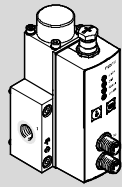


# Proportional pressure regulator VPPL



## FESTO

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(en) Operating instructions

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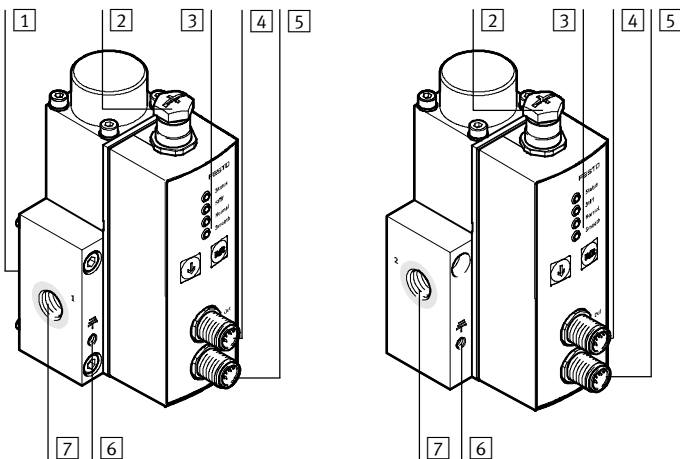
Proportional pressure regulator VPPL ..... English

## 1 Design

### 1.1 Overview

VPPL-3Q / VPPL-3Q-Z

VPPL-3L



- 1 Flange (concealed)<sup>1)</sup>
- 2 Service interface (socket M12)<sup>2)</sup>
- 3 Display and control elements
- 4 Output connection actual value (plug connector M12)

- 5 Input connection setpoint value / voltage supply (plug connector M12)
- 6 M5 thread for earthing screw (functional earth - FE)
- 7 Sleeve (threaded connection G1/4)<sup>3)</sup>

1) Only for VPPL-3Q / VPPL-3Q-Z

2) The diagnostics interface should only be used by Festo service staff.

3) Only for VPPL-3Q-Z / VPPL-3L

Fig. 1

### 1.2 Display and control elements

- 1 LED Status (red / green) – status display
- 2 LED Stiff (blue) – fast control reaction
- 3 LED Normal (blue) – normal control reaction
- 4 LED Smooth (blue) – precise control reaction
- 5 DOWN button
- 6 EDIT button

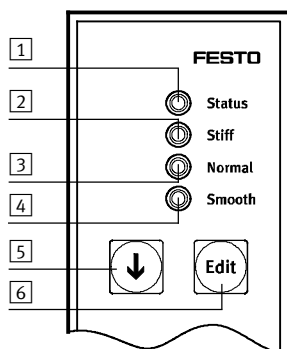


Fig. 2

## 2 Function



### Note

The flange mounted version and the flange mounted version with external pilot air supply of the proportional pressure regulator VPPL can only be operated together with the pressure regulator PREL. Also read the operating instructions of the pressure regulator PREL.

The output pressure of the pressure regulator PREL is present at the working line of the proportional-pressure regulator VPPL. Using an integrated pressure sensor, the output pressure is determined and compared with a setpoint value. In case of deviations the VPPL actuates the controller of the pressure regulator PREL until the output pressure reaches the setpoint value.

The proportional pressure regulator VPPL is available in three versions:

- Flange mounted version (VPPL-3Q)
- Flange mounted version with external pilot air supply (VPPL-3Q-Z)
- Sleeve version (VPPL-3L)

## 3 Application

The proportional-pressure regulator VPPL is exclusively intended to regulate pressure proportional to a specified setpoint value. Only compressed air should be used as an operating medium in accordance with the following specification

→ Technical data.



### Note

The device is intended for use in an industrial environment. Measures for interference suppression may need to be implemented in residential areas.

