

VPPE-3-1-1/8-...-E1 (LED-Display)



Operating instructions

Festo AG & Co. KG
Postfach
D-73726 Esslingen
Phone:
+49/711/347-0
www.festo.de

Original: de

0909a

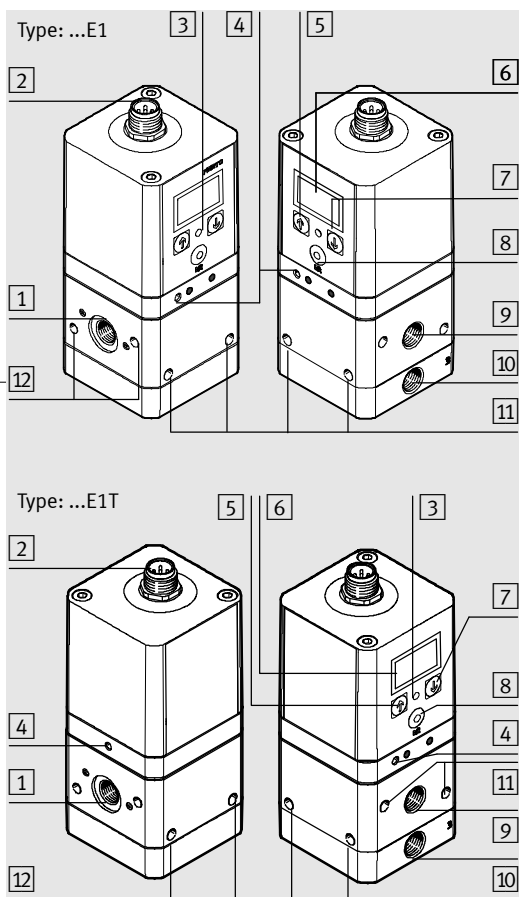
749 698

Warning

For electrical isolation of operating voltage:

- Use only power units which guarantee reliable electrical isolation of the operating voltage as per IEC/DIN EN 60204-1. Observe also the general requirements for PELV power circuits as per IEC/DIN EN 60204-1.

Switch power packs are permitted, providing they guarantee reliable isolation in accordance with EN 60950/VDE 0805.



- 1 Supply port (1)
- 2 Electrical connection
- 3 Status LED (green)
- 4 Earth terminal, external (front and back side)
- 5 Operating key upwards (UP)
- 6 LED display
- 7 Operating key downwards (DOWN)
- 8 Edit key
- 9 Pressure output (2)
- 10 Venting (3)
- 11 Front fastening hole
- 12 Side fastening hole

Fig. 1

Proportional pressure regulating valve

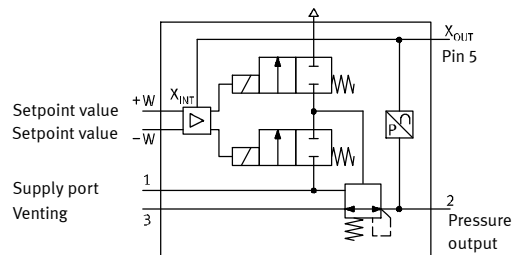
→ Note

- Installation and commissioning may only be performed in accordance with the operating instructions and by qualified personnel.

1 Application and function

The VPPE-... is designed to control pressure proportionately to a specified setpoint value.

Replacement of manually adjustable pressure regulators by remotely, electrically adjustable regulators, to have different machine parameters available quickly and automatically, for example.



2 Variants of the VPPE-...

Type code of the VPPE-...

VPPE-3-1-1/8-6-010-E1T			
	1	2	3
Item	Features	Meaning	
1	Pressure regulation range: 2 6 10	0.02 ... 2.0 bar 0.06 ... 6.0 bar 0.1 ... 10.0 bar	
2	Setpoint specification: 010 420	0 ... 10 V (voltage) 4 ... 20 mA (current)	
3	Control unit: E1 Type of mounting: T	7-segment LED display Supply manifold mounting	

3 Conditions of use

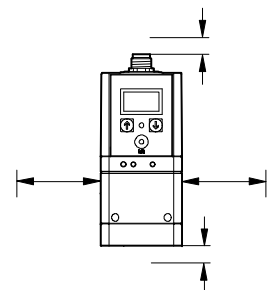
General conditions for the correct and safe use of the product, which must be observed at all times:

- Observe the specified limits (e.g. for pressures, temperatures and electric voltage).
- Make sure there is a supply of correctly prepared compressed air in accordance with the specifications on the medium Technical specifications.
- Please observe the prevailing ambient conditions.
- Please comply with national and local safety laws and regulations.
- Remove all transport packing, such as protective wax, foils, caps, cardboard boxes (with exception of the covers in the pneumatic connections). The individual materials can be stored in containers for recycling purposes.
- Slowly pressurize the complete system. This will prevent uncontrolled movements from occurring.
- Note the warnings and instructions
 - on the product
 - in these operating instructions.
- Use the product in its original state without undertaking any modifications.

