hymatik

LUCIFER®

EPP3 Series Electropneumatic pressure regulator

with integrated electronic control

Catalogue 8677/GB
March 1999

Parker

INTRODUCTION

The product

A range of electropneumatic pressure regulators G1/4 and G1/2 which, by means of an integrated electronic control system and pulse width modulated solenoid valves, controls the output pressure proportionally to an analog electrical signal. A high precision is achieved by means of an internal feed-back through an integrated pressure sensor.

Applications

Pressure control independent of flow in electropneumatic control systems, in particularly the following industries:

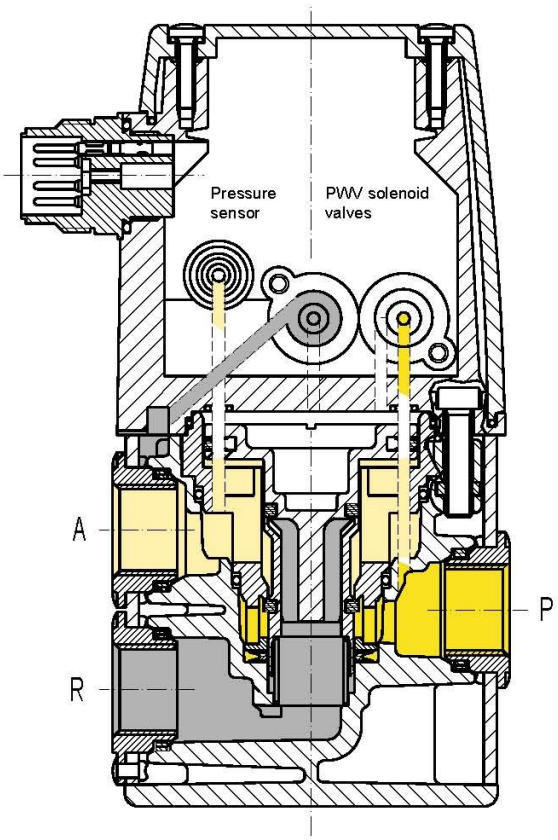
- Robotics: welding, painting lines, etc.
- Paper and printing: tension regulation, speed- and brake control for rolls
- Machine Tools: Plastic moulding, laser welding, presses, polishing, etc.
- Trucks and Trains: control of adaptive suspensions.

Benefits

- Simplification of control systems by reducing the number of components
- More flexibility of the controls
- Very fast response times
- Excellent linearity and hysteresis
- No air consumption in rest position
- Increase of the productivity (performances, quality, reliability)
- Direct interface to programmable controllers.

THE REGULATOR EPP3 - DESCRIPTION OF OPERATION

The EPP3 Series is a family of electrically remote-controlled pneumatic pressure regulators with closed loop integrated electronic control. It allows to regulate the outlet pressure proportionally to an electrical control signal.
The EPP3 regulator comprises a traditional servo-operated pneumatic pressure regulator, where the pilot chamber is fed by one or the other of two pulse width modulated 2-way solenoid valves. The pressure sensor measures the outlet pressure of the regulator and provides a feedback signal to the amplifier. Any difference between the control signal and the feedback signal is converted to a digital signal to energize the coil of one or the other 2-way valves to correct the position of the regulator.
The control signal can be a voltage (0 - 10V) or a current (4 - 20 mA). The inlet of the "filling valve" is connected directly to the main inlet P of the regulator; when energized this valve will fill the servo-chamber for increasing the pressure at the outlet A of the regulator.
When the other "exhaust valve" is energized (reduction of pressure at the outlet A of the regulator), the pressure of the servo-chamber will be exhausted through a discharge orifice located between the cover and the body and directly fed to the atmosphere without silencer. The exhaust of the main regulated pressure will be made through the quick exhaust R. The use of a conventional silencer is recommended. Both solenoid valves assure the filling or emptying of the servo-chamber in order to increase or decrease the pressure at the outlet of the regulator. In rest position of the valves all ports are blocked.



