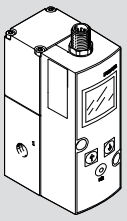
VPPM-...-C1

Proportional-pressure regulator



Festo SE & Co. KG
Ruiter Straße 82
73734 Esslingen
Deutschland
+49 711 347-0

www.festo.com

Operating instructions

8110158
2021-11f
[8110160]

8110158

1 Applicable Documents

All available documents for the product ➔ www.festo.com/sp.

2 Safety

2.1 Safety instructions

- Only use the product in its original condition without unauthorised modifications.
- Only use the product if it is in perfect technical condition.
- Take into account the ambient conditions at the location of use.
- Before working on the product, switch off the power supply and secure it against being switched on again.
- Store the product in a cool, dry environment protected from UV and corrosion. Keep storage times short.

2.2 Intended use

The proportional-pressure regulator is intended to regulate a pressure proportional to a specified setpoint value. The product is intended for use in industrial environments.

2.3 Training of qualified personnel

Work on the product may only be carried out by qualified personnel who can evaluate the work and detect dangers. The qualified personnel have skills and experience in dealing with electropneumatic (open-loop) control technology.

2.4 Approvals

In combination with the UL inspection mark on the product, the information in this section must also be observed in order to comply with the certification conditions of Underwriters Laboratories Inc. (UL) for USA and Canada.

UL certification information	
Product category code	QUYX, QUYX7
File number	E322346
Considered standards	UL 610101, CAN/CSAC22.2 No. 610101
UL mark	c UL us LISTED

Tab. 1: UL certification information

- The unit shall be supplied by a power source which fulfils the requirements on a limited-energy circuit in accordance to IEC/EN/UL/CSA 61010-1 or on a Limited Power Source (LPS) in accordance to IEC/EN/UL/CSA 60950-1 or IEC/EN/UL/CSA 62368-1 or a Class 2 circuit in accordance to NEC or CEC.

Electrical data and ambient conditions	
Supply voltage	24 V DC
Max. power VPPM-6, VPPM-8	7 W
Max. power VPPM-12	12 W
Rated pressure	up to 1.1 MPa
Max. installation height	2000 m

Tab. 2: Electrical data and ambient conditions

3 Additional information

- Contact the regional Festo contact if you have technical problems ➔ www.festo.com.
- Accessories and spare parts ➔ www.festo.com/catalogue.

4 Product overview

4.1 Function

The proportional-pressure regulator controls the pressure proportionally to a specified setpoint value. A built-in pressure sensor records the pressure at the working port and compares this value with the setpoint value. If there are deviations between the setpoint value and actual values, the proportional-pressure regulator is actuated until the output pressure has reached the setpoint.

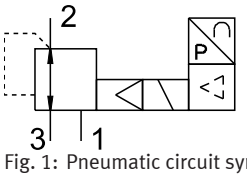


Fig. 1: Pneumatic circuit symbol

4.2 Structure

4.2.1 Product design

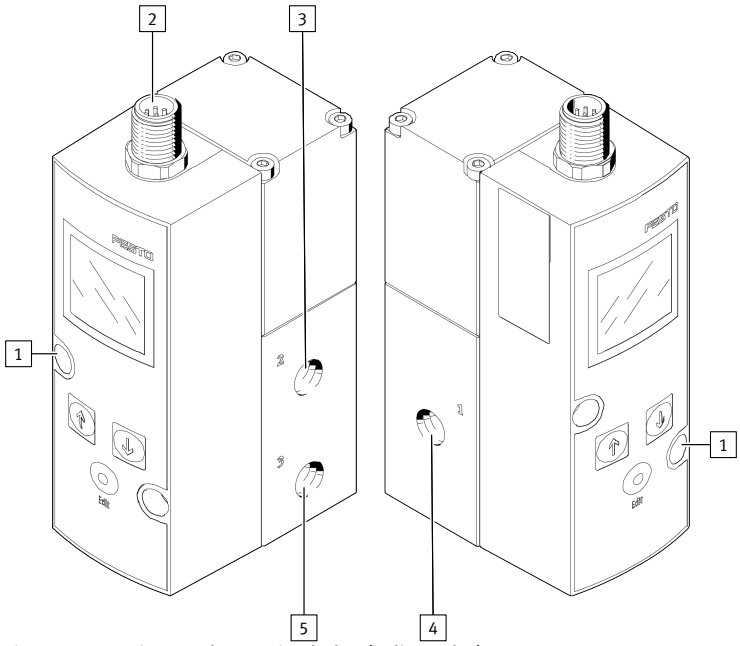
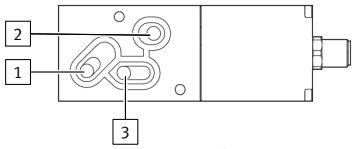


Fig. 2: Connections and mounting holes (in-line valve)

1	Through-holes for fastening	4	Compressed air port (1)
2	Electrical connecting plug	5	Exhaust air port (3)
3	Working air port (2)		



1	Exhaust air port (3)
2	Working air port (2)
3	Compressed air port (1)

Fig. 3: Pneumatic ports (sub base valve)