4 Fitting

4.1 Mechanical

- Handle the VPPE-... with care so that the electrical connection is not damaged. Such damage reduces the operational reliability.
- Make sure there is sufficient space for the cable connection and tube couplings. This avoids breakage of the connecting cable.



- Put the VPPE-... as close as possible to the consuming device. This leads to improved control precision and shorter response times.
- Push two screws (M4) into the side mounting holes 12 or the front mounting holes 11 (see Fig. 1), max. torque: 2 Nm.
- Fasten the VPPE-... in the intended location.

4.2 Pneumatic

- Remove the covers on the compressed air connections.
- Attach the pneumatic tubing to the following connections (see Fig. 1):
 - Supply port (1) 1
 - Pressure output (2) 9
- Install a silencer at venting (3) (item 10) or remove the exhaust with ducted tubing.

→ Note

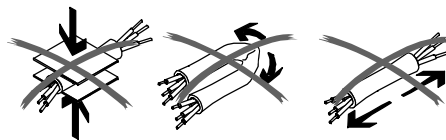
The position of the pneumatic connections depends on the variant ordered.

4.3 Electrical

→ Note

Make sure that the cable is laid as follows:

- not squashed
- not bent
- not stretched.



- Use accessories from Festo (see "Accessories"):

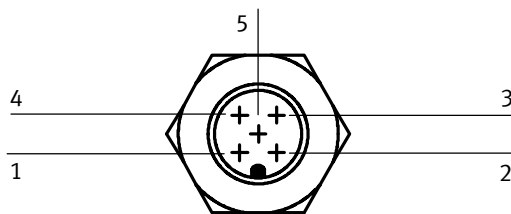
- plug socket with cable
 - or
 - socket cable, ready-to-use.
- This ensures that the specified protection class IP65 and EMC are achieved.

→ Note

To ensure EMC safety, the device must be earthed as follows:

- Use the earth terminal (see Fig. 1).
- Use the following earthing accessories (included in delivery):
 - Self-cutting screw
 - Flat plug
 - Contact disc

- Connect the circuitry of the VPPE-... as show in the circuit diagram. Preferably use cable from Festo.



PIN no.	Colour 1)	VPPE
1	brown	+24 VDC
2	white	Analogue input - setpoint value / - w
3	blue	GND
4	black	Analogue input + setpoint value / + w (0 ... 10 V or 4 ... 20 mA)
5	grey	Switch output (24 V) or analogue output (0 ... 10 V or 4 ... 20 mA) + actual value / X _{OUT}

1) Colour is only valid for accessory cable from Festo

5 Commissioning

→ Note

- The VPPE-... interprets setpoint signals less than 0.1 V as 0 V and setpoint signals less than 4.16 mA as 4 mA. In this case, the output pressure is set to 0 bar through activation of the ventilation valve. As a result, a clear valve condition is assured at w = 0.
- Safety position: In case of setpoint cable break of the voltage variant, the output pressure is set to 0 bar. In case of setpoint cable break of the current variant, or in case of loss of power supply, the output pressure remains uncontrolled. Leakage produces a change in pressure in the long term.

- Connect the VPPE-... with a setpoint signal. The VPPE has a so-called "differential input". The setpoint signal is applied to the contact Pin 2 and Pin 4, whereby the lower potential must be connected to contact Pin 2 and the higher potential to contact Pin 4. Contact Pin 2 (- setpoint) can be connected to contact Pin 3 (GND).
- Apply current to the VPPE-... with direct current (Supply voltage U_V = 24 VDC ±10 %).
- Pressurize the VPPE-... with a supply pressure (p₁) at least 1 bar higher than the maximum desired output pressure. A proportional output pressure (p₂) is set automatically.

