nominal flow	Q_N	Cv (l/min)	RFG, RFB: 1.3 (1300) RFE: 1.0 (1000)	
Actuation				
Manual control			Direct	
Stroke		in (mm)	.256 (6.5)	
Actuating force	F_b	lbf (N)	G,E,B: 2.25 (10) RFG, RFE, RFB: 3.37 (15)	

[1)] We recommend the use of mineral oil type VG32 to ISO 3448

5/3-Way Valve
1/4

Actuation: Hand lever

- **Detent**
- **Spring Center**
- **Safety Detent**



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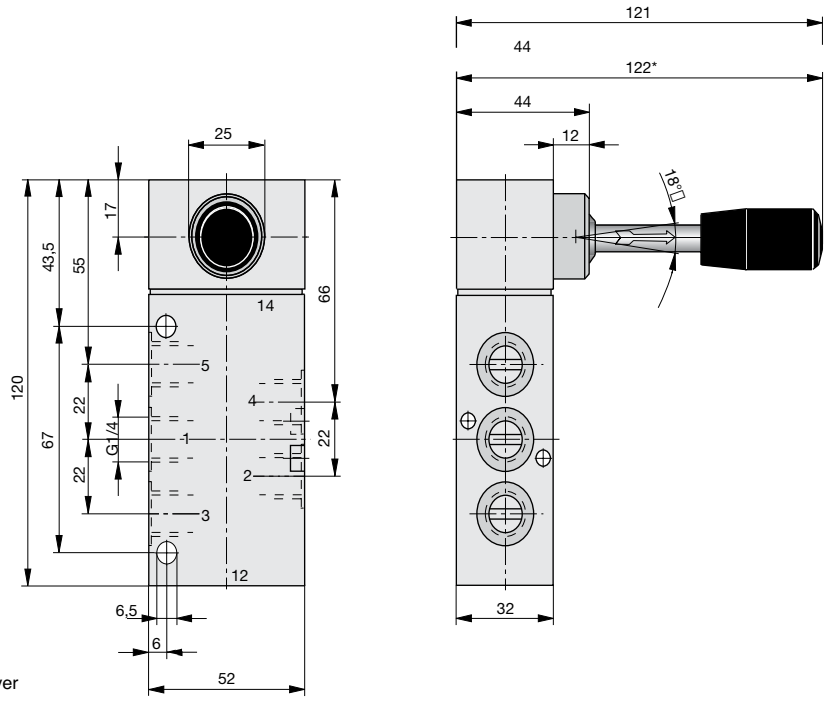
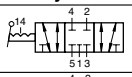
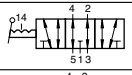
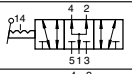
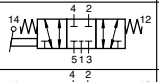
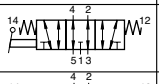
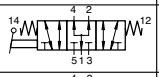
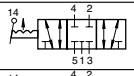
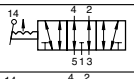
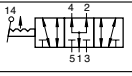
Dimensions (mm)



*Safety hand lever

Version 1/4		Metric Version		NPT Version	
Actuation	**Symbol**	**Type Number**	**Order Number**	**Type Number**	**Order Number**
5/3-way Hand Lever/Detent; Blocked		S9 511G-1/4	PA 12687	S9 511G-1/4U	PD 45483
5/3-way Hand Lever/Detent; Exhausted		S9 511E-1/4	PA 12688	S9 511E-1/4U	PD 45484
5/3-way Hand Lever/Detent; Dual		S9 511B-1/4	PA 12689	S9 511B-1/4U	PD 45485
5/3-way Hand Lever/Spring; Blocked		S9 511RFG-1/4	PA 12690	S9 511RFG-1/4U	PD 45486
5/3-way Hand Lever/Spring; Exhausted		S9 511RFE-1/4	PA 12691	S9 511RFE-1/4U	PD 45487
5/3-way Hand Lever/Spring; Dual		S9 511RFB-1/4	PA 12692	S9 511RFB-1/4U	PD 45488
5/3-way Hand Lever/Detent; Blocked (safety)		S9 511SG-1/4	PA 12693	S9 511SG-1/4U	PD 45489
5/3-way Hand Lever/Detent; Exhausted (safety)		S9 511SE-1/4	PA 12694	S9 511SE-1/4U	PD 45490
5/3-way Hand Lever/Detent; Dual (safety)		S9 511SB-1/4	PA 12695	S9 511SB-1/4U	PD 45491

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5/3-Way Valve
1/2

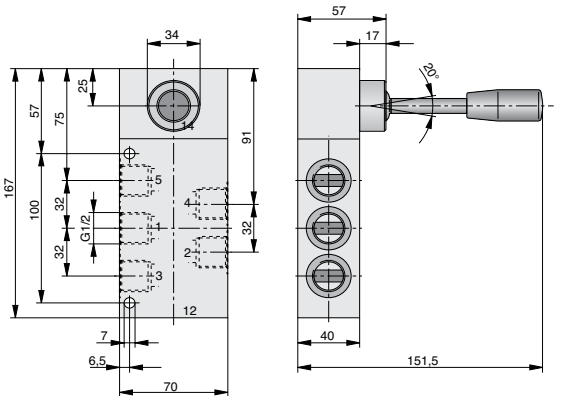
Actuation: Hand lever

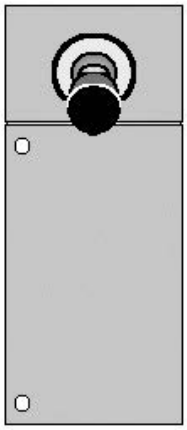
- Detent

Characteristics to VDI 3290 Pressures quoted as gauge pressure				
Characteristics	Symbol	Unit	Description	
General Features				
Type			Spool valve	
Mounting			2 screws M6	
Tube connection			Thread	
Port size		NPT (G)	1/2	
Weight (mass)		lbs. (kg)	2.64 (1.20)	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 158 (+70)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication[1)]	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	87 (6)	
Operating pressure range	p_{min} p_{max}	psi (bar)	0 (0) 145 (10)	
Nominal flow	Q_N	Cv (l/min)	3.5 (3500)	
Actuation				
Manual control			Direct	
Stroke		in (mm)	.370 (9.4)	
Actuating force	F_b	lbf (N)	3.37 (15)	

1) We recommend the use of mineral oil type VG32 to ISO 3448

Dimensions (mm)





Version 1/2		**Metric Version**		**NPT Version**	
Actuation	**Symbol**	**Type Number**	**Order Number**	**Type Number**	**Order Number**
5/3-way Hand Lever/Detent; Blocked		S9 511G-1/2	PA 16369	S9 511G-1/2U	PD 45496

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Pressures quoted as gauge pressure		
Characteristics	Unit	Description
General Features		
Type		Body ported valve
Style		Spool valve
Port size	G	1/4
Weight (mass)	lbs. (kg)	1.43 (0.65)
Installation		In any position
Ambient temperature minimum maximum	°F (°C)	 14 (-10) 140 (+60)
Medium temperature minimum maximum	°F (°C)	 14 (-10) 158 (+70)
Pneumatic Characteristics		
Medium		Air
Nominal pressure	psi (bar)	87 (6)
Operating pressure minimum maximum	psi (bar)	 22 (1.5) 116 (8)
Nominal flow	Cv (l/min)	1.3 (1300)
Filtration		40 micron recommended
Lubrication		With or without lubrication[1)]
Electrical Characteristics		
Voltage AC DC	V	 110, 220 12, 24
Duty cycle		Continuous duty
Electric protection		IP65 to DIN 40050
Insulating Material		VDE 0580
Connection		Plug to DIN 43650 form B

[1)] We recommend the use of mineral oil type VG32 to ISO 3448

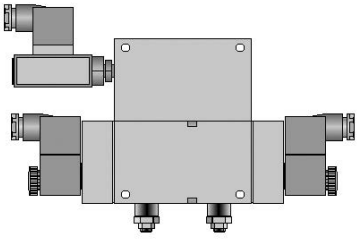
5/2-Way Valve
1/4

Interference Sensing Module

The interference sensing module was designed to automatically reverse the direction of a pneumatic cylinder, when it detects an obstruction. Loss of back pressure, caused by an obstruction, triggers the built-in pressure switch to shift the valve and retract the cylinder.

Applications:
- Doors
- Machine Guards
- Conveyor Transfer
- Pallet Handling
- Feed Systems
- Elevator Systems
- Variable Height Pick & Place

Version 1/4			
Order Number	**Description**	**Ports**	**Voltage**
IS0250-0133	5/2-way IS-module	G1/4	12vDC
IS0250-0233	5/2-way IS-module	G1/4	24vDC
IS0250-5733	5/2-way IS-module	G1/4	110vAC
IS0250-6133	5/2-way IS-module	G1/4	220vAC



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Characteristics to VDI 3290 Pressures quoted as gauge pressure				
Characteristics	Symbol	Unit	Description	
General Features				
Type			Ceramic spool valve	
Mounting			On base plate, to ISO 5599	
Tube connection			Base plate	
Port size			G1/4 (base plate)	
Weight (mass)		lbs. (kg)	1.01 (0.46) signal solenoid 1.30 (0.59) double solenoid	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication[1)]	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	87 (6)	
Operating pressure range	p_{min}	psi (bar)	29 (2)	
			-1 (Version S)	
	p_{max}	psi (bar)	174 (12)	
Nominal flow			5/2-way valve	5/3-way valve
	Q_N	Cv (l/min)	1.7 (1680)	1.7 (1680)
Actuation				
Electrical			Pilot operated Pilot operated with external pilot air	
Actuation pressure range	$p_{at\ min}$	psi (bar)	29 (2)	
	$p_{at\ max}$	psi (bar)	145 (10)	
Voltage type			AC	DC
Nominal Voltage Standard version Low watt. version	 U_n U_n	 V V	 220 220 Further voltages available on request	 24 24
Initial Power Consumption Standard version Low watt. version		 VA (W) VA (W)	 11 7.8	 4.8 2.7
Continuous Power Consumption Standard version Low watt. version		 VA (W) VA (W)	 8.5 4.9	 4.8 2.7
Duty cycle	ED	%	Continuous Duty	
Electrical protection			IP65 to DIN 40050 (with plug)	
Insulating material			VDE 0580	
Connection			Plug to DIN 43650 form B	

