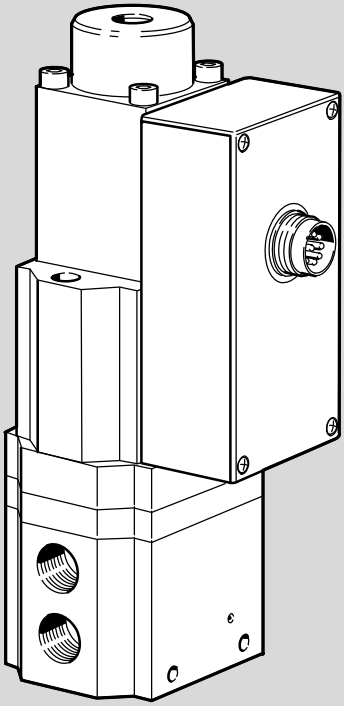
Proportional pressure regulating valve

MPPES



FESTO

en Operating instructions

8081503
2018-01f
[8081505]

Translation of the original instructions

Symbols:



Warning

Installation and commissioning may only be performed in accordance with these instructions by technicians with appropriate qualifications.



Caution



Note



Environment



Accessories

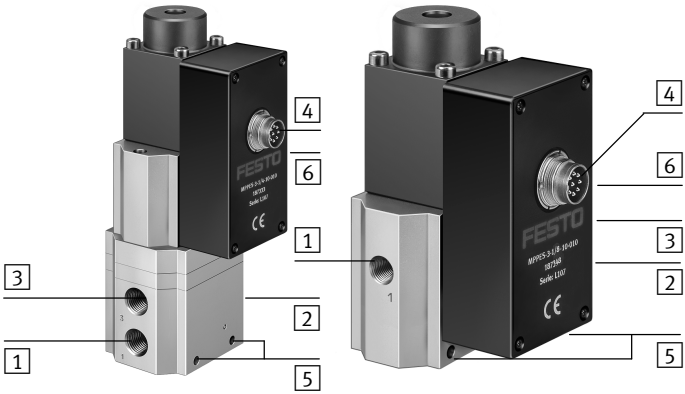
English 3

English – Proportional pressure regulating valve MPPES

Documentation on the product

For all available product documentation ➔ www.festo.com/pk

1 Control sections and connections



1 Compressed air supply port (pressure input)
2 Air supply port (pressure output)
3 Exhaust port
4 Electrical connection
5 Through holes for fastening
6 Functional earth connection (reverse side)

Fig. 1

2 Function and application

A built-in pressure sensor records the pressure at the air supply port. The electronic control unit compares the pressure value with the setpoint value. An analogue, electrical signal is issued corresponding to the output pressure. If the actual value differs from the setpoint value, the regulating valve is actuated until the output pressure reaches the setpoint value.
The MPPES-... is designed to control pressure proportionately to a specified, electrical setpoint value.



Note

- Make sure that high-frequency radiation (e.g. by radio sets, mobile telephones or other interference-emitting devices) is kept away from the MPPES-....
  In this way you will avoid increased tolerances in the output pressure (for further information refer to the EMC specifications in the Technical data chapter).

3 Requirements for product use

Note
General conditions for the correct and safe use of the product, which must be observed at all times:

- Comply with the specified limit values (e.g. for pressures, forces, torques, temperatures and electric voltage).
- Compare the specified limit values, e.g. for pressures, forces, temperatures, with those of your application.
- Ensure that there is a supply of correctly prepared compressed air (➔ Fig. 2)

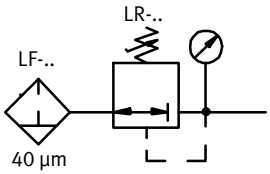


Fig. 2

- Take into account the prevailing ambient conditions (➔ Fig. 3 and chap. 11)

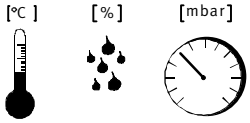


Fig. 3

- Also observe the regulations of the trade association, the German Technical Control Board (TÜV), the VDE and relevant national regulations.
- Too much residual oil content in the compressed air will reduce the service life of the valve.
  When using bio-oils (oils that are based on synthetic ester or native ester, e.g. rapeseed oil methyl ester), the maximum residual oil content of 0.1 mg/m³ should not be exceeded (➔ ISO 8573-1 [7:4:2]).
- Remove all transport packaging, such as protective wax, foils, caps, cartons (except for plugs in the pneumatic connections).
  The individual materials can be disposed of in recycling containers.
- Pressurise your entire system slowly (e.g. according to Fig. 4) to avoid any uncontrolled movements.
- Observe the warnings and instructions
  – on the product
  – in these operating instructions.