- Only use the product in original status without unauthorised modifications. Only the assembly and commissioning activities described in this manual are permitted.
- Observe the permissible limit values and specifications (→ Technical data).
- Only use the product if it is in excellent technical condition.
- Only use pre-filtered compressed air as an operating medium in accordance with the specification (→ Technical data).
- Operation with fluids or gases is impermissible.
- Use the proportional-pressure regulator only in the marked flow direction.
- All applicable national and international regulations must be complied with.

## 4 Product variants

Key features	Type codes	Description
Type	VPPL	Proportional pressure regulator
Nominal size	3	2.5 mm
Valve type	Q	Flange
	L	Sleeve
Valve functions	3	3/3-way valve, normally open <sup>1)</sup>
Pneumatic connection	–	Flange
	Z	Threaded connection 1/4" and flange with external pilot air supply
	G14	Threaded connection 1/4"
Regulation range	0L	0 bar lower pressure value
	2L	2 bar lower pressure value
	20H	20 bar upper pressure value
	40H	40 bar upper pressure value
Setpoint specification	V1	Voltage variant, DC 0 ... 10 V
	A4	Current variant, 4 ... 20 mA
Actual value (output)	V	0 ... 10 V
	A	4 ... 20 mA
Accuracy	S1	1 %
Valve variant	1 ... 20	Numerical value

1) Valve 2 to 3 open, valve 1 to 2 closed

Fig. 3



### Note

The valve variants of the VPPL are adapted to the use of the VPPL → Fig. 4. Please note the designated use to ensure functionality.

Valve variant VPPL	Use	Comment
1	for use with PREL-186-...-1	Standard parameter set
2	for use with PREL-90-...-2	
3	for use with PREL-90-...-3	
4	for use with PREL-90-...-4	
5	for use with PREL-90-...-5	
6	for sleeve version	Standard parameter set, control range up to 20 bar
7	for sleeve version	Standard parameter set, control range up to 40 bar
8	for use with PREL-90-...-8	Standard parameter set
9... 20	-	Not assigned

Fig. 4

## 5 Installation



### Note

- Installation only by qualified personnel and only in accordance with the operating instructions.

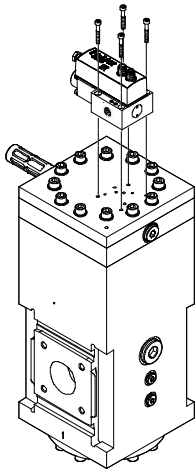


Fig. 5

- Check the equipment conditions before installation:
  - The piping system is unpressurised and no medium flows in it.
  - The supply lines are clean and free of wear-causing particles.
  - Shut-off valves for venting the system are mounted in the compressed air supply line.
- Flange-mount the VPPL onto the pressure regulator PREL (→ Fig. 5).
  - Provide a mounting clearance for cable connection and tube couplings.
  - Tightening torques of the four mounting screws, 3.8 Nm.

## 6 Electrical connection



### Warning

- Electrical connection only by qualified personnel.
- Use only power sources which guarantee reliable electrical isolation of the operating voltage as per IEC/DIN EN 60204-1.
- Observe the requirements for PELV power circuits as per IEC/DIN EN 60204-1.

- Before establishing the electrical connection, check the connecting cable:
  - The signal lines should not be longer than 30 m.
  - Use the pre-assembled cables from Festo.
  - The cables are installed free of crimping, kinking and stretching.



### Note

The connection [2] (sealed with a cap) is only used for diagnostics. If this plug connector is nevertheless used for operation of the valve, it can result in damage to the electronic controls.

- Never connect the power supply.
- Always keep the terminal covered with the sealing cap.

- Screw the signal cable to the terminal [4].

- Max. tightening torque 0.5 Nm.
- Pin allocation for M12 plug:

Pin	Cable colour <sup>1)</sup>	Allocation	Plug M12
1	-	Unused	
2	White (WH)	Analogue Out+ (actual value)	
3	-	Unused	
4	Black (BK)	Analogue Out- (actual value)	
5	grey (GY)	FE	

- When using the pre-assembled Festo cables
- Fig. 6



### Note

- If a screened cable is used, earth the insulation at the cable end which is farther away from the VPPL.