[1)] We recommend the use of mineral oil type VG32 to ISO 3448

5/2-Way Valve
5/3-Way Valve

ISO 5599
Size 1

Actuation: Solenoid

- **Single Solenoid**
- **Double Solenoid**
- **Spring Center**

Discontinued

Delivery Includes:
valve
mounting screws
gasket
solenoid coil(s)

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Characteristics to VDI 3290 Pressures quoted as gauge pressure				
Characteristics	Symbol	Unit	Description	
General Features				
Type			Ceramic spool valve	
Mounting			On base plate, to ISO 5599	
Tube connection			Base plate	
Port size			G1/4 (base plate)	
Weight (mass)		lbs. (kg)	.70 (0.32)	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication[1)]	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	87 (6)	
Operating pressure range	p_{min} p_{max}	psi (bar)	-13 (-0.9) 174 (12)	
Nominal flow			5/2-way valve	5/3-way valve
	Q_N	Cv (l/min)	1.7 (1680)	1.7 (1680)
Actuation				
Pneumatic			Direct	
Actuation pressure range	$p_{st\ min}$	psi (bar)	29 (2)	
	$p_{st\ max}$	psi (bar)	145 (10)	

[1)] We recommend the use of mineral oil type VG32 to ISO 3448

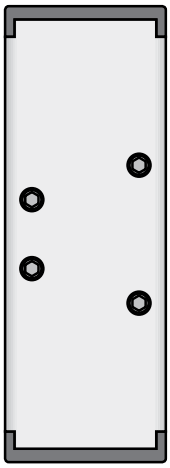
5/2-Way Valve
5/3-Way Valve

ISO 5599
Size 1

Actuation: Air Pilot

- **Single Air Pilot**
- **Double Air Pilot**
- **Spring Center**

Delivery Includes:
valve
mounting screws
gasket



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Characteristics to VDI 3290 Pressures quoted as gauge pressure				
Characteristics	Symbol	Unit	Description	
General Features				
Type			Ceramic spool valve	
Mounting			On base plate, to ISO 5599	
Tube connection			Base plate	
Port size			G3/8 (base plate)	
Weight (mass)		lbs. (kg)	1.54 (0.70) single solenoid 1.83 (0.83) double solenoid	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication[1)]	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	87 (6)	
Operating pressure range	p_{min}	psi (bar)	29 (2)	
			-1 (Version S)	
	p_{max}	psi (bar)	174 (12)	
Nominal flow			5/2-way valve	5/3-way valve
	Q_N	Cv (l/min)	4.3 (4320)	4.3 (4320)
Actuation				
Electrical			Pilot operated Pilot operated with external pilot air	
Actuation pressure range	$p_{st\ min}$	bar	2	
	$p_{st\ max}$	bar	12	
Voltage type			AC	DC
Nominal Voltage Standard version Low watt. version	 U_n U_n	 V V	 220 220 Further voltages available on request	 24 24
Initial Power Consumption Standard version Low watt. version		 VA (W) VA (W)	 11 7.8	 4.8 2.7
Continuous Power Consumption Standard version Low watt. version		 VA (W) VA (W)	 8.5 4.9	 4.8 2.7
Duty cycle	ED	%	Continuous Duty	
Electrical protection			IP65 to DIN 40050 (with plug)	
Insulating material			VDE 0580	
Connection			Plug to DIN 43650 form B	

[1)] We recommend the use of mineral oil type VG32 to ISO 3448

5/2-Way Valve
5/3-Way Valve

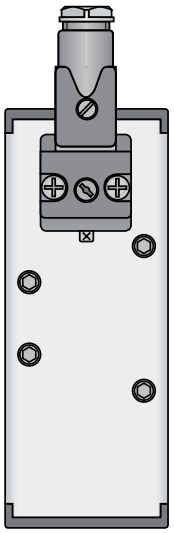
ISO 5599
Size 2

Actuation: Solenoid

- **Single Solenoid**
- **Double Solenoid**
- **Spring Center**

Discontinued

Delivery Includes:
valve
mounting screws
gasket
solenoid coil(s)



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Characteristics to VDI 3290	Pressures quoted as gauge pressure			
Characteristics	Symbol	Unit	Description	
General Features				
Type			Ceramic spool valve	
Mounting			On base plate, to ISO 5599	
Tube connection			Base plate	
Port size			G3/8 (base plate)	
Weight (mass)		lbs. (kg)	1.23 (0.56)	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication[1)]	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	87 (6)	
Operating pressure range	p_{min} p_{max}	psi (bar)	-13 (-0.9) 174 (12)	
Nominal flow			5/2-way valve	5/3-way valve
	Q_N	Cv (l/min)	4.3 (4320)	4.3 (4320)
Actuation				
Pneumatic			Direct	
Actuation pressure range	$p_{st\ min}$	psi (bar)	29 (2)	
	$p_{st\ max}$	psi (bar)	174 (12)	

[1)] We recommend the use of mineral oil type VG32 to ISO 3448

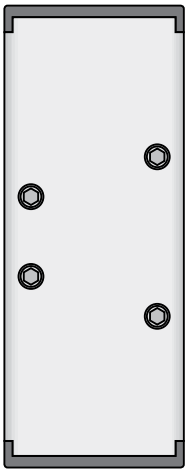
5/2-Way Valve
5/3-Way Valve

ISO 5599
Size 2

Actuation: Air Pilot

- **Single Air Pilot**
- **Double Air Pilot**
- **Spring Center**

Delivery Includes:
valve
mounting screws
gasket



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Characteristics to VDI 3290 Pressures quoted as gauge pressure				
Characteristics	Symbol	Unit	Description	
General Features				
Type			Ceramic spool valve	
Mounting			On base plate, to ISO 5599	
Tube connection			Base plate	
Port size			G1/2 (base plate)	
Weight (mass)		lbs. (kg)	2.71 (1.23) single solenoid 3.01 (1.37) double solenoid	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication[1)]	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	87 (6)	
Operating pressure range	p_{min}	psi (bar)	29 (2)	
			-1 (Version S)	
	p_{max}	psi (bar)	174 (12)	
Nominal flow			5/2-way valve	5/3-way valve
	Q_N	Cv (l/min)	6.5 (6540)	6.5 (6540)
Actuation				
Electrical			Pilot operated Pilot operated with external pilot air	
Actuation pressure range	$p_{st\ min}$	psi (bar)	29 (2)	
	$p_{st\ max}$	psi (bar)	145 (10)	
Voltage type			AC	DC
Nominal Voltage Standard version Low watt. version	 U_n U_n	 V V	 220 220 Further voltages available on request	 24 24
Initial Power Consumption Standard version Low watt. version		 VA (W) VA (W)	 11 7.8	 4.8 2.7
Continuous Power Consumption Standard version Low watt. version		 VA (W) VA (W)	 8.5 4.9	 4.8 2.7
Duty cycle	ED	%	Continuous Duty	
Electrical protection			IP65 to DIN 40050 (with plug)	
Insulating material			VDE 0580	
Connection			Plug to DIN 43650 form B	

[1)] We recommend the use of mineral oil type VG32 to ISO 3448

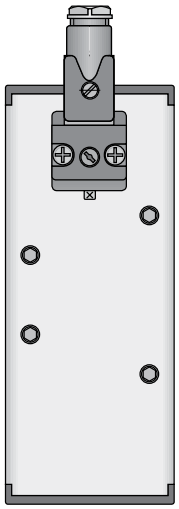
5/2-Way Valve
5/3-Way Valve

ISO 5599
Size 3

Actuation: Solenoid

- **Single Solenoid**
- **Double Solenoid**
- **Spring Center**

Delivery Includes:
valve
mounting screws
gasket
solenoid coil(s)



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Characteristics to VDI 3290 Pressures quoted as gauge pressure				
Characteristics	Symbol	Unit	Description	
General Features				
Type			Ceramic spool valve	
Mounting			On base plate, to ISO 5599	
Tube connection			Base plate	
Port size			G1/2 (base plate)	
Weight (mass)		lbs. (kg)	2.42 (1.1)	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication[1)]	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	87 (6)	
Operating pressure range	p_{min} p_{max}	psi (bar)	-13 (-0.9) 174 (12)	
Nominal flow			5/2-way valve	5/3-way valve
	Q_N	1/min	6.5 (6540)	6.5 (6540)
Actuation				
Pneumatic			Direct	
Actuation pressure range	$p_{st\ min}$	psi (bar)	29 (2)	
	$p_{st\ max}$	psi (bar)	174 (12)	

