

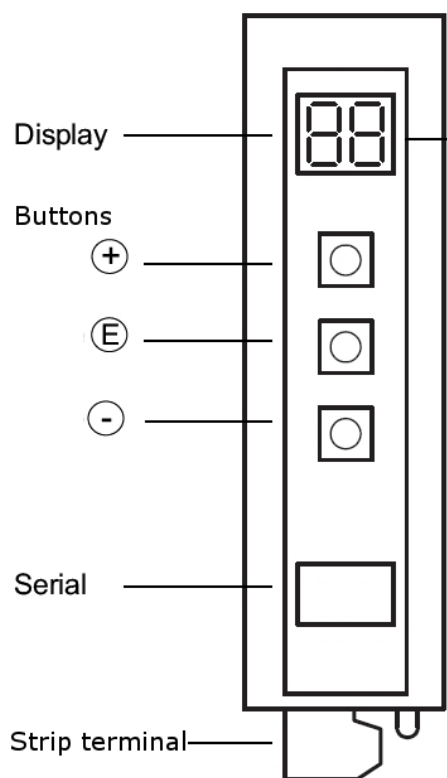
Digital amplifier for proportional valves PEM XD

FEATURES

- Amplifier for cap rail mounting according to DIN EN 50022
- Control of 2 coils in open loop, or 2 proportional valves with 1 coil in open loop
- Linear control with minimal hysteresis

SPECIFICATIONS

Electric supply*:	DC 10 - 30 VDC (rectified and filtered, small ripple) * shall be > than voltage of coils
Power:	20 up to max. 40 W
Output:	860 mA – 2600 mA
Setpoint signal:	
- tension	±10V Input impedance 10-100 kΩ
- current	4 up to 20 mA Input impedance max 500 Ω
Card connector:	DIN 41612-D 32 drill
Ambient temperature:	-20 up to 70° C
Electro-magnetic capability (EMC):	
- Output	according to CEI EN 61000-6-4
- capability	according to CEI EN 61000-6-2
Protection:	according to standards 2004/108/CEE Supply: Over-voltage- and Inverse polarity protection Signal entry: (> 33 V) inverse polarity protect. Coil output: over-voltage protection
Weight:	0,15 kg
Measures:	120 x 93 x 23 mm
Fixation:	cap rail DIN 50022, terminal strip 15 poles

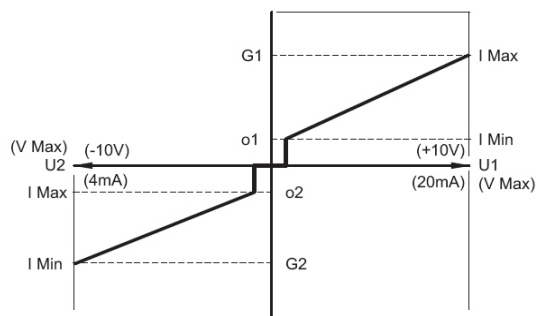


Signals

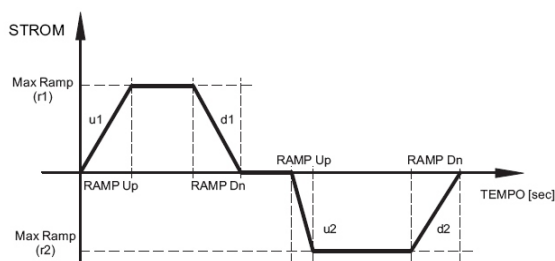
- A1** Setpoint 1 < 3,5A
- A2** Setpoint 2 < 3,5A
- A3** Short circuit at port 1
- A4** Short circuit at port 2
- A5** Disconnection at port 1
- A6** Disconnection at port 2
- A7** Supply voltage < 10V

Annotation: if the reason for the failure is corrected the display is automatically deleted

Block diagram



Parameters for PEM-XD-Dx2x



1 - FEATURES

1.1 - Supply

The amplifier requires a power supply of 10 to 30 VDC (terminals 1 and 2).

Note: The supply voltage of the amplifier may not be lower than the operating voltage of the controlled solenoids.

The voltage must be rectified and filtered, and the max. allowable ripple must be above the voltage range. The performance of the amplifier depends on the supply voltage and the value of the highest current. In general, a safe value for estimating the required performance results from the product of $V \times I$.

For example, an amplifier with maximum solenoid current = 800 mA and a supply voltage of 24 Vdc has a power consumption of 20W.

1.2 - Electrical protection devices

The input power of the amplifier is equipped with an over-voltage and reverse polarity protection. The outputs have a short circuit protection.