- Screw the connecting cable to the terminal [5].

- Max. tightening torque 0.5 Nm.
- Pin allocation for M12 plug:

Pin	Cable colour <sup>1)</sup>	Allocation	Plug M12
1	Brown (BN)	DC 24 V	
2	White (WH)	Analogue In+ (setpoint value)	
3	Blue (BU)	0 V	
4	Black (BK)	Analogue In- (setpoint value)	
5	grey (GY)	FE	

- When using the pre-assembled Festo cables
- Fig. 7

## 7 Commissioning



### Note

The flange mounted version and the flange mounted version with external pilot air supply of the proportional pressure regulator VPPL can only be commissioned together with the pressure regulator PREL. Read the operating instructions of the pressure regulator PREL.

- Commissioning should only be conducted by qualified personnel.

- Prior to commissioning, check the requirements:
  - for VPPL-3L (sleeve)
    - The VPPL is completely connected and ready for operation.
    - Any necessary safety equipment is present and active.
  - for VPPL-3Q (flange)
    - The VPPL is flange-mounted to the PREL.
    - The PREL is completely connected and ready for operation.
    - Any necessary safety equipment is present and active.
- Switch on the supply voltage.
- Switch on the voltage for the setpoint signal.
- Start up the VPPL and PREL together (→ PREL operating instructions).
- Select the parameter set for the regulator.
  - Press the EDIT button for 3 seconds.
    - The LED for the current controller setting flashes blue (factory setting: Normal).
    - Use the DOWN button to select the required parameter set → Fig. 2.
      - The LED of the required parameter set flashes blue.
    - Press the EDIT button again.
      - The selection is accepted, the LED illuminates blue.

## 8 Operation

- Comply with the operating conditions.
- Always observe the permissible limit values.
- Keep sources of high-frequency electromagnetic radiation (e.g. radios, mobile phones, other jammers) away from the unit. This prevents interference with the setpoint signal.
- Observe the operational status displays.

Status LED	Display	Description
Green	Continuous lighting	Electronic control OK
Red	Flashing light	Error: Under/overvoltage! The valve is no longer functional in this status. A correct voltage supply remedies the error.
	Continuous lighting	Malfunction, valve failure
Off	Off	Malfunction, the valve is not ready for operation

Fig. 8



## Note

- Safety setting: in case of a wire break, the output pressure is lowered to 0 bar.
- The VPPL interprets setpoint signals less than 1 % of full scale as 0 V. In this case, the working pressure is set to the ambient pressure.

## 9 Maintenance and care



## Warning

Danger of injury from compressed air.

Products under pressure can cause injury to human beings and damage to property.

- Maintenance only by qualified personnel.
- Before any maintenance work, depressurise the valve, service unit string and tubing.

### Before any maintenance work:

1. Depressurise the valve and the neighbouring pneumatic equipment.
2. Switch off the analogue setpoint signal.
3. Let the device cool off.
4. Switch off the supply voltage.

### Cleaning:

- Regularly clean the outside of the pressure regulator with a soft cloth. The permissible cleaning agent is water or soap suds (max. 50 °C).

## 10 Dismantling



## Warning

Danger of injury from compressed air.

Products under pressure can cause injury to human beings and damage to property.

- Dismantling only by qualified personnel.
- Depressurise the valve, service unit string and tubing.



## Note

The flange mounted version and the flange mounted version with external pilot air supply of the proportional pressure regulator VPPL can only be shut down together with the pressure regulator PREL. Read the operating instructions of the pressure regulator PREL.

1. Depressurise the pneumatic system.
2. Switch off the analogue setpoint signal.
3. Let the device cool off.
4. Switch off the supply voltage.
5. Disconnect the electrical connections of the VPPL.
6. Shut down the PREL and VPPL together (→ PREL operating instructions).
7. Release the mechanical mounting of the VPPL.