[1)] We recommend the use of mineral oil type VG32 to ISO 3448

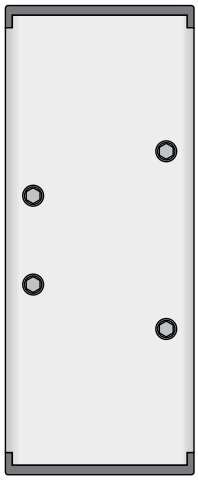
5/2-Way Valve
5/3-Way Valve

ISO 5599
Size 3

Actuation: Air Pilot

- **Single Air Pilot**
- **Double Air Pilot**
- **Spring Center**

Delivery Includes:
valve
mounting screws
gasket



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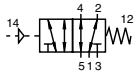
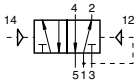
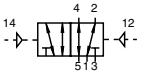
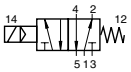
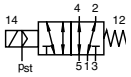
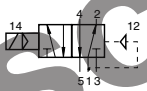
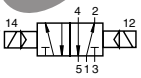
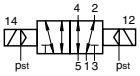
ORDER INSTRUCTIONS: 5/2-Way Valves				
Actuation	**Symbol**	**Type Number**	**Order Number**	**Size**
5/2 Single Air Pilot Spring Return		S20561RF-01	PA 12891	VDMA 01
		S20561RF-1	PA 12869	Size 1
		S20561RF-2	PA 16425	Size 2
		S20561RF-3	PA 16426	Size 3
5/2 Single Air Pilot Air Spring Return		S20561R-01	PA 12892	VDMA 01
		S20561R-1	PA 12870	Size 1
		S20561R-2	PA 16428	Size 2
		S20561R-3	PA 16429	Size 3
5/2 Double Air Pilot		S20561-01	PA 12893	VDMA 01
		S20561-1	PA 12868	Size 1
		S20561-2	PA 16422	Size 2
		S20561-3	PA 16423	Size 3
5/2 Single Solenoid Spring Return		S20581RF-01-..	PA 12886-..33	VDMA 01
		S20581RF-1-..	PA 12875-..33	Size 1
		S20581RF-2-..	PA 16441-..33	Size 2
		S20581RF-3-..	PA 16442-..33	Size 3
5/2 Single Solenoid Spring Return with external pilot air		S20581S-RF-01-..	PA 12896-..33	VDMA 01
		S20581S-RF-1-..	PA 12882-..33	Size 1
		S20581S-RF-2-..	PA 16456-..33	Size 2
		S20581S-RF-3-..	PA 16462-..33	Size 3
5/2 Single Solenoid Air Spring Return		S20581R-01-..	PA 12887-..33	VDMA 01
		S20581R-1-..	PA 12876-..33	Size 1
		S20581R-2-..	PA 16444-..33	Size 2
		S20581R-3-..	PA 16445-..33	Size 3
5/2 Double Solenoid		S20581-01-..	PA 12888-..33	VDMA 01
		S20581-1-..	PA 12874-..33	Size 1
		S20581-2-..	PA 16438-..33	Size 2
		S20581-3-..	PA 16439-..33	Size 3
5/2 Double Solenoid with external pilot air		S20581S-01-..	PA 12898-..33	VDMA 01
		S20581S-1-..	PA 12880-..33	Size 1
		S20581S-2-..	PA 16454-..33	Size 2
		S20581S-3-..	PA 16460-..33	Size 3

Voltage Range		Coil Number	Order Code
Nominal	**Secondary**		
12 vDC	--	KZ 3518	**01**
24 vDC	60 50/60Hz	KZ 3519	**02**
110 50/60Hz	48 vDC	KZ 3521	**57**
220 50/60Hz	110 vDC	KZ 3522	**61**

CE

• Other voltages available. Contact factory.

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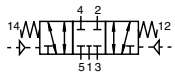
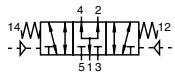
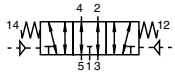
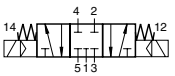
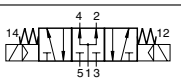
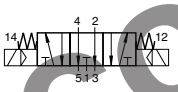
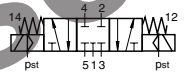
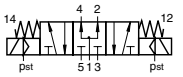
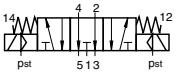
ORDER INSTRUCTIONS: 5/3-Way Valves				
Actuation	**Symbol**	**Type Number**	**Order Number**	**Size**
5/3 Double Air Pilot		S20561RFG-01	PA 12894	VDMA 01
Closed Center		S20561RFG-1	PA 12871	Size 1
		S20561RFG-2	PA 16431	Size 2
		S20561RFG-3	PA 16432	Size 3
Dual Center		S20561RFB-1	PA 12873	Size 1
		S20561RFB-2	PA 16437	Size 2
Open Center		S20561RFE-01	PA 12895	VDMA 01
		S20561RFE-1	PA 12872	Size 1
		S20561RFE-2	PA 16434	Size 2
		S20561RFE-3	PA 16435	Size 3
5/3 Double Solenoid		S20581RFG-01	PA 12889-..33	VDMA 01
Closed Center		S20581RFG-1-..	PA 12877-..33	Size 1
		S20581RFG-2-..	PA 16447-..33	Size 2
		S20581RFG-3-..	PA 16448-..33	Size 3
Dual Center		S20581RFB-1-..	PA 12879-..33	Size 1
		S20581RFB-2-..	PA 16453-..33	Size 2
Open Center		S20581RFE-01	PA 12890-..33	VDMA 01
		S20581RFE-1-..	PA 12878-..33	Size 1
		S20581RFE-2-..	PA 16450-..33	Size 2
		S20581RFE-3-..	PA 16451-..33	Size 3
5/3 Double Solenoid with external air pilot		S20581S-RFG-01-..	PA 12900-..33	VDMA 01
Closed Center		S20581S-RFG-1-..	PA 12883-..33	Size 1
		S20581S-RFG-2-..	PA 16457-..33	Size 2
		S20581S-RFG-3-..	PA 16463-..33	Size 3
Dual Center		S20581S-RFB-1-..	PA 12885-..33	Size 1
		S20581S-RFB-2-..	PA 16459-..33	Size 2
Open Center		S20581S-RFE-01-..	PA 12899-..33	VDMA 01
		S20581S-RFE-1-..	PA 12884-..33	Size 1
		S20581S-RFE-2-..	PA 16458-..33	Size 2
		S20581S-RFE-3-..	PA 16464-..33	Size 3

Discontinued

Voltage Range		Coil Number	Order Code
Nominal	**Secondary**		
12 vDC	--	KZ 3518	**01**
24 vDC	60 50/60Hz	KZ 3519	**02**
110 50/60Hz	48 vDC	KZ 3521	**57**
220 50/60Hz	110 vDC	KZ 3522	**61**

CE

• Other voltages available. Contact factory.

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Characteristics to VDI 3290 Pressures quoted as gauge pressure				
Characteristics	Symbol	Unit	Description	
General Features				
Type			Spool valve	
Mounting			2 screws M5	
Tube connection			Thread	
Port size		NPT (G)	1/8	
Weight (mass)		lbs. (kg)	.616 (0.280) Single solenoid .913 (0.415) Double solenoid	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 158 (+70)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication[1)]	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	87 (6)	
Operating pressure range	p_{min} p_{max}	psi (bar)	Single solenoid 29 (2) 145 (10)	
	p_{min} p_{max}	psi (bar)	Double solenoid 22 (1.5) 145 (10)	
Nominal flow	Q_N	Cv (l/min)	.5 (500)	
Actuation				
Electrical			Pilot operated	
Voltage			AC	DC
Nominal voltage* Standard version	U_n	V	220	24
Initial power consumption Standard version		VA (W)	8.5	2.5
Continuous consumption Standard version		VA (W)	6.0	2.5
Duty cycle	ED	%	Continuous Duty	
Electrical protection			IP65 to DIN 40050 (with plug)	
Insulating material			VDE 0580	
Connection			Plug to DIN 43650 form B	

[1)] We recommend the use of mineral oil type VG32 to ISO 3448

5/2-Way Valve

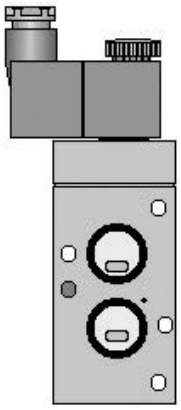
1/8

with NAMUR connection

Actuation: Solenoid

- **Single Solenoid**
- **Double Solenoid**

Delivery Includes:
valve
mounting screws
coding pin
o-rings



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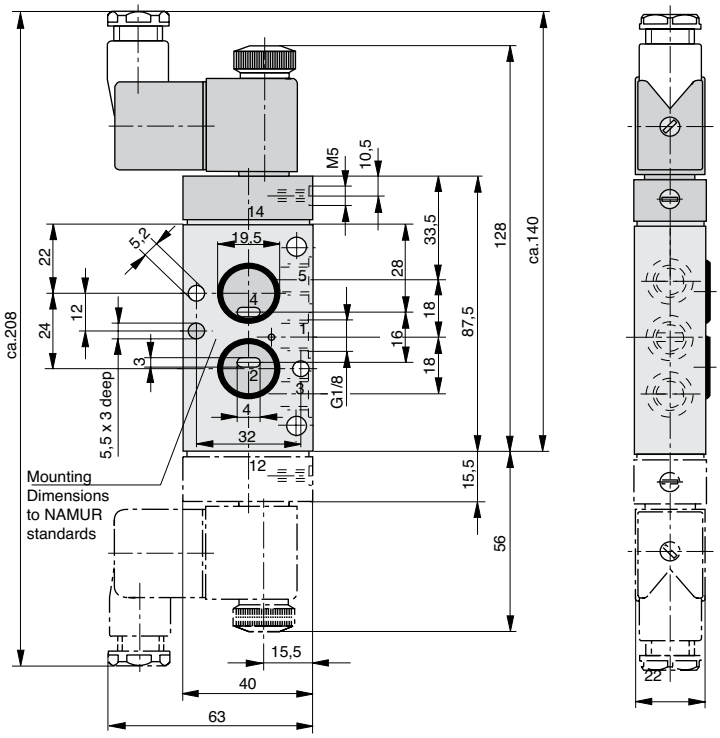
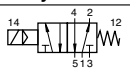
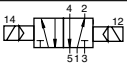
Dimensions (mm)



Version 1/8		Metric Version		NPT Version	
Actuation	**Symbol**	**Type Number**	**Order Number**	**Type Number**	**Order Number**
5/2 Single Solenoid/Spring Return		S9 581RF-1/8-SO	PD 34143-..33	S9 581RF-1/8U-SO	PD 45502-..33
5/2 Double Solenoid		S9 581-1/8-SO	PD 34984-..33	S9 581-1/8U-SO	PD 45503-..33

Voltage Range		Coil Number	Order Code
Nominal	**Secondary**		
12 vDC	--	KZ 3674	**01**
24 vDC	60 50/60Hz	KZ 3673	**02**
110 50/60Hz	48 vDC	KZ 3669	**57**
220 50/60Hz	110 vDC	KZ 3672	**61**
24 50/60Hz	--	KZ 3675	**51**

- Other voltages available. Contact factory.
- Explosion proof coils available. Contact factory.
- UL/CSA rated coils available. Contact factory.