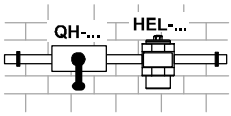


Fig. 4

- Use the product in its original status, without any unauthorised product modifications.

4 Installation

Mechanical

- Handle the MPPES-... with care so that the electrical connection is not damaged.

  Such damage will reduce operational reliability

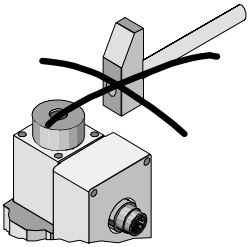


Fig. 5

- Make sure there is sufficient space for the cable connection and tube couplings.
  In this way you will prevent the connecting cable from being bent.
- Place the MPPES-... as close to the cylinder as possible.
  This results in better control precision and shorter response times.

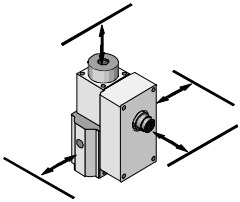


Fig. 6

- Insert the screws for mounting into the two holes [5].
- Secure the MPPES-... at the intended position.

4.1 Pneumatic

- Remove the covers from the compressed air supply ports.
- Attach the pneumatic tubing to the following connections:
  - Compressed air supply port [1]
  - Air supply port [2]
- Screw a silencer (➔ Accessories) into the exhaust port [3].

4.1.1 Electrical

- Note the rating plate.
  A distinction is made between the following valve variants (➔ Tab. 1).

Designation on the rating plate	MPPES-...-010	MPPES-...-420
Designation	Voltage variant	Current variant
Electrical setpoint value	DC 0 ... 10 V	4 ... 20 mA

Tab. 1

Warning
- Use for the electrical power supply only PELV **circuits** in accordance with IEC 60204-1 PELV).
- Use only **power sources** which guarantee reliable electrical disconnection of the operating voltage in accordance with IEC 60204-1.

Note
- Check the use of the voltage or current actual signal at the MPPES-....

- Use the following connection accessories (➔ Accessories):
  - Socket with cable or
  - Plug socket and screened cable

Note
- Wire the following connections with earth potential:
  - screening on the cable end away from the MPPES
  - the functional earth connection 6 (blind hole in the aluminium housing ➔ Fig 8) You can then guarantee that the specified protection class IP65 and EMC are fulfilled.

Note
- Make sure that the cables are laid as follows:
  - not squashed
  - not bent
  - not stretched (➔ Fig. 8).

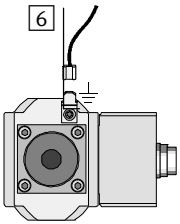
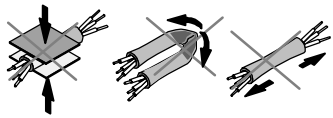


Fig. 7


Fig. 8

- Wire the MPPES-...- according to one of the connection arrangements: Fig. 9 or Fig. 10

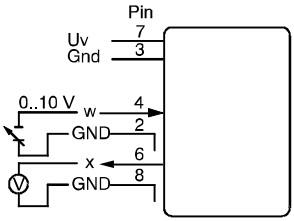


Fig. 9 Voltage variant

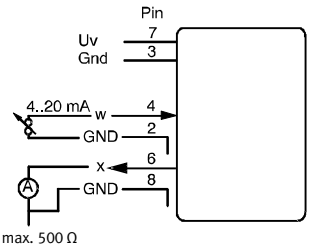
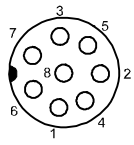


Fig. 10 Current variant

	Pin no.	Voltage variant	Current variant	Cable colour when the socket with cable type KMPPE-... is used, according to accessories	
	1	–	–	WH	White
	2 [1)]	Ground setpoint value[1)]		BN	Brown
	3 [1)]	Ground supply[1)]		GN	Green
	4	Setpoint value DC 0 ... 10 V	Setpoint value 4 ... 20 mA	YE	Yellow
	5	–		GY	Grey
	6	Actual value - output DC 0 ... 10 V	Actual value - output 4 ... 20 mA	PK	Pink
	7	DC 24 V supply voltage		RD	Red
	8 [1)]	Ground actual value[1)]		BU	Blue