4.2.2 Display and control elements

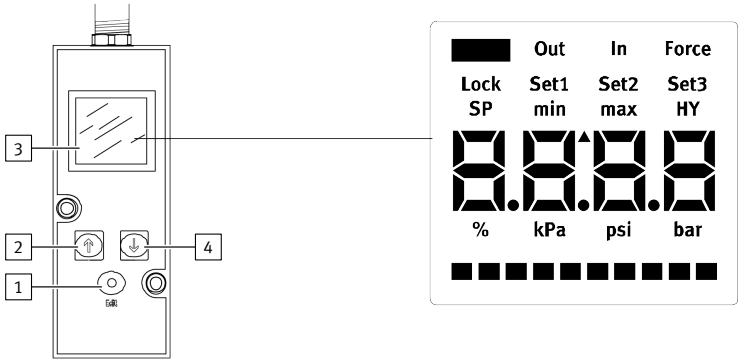


Fig. 4: Display and control elements

1	[Edit] key	3	Display
2	[UP] key	4	[DOWN] key

Menu level	Symbol	Description
Out	■ ⊓	Switching output set, switching output not set
	Out	Switching output
	⊓ SP	Threshold value comparator Switching point
	⊓ SP max SP min	Window comparator Upper switching point Lower switching point
	SP.O.	SetPoint OK
	HY	Hysteresis
	N/O N/C	N/O N/C
In	In	Input
	min max	Lower pressure value Upper pressure value
	mA or V[1],% ,bar, psi, kPa[2]	Units of the input
Force	Force	Manual setpoint specification
Set ...	Set 1, Set 2, Set 3	Factory parameter sets
SPEC	SPEC	Special menu
	Lock	Security code active, blocked against unauthorised programming
	kPa, psi, bar	Units of pressure, switchable
	■■■■■□□□□□	Pressure display as bar chart

1) Dependent on the variant of the VPPM-...
2) Dependent on the unit set in SPEC menu

Tab. 3: Symbols on the display

5 Transport

Store and transport the product in its original packaging. Observe the weight, the dimensions and the ambient conditions.

6 Assembly

6.1 Mounting clearances

During assembly make sure that there is sufficient space for the cable connection and the tubing connections. Place the device as close to the consumer as possible. This leads to better control accuracy and shorter response times.

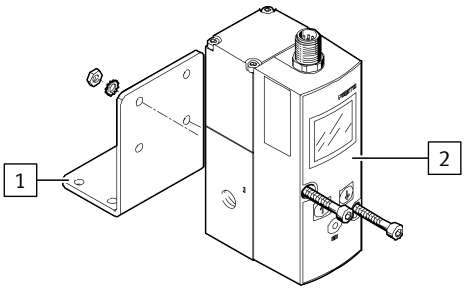
6.2 Wall mounting (in-line valve)

VPPM-6L-... and VPPM-8L-...

- Fasten the VPPM-... [2] with 2 M4 screws. If necessary, use the bracket VAME-P1-A [1].
  - Tightening torque: 1.5 Nm

i

Only apply a static load to the VPPM-... when mounting the VPPM-... with the assistance of the bracket.



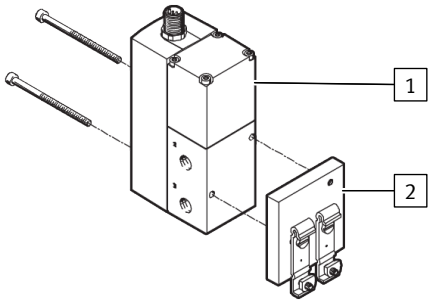
VPPM-12L-...

- Fasten the VPPM-... with 2 M5 screws.
  - Tightening torque: 2.0 Nm

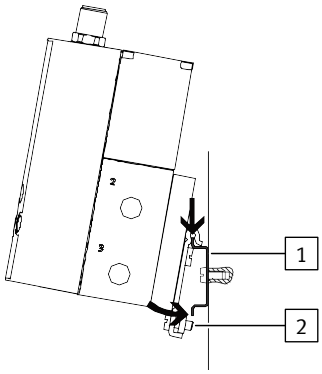
6.3 H.rail mounting (in-line valve)

VPPM-6L-... and VPPM-8L-...

1. Attach the H-rail adapter VAME-P1-T [2] to the VPPM-... with 2 screws [1].
   - Screws: M4 x 65 for VPPM-6L-..., M4 x 77 for VPPM-8L-...
   - Tightening torque: 1.5 Nm



2. Attach the VPPM -... to the H-rail.

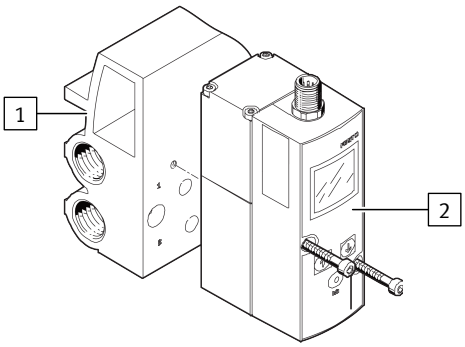


3. Fasten the VPPM-... with the retaining screw [2] of the H-rail adapter.
   - Tightening torque: 1.5 Nm

6.4 Manifold block assembly (sub base valve)

VPPM-6F-... and VPPM-8F-...