The following output pressure range is then assigned to the setpoint signal range 0 ... 10 V or 4 ... 20 mA:

Setpoint signal range	Output pressure range of the variant		
	2 bar	6 bar	10 bar
0 ... 10 V or 4 ... 20 mA	0.02 ... 2 bar	0.06 ... 6 bar	0.1 ... 10 bar

5.1 Recommended parameter sets

The valves in all pressure variants are set at the factory with Preset 2.

Preset recommendation	Preset		
	1	2	3
Consuming device volumes	< 0.5 l	~ 0.5 l	> 0.5 l

5.2 VPPE display and meaning

Notes on the following table:

Preset, control behaviour:

You can select the desired factory parameter set in the menu on the VPPE (Pr1, Pr2, Pr3).

Display	Meaning	Description
[An]	Analogue	Output: Analogue
[bAr]	bar	Pressure unit
[Eco]	ECO mode	Display switch-off (adjustable)
[Frc]	Force	Manual setpoint input
[HY]	Hysteresis	Spread, switch difference
[in]	Setpoint value	When ↓ key is pressed (1 sec.), [in] appears. When the key is released, the setpoint value is displayed.
[Loc]	Lock	Input blocked with Pin code
[n.Hi]	Switch normally closed	Contact (normally closed)
[n.Lo]	Switch normally open	Contact (normally open)
[OFS]	Offset	Zero point lift (output pressure without setpoint value)
[out]	Actual value	When ↓ key is pressed (1 sec.), [out] appears. When the key is released, the actual value is displayed.
[PA]	Kilo pascal	Pressure unit (in KPa)
[Pin]	Pin code	Enter value for locking (1 ... 999)
[Pr1]	Preset 1	(see section 5.1)
[Pr2]	Preset 2	(see section 5.1)
[Pr3]	Preset 3	(see section 5.1)
[PSI]	psi	Pressure unit
[rES]	Reset (factory setting)	Switch on device with pressed ↑ + ↓ + Edit keys. Observe the instruction in chapter 10.
[rnG]	Range	Pressure range adjustment
[Snr]	Display series number	Switch on device with pressed ↑ + Edit keys: Series number is displayed to 6 places, first [xxx.] than [xxx], alternating approx. 2 sec.
[SOF]	Display software version	Switch on device with pressed ↓ + Edit keys: Software version appears
[SP]	Switching point	(see section 5.3)
[SP.H]	Switching point high	Top switching point (see section 5.3)
[SP.L]	Switching point low	Bottom switching point (see section 5.3)
[SP.O.]	Set point ok	Setpoint value reached (see section 5.3)
[unL]	Unlock	Lock removed
[]	Threshold value comparator	(see section 5.3)
[]	Window comparator	(see section 5.3)
[...]	ECO mode activated	After x seconds (adjustable), a line moves through the display [...]

5.3 Configuring the output

Depending on the variant ordered, the actual value is displayed at the analogue output [An] 0 ... 10V or 4 ... 20 mA.

If a switch output is chosen, the following modes can be selected: Threshold value, window comparator, or SP.O..

Switching points (SP..) and hysteresis (HY)

The switching point is only active when a switching point or window comparator is active.

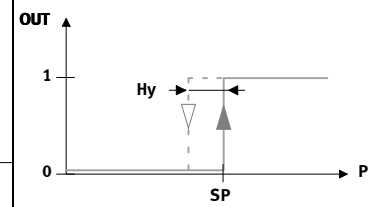
The value of the hysteresis specifies the tolerance in which the control deviation can move without causing a signal change at the output (Pin 5).

Setting SP.O.

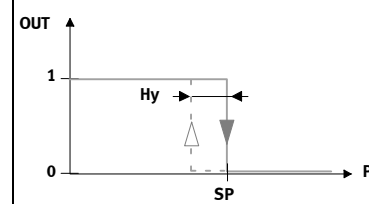
The SP.O. signal means that the setpoint value has been reached in the range (+/-) of the set hysteresis.