1) Internally connected

Tab. 2

5 Commissioning

1. Supply the MPPES-... with direct current (supply voltage U_V = DC 24 V).
2. Pressurise the MPPES-... with an input pressure higher than the maximum desired output pressure.
3. Supply current to the MPPES-... with a setpoint value signal corresponding to the valve type (current/voltage variant).
   A proportional output pressure P_S is then adjusted to.
   To the setpoint value signal range DC 0 ... 10 V or 4 ... 20 mA are assigned the following pressure ranges, depending on the design (➔ Tab. 3):

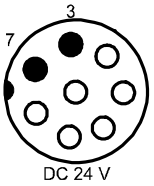


Fig. 11

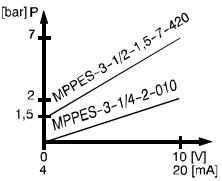


Fig. 12

Type	Setpoint signal range	Pressure range
MPPES-...-**(P_u)-P_o**-010	DC 0 ... 10 V	**P_u ... P_o** bar
MPPES-...-**(P_u)-P_o**-420	4 ... 20 mA	
e.g. standard design		
MPPES-1/4-2-010	DC 0 ... 10 V	0 ... 2 bar (➔ Fig. 14)
e.g. special adaptation		
MPPES-1/2-1,5-7-420	4 ... 20 mA	1.5 ... 7 bar (➔ Fig. 14)

Tab. 3

For visual inspection of the control process at the MPPES-...:

- Wire the MPPES-... with the following measuring device according to Fig. 13/Fig. 14:
- Use for the
  - **voltage** variant a **voltage** measuring device and for the
  - **current** variant a **current** measuring device (ammeter).

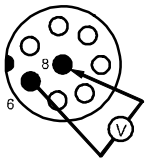


Fig. 13 Voltage measuring device

The actual electrical value can be tracked on the display of the measuring device. This changes proportional to the pressure curve at port 2.

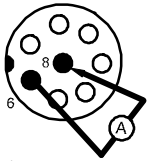


Fig. 14 Ammeter

6 Operation

If the same output pressure is still evident despite a modified setpoint value specification:



Note

- Look for defective cables.
  In the event of fractured setpoint cables (only MPPES-...-420B) or power supply cables, the output pressure goes back to 0 bar.

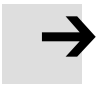
When using the MPPES-...-**10**-...:



Warning

- Make sure the solenoid head is secured against direct contact.
  The temperature of the magnet can rise in continuous operation to over +70 °C.

When the MPPES**-1/8-10**-... is used in an ambient temperature greater than 40 °C and an output pressure greater than 8 bar (**T > 40 °C and p_2 > 8 bar**):

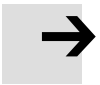


Note

- Make sure that the MPPES-1/8-10-... for cooling the magnets is operated only with forced convection of the ambient atmosphere.
  The magnets of the types MPPES-1/8-**6**-... and MPPES-1/8-**2**-... require no additional cooling.

7 Disassembly and repair

On disassembly:



Note

- Switch off the following power:
  - compressed air
  - voltage supply

8 Maintenance and care

- Clean the MPPES-... with soap suds only, max. +60 °C.

9 Accessories

Designation	Type
Socket with cable, 8-core, 2.5 m (5 m)	KMPPE-2,5 (KMPPE-5)
Socket, 8-pin	MPPE-B
Cable for valve terminal, 1 socket 8-pin, 1 socket 6-pin	KVIA-MPPE-2,5
Silencer	U-1/8; U-1/4; U-1/2

Tab. 4

10 Troubleshooting

Malfunction	Possible cause	Remedy
MPPES-..- does not react	Supply voltage lacking	Check the 24 V DC supply voltage connection
	No setpoint voltage	Check control unit; check connection
	Supply pressure P_1 not present	Increase the supply pressure above the desired setpoint pressure. The supply pressure must be less than the maximum permissible value (➔ Technical data).
	MPPES-... defective	Return the MPPES-... to Festo
Flow rate too low	Restriction of the flow cross section due to connection technology (swivel fittings, silencer too small)	Use an alternative connection

Tab. 5

11 Technical data

11.1 General data

Voltage variant: MPPES-...-010 (Setpoint value: DC 0 ... 10 V)
Current variant: MPPES-...-420 (Setpoint value: 4 ... 20 mA)