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TECHNICAL DATA

Fluid:	Lubricated or non lubricated air and neutral gases (recommended filtration: 25-50 μ)
Temperature range:	ambient 0 to 50° C fluid 0 to 50° C
Inlet pressure range:	1 to 12 bar (the inlet pressure must always be at least 1 bar above the regulated pressure).
Outlet pressure range:	0.2 to 10 bar
Hysteresis:	≈ 100 mbar (Factory set up)
Linearity:	1% f.s.o.
Air consumption at constant control signal:	0
Supply voltage:	24 V DC ± 15 % (Max. ripple 1 V)
Power consumption:	max. 6 W with 24 V DC and constant changes of the control signal < 1 W without change of control signal.
Control signal:	analog 0-10 V Impedance: 10 kΩ analog 4-20 mA Impedance: 0.5 kΩ
Outlet sensor signal:	A) proportional pressure outlet signal 0-10 V from integrated sensor (recommended load resistance 10 kΩ) B) proportional pressure outlet signal 4-20 mA from integrated sensor (recommended load resistance 0.5 kΩ) C) "Alarm" output signal 0/24 V with adjustable triggering level. (Difference between control signal and sensor pressure signal) (Imax. = 40 mA) - factory set up: diff. signal = ± 0.8 V to ± 1 V - possible set up: diff. signal = ± 0.1 V to ± 5 V To neutralize the alarm output signal during the control signal changes, the use of a synchronized time lag relay is required.
Indicative response time:	With a volume of 330 cm^3 at the outlet of the regulator: Filling: 2 to 4 bar - 2 to 8 bar Step response: ≈ 60 ms - ≈ 120 ms Emptying: 4 to 2 bar - 8 to 2 bar Step response: ≈ 70 ms - ≈ 130 ms.
Safety position:	In case of control failure or if it is less than 1% of its full scale value, the regulated pressure drops automatically to 0 bar (atmospheric pressure). In case of voltage supply failure, the regulated pressure will be kept constant (with eventual discrepancy due to loss of pressure in the servo-chamber).
Electrical connection:	4 screw terminals under the protection cover with Pg 13.5 cable gland or through DIN 43651 connector (6 P + E).
Life expectancy:	> 50 Mio changes of control signal steps.
Mounting position:	Indifferent (recommended position: upright; electronic part on top).
Resistance to vibrations:	30 g in all directions.
External sensors:	All pressure sensors with following characteristics are compatible with the EP-transducer: Sensitivity: 0.5 V/bar up to 10 V/bar Zero offset: – 3 V to + 3 V.
Degree of protection:	IP 65.
Assembly:	Silicone free.
Electromagnetic compatibility:	In accordance with IEC 801-4 part 4 standards.
Installation and setting instructions:	See publication MI-9202 and appendix supplied with the product.