With threshold value comparator setting

Switching characteristic (normally open)

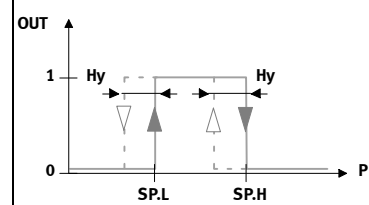


Switching characteristic NC (normally closed)

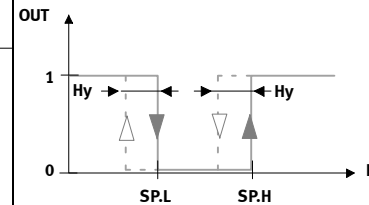


With window comparator setting

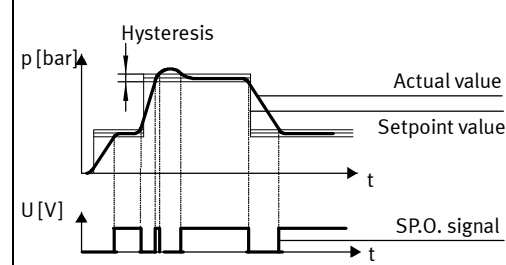
Switching characteristic (normally open)



Switching characteristic NC (normally closed)



With setting SP.O.



5.4 Display symbols menu

Notes on the following table:

[x.xx] = pressure display (actual value or setpoint value)
[...] = Enter value (with flashing display)

- The main menu selection can be made in only one direction with the Selection key ↓.
- Within a menu option, the selection can usually be made with the ↑ or ↓ key.
- If no selection is made within 10 sec. in the main menu or 80 sec. within a menu option, the display automatically jumps back to the basic position, exception [Frc].

Menu = main menu selection

[x.xx] = value input (setpoint value/actual value)

Further in the menu = press Edit key

With flashing display (grey background) = selection option with keys ↑ ↓

Change value [...] = with keys ↑

Selection/save value = press Edit key

No.	Menu	Selection possibility ↑ ↓		
1	[x.xx]	↑ (1 sec.) = [in]	↓ (1 sec.) = [out]	
2	[Pr...]			
	[Pr...]	Pr1	Pr2	Pr3
3	[bAr]			
	[bAr]	bAr	PA	PSI
4	[OFS]			
	[...]			
5	[mG]			
	[...]			
6	[Frc]	0.00 ... 10.0 V (voltage variant) 4.00 ... 20.0 mA (current variant)		
	[...]			
7	[An]			
	[An]			SP.O.
		SP	SP.L	HY
	[...]	[...]	[...]	[...]
	[...]	[...]	[...]	[...]
	HY	SP.H	[n.Lo/ n.Hi]	[n.Lo/ n.Hi]
	[...]	[...]	[...]	[...]
	[...]	[...]	[...]	[...]
	[n.Lo/ n.Hi]	HY		
	[n.Lo/ n.Hi]	[...]		
		[...]		
		n.Lo/ n.Hi		
		n.Lo/ n.Hi		
8	[Eco]			
	[OFF]			
	[OFF]	[1 ... 999] sec.		
9	[Pin]			
	[OFF]			
	[OFF]	[1 ... 999]		
	Back to no. 1			

6 Operation

→ Note

- Make sure, when switching off the VPPE-..., that first the set value voltage, then the supply voltage and finally the supply pressure are switched off.

The green status LED lights up when the actual value is equal to or in a range of ±1 % (FS) of the setpoint value.

Lock [Loc] – unlock [unL]

If a Pin code was entered with [Pin], [Loc] is shown in the display and the edit mode is locked via the Pin code.

If a flashing [0] appears, enter the correct Pin. After the correct Pin is entered, [unL] is displayed. If the entry is incorrect, the VPPE jumps to the basic position.

7 Care and maintenance

- Clean the housing of the VPPE-... with a soft cloth only. The permitted cleaning agent is a mild soap- water solution, max. 50 °C.

8 Accessories

→ Note

You can find product accessories under:

<http://www.festo.com/catalog>

9 Eliminating faults

Fault	Possible cause	Remedy
VPPE-... does not react	No power, LED does not light	Check connection of the 24 VDC power supply
	No set value voltage	Check control unit; check connection
	VPPE-... defective	Send the device to the Festo repair service
Flow volume too low	Connection are narrowing the flow diameter (swivel fittings)	Use an alternative connection
Pressure increase too slow	Large cylinder volumes and long tubing length	- Choose different parameter set
Pressure constant despite changed setpoint input	- Break of the supply cable (the last output pressure set remains intact uncontrolled). Slow pressure drop due to leakage - Too little supply pressure p1	- Replace supply cable - Increase supply pressure

10 Reset to factory setting

→ Note

By resetting to factory setting, the current settings are lost.
- If needed, note down these settings before resetting.

Reset [rES] returns settings to factory setting. To do this, press and hold the following keys "↑ + ↓ + Edit" and then switch on the device.