- Fasten the VPPM-... [2] to the manifold block [1] with 2 screws.
  - Screws: M4 x 65 for VPPM-6F-..., M4 x 77 for VPPM-8F-...
  - Tightening torque: 1.5 Nm



7 Installation

7.1 Pneumatic installation

1. Remove the covers from the supply ports.
2. Connect the compressed air port (1) and the working air port (2) with tubing ➔ Fig. 2.
3. Fit a silencer at the exhaust air port (3) or install an exhaust air duct ➔ Fig. 2.

Operating medium

NOTICE

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 must not be exceeded (ISO8573-1:2010 [–:–:2]).

7.2 Electrical installation

⚠ WARNING

Risk of injury due to electric shock.

- For the electrical power supply, use only PELV circuits in accordance with IEC 60204-1/EN 60204-1 (Protective Extra-Low Voltage, PELV).
- Observe the general requirements of IEC 60204-1/EN 60204-1 for PELV circuits.
- Only use voltage sources that ensure a reliable electric separation from the mains network in accordance with IEC 60204-1/EN 60204-1.

NOTICE

Malfunction due to impaired immunity to interference

Long signal lines reduce the immunity to interference.

- Use the shortest possible signal lines.

NOTICE

- The connector must not be twisted out of the intended position.
- The tightening torque of the M12 plug socket with cable must not exceed 0.5 Nm.

NOTICE

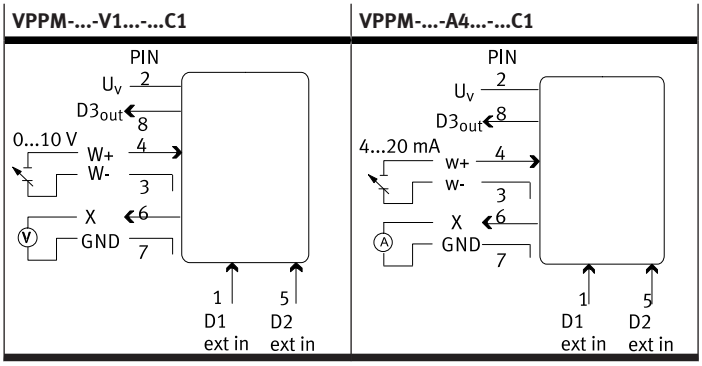
If the Y-connecting cable type NEBV-M12G8-KD-..-M12G5 is connected to CPX I/O modules, galvanic isolation of the I/O modules will not be guaranteed.

1. Use the rating plate to check which valve variant is involved.

Valve variant	VPPM-...-V1...-...C1	VPPM-...-A4...-...C1
Voltage variant	0 ... 10 V DC	
Current variant	4 ... 20 mA	

2. Lay the electrical connection cable without crushing, kinking or stretching it.

3. If a shielded electrical connection cable is used, earth the shield at the end of the cable remote from the valve.
4. Wire the VPPM-... according to the corresponding plug pattern.



Pin allocation

The pins on the electrical connection are assigned as follows:

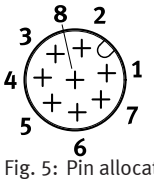
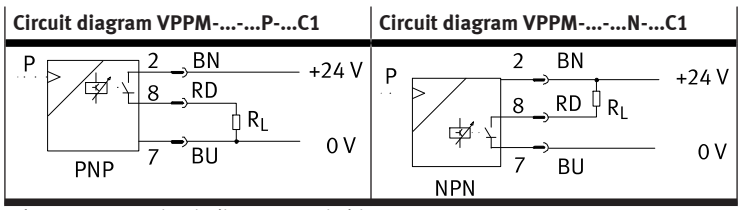


Fig. 5: Pin allocation

PIN	Wire colour[1]	Port identifications	
		VPPM-...-V1...-...C1	VPPM-...-A4...-...C1
1	white (WH)	Digital input D1	
2	brown (BN)	+24 V DC supply voltage	
3	green (GN)	Analogue input W- (- setpoint value)	
4	yellow (YE)	Analogue input W+ (+ setpoint value) 0 ... 10 V	Analogue input W+ (+ setpoint value) 4 ... 20 mA
5	grey (GY)	Digital input D2	
6	pink (PK)	Analogue output X (actual value)	
7	blue (BU)	GND supply earth	
8	red (RD)	Digital output D3[2]	

1) With usage of the plug socket with cable as specified in accessories.
2) The hysteresis of the digital comparator output D3 is 0.5% FS.

Tab. 4: Pin allocation



Tab. 5: VPPM-... circuit diagrams Switching output

8 Commissioning

⚠ WARNING

Depending on the functioning of the machine/system, manipulation of signal states may cause serious personal injury or property damage.

- Note that changing the switching characteristics of the switching outputs in the EDIT mode is effective immediately.
- Activate password protection (security code).

8.1 Fast commissioning with factory setting

The VPPM-... is delivered with the following factory setting:
– Switching characteristics: threshold value comparator
– Switching point: 40% Full Scale (FS)

The switching point is only active if a comparator (threshold value comparator or window comparator) is selected.
– Hysteresis: 0.5% Full Scale (FS)
– Switching characteristic N/O (normally open)

Setting switching point manually

i

When the operating voltage is switched on, the VPPM-... is automatically in the RUN mode (initial position). To ensure that the VPPM-... is in the RUN mode, press and hold the [Edit] key for 3 seconds. The switching points can be set manually.