CE

Accessory:

Order #	**Description**
NAMURPLATE-1/8	Converts the 5/2-way valve to a 3/2-way valve

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Characteristics to VDI 3290	Pressures quoted as gauge pressure			
Characteristics	Symbol	Unit	Description	
General Features				
Type			Spool valve	
Mounting			2 screws M5	
Tube connection			Thread	
Port size		NPT (G)	1/4	
Weight (mass)		lbs. (kg)	1.32 (0.6) Single solenoid 1.54 (0.7) Double solenoid	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 158 (+70)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication[1)]	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	87 (6)	
Operating pressure range	p_{min} p_{max}	psi (bar)	Single solenoid 29 (2) 145 (10)	
	p_{min} p_{max}	psi (bar)	Double solenoid 22 (1.5) 145 (10)	
Nominal flow	Q_N	Cv (l/min)	1.3 (1300)	
Actuation				
Electrical			Pilot operated	
Voltage			AC	DC
Nominal voltage* Standard version	U_n	V	220	24
Initial power consumption Standard version		VA (W)	8.5	2.5
Continuous consumption Standard version		VA (W)	6.0	2.5
Duty cycle	ED	%	Continuous Duty	
Electrical protection			IP65 to DIN 40050 (with plug)	
Insulating material			VDE 0580	
Connection			Plug to DIN 43650 form B	

[1)] We recommend the use of mineral oil type VG32 to ISO 3448

5/2-Way Valve

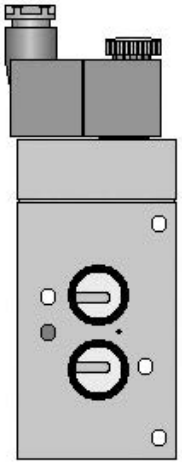
1/4

with NAMUR connection

Actuation: Solenoid

- **Single Solenoid**
- **Double Solenoid**

Delivery Includes:
valve
mounting screws
coding pin
o-rings



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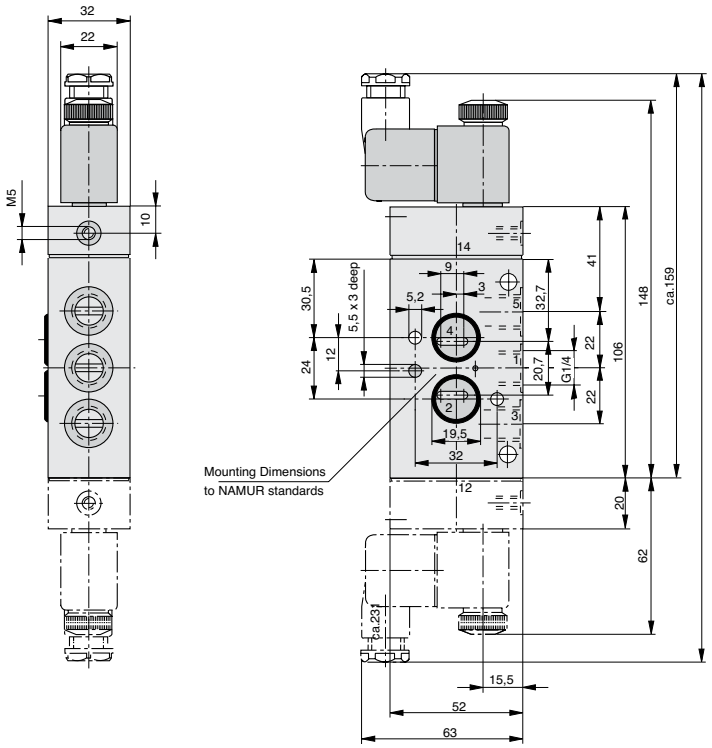
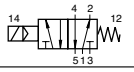
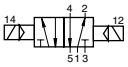
Dimensions (mm)



Version 1/4		Metric Version		NPT Version	
Actuation	**Symbol**	**Type Number**	**Order Number**	**Type Number**	**Order Number**
5/2 Single Solenoid/Spring Return		S9 581RF-1/4-SO	PD 34985-..33	S9 581RF-1/4U-SO	PD 45504-..33
5/2 Double Solenoid		S9 581-1/4-SO	PD 34986-..33	S9 581-1/4U-SO	PD 45505-..33

Voltage Range		Coil Number	Order Code
Nominal	**Secondary**		
12 vDC	--	KZ 3674	**01**
24 vDC	60 50/60Hz	KZ 3673	**02**
110 50/60Hz	48 vDC	KZ 3669	**57**
220 50/60Hz	110 vDC	KZ 3672	**61**
24 50/60Hz	--	KZ 3675	**51**

- Other voltages available. Contact factory.
- Explosion proof coils available. Contact factory.
- UL/CSA rated coils available. Contact factory.

CE

Accessory:

Order #	**Description**
NAMURPLATE-1/4	Converts the 5/2-way valve to a 3/2-way valve

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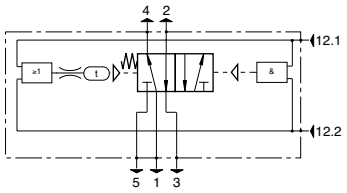
5/2-Way Valve

1/8

for two-hand safety operation

Actuation: Pneumatic

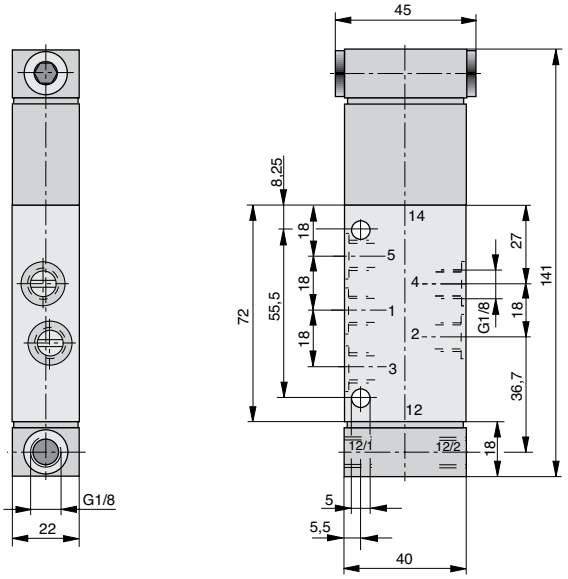


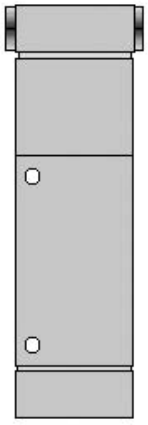
- The valve switches from outlet 4 to outlet 2 only if both signal inputs are actuated simultaneously or within 0.5 seconds.
- The valve will not switch again until both signal inputs are stopped.
- For the safety of operating personnel in manufacturing processes such as pressing, bending, stamping, deburring etc.
- Not suitable for control systems of eccentric or similar presses.

Characteristics to VDI 3290	Pressures quoted as gauge pressure			
Characteristics	Symbol	Unit	Description	
General Features				
Type			Spool valve	
Mounting			2 screws M5 (M3)	
Tube connection			Thread	
Port size		NPT (G)	1/8	
Weight (mass)		lbs. (kg)	.594 (.27)	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 158 (+70)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication[1)]	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	87 (6)	
Operating pressure range	p_{min} p_{max}	psi (bar)	0 (0) 145 (10)	
Nominal flow	Q_N	Cv (l/min)	.5 (500)	
Actuation				
Pneumatic			Direct	
Actuating pressure range	$p_{st\ min}$ $p_{st\ max}$	psi (bar)	29 (2) 145 (10)	

[1)] We recommend the use of mineral oil type VG32 to ISO 3448

Dimensions (mm)





Version 1/8	**Metric Version**		**NPT Version**	
Description	**Type Number**	**Order Number**	**Type Number**	**Order Number**
Two-hand safety valve	S9 563/65RF-1/8-SO	PD 37673	S9 563/65RF-1/8U-SO	PD 45506

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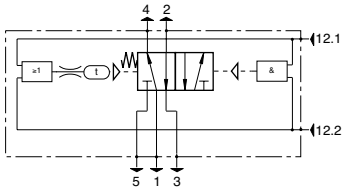
5/2-Way Valve

1/4

for two-hand safety operation

Actuation: Pneumatic

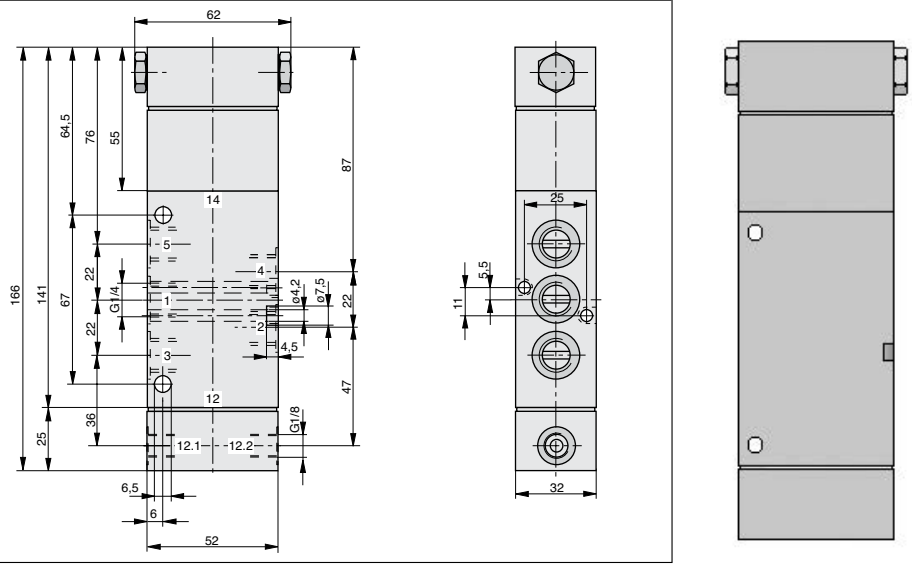


- The valve switches from outlet 4 to outlet 2 only if both signal inputs are actuated simultaneously or within 0.5 seconds.
- The valve will not switch again until both signal inputs are stopped.
- For the safety of operating personnel in manufacturing processes such as pressing, bending, stamping, deburring etc.
- Not suitable for control systems of eccentric or similar presses.