Then the following parameters are set:

Parameters	Setting / value
x.xx	Permanent display (actual value/setpoint value)
Pr2	(universal control behaviour)
bar	bar
OFS	000
mG	for 10 bar type: 10.0 for 6 bar type: 6.00 for 2 bar type: 2.00
Frc	Display shows current pressure at pressure output (p2)
An	Output: Analogue
Eco	OFF
PIN	OFF

11 Technical specifications

Type	VPPE-3-1-1/8-...-E1			
Design	Proportional pressure regulating valve			
Mounting position	As desired, preferably vertical (electronics upward)			
Medium	Filtered, non-lubricated compressed air (filter fineness min. 40 µm), no condensation allowed			
Pressure ranges	2 bar type	6 bar type	10 bar type	
	- Permitted supply pressure	3 ... 4 bar	6 ... 8 bar	6 ... 11 bar
	- Control range	0.02 ... 2 bar	0.06 ... 6 bar	0.1 ... 10 bar
	Supply pressure p1 at least 1 bar above output pressure p2			
Standard rated flow	see Fig. 2			
Total leakage in new condition	< 5 l/h			
Connections	G1/8			
Rated width	- Pressurisation	5 mm		
	- Venting	2.5 mm		
Protection class	IP65 in combination with connector socket according to accessories.			
Perm. temp. range	- Surroundings	0 ... +60 °C		
	- Storage	-10 ... +60 °C		
	- Medium	+10 ... +50 °C		
Electrical connection	Plug contact M12x1, 5-pin			
Permitted supply voltage	24 VDC ±10 %			
Setpoint value size	0 ... +10 V / 4 ... 20 mA			
Input resistor	10 kΩ (voltage) / 250 Ω (current)			
Load actual value output	min. 2 kΩ (voltage) max. 500 Ω (current)			
Linearity fault	max. ±1 % FS (full scale) at 24 VDC and 25 °C			
Residual ripple	10 %			
Vibration and shock	- Vibration	Tested as per DIN/IEC 68 / EN 60068 Part 2-6, Severity class 2		
	- Shock	Tested as per DIN/IEC 68 / EN 60068 Part 2-27, Severity class 2		
Power consumption	max. 4.2 W			
Electromagnetic compatibility	- EMC interference emission and resistance	See conformity declaration → www.festo.com CE conformity for industrial installations fulfilled		
	Materials	Al PA NBR silicon-free		
Weight	approx. 390 g			

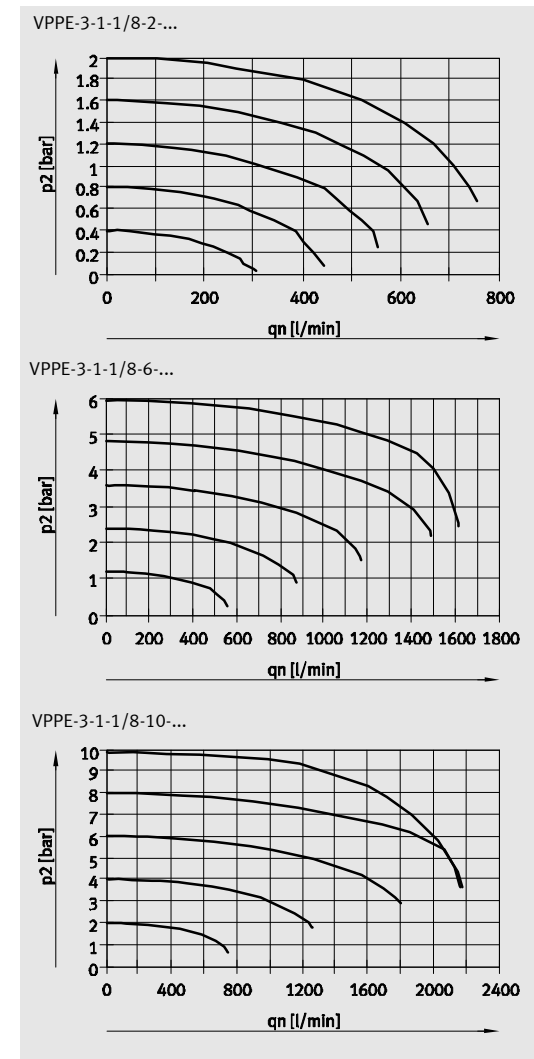


Fig. 2