If the factory setting is to be used, but a different switching point is to be specified for 'Out', proceed as follows:

1. In order to activate the EDIT mode, press the [Edit] key.
   ↳ The 'Out' display flashes.
2. Press the [Edit] key twice.
   ↳ The 'SP' display flashes.
3. Change the threshold value with the [UP] and [DOWN] keys.
4. Press and hold the [EDIT] key for 3 seconds.
   ↳ The VPPM-... is in the RUN mode.

8.2 Preparing commissioning

i

- Keep high-frequency radiation away from the VPPM-... in order to avoid increased tolerances of the outlet pressure.
- The VPPM-... interprets setpoint signals that are less than 1% Full Scale (FS) as 0 V or 4 mA. In this case the working pressure is set to ambient pressure.
- At typical input values below 3.6 mA, the valve detects a cable break and the last pressure set remains unregulated. Leakage results in a change of pressure over the long term.

The RUN mode appears during the initial start-up. The RUN mode shows the current measured value. The setpoint value is displayed by briefly pressing the [DOWN] key.
The RUN mode can be reached from other modes as follows:
– Press and hold the [Edit] key for 3 seconds.
– After a monitoring time has elapsed (Timeout) ➔ Tab. 7 Symbols for representing the menu structure.

Preparing commissioning

1. Switch on the operating voltage.
   ↳ The VPPM-... is in the RUN mode.
2. Check the functions of the VPPM -... by applying a setpoint value to the analogue input.
3. Note the following to set the control response via the digital inputs or via the display:
   – If the control response is selected via the factory parameter sets, ensure that there is a logic 0 at the D1 and D2 digital inputs.
   – Select the desired factory parameter set in the EDIT mode ➔ 8.3.3 EDIT mode. The 'Set 2' parameter set is preselected.

   i

   Selection of the control response via the D1 and D2 digital inputs takes priority over the factory parameter sets in the VPPM-.... .
4. If the control response is to be preselected via the digital inputs, the following signals must be applied to the D1 and D2 digital inputs:

Parameter set	Control response	Input D1 PIN 1	Input D2 PIN 5
1	fast control response	1 (24 V DC)	0 (0 V DC)
2	universal control response (factory setting)	0 (0 V DC)	1 (24 V DC)
3	precise control response	1 (24 V DC)	1 (24 V DC)
...	Selection of the desired parameter set via the display of the VPPÄM-...	0 (0 V DC)	0 (0 V DC)

Tab. 6: Parameter set

8.3 Menu structures of the modes

Symbols for representing the menu structure

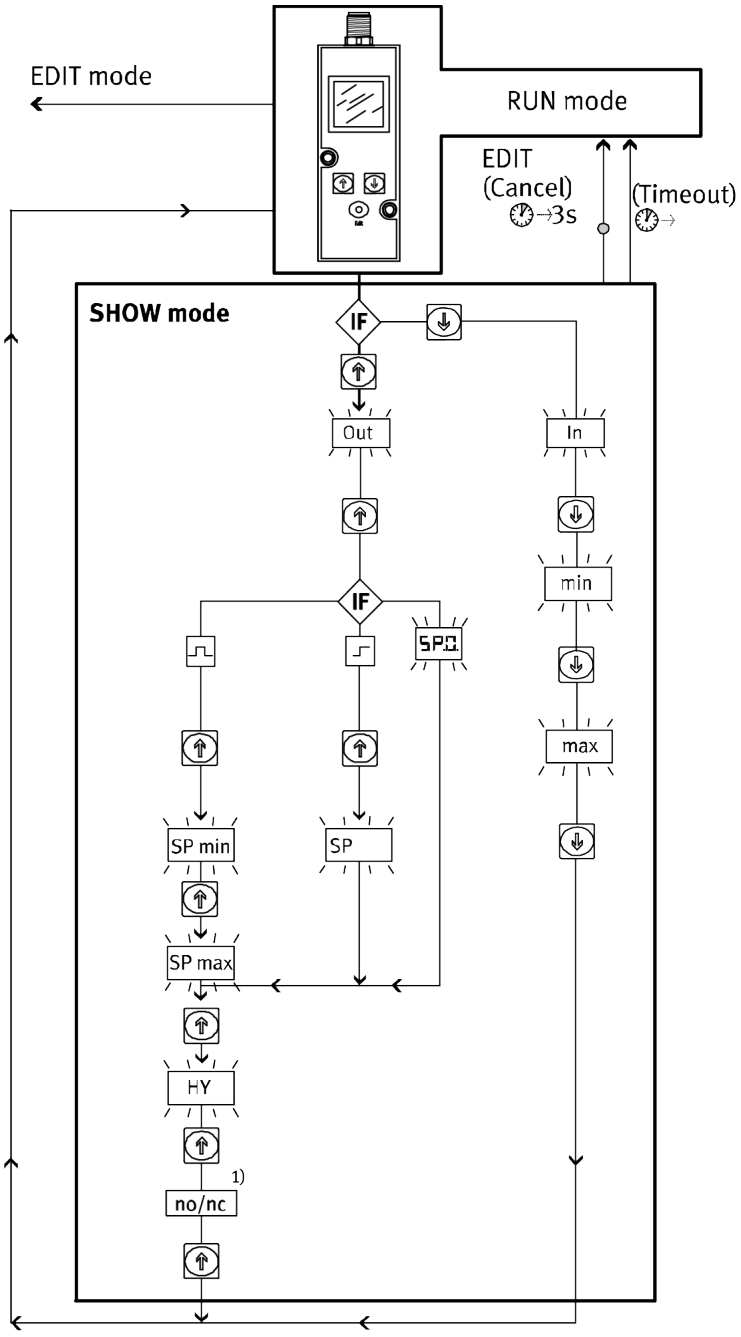
Symbol	Meaning
(Timeout) 80s	Automatic return to the basic status (RUN mode) when the monitoring time expires, e.g. after 80 seconds.
EDIT (Cancel) 3s	To return to the basic state (RUN mode) manually, press and hold the [Edit] key for 3 seconds.
Out	The symbol on the display flashes.
	Security code active, blocked against unauthorised programming.
	Security code inactive.
	Press key.
	Press the [UP] or [DOWN] key to set values or select functions.
	Press the [UP] or [DOWN] key to switch the functions in the menu.
Edit	Press the [Edit] key.