Characteristics to VDI 3290	Pressures quoted as gauge pressure			
Characteristics	Symbol	Unit	Description	
General Features				
Type			Spool valve	
Mounting			2 screws M6	
Tube connection			Thread	
Port size		NPT (G)	1/4	
Weight (mass)		lbs. (kg)	1.41 (.64)	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 158 (+70)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication[1)]	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	87 (6)	
Operating pressure range	p_{min} p_{max}	psi (bar)	0 (0) 145 (10)	
Nominal flow	Q_N	Cv (l/min)	1.3 (1300)	
Actuation				
Pneumatic			Directly	
Control pressure range	$p_{st\ min}$ $p_{st\ max}$	psi (bar)	44 (3) 145 (10)	

[1)] We recommend the use of mineral oil type VG32 to ISO 3448

Dimensions (mm)



Version 1/4	**Metric Version**		**NPT Version**	
Description	**Type Number**	**Order Number**	**Type Number**	**Order Number**
Two-hand safety valve	S9 563/65RF-1/4-SO	PD 37173	S9 563/65RF-1/4U-SO	PD 45507

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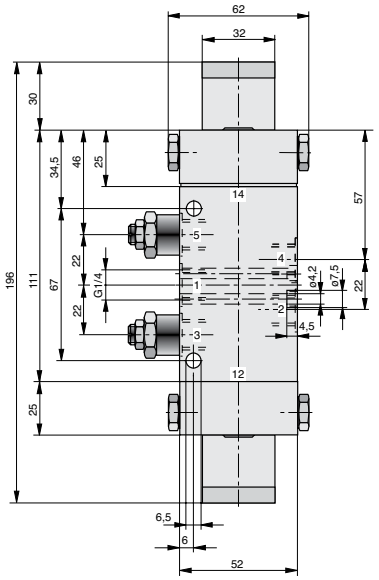
Characteristics to VDI 3290		Pressures quoted as gauge pressure		
Characteristics	Symbol	Unit	Description	
General Features				
System			Spool valve	
Mounting			2 screws M6 (M4)	
Tube connection			Thread	
Port size		NPT (G)	1/4	
Weight (mass)		lbs. (kg)	1.43 (0.65)	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 158 (+70)	
Medium			Filtered compressed air	
Lubrication			With or without oil mist lubrication[1)]	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	87 (6)	
Operating pressure range	p_{min} p_{max}	psi (bar)	36 (3) 118 (8)	
Nominal flow	Q_N	Cv (l/min)	1.3 (1300)	
Actuation				
Pneumatic			Direct	
Actuating pressure range	$p_{st\ min}$ $p_{st\ max}$	psi (bar)	36 (3) 118 (8)	

1) We recommend the use of mineral oil type VG32 to ISO 3448

Dimensions (mm)

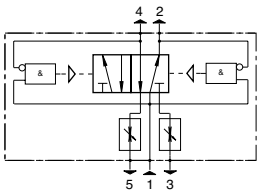


5/2-Way Valve

1/4

oscillating valve

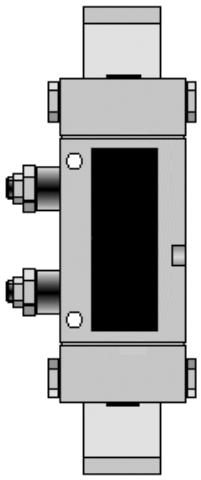
Actuation: Pneumatic



The oscillating valve automatically generates reciprocating movements, for applications such as shaking, feeding, hammering, plunging, scraping, wiping, winding, tensioning, raking, diverting, spraying, cleaning, and dipping.

The oscillating valve is supplied with two built-in flow control valves. This makes it easy to adjust the stroke frequency of the actuator.

Pneumatic Version:
If compressed air is introduced into inlet port 1, the outlet ports 4 and 2 are alternately supplied with air.



Version 1/4	**Metric Version**		**NPT Version**	
Description	**Type Number**	**Order Number**	**Type Number**	**Order Number**
Oscillating valve	S9 568/68-1/4-SO	PD 34796	S9 568/68-1/4U-SO	PD 45508

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Characteristics to VDI 3290	Pressures quoted as gauge pressure	
Characteristics	Unit	Description
General Features		
Type		Body ported valve
Style		Spool valve
Mounting		2 screws M6 (M4)
Tube connection		Thread
Port size	NPT (G)	1/4
Weight (mass)	lbs. (kg)	1.70 (.77)
Installation		In any position
Ambient temperature minimum maximum	°F (°C)	 14 (-10) 140 (+60)
Medium temperature minimum maximum	°F (°C)	 14 (-10) 158 (+70)
Pneumatic Characteristics		
Medium		Air
Nominal pressure	psi (bar)	131 (6)
Operating pressure minimum maximum	psi (bar)	 36 (3) 118 (8)
Nominal flow	Cv (l/min)	1.3 (1300)
Filtration		40 micron recommended
Lubrication		With or without lubrication[1)]
Electrical Characteristics		
Voltage AC DC	V	 110, 220 12, 24
Duty cycle		Continuous Duty
Electric protection		IP65 to DIN 40050
Insulating Material		VDE 0580
Connection		Plug to DIN 43650 form B
Actuation		
Electric manual override		(Internal) pilot operated yes

[1)] We recommend the use of mineral oil type VG32 to ISO 3448

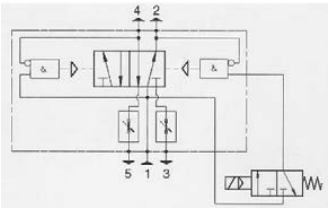
5/2-Way Valve

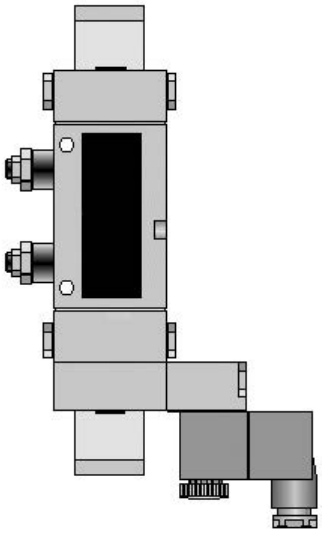
1/4

Oscillating Valve

Actuation: Electric

Electric Version:
Compressed air is introduced into inlet port 1. The outlet ports 4 and 2 are alternately supplied with air, for as long as an electrical signal is present at the solenoid coil.





Version 1/4			
Order Number	**Description**	**Ports**	**Voltage**
PD 47166-0133	5/2-way oscillating valve	1/4" NPT	12vDC
PD 47166-0233	5/2-way oscillating valve	1/4" NPT	24vDC
PD 47166-5733	5/2-way oscillating valve	1/4" NPT	110vAC

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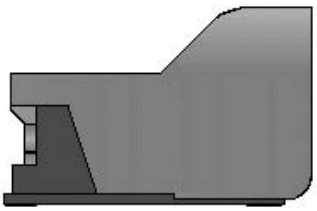
Characteristics to VDI 3290 Pressures quoted as gauge pressure				
Characteristics	Symbol	Unit	Description	
General Features				
System			Poppet valve	
Mounting			After removing the rubber footing 4 screws M8	
Tube connection			Thread	
Port size			G1/4	
Weight (mass)		lbs. (kg)	3.08 (1.5)	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 131 (+55)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	
Medium			Filtered compressed air	
Lubrication			Oil mist lubrication compatible with Buna N	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	87 (6)	
Operating pressure range	p_{min} p_{max}	psi (bar)	0 (0) 145 (10)	
Nominal flow	Q_N	Cv (l/min)	1.4 (1400)	
Actuation				
Manual control			Direct	
Stroke		mm	2	
Actuating force	Fb	lbf (N)	6.74 (30)	

3/2-Way Valve
1/4

Actuation: Foot Pedal

- **Detent**
- **Spring Return**

Delivery Includes:
valve
toe guard



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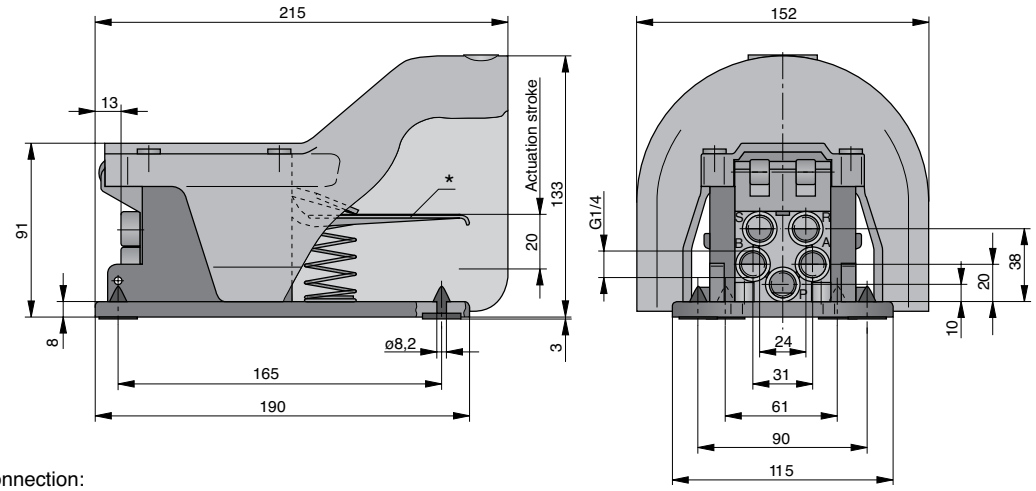
Dimensions (mm)



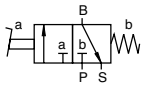
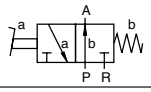
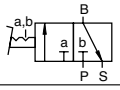
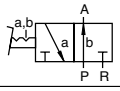
Connection:
Version "normally closed": P, B, S
Version "normally open": P, A, R

* Only for version "both switch positions indexed" - return is only effected after actuating the locking pedal.