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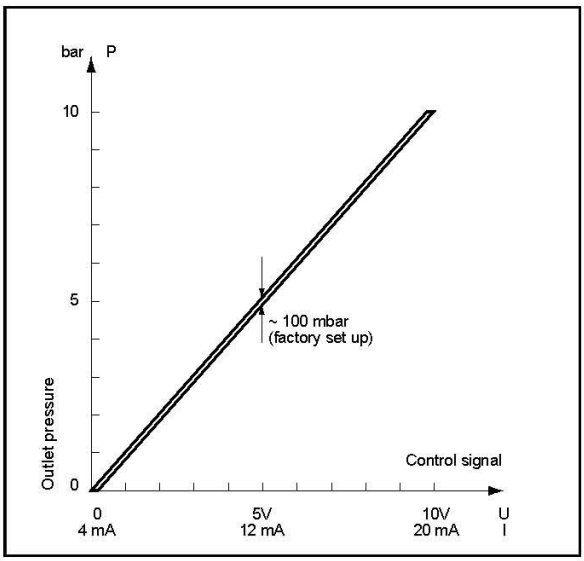
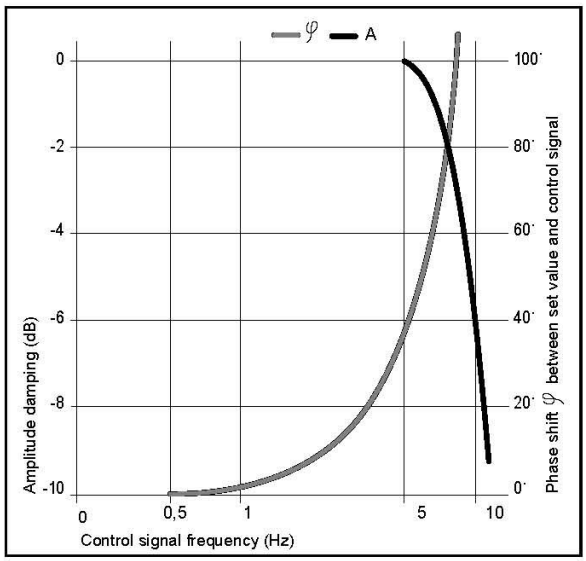
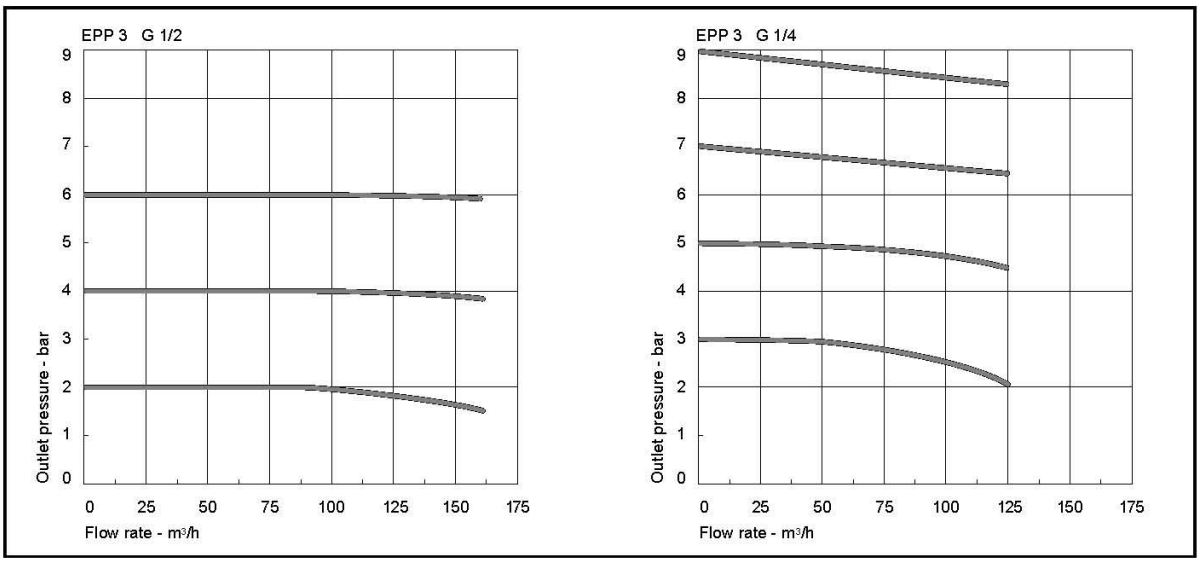
HYSTERESIS DIAGRAM



TRANSFER DIAGRAM



FLOW DATA - OUTLET PRESSURE IN FUNCTION OF FLOW AT CONSTANT CONTROL SIGNAL (P1 = 10 bar)



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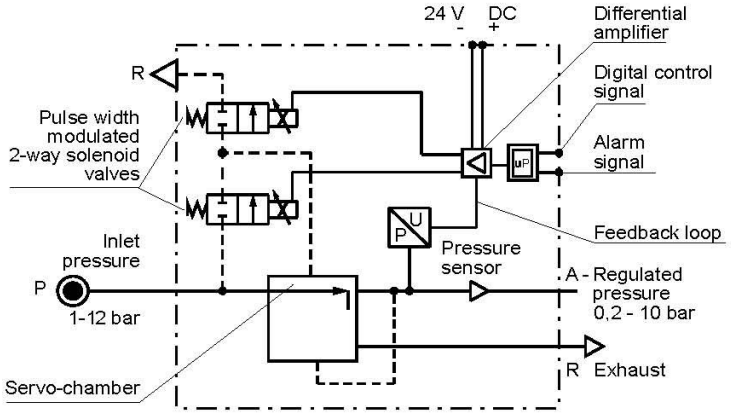
EPP3 - BLOCK DIAGRAMS