Tab. 7: Symbols for representing the menu structure

8.3.1 RUN mode

The RUN mode indicates the current pressure value for the 'Out' output.
- To display the setpoint value of the 'In' input briefly press the [DOWN] key.

8.3.2 SHOW mode



1) Dependent on the setting in the "Out" menu in the EDIT mode

Fig. 6: SHOW mode

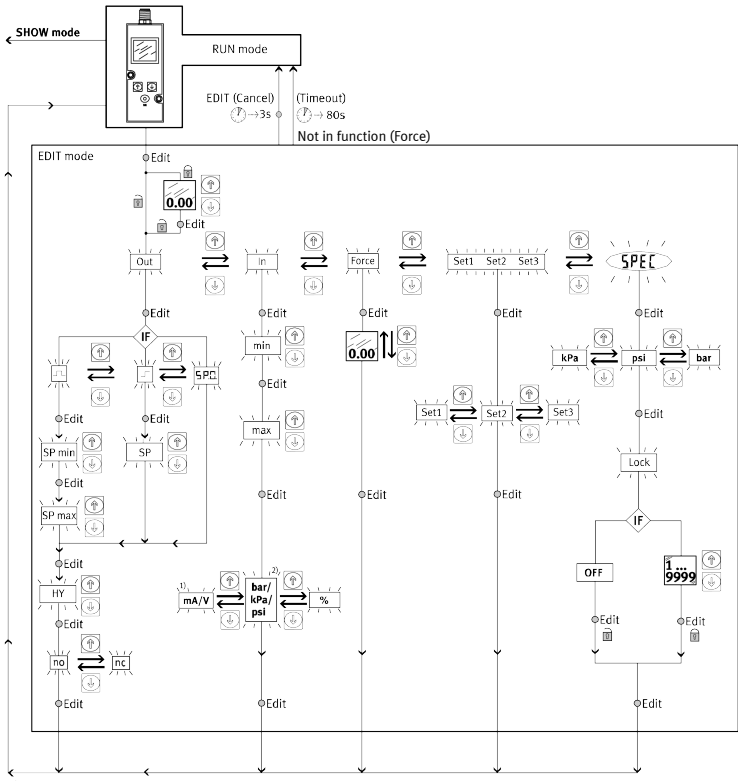
If the VPPM-... is in the RUN mode, press the [UP] or [DOWN] key twice to activate the SHOW mode.
If the 'Out' output is selected, the current settings of the 'Out' output are displayed every time the [UP] key is pressed.
If the 'In' input is selected, the value of the minimum and maximum pressure of the 'In' input are displayed by pressing the [DOWN] key.
The SHOW mode shows the following settings and values:
Settings for 'Out':
- Switching function (threshold value comparator/window comparator/'SP.O.')
- Switching point 'SP' or 'SP min' and 'SP max'
- Hysteresis 'HY'
- Switching characteristic ('N/O'/'N/C')

1. Press the [UP] key several times in succession and check the current values and settings of [Out].
2. After displaying the switching characteristics press the [UP] key to return to the RUN mode.

Settings for 'In':
- Minimum pressure value: display 'min'
- Maximum pressure value: display 'max'

1. Press the [DOWN] key several times in succession and check the current values of 'In'.
2. After displaying the maximum pressure press the [DOWN] key to return to the RUN mode.

8.3.3 EDIT mode



1) Abhängig von der Ausführung des VPPM-...-C1
2) Dependent on the setting in the "SPEC" menu

Fig. 7: EDIT mode

The EDIT mode enables the following:

In the menu	Selection
OUT	– Select switching function (threshold value comparator/window comparator/'SP.O.'). – Select switching points 'SP' or 'SP min' and 'SP max' and the hysteresis 'HY'. – Select the switching characteristic ('N/O'/'N/C').
IN	– Set the minimum and maximum pressure of the pressure regulation range. – Select the pressure unit 'kPa', 'psi', 'bar' (depending on the setting in the 'SPEC' menu) or 'mA'/'V' or '%'.
Set	– Select factory parameter set 'Set1', 'Set2' or 'Set3'.
SPEC	– Set the 'Lock' security code and the pressure unit (kPa, psi, bar).