Mounting instruction:
Only use screw connections with max. wrench size across flats of 15.

METRIC ONLY

Version G1/4

Actuation	Return	Symbol	Type Number	Order Number
Pedal	Spring return		**F331RF-08NG***	**KZ 4410**
			**F331RF-08NO***	**KZ 4411**
Pedal	Detent		**F331-08NG***	**KZ 4408**
			**F331-08NO***	**KZ 4409**

*NG = normally closed, NO = normally open

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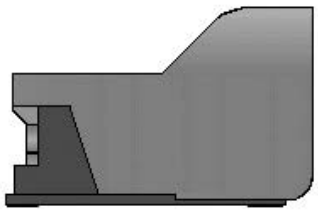
Characteristics to VDI 3290 Pressures quoted as gauge pressure				
Characteristics	Symbol	Unit	Description	
General Features				
System			Poppet valve	
Mounting			After removing the rubber footing 4 screws M8	
Tube connection			Thread	
Port size			G1/4	
Weight (mass)		lbs. (kg)	3.08 (1.5)	
Installation			In any position	
Ambient temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 131 (+55)	Note: When using below freezing point it is necessary to consult factory.
Medium temperature range	ϑ_{min} ϑ_{max}	°F (°C)	14 (-10) 140 (+60)	
Medium			Filtered compressed air	
Lubrication			Oil mist lubrication compatible with Buna N	
Pneumatic Characteristics				
Nominal pressure	p_n	psi (bar)	87 (6)	
Operating pressure range	p_{min} p_{max}	psi (bar) 10	0 (0) 145 (10)	
Nominal flow	Q_N	Cv (l/min)	1.4 (1400)	
Actuation				
Manual control			Direct	
Stroke		mm	2	
Actuating force	Fb	lbf (N)	6.74 (30)	

5/2-Way Valve
1/4

Actuation: Foot Pedal

- **Detent**
- **Spring Return**

Delivery Includes:
valve
toe guard



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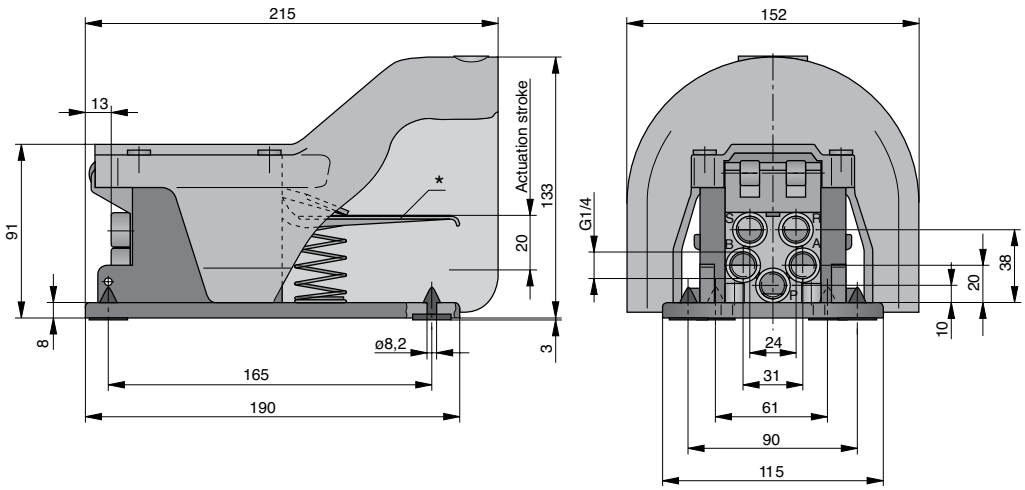
Dimensions (mm)

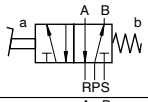
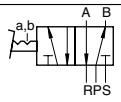


* Only for version "both switch positions indexed" - return is only effected after actuating the locking pedal.

Mounting instruction:
Only use screw connections with max. wrench size across flats of 15.

METRIC ONLY

Version G1/4

Actuation	Return	Symbol	Type Number	Order Number
Pedal	Spring return		**F531RF-08**	**KZ 4413**
Pedal	Detent		**F531-08**	**KZ 4412**

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RPS-Supply Manifolds

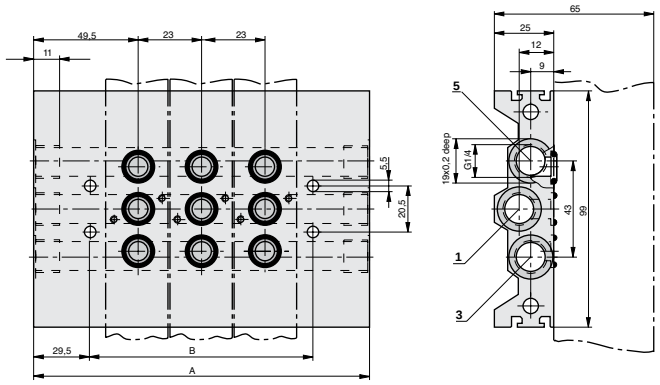
for directional valves of the S9-1/8 Series

Metric Only

Body Ported Valves

Dimensions (mm)

For dimensions A and B see table



Drawing shows: RPSL-S9-1/8-3

Dimension Table (mm)

Type #	# of valves	A	B
RPSL-S9-1/8-2	2	74	63
RPSL-S9-1/8-3	3	96	86
RPSL-S9-1/8-4	4	118	109
RPSL-S9-1/8-5	5	140	132
RPSL-S9-1/8-6	6	162	155
RPSL-S9-1/8-7	7	184	178
RPSL-S9-1/8-8	8	206	201
RPSL-S9-1/8-9	9	228	224
RPSL-S9-1/8-10	10	250	247

Material

Description	Material
RPS-supply mani.	Al, anodized
Screws	Galvanized steel
O-ring	Oil-resist. rubber

Accessories

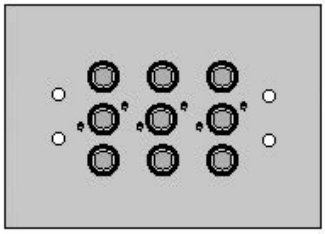
Description	Order No.
Complete cover strip	**PD 32956**
Flow divider	**PD 42483**

Versions:
5/2-way valves
5/3-way valves

Delivery Includes:
RPS-supply manifold
mounting screws
o-rings

Order Instructions

Type #	Order #	Quantity Manifold	Screws	O-rings	Weight (kg)
RPSL-S9-1/8-2	**PD 44813-0002**	1	4	6	0.47
RPSL-S9-1/8-3	**PD 44813-0003**	1	6	9	0.57
RPSL-S9-1/8-4	**PD 44813-0004**	1	8	12	0.67
RPSL-S9-1/8-5	**PD 44813-0005**	1	10	15	0.77
RPSL-S9-1/8-6	**PD 44813-0006**	1	12	18	0.87
RPSL-S9-1/8-7	**PD 44813-0007**	1	14	21	0.97
RPSL-S9-1/8-8	**PD 44813-0008**	1	16	24	1.07
RPSL-S9-1/8-9	**PD 44813-0009**	1	18	27	1.17
RPSL-S9-1/8-10	**PD 44813-0010**	1	20	30	1.27



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RPS-Supply Manifolds

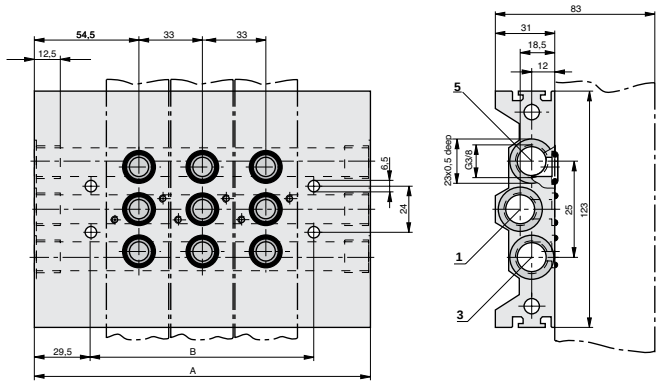
for directional valves of the S9-1/4 Series

Metric Only

Body Ported Valves

Dimensions (mm)

For dimensions A and B see table



Drawing shows: RPSL-S9-1/4-3

Dimension Table (mm)