## 11 Troubleshooting

Malfunction	Display	Possible cause	Remedy
VPPL does not react.	LED status → Fig. 2 does not light up	No supply voltage	• Check the power supply.
	–	Device defective	• Replace device
Valve exhausts to 0 bar.	–	Power supply cable broken	• Replace cable
LED status illuminates red Output stage is switched off, error bit is set, the valve exhausts to 0 bar.	LED status → Fig. 2 red continuous light	Pressure sensor signal error	• Replace device
		Hardware error electronics	• Replace device
		VPPL wire break with current setpoint value signal	• Replace cable
LED status flashes red Output stage is switched off, error bit is set, the valve exhausts to 0 bar.	LED status → Fig. 2 red flashing light	Undervoltage in voltage supply (< 17 V)	• Increase voltage supply to > 20 V.
		No supply pressure present	1. Setpoint value must be switched to zero 2. Apply supply pressure

Fig. 9

## 12 Accessories

Designation		VPPL-...-0L20H	VPPL-...-0L40H
Connecting cable, M12x1, 5-pin, straight socket	2.5 m	NEBU-M12G5-K-2.5-LE5	
	5 m	NEBU-M12G5-K-5-LE5	
	10 m	NEBU-M12G5-K-10-LE5	
Connecting cable, M12x1, 5-pin, angled plug socket	2.5 m	NEBU-M12W5-K-2.5-LE5	
	5 m	NEBU-M12W5-K-5-LE5	

Fig. 10

You can configure additional connecting cables via our catalogue.

→ [www.festo.com/catalogue/nebu](http://www.festo.com/catalogue/nebu)

## 13 Technical data

Type		VPPL-...-0L20H	VPPL-...-0L40H
Design		Proportional pressure regulator	
Mounting position		As desired, preferably with display components facing upwards (magnet should not be upside down)	
Type of mounting		Flange and thread	
Operating medium		Filtered compressed air, unlubricated Filtration grade min. 40 µm	
Max. permissible supply pressure	[bar]	40	50
Regulation range	[bar]	0.2 ... 20	0.4 ... 40
Control precision, standard 2%	[bar]	0.4	0.8
Max. total leakage when new	[l/h]	< 20	
Nominal size			
– Pressurisation	[mm]	2.5	
– Exhaust port	[mm]	2.5	
Medium temperature	[°C]	+5 ... +50	
Ambient temperature	[°C]	+5 ... +50	
Protection <sup>1)</sup>		IP65 as per EN 60529	
Operating voltage DC <sup>2)</sup>	[V]	21.6 ... 27.6	
Max. power consumption	[W]	24	
Signal setpoint value DC (Analogue input)	Voltage [V]	0 ... 10	
	Current [mA]	4 ... 20	
Input resistance setpoint value	-V1 [kΩ]	≥100	
	-A4 [Ω]	≤100	
Signal actual value DC (Analogue output)	Voltage [V]	0 ... 10	
	Current [mA]	4 ... 20	
Load resistor (Analogue output)	-V1 [kΩ]	≥1	
	-A4 [Ω]	≤600	
Electrical connection			
– Supply voltage/analogue input <sup>3)</sup>		M12, 5-pin, plug connector	
– Analogue output		M12, 5-pin, plug connector	
– Diagnostics interface <sup>4)</sup>		M12 socket, 5-pin	
Materials			
– Housing		Wrought aluminium alloy	
– Internal parts		Stainless steel, brass, aluminium	
– Cover		PAXMD6-GF50gr-P; PA6-GB20, GF10/gr-P	
– Seals		Nitrile rubber	
– Lubrication		Not PWIS-free	
Weight	[kg]	1.1	
CE mark <sup>5)</sup>		In accordance with EC Directive EMC 2004/108/EC	
		In accordance with EC Low Voltage Directive 2006/95/EC	

1) In assembled condition, with mounting screws tightened

2) Direct current, residual ripple max. 10%

3) Max. length, signal line 30 m

4) Should only be used by Festo service staff.

5) Declaration of conformity → [www.festo.com](http://www.festo.com)

Fig. 11