Tab. 8: Menus

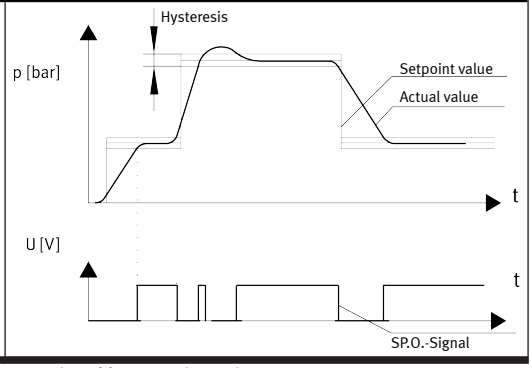
8.4 Configuring VPPM-...

8.4.1 Changing pressure range and configuration of the setpoint value display

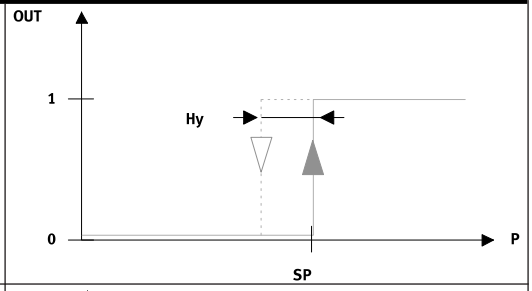
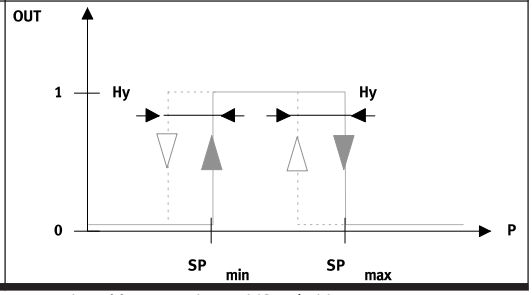
1. In order to activate the EDIT mode, press the [Edit] key.
   ↳ The 'Lock' display flashes if security blocking is active.
2. Use the [UP] and [DOWN] keys to set the selected security code and confirm with the [Edit] key.
   ↳ The 'Out' display flashes.
3. Press the [UP] or [DOWN] key until 'In' flashes in the display.
4. Press the [Edit] key.
   ↳ The 'min' display flashes.
5. Set the minimum pressure value with the [UP] and [DOWN] keys.
6. Press the [Edit] key.
   ↳ The 'max' display flashes.
7. Use the [UP] and [DOWN] keys to set the maximum pressure value.
8. Press the [Edit] key.
   ↳ The current setpoint value display type flashes.
   - The 'mA' or 'V' display flashes. The display depends on the variant of the VPPM -... .
   - The '%' display flashes.
   - The 'kPa', 'psi' or 'bar' display flashes. The display depends on the unit set in the 'SPEC' menu.
9. Use the [UP] and [DOWN] keys to select the display type of the setpoint value and confirm with the [Edit] key.
   ↳ The VPPM-... is back to RUN mode.

8.4.2 Configuring 'Out' switching output

- Define the desired switching characteristics of switching output D3.

Switching points ‘SP...’ and hysteresis ‘HY’	
If ‘SP.O.’ is selected	

Tab. 9: Switching points ‘SP...’ and hysteresis ‘HY’

Switching points ‘SP...’ and hysteresis ‘HY’ if ‘N/O’ is set	
When setting the threshold value comparator	
When setting the window comparator	

Tab. 10: Switching points ‘SP...’ and hysteresis ‘HY’ if ‘N/O’ is set

Configuring ‘Out’ switching output

1. Press the [Edit] key to activate the EDIT mode.
   - The ‘Lock’ display flashes if security blocking is active.
2. Use the [UP] and [DOWN] keys to set the selected security code and confirm with the [Edit] key.
   - The ‘Out’ display flashes.
3. Press the [Edit] key.
   - The current switching reaction flashes.
4. Use the [UP] and [DOWN] keys to select the desired switching response (threshold value comparator, window comparator or ‘SP.O.’) and confirm with the [Edit] key.
   - With the ‘threshold value comparator or window comparator’ switching function the ‘SP’ or ‘SP min’ display flashes.
5. Use the [UP] and [DOWN] keys to set the ‘SP’ or ‘SP min’ switching point and confirm with the [Edit] key.
   - With the ‘window comparator’ switching function the ‘SP max’ display flashes.
6. Use the [UP] and [DOWN] keys to set the ‘SP max’ switching point and confirm with the [Edit] key.
   - The ‘HY’ display flashes.
7. Use the [UP] and [DOWN] keys to set the hysteresis ‘HY’ and confirm with the [Edit] key.
   - The ‘N/O’ or ‘N/C’ display flashes.
8. Use the [UP] and [DOWN] keys to set the switching characteristics and confirm with the [Edit] key.
   - The VPPM-... is back in the RUN mode.

8.4.3 Force input

1. In order to activate the EDIT mode, press the [Edit] key.
   - The ‘Lock’ display flashes if security blocking is active.
2. Use the [UP] and [DOWN] keys to set the selected security code and confirm with the [Edit] key.
   - The ‘Out’ display flashes.
3. Press the [UP] or [DOWN] key until ‘Force’ flashes in the display.
4. Press the [Edit] key.
   - The ‘Force’ display flashes.
5. Press the [UP] or [DOWN] key to change the default value.
   - The new set default value is immediately accepted by the regulator.
6. Press the [Edit] key to exit the Force mode.
   - The analogue voltage and current values of the input still apply.
   - The VPPM-... is back in the RUN mode.