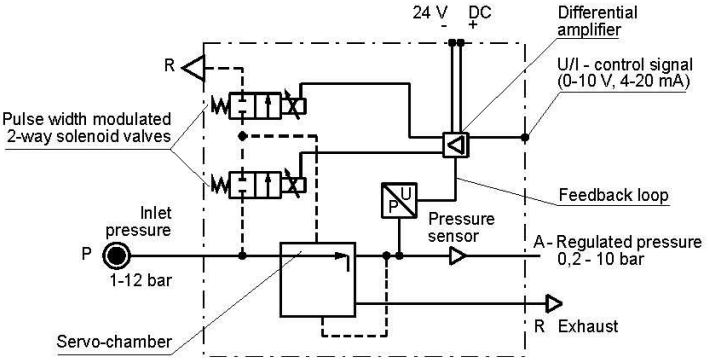
Series ... 600/700 ...
with integrated pressure sensor
and output signal module

The microprocessor receives through a differential amplifier both the control signal (set pressure) and the feedback signal from the sensor (outlet pressure). Any difference between the two amplifier inputs results in a corresponding output which drives the appropriate 2-way pulse width modulated solenoid valve so that the pilot piston moves to correct the pressure.



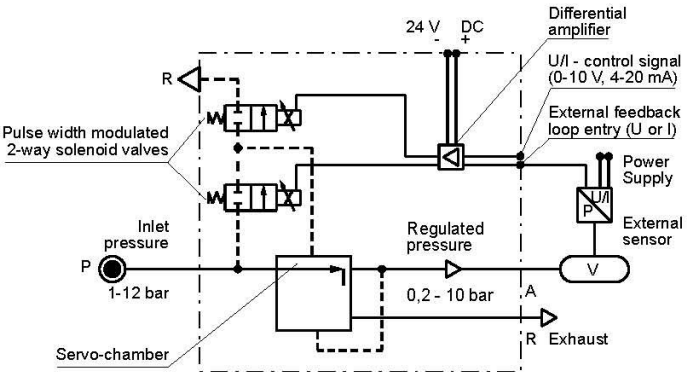
Series ... 100 ...
with integrated pressure sensor
without output signal module

Similar principle of operation as explained under pt. 1, but without output signal module.



Series ... 130 ...
without pressure sensor and
without output signal module

Similar principle of operation as explained under pt. 1, but without integrated pressure sensor and without output signal module, but with external feedback loop entry. A vast range of sensors can be used as proximity -, level -, pressure sensors etc providing the regulation system responds proportionally to the pressure.
Example: opening of a large valve through a pneumatically driven actuator. If the angle of rotation of the gate is proportional to the pressure, the EPP3 can be controlled by a proximity sensor.



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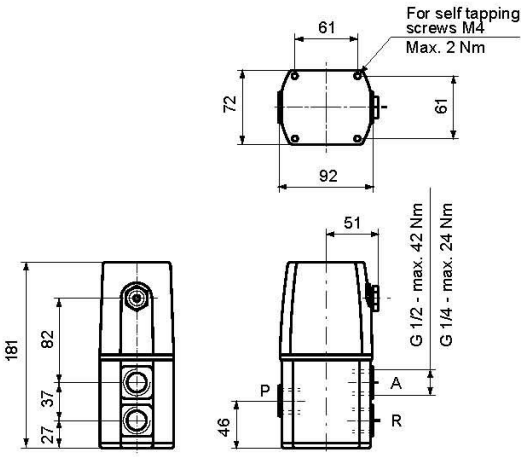
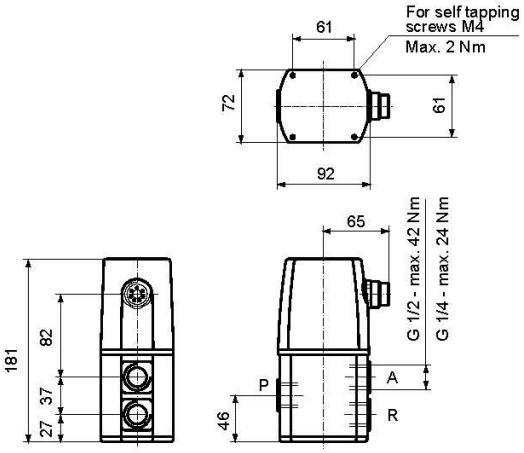
DIMENSIONS - TORQUES