Type	**MPPES**
Design	Proportional pressure regulator
Mounting position	Any, preferably vertical (proportional solenoid upward)
Medium	Compressed air to ISO 8573-1:2010 [7:4:4]; Inert gases Lubricated operation possible (required during subsequent operation)
Working pressure	Constant (independent of fluctuations in the compressed air supply) supply pressure min. 1 bar higher than max. output pressure
Protection class	IP65 in combination with plug socket according to accessories
Permissible temperature range[1)]	Ambient: 0 ... +50 °C Storage: –20 ... +70 °C Medium: 0 ... +60 °C
Permissible supply voltage	DC +18 ... max. 30 V (nominal value: DC +24 V)
Power consumption (at U_{vmax} =DC 30 V)	Max. 20 W (at MPPES-2-... and at MPPES-6-...) max. 30 W (at MPPES-10-...)
CE marking (see declaration of conformity)[2)] ➔ www.festo.com/sp – Max. cable length	In accordance with EU EMC Directive[3)] 30 m
Linearity	< 0.5 % full scale
Electrical connection	Pin contact, 8-pin according to DIN 45326
Resolution of the actual value output	8 bit (approx. 40 mV for voltage variant/approx. 0.0625 mA with current variant)
Safety position	If the supply voltage cable or the setpoint cable is broken, output pressure goes back to 0 bar

1) With an ambient temperature of T › 40 °C and an output pressure p2 8 bar, a forced convection (forced cooling) of the magnet is required for the MPPES-**1/8-10**-....

2) The device is intended for use in an industrial environment. Outside of industrial environments, e.g. in commercial and mixed-residential areas, actions to suppress interference may have to be taken.

3) Only when using connecting cable from Festo.

Tab. 6

Type	MPPES-...-010		MPPES-...-420
Materials	Housing:	Aluminium, polyethylene terephthalate	
	Cover:	Die-cast zinc	
	Seals:	Nitrile rubber	
	Lubrication:	Silicone-free	
Setpoint variable:	0...+10 V		4 ... 20 mA
Permissible load resistance:	min. 2 kΩ		max. 500 Ω
Input resistance:	10 kΩ		250 Ω

Tab. 7

11.1.1 Connection-specific data

Type	MPPES-1/8-...	MPPES-1/4-...	MPPES-1/2-...
Ports	1/8	1/4	1/2
Nominal diameter – pressurisation/exhaust	3 mm/2 mm	7 mm/7 mm	11 mm/12 mm
Hysteresis [1]	max. 10 mbar	max. 50 mbar	
Weight	0.9 kg	1.3 kg	2.6 kg

1) ➔ EMC specifications (general data)

Tab. 8

11.1.2 Product-specific data

Type	MPPES-3-1/8-10-		MPPES-3-1/4-10-		MPPES-3-1/2-10-	
	010	420	010	420	010	420
Part No.	187348	187349	187333	187334	187326	187327
Nominal flow rate Q_n 6 ⟶ 5 with p = 10 bar at 1	630 l/min.		2800 l/min.		7800 l/min.	
Pressure ranges	Permissible supply pressure: max. 12 bar control range: 0 ... 10 bar					

Tab. 9

Type	MPPES-3-1/8-6-		MPPES-3-1/4-6-		MPPES-3-1/2-6-	
	010	420	010	420	010	420
Part No.	187352	187353	187337	187338	187330	187331
Nominal flow rate Q_n 3.6 ⟶ 3 with p = 8 bar at 1	540 l/min.		2500 l/min.		8500 l/min.	
Pressure ranges	Permissible supply pressure: max. 8 bar control range: 0 ... 6 bar					

Tab. 10

Type	MPPES-3-1/8-2-		MPPES-3-1/4-2-		MPPES-3-1/2-2-	
	010	420	010	420	010	420
Part No.	187350	187351	187335	187336	187328	187329
Nominal flow rate Q_n 1.2 → 1 with p = 4 bar at 1	300 l/min.		1450 l/min.		3800 l/min.	
Pressure ranges	Permissible supply pressure: max. 4 bar control range: 0 ... 2 bar					

Tab. 11

Type	MPPES-3-1/8-PU-PO-		MPPES-3-1/4-PU-PO-		MPPES-3-1/2-PU-PO-	
	010	420	010	420	010	420
Part No.	187347	187762	187339	187744	187332	187735
Nominal flow rate Q_n	Dependent on special adaptation selected					
Pressure ranges	Permissible supply pressure: max. (P_o + 1) bar (with P_o < 1 bar) max. (P_o + 2) bar (with P_o > 1 bar) Permissible supply pressure: P_u ... P_o bar					

Tab. 12

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