8.4.4 Selecting factory parameter set

1. In order to activate the EDIT mode, press the [Edit] key.
   - The ‘Lock’ display flashes if security blocking is active.
2. Use the [UP] and [DOWN] keys to set the selected security code and confirm with the [Edit] key.
   - The ‘Out’ display flashes.
3. Press the [DOWN] key until ‘Set1’, ‘Set2’ and ‘Set3’ flash in the display.
4. Press the [Edit] key.
   - The ‘Set1’, ‘Set2’ or ‘Set3’ display flashes.
5. Use the [UP] and [DOWN] keys to select the desired factory parameter set.
   - ‘Set1’ (parameter set 1): fast control response
   - ‘Set2’ (parameter set 2): universal control response
   - ‘Set3’ (parameter set 3): precise control response
   - The selected parameter set flashes.
6. Press the [Edit] key.
   - The VPPM-... is back to RUN mode.

8.4.5 Setting unit and security code

1. In order to activate the EDIT mode, press the [Edit] key.
   - The ‘Lock’ display flashes if security blocking is active.
2. Use the [UP] and [DOWN] keys to set the selected security code and confirm with the [Edit] key.
   - The ‘Out’ display flashes.
3. Press the [DOWN] key until ‘SPEC’ flashes in the display.
4. Press the [Edit] key.
   - The current unit ‘kPA’, ‘psi’ or ‘bar’ flashes.
5. Select the desired unit with the [UP] and [DOWN] keys.
   - The selected unit flashes.
6. Press the [Edit] key.
   - The ‘Lock’ display flashes.
     ‘OFF’ or the security code is shown on the display.
7. **i**
   - The security code can have a maximum of 4 digits.
   - Keep the security code where it can be found.
   - OFF = no protection

   Use the [UP] and [DOWN] keys to set the required security code and confirm with the [Edit] key.
   - The VPPM-... is back in the RUN mode.

8.5 Commissioning VPPM-...

NOTICE

Safety position: in the event of a setpoint value cable break of the voltage variant, the output pressure is set to 0 MPa. If the cable of the voltage variant (detection of input values below 3.6 mA) breaks or if the supply voltage is lost, the output pressure is retained unregulated. Leakage results in a change of pressure over the long term.

1. Connect the VPPM-... with a setpoint value signal. The VPPM-... has a differential input. Apply the 0 ... 10 V setpoint value signal to contacts 3 and 4. Apply the lower potential to contact 3 and the higher potential to contact 4.

   i

   Contact 3 (– setpoint value) can be connected to contact 7 (0 V DC).
2. Power the VPPM-... with direct current.
   - Supply voltage UV = 24 V DC ±10%
3. Select an appropriate parameter set for the regulator.

The following 3 tables show the recommended parameter sets for the different pneumatic ports:

Parameter sets recommended for VPPM-6...				
Tube length[1)]	Open system	Output volume in ml		
		0 ... 100	100 ... 1000	> 1000
0 m	3	3	2	1
1 m	3	3	2	2
3 m	3	3	3	2
≥ 5 m	3	3	3	2

1) with inner tubing diameter 6 mm or 8 mm

Tab. 11: Parameter sets recommended for VPPM-6...

Parameter sets recommended for VPPM-8...				
Tube length[1)]	Open system	Output volume in ml		
		0 ... 500	500 ... 2000	> 2000
0 m	3	1	2	3
1 m	3	1	2	3
3 m	3	2	3	3
≥ 5 m	3	3	3	3

1) with tubing diameter 8 mm or 10 mm

Tab. 12: Parameter sets recommended for VPPM-8...

Parameter sets recommended for VPPM-12L-...				
Tube length[1]	Open system	Output volume in ml		
		0 ... 2000	2000 ... 10000	> 10000
0 m	3	1	2	3
1 m	3	1	2	3
3 m	3	2	3	3
≥ 5 m	3	3	3	3

1) with tubing diameter 12 mm or 16 mm

Tab. 13: Parameter sets recommended for VPPM-12L-...

9 Operation

NOTICE

When switching off the VPPM.-..., first make sure that the setpoint value is set to 0, then that the supply pressure and finally the supply voltage are switched off.

9.1 Restoring VPPM-... factory setting

Restoring the factory settings deletes the current settings.

i

- The VPPM -... can also be reset if a security code cannot be found.

1. Press and hold the [UP], [DOWN] and [Edit] keys.
2. Switch on the operating voltage.
3. Release the [UP], [DOWN] and [Edit] keys.
   ↳ The 'ALL' display flashes.
4. Use the [UP] and [DOWN] keys to select which parameters are to be reset to the factory setting.
   – 'Out' flashes: reset all output parameters.
   – 'In' flashes: reset all input parameters.
   – 'ALL' flashes: reset all output parameters and input parameters and the security code.
5. Press the [Edit] key to reset the selected parameter.
   ↳ The VPPM-... is back in the RUN mode.

10 Maintenance

10.1 Disassembly

NOTICE

- When switching off the VPPM.-..., first make sure that the setpoint value is set to 0, then that the supply pressure and finally the supply voltage are switched off.

1. Switch off the following energy sources:
   – Operating voltage
   – Compressed air
2. Disconnect the connections from the device.
3. Remove the device from the mounting surface or H-rail.

10.2 Cleaning

1. Switch off the following energy sources to clean the outside:
   – Operating voltage
   – Compressed air
2. Clean the device on the outside with a soft cloth as required.