EPP3JC ... 100 ...
with Pg 13.5 cable gland connection

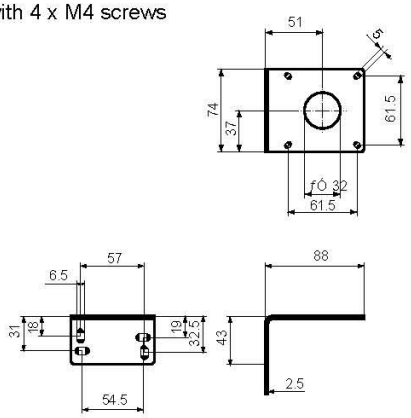


EPP3JC ... 130/600/700 ...
with DIN circular plug-in connection 6 P + E
(connector included)



ACCESSORIES

Mounting brackets
Supplied with 4 x M4 screws



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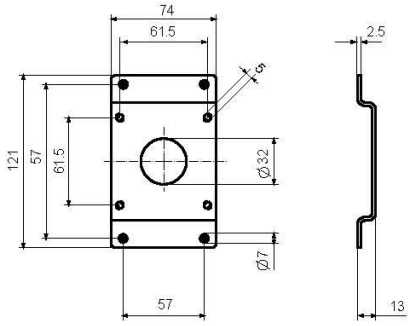

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DESIGNATION CODE

EPP3 J C 21 U 100 10 ...

Manufacturing date

Pressure range
10 = up to 10 bar

Special design reference

Outlet signal options
1 = without outlet signal or without sensor
6 = outlet signal 0-10 V and 4-20 mA
7 = outlet signal 0-10 V and 0/24 V alarm

Type of input signal (control value)
U = voltage 0-10 V
I = current 4-20 mA

Sensor option reference
1 = pressure sensor at the outlet of the regulator
3 = without internal pressure sensor, feedback 0-10 V
4 = without internal pressure sensor, feedback 4-20 mA

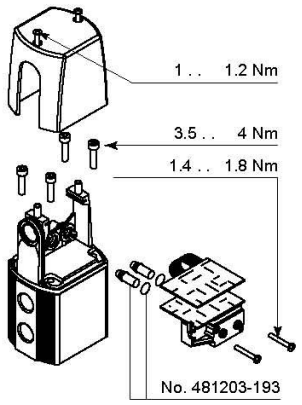
Port size reference
2 = 1/4", 4 = 1/2"

Port thread
C = BSP
O = NPT

Body type
J = plastic body with aluminium jacket

MAINTENANCE KIT

Torques; kit n° 481203-193
Plungers and seals for pilot valves



SUMMARY OF TYPES

	Connection G	With integrated pressure sensor	Entry options for external sensor signal		Outlet signal options			Electrical connection	
			feedback signal 0 - 10 V	feedback signal 4 - 20 mA	without	0 - 10 V 4 - 20 mA	0 - 10 V 0/24 V alarm	DIN 43651 connector	cable gland Pg. 13.5
EPP3JC 21U/I100 10	1/4	•			•				•
21U/I600 10	1/4	•				•		•	
21U/I700 10	1/4	•					•	•	
EPP3JC 23U/I130 10	1/4		•		•			•	
24U/I130 10	1/4			•	•			•	
EPP3JC 41U/I100 10	1/2	•			•				•
41U/I600 10	1/2	•				•		•	
41U/I700 10	1/2	•					•	•	
EPP3JC 43U/I130 10	1/2		•		•			•	
44U/I130 10	1/2			•	•			•	

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