Type #	# of valves	A	B
RPSL-S9-1/4-2	2	96	83
RPSL-S9-1/4-3	3	129	116
RPSL-S9-1/4-4	4	162	149
RPSL-S9-1/4-5	5	195	182
RPSL-S9-1/4-6	6	228	215
RPSL-S9-1/4-7	7	261	248
RPSL-S9-1/4-8	8	294	281
RPSL-S9-1/4-9	9	327	314
RPSL-S9-1/4-10	10	360	347

Material

Description	Material
RPS-supply mani.	Anodized alum.
Screws	Galvanized steel
O-ring	Oil-resist. rubber

Accessories

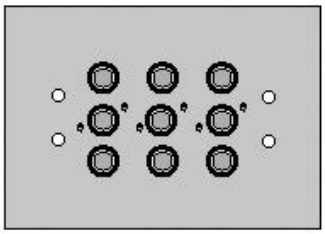
Description	Order No.
Cover strip kit	**PD 32957**
Flow divider	**PD 42516**

Versions:
5/2-way valves
5/3-way valves

Delivery Includes:
RPS-supply manifold
mounting screws
o-rings

Order Instructions

Type #	Order #	Quantity Manifold	Quantity Screws	Quantity O-rings	Weight (kg)
RPSL-S9-1/4-2	**PD 44814-0002**	1	4	6	0.845
RPSL-S9-1/4-3	**PD 44814-0003**	1	6	9	1.045
RPSL-S9-1/4-4	**PD 44814-0004**	1	8	12	1.245
RPSL-S9-1/4-5	**PD 44814-0005**	1	10	15	1.445
RPSL-S9-1/4-6	**PD 44814-0006**	1	12	18	1.645
RPSL-S9-1/4-7	**PD 44814-0007**	1	14	21	1.845
RPSL-S9-1/4-8	**PD 44814-0008**	1	16	24	2.045
RPSL-S9-1/4-9	**PD 44814-0009**	1	18	27	2.245
RPSL-S9-1/4-10	**PD 44814-0010**	1	20	30	2.445



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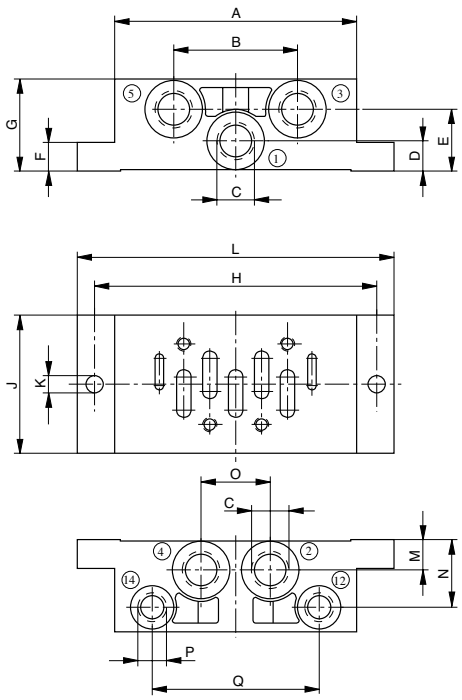
Dimensions (mm)
Single Base Plate, Form A — **Side Ported**



Base Plates

ISO 5599
Size: 1, 2, 3

Single Base Plates

- **To VDMA 24345 Form A Side Ported**
- **To VDMA 24345 Form B Bottom Ported**

Dimension Table (mm)

ISO Size	A	B	C	D	E	F	G	H
1	84	43	1/4	10.5	21.5	10	32	98
2	95	56	3/8	14	26	13	40	112
3	119	68	1/2	17	17	18	32	136

ISO Size	J	K	L	M	N	O	P	Q
1	48	5.5	110	10.5	23.5	24	1/8	58
2	57	6.6	124	14	30	30	1/8	74
3	71	6.6	149	17	22	32	1/8	90

Order Instructions

		Order Number	
ISO Size	Ports	Metric Version	NPT Version
1	1/4 3/8	KX 9076	600C01 642K91
2	3/8 1/2	KX 9433	601C01 643K91
3	1/2 3/4	KX 9434	602C01 644K91

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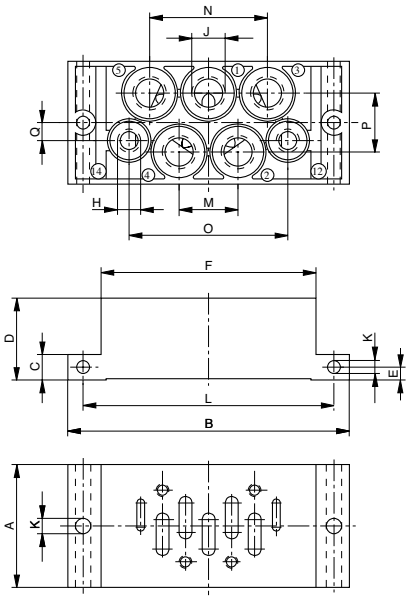
Dimensions (mm)
Single Base Plate, Form B **Bottom Ported**



Intermediate Plate
Form C

End Plate Set, Form D
for Intermediate Plate

Dimension Table (mm)

ISO Size	A	B	C	D	E	F	H	J	K	L	M	N	O	P	Q
1	46	110	10	30	5	84	G1/8	G1/4	5.5	98	23	46	62	23	7.5
2	56	124	13	35	6.5	95	G1/8	G3/8	6.6	112	28	56	73	27	7.5
3	71	149	18	32	9	119	G1/8	G1/2	6.6	136	34	68	90	35	10

Order Instructions

ISO Size	Ports	Order Number
1	G1/4	KX 9077
2	G3/8	KX 9436
3	G1/2	KX 9437

Order Instructions

ISO Size	Description	Order Number
1 2 3	manifold subbase, G1/4, Form C manifold subbase, G3/8, Form C manifold subbase, G1/2, Form C	KX 9079 KX 9419 KX 9420
1 2 3	end plate set, G3/8, Form D end plate set, G1/2, Form D end plate set, G1, Form D	KX 9078 KX 9421 KX 9422
	adapter plate to combine size 1 to size 2 adapter plate to combine size 1 to size 3 adapter plate to combine size 2 to size 3	KX 9430 KX 9432 KX 9431
1 2 3	cover strip kit cover strip kit cover strip kit	KX 9082 KX 9423 KX 9424
1 2 3	intermediate plate, with built-in flow control valves intermediate plate, with built-in flow control valves intermediate plate, with built-in flow control valves	701B77 702B77 722K77
1 2 3	intermediate plate, with ONE built-in pressure regulator intermediate plate, with ONE built-in pressure regulator intermediate plate, with ONE built-in pressure regulator	620C91 624C91 628C91
1 2 3	intermediate plate, with TWO built-in pressure regulators intermediate plate, with TWO built-in pressure regulators intermediate plate, with TWO built-in pressure regulators	621C91 625C91 629C91

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Accessories

Exhaust Mufflers	
Order Number	Port Size
KY 2010	G1/8
KY 2011	G1/4
KY 2012	G3/8
KY 2013	G1/2
KY-U2010	1/8" NPT
KY-U2011	1/4" NPT
KY-U2013	1/2" NPT

Exhaust Flow Controls	
Order Number	Port Size
KY 6952	G1/8
KY 6953	G1/4
KY 6954	G1/2
ASP-1SC	1/8" NPT
ASP-2SC	1/4" NPT

Port Plugs	
Order Number	Port Size
0205-1000	G1/8
0205-1300	G1/4
0205-1600	G3/8
0205-2000	G1/2
0205-1100	1/8" NPT
0205-1400	1/4" NPT
0205-1800	3/8" NPT
0205-2200	1/2" NPT

Metric Conversion Fittings	
Order Number	Port Size
2521-1/8-02	G1/8 to 1/8" NPT
2521-1/4-04	G1/4 to 1/4" NPT
2521-3/8-06	G3/8 to 3/8" NPT
2521-1/2-08	G1/2 to 1/2" NPT

Spare Parts

Replacement Solenoid Coils: 1/8" & 1/4" Body Ported Valves	
Order Number	Voltage
KZ 3674	12vDC
KZ 3673	24vDC
KZ 3669	110vAC
KZ 3672	220vAC
KZ 3675	24vAC

Replacement Solenoid Coils: 1/2" Body Ported Valves & ISO Valves	
Order Number	Voltage
KZ 3518	12vDC
KZ 3519	24vDC
KZ 3521	110vAC
KZ 3522	220vAC
KZ 3518	24vAC

Replacement DIN Connector Plugs	
Order Number	Description
KY 9393	Replacement DIN connector plug
C12213N21	DIN connector plug w/1/2" NPTF conduit entry
PD 34991	Solenoid retaining nut
KW 0766	Lighted wafer seal, for DIN connector plug, 24vDC
KZ 3759	DIN connector plug w/surge suppression, 12 & 24vDC
KX 5368	DIN connector plu w/surge suppression, 110 & 220vAC
KY 3018	DIN connector plug w/surge suppression, LED, 12 & 24vDC
KW 0718	DIN connector plug w/surge suppression, LED, 110 & 220vAC

Seal Kits: S9 Solenoid Valves			
Actuation	1/8"	1/4"	1/2"
5/2 Single	PD 35534	PD 35536	PD 35578
5/2 Double	PD 35520	PD 35526	PD 35577
5/3 Blocked	PD 35525	PD 35531	PD 35579
5/3 Exhaust	PD 35524	PD 35530	PD 35581
5/3 Dual	PD 35523	PD 35529	PD 35580

RPS Supply Manifolds: 1/8 PD 44813-....	
Order Number	Description
88-37H643-75	O-ring (10x2)
ZP 3986	Screws (M3x40)

RPS Supply Manifolds: 1/4 PD 44814-....	
Order Number	Description
88-52H643-75	O-ring (13x2)
ZP 3988	Screws (M4x55)

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Safety Guide For Selecting And Using Pneumatic Division Products And Related Accessories

⚠ WARNING:

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF PNEUMATIC DIVISION PRODUCTS, ASSEMBLIES OR RELATED ITEMS ("PRODUCTS") CAN CAUSE DEATH, PERSONAL INJURY, AND PROPERTY DAMAGE. POSSIBLE CONSEQUENCES OF FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THESE PRODUCTS INCLUDE BUT ARE NOT LIMITED TO:

- Unintended or mistimed cycling or motion of machine members or failure to cycle
- Work pieces or component parts being thrown off at high speeds.
- Failure of a device to function properly for example, failure to clamp or unclamp an associated item or device.
- Explosion
- Suddenly moving or falling objects.
- Release of toxic or otherwise injurious liquids or gasses.