11 Malfunctions

11.1 Error display

Error indicator in display	Cause
ER.01	Hardware error
ER.05	Supply voltage too low
ER.09	Limit value (setpoint value) undershot
ER.10	Limit value (setpoint value) overshot
ER.26	Supply voltage too high
ER.28	Temperature range exceeded in the device

Tab. 14: Error display

11.2 Fault clearance

Malfunction	Possible cause	Remedy
Device does not respond	No supply voltage, LED [power] off.	Check 24 V DC supply voltage connection.
	No data communication.	– Check control unit. – Check connection.
Flow rate too low	Restriction of the flow cross section by connection technology.	Use alternative connections.
Pressure rise too slow	Large cylinder volume and long tube length.	– Select another parameter set. – Use device with larger nominal width.
Pressure constant despite modified setpoint specification	Break in the electrical connecting cable.	Replace electrical connecting cable.
Pressure constant despite modified setpoint specification	Supply pressure P1 too low.	Increase supply pressure.
Manual selection of parameter sets with the [UP] and [DOWN] keys on the device is not possible	Voltage is applied at digital inputs D1 and D2.	Apply 0 V DC at digital inputs D1 and D2.

Tab. 15: Fault clearance

12 Technical data

General technical data		
Design		Proportional-pressure regulator
Mounting position		As desired, preferably horizontal (display elements facing upwards)
Materials		
Housing		Wrought aluminium alloy
Cover		PAXMD6 GF50/gr-P PA6-GB20,GF10/gr-P
Seals		Nitrile rubber
Lubrication		silicone-free
Weight		
VPPM-6...	[g]	400
VPPM-8...	[g]	560
VPPM-12...	[g]	2050

Tab. 16: General technical data

Operating and environmental conditions		
Medium		Compressed air in accordance with ISO 8573-1:2010 [7:4:4] inert gases
Information on operating medium		Lubricated operation not possible
Degree of protection		IP 65 when mounted, with tightened mounting screws, in combination with plug socket according to accessories.
Ambient temperature	[°C]	0 ... 60
Temperature of medium	[°C]	10 ... 50
Storage temperature	[°C]	–10 ... +70
Vibration and shock		
Vibration		Tested in accordance with DIN/IEC 68/EN 60068 Part 2-6; wall mounting: 0.35 mm path at 10 ... 60 Hz, 5 g acceleration at 60 ... 150 Hz[1]
Shock		Tested in accordance with DIN/IEC 68/EN 60068 Part 2-27; wall mounting: ±30 g at 11 ms duration; 5 shocks per direction[1]

1) Information does not apply when mounting the VPPM-.../VPPX-... on bracket VAME-P1-A/-T.

Tab. 17: Operating and environmental conditions

VPPM-...		0L2H	0L6H	0L10H
Pressure ranges				
Permissible input pressure P1	[MPa]	0 ... 0.4	0 ... 0.8	0 ... 1.1
	[bar]	0 ... 4	0 ... 8	0 ... 11
	[psi]	0 ... 58	0 ... 116	0 ... 159.5
Control range (output pressure P2)[1]	[MPa]	0.002 ... 0.2	0.006 ... 0.6	0.01 ... 1
	[bar]	0.02 ... 2	0.06 ... 6	0.1 ... 10
	[psi]	2.9 ... 29	8.7 ... 87	1.45 ... 145
Total leakage when new	[l/h]	< 5		
Connection		G 1/8, 1/8 NPT, G 1/4, 1/4 NPT, G 1/2, 1/2 NPT		
Nominal width				
Pressurisation	[mm]	6 for VPPM-6... 8 for VPPM-8... 12 for VPPM-12...		
Exhaust port	[mm]	4.5 for VPPM-6... 6 for VPPM-8... 12 for VPPM-12...		

1) Input pressure P1 at least 0.1 MPa (1 bar, 14.5 psi) above output pressure P2.

Tab. 18: Characteristic pneumatic values

Characteristic electrical values		
Electrical connection		Pin contact M12x1, 8-pin
Permissible operating voltage	[V DC]	21.6 ... 26.4 Permissible residual ripple max. 10%
Power rating of digital switching output D3 (PIN 8 in el. connection)	[mA]	max. 60
Max. permissible supply cable length and signal line length	[m]	10
Max. electrical power consumption		
VPPM-6... and VPPM-8...	[W]	7
VPPM-12L-...	[W]	12

Characteristic electrical values		
Voltage type VPPM-...-V1...-...C1		
Setpoint variable	[V DC]	0 ... 10
Input resistance (setpoint value)	[kΩ]	10
Output actual value load	[kΩ]	min. 2
Current type VPPM-...-A4...-...C1		
Setpoint variable	[mA]	4 ... 20
Input resistance (setpoint value)	[Ω]	250
Output actual value load	[Ω]	max. 500

Tab. 19: Characteristic electrical values

Control characteristics[1)]	
Linearity	1% Full Scale (FS)/2% Full Scale (FS)
Hysteresis	0.5% Full Scale (FS)
Reproducibility	0.5% Full Scale (FS)
Total accuracy	1.25% (S1)/2.25 (2%)
Temperature coefficient	0.04/K

1) Maximum deviation, characteristic values determined at room temperature in accordance with ISO 10094. Linearity refers to the ideal characteristic curve.

Tab. 20: Control characteristics