Before selecting or using any of these Products, it is important that you read and follow the instructions below.

1. GENERAL INSTRUCTIONS

1.1. Scope: This safety guide is designed to cover general guidelines on the installation, use, and maintenance of Pneumatic Division Valves, FRLs (Filters, Pressure Regulators, and Lubricators), Vacuum products and related accessory components.

1.2. Fail-Safe: Valves, FRLs, Vacuum products and their related components can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of associated valves, FRLs or Vacuum products will not endanger persons or property.

1.3 Relevant International Standards: For a good guide to the application of a broad spectrum of pneumatic fluid power devices see: ISO 4414:1998, Pneumatic Fluid Power – General Rules Relating to Systems. See www.iso.org for ordering information.

1.4. Distribution: Provide a copy of this safety guide to each person that is responsible for selection, installation, or use of Valves, FRLs or Vacuum products. Do not select, or use Parker valves, FRLs or vacuum products without thoroughly reading and understanding this safety guide as well as the specific Parker publications for the products considered or selected.

1.5. User Responsibility: Due to the wide variety of operating conditions and applications for valves, FRLs, and vacuum products Parker and its distributors do not represent or warrant that any particular valve, FRL or vacuum product is suitable for any specific end use system. This safety guide does not analyze all technical parameters that must be considered in selecting a product. The user, through its own analysis and testing, is solely responsible for:

- Making the final selection of the appropriate valve, FRL, Vacuum component, or accessory.
- Assuring that all user's performance, endurance, maintenance, safety, and warning requirements are met and that the application presents no health or safety hazards.
- Complying with all existing warning labels and / or providing all appropriate health and safety warnings on the equipment on which the valves, FRLs or Vacuum products are used; and,
- Assuring compliance with all applicable government and industry standards.

1.6. Safety Devices: Safety devices should not be removed, or defeated.

1.7. Warning Labels: Warning labels should not be removed, painted over or otherwise obscured.

1.8. Additional Questions: Call the appropriate Parker technical service department if you have any questions or require any additional information. See the Parker publication for the product being considered or used, or call 1-800-CPARKER, or go to www.parker.com, for telephone numbers of the appropriate technical service department.

2. PRODUCT SELECTION INSTRUCTIONS

2.1. Flow Rate: The flow rate requirements of a system are frequently the primary consideration when designing any pneumatic system. System components need to be able to provide adequate flow and pressure for the desired application.

2.2. Pressure Rating: Never exceed the rated pressure of a product. Consult product labeling, Pneumatic Division catalogs or the instruction sheets supplied for maximum pressure ratings.

2.3. Temperature Rating: Never exceed the temperature rating of a product. Excessive heat can shorten the life expectancy of a product and result in complete product failure.

2.4. Environment: Many environmental conditions can affect the integrity and suitability of a product for a given application. Pneumatic Division products are designed for use in general purpose industrial applications. If these products are to be used in unusual circumstances such as direct sunlight and/or corrosive or caustic environments, such use can shorten the useful life and lead to premature failure of a product.

2.5. Lubrication and Compressor Carryover: Some modern synthetic oils can and will attack nitrile seals. If there is any possibility of synthetic oils or greases migrating into the pneumatic components check for compatibility with the seal materials used. Consult the factory or product literature for materials of construction.

2.6. Polycarbonate Bowls and Sight Glasses: To avoid potential polycarbonate bowl failures:

- Do not locate polycarbonate bowls or sight glasses in areas where they could be subject to direct sunlight, impact blow, or temperatures outside of the rated range.
- Do not expose or clean polycarbonate bowls with detergents, chlorinated hydro-carbons, keytones, esters or certain alcohols.
- Do not use polycarbonate bowls or sight glasses in air systems where compressors are lubricated with fire resistant fluids such as phosphate ester and di-ester lubricants.

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2.7. Chemical Compatibility: For more information on plastic component chemical compatibility see Pneumatic Division technical bulletins Tec-3, Tec-4, and Tec-5

2.8. Product Rupture: Product rupture can cause death, serious personal injury, and property damage.
- Do not connect pressure regulators or other Pneumatic Division products to bottled gas cylinders.
- Do not exceed the maximum primary pressure rating of any pressure regulator or any system component.
- Consult product labeling or product literature for pressure rating limitations.

3. PRODUCT ASSEMBLY AND INSTALLATION INSTRUCTIONS

3.1. Component Inspection: Prior to assembly or installation a careful examination of the valves, FRLs or vacuum products must be performed. All components must be checked for correct style, size, and catalog number. DO NOT use any component that displays any signs of nonconformance.

3.2. Installation Instructions: Parker published Installation Instructions must be followed for installation of Parker valves, FRLs and vacuum components. These instructions are provided with every Parker valve or FRL sold, or by calling 1-800-CPARKER, or at www.parker.com.

3.3. Air Supply: The air supply or control medium supplied to Valves, FRLs and Vacuum components must be moisture-free if ambient temperature can drop below freezing

4. VALVE AND FRL MAINTENANCE AND REPLACEMENT INSTRUCTIONS

4.1. Maintenance: Even with proper selection and installation, valve, FRL and vacuum products service life may be significantly reduced without a continuing maintenance program. The severity of the application, risk potential from a component failure, and experience with any known failures in the application or in similar applications should determine the frequency of inspections and the servicing or replacement of Pneumatic Division products so that products are replaced before any failure occurs. A maintenance program must be established and followed by the user and, at minimum, must include instructions 4.2 through 4.10.

4.2. Installation and Service Instructions: Before attempting to service or replace any worn or damaged parts consult the appropriate Service Bulletin for the valve or FRL in question for the appropriate practices to service the unit in question. These Service and Installation Instructions are provided with every Parker valve and FRL sold, or are available by calling 1-800-CPARKER, or by accessing the Parker web site at www.parker.com.

4.3. Lockout / Tagout Procedures: Be sure to follow all required lockout and tagout procedures when servicing equipment. For more information see: OSHA Standard – 29 CFR, Part 1910.147, Appendix A, The Control of Hazardous Energy – (Lockout / Tagout)

4.4. Visual Inspection: Any of the following conditions requires immediate system shut down and replacement of worn or damaged components:
- Air leakage: Look and listen to see if there are any signs of visual damage to any of the components in the system. Leakage is an indication of worn or damaged components.
- Damaged or degraded components: Look to see if there are any visible signs of wear or component degradation.
- Kinked, crushed, or damaged hoses. Kinked hoses can result in restricted air flow and lead to unpredictable system behavior.
- Any observed improper system or component function: Immediately shut down the system and correct malfunction.
- Excessive dirt build-up: Dirt and clutter can mask potentially hazardous situations.

Caution: Leak detection solutions should be rinsed off after use.

4.5. Routine Maintenance Issues:
- Remove excessive dirt, grime and clutter from work areas.
- Make sure all required guards and shields are in place.

4.6. Functional Test: Before initiating automatic operation, operate the system manually to make sure all required functions operate properly and safely.

4.7. Service or Replacement Intervals: It is the user's responsibility to establish appropriate service intervals. Valves, FRLs and vacuum products contain components that age, harden, wear, and otherwise deteriorate over time. Environmental conditions can significantly accelerate this process. Valves, FRLs and vacuum components need to be serviced or replaced on routine intervals. Service intervals need to be established based on:
- Previous performance experiences.
- Government and / or industrial standards.
- When failures could result in unacceptable down time, equipment damage or personal injury risk.

4.8. Servicing or Replacing of any Worn or Damaged Parts: To avoid unpredictable system behavior that can cause death, personal injury and property damage:
- Follow all government, state and local safety and servicing practices prior to service including but not limited to all OSHA Lockout Tagout procedures (OSHA Standard – 29 CFR, Part 1910.147, Appendix A, The Control of Hazardous Energy – Lockout / Tagout).
- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to system and Pneumatic Division products before installation, service, or conversion.
- Installation, servicing, and / or conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversions air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or if the product does not operate properly, do not put product or system into use.
- Warnings and specifications on the product should not be covered or painted over. If masking is not possible, contact your local representative for replacement labels.

4.9. Putting Serviced System Back into Operation: Follow the guidelines above and all relevant Installation and Maintenance Instructions supplied with the valve FRL or vacuum component to insure proper function of the system.

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Offer of Sale

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7. Special Tooling: A tooling charge may be imposed for any special tooling, including without limitations, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the items sold hereunder, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

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9. Taxes: Unless otherwise indicated on the face hereof, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are held to be taxable.

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If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, Buyer shall defend and indemnify Seller for all costs, expenses or judgements resulting from any claim that such item infringes any patent, trademark, copyright, trade dress, trade secret or any similar right.

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12. Entire Agreement/Governing Law: The terms and conditions set forth herein, together with any amendments, modifications and any different terms or conditions expressly accepted by Seller in writing, shall constitute the entire Agreement concerning the items sold, and there are no oral or other representations or agreements which pertain thereto. This Agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of sale of the items sold hereunder or this Agreement may be brought by either party more than two (2) years after the cause of action accrues.

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