1.3 - Setpoint signal

The amplifier is designed for input setpoint values in the form of voltage signals 0 and 10 V and $\pm 10V$ and current signals of 20 mA. The setpoint values come from an exterior generator (PLC, CNC) or from an external potentiometer, which is supplied with the amplifier.

2 - STATUSMELDUNGEN

2.1 - Power ON

The two-character display issues a confirmation of the power supply to the amplifier:

ON - Supply ok.

OFF - no or insufficient supply

FLASHING - error message (see table 1)

4.2 - Card OK OUTPUT

If no error is present, there is voltage at Pin 9. The output voltage signal corresponds to the supply voltage, if not even detected as defective ($<10V$). As a reference point, the ground pin 15 may be used. In case of failures the output is set to 0V.

The following failures are recognized:

- Supply voltage $<10V$

- Short circuit

- No coil connected

In the case of a failure the output amplifier ports are disabled.

After eliminating the interference the output ports are automatically reset.

The output current shall not exceed 100mA.

3 - Settings

Two modes of operation have to be distinguished: display of variables and modification of parameters.

The display of variables allows a real-time control of the setpoint and actual point state of the current and voltage values. The second mode enables editing and adjustment of various operating parameters.

3.1 - Variable display

After switching-on the amplifier starts in the variable display mode and shows the value of the first variable, i.e. U1 = setpoint signal of Channel 1. By the buttons (+) and (-) it is possible to select another variable for display. After the choice, the name of the variable is displayed for about 1 second and then automatically replaced by the value of this variable. By a short press of the button (E) the name of the displayed value will be shown for about 1second.

The number of the displayed variables is depending on the version of the amplifier (see model code):

U1: setpoint of Channel 1:

..0V 9.9 V at version D01x

4mA to 20mA version D11x ..

- 9.9 V. V. .0. +9.9 V for version D02x

..4mA 12mA 20mA at version D12x

C1: Nominal current for channel 1. Calculated from the setpoint signal. Displayed in amperes in the range of 0A to 3.0 A.

E1: Actual current for channel 1. Measured actual current value. Displayed in amperes in the range of 0A to 3.0 A.

U2: Setpoint signal of channel 2:

0V .. 9.9 V at version D03x

4mA to 20mA version D13x ..

- 9.9 V. V. .0. +9.9 V for version D02x

. 4mA 12mA 20mA at version D12x

C1: Nominal current for channel 2. Calculated from the setpoint. Displayed in amperes in the range of 0A to 3.0 A.

E1: Actual current for channel 2. Measured actual current value. Displayed in amperes in 0A to 3.0 A.

In version Dx1x, only the variables U1, C1 and E1 are foreseen for display.

The indicated value should be interpreted as described below. E.g. version D12x.

Setpoint signal

REFERENCE (V)	VAR. U1 (mA)	VAR. U1 (V)	VAR. C1/E1	VAR. U2 (V)	VAR. C2/E2
+10	20	10.	18. (A)		
+5	16	5.0	1.0 (A)		
0	12	00	40.(mA)		
0	12			0.0	40.(mA)
-5	8			5.0	1.0 (A)
-10	4			10.	1.8 (A)

4 – CHANGE OF PARAMETERS

If the button (-) is pressed longer than 1.5 seconds the display changes from display mode to the mode to change the parameters - and vice versa.

The change of the parameters is done via the buttons (+) and (-) – its name appears after each selection for about 1 second in the display. By a short press of the button (E) the name of the displayed value will be shown for about 1second.

If the button (E) is pressed more than 1.5 seconds the parameter name will flash for about 1 second. Change of the parameter value using the buttons (+) and (-) is possible. At each time the buttons are pressed, the parameter value is increased or decreased by one unit. If the button is hold, the parameter value changes with increasing speed. After selecting the desired parameter value is stored

by pressing the button (E) in the EEPROM.
By the buttons (+) and (-) the selection of the parameters is again possible. After pressing the button (+) for more than 2-seconds the displayed value begins to flash. The parameter values are stored in EEPROM.

List of parameters

G1: "I, Max" in amperes

Corresponds to the maximum current of the solenoid coil (channel 1) at maximum setpoint voltage +10 V (or 20mA). Used e.g. to limit the hydr. parameters.
Default: 860mA at Dxx1 and Dxx2
Area: 50% from .100 I_{max}

o1: "I min" in amperes

Corresponds to the offset streamed to the solenoid coil (channel 1) if the setpoint signal exceeds the threshold of 0.1 V (or 0.1 mA). E.g. used to reduce the zero coverage.
Default: 200mA
Range: 0 .50% of I_{max}.

r1: "Max. ramp time in seconds

Determines the time in which the current to the solenoid coil (channel 1) rises from 0 to 100%, triggered by a setpoint signal from 0 to 100%. Also valid for inverse signal course.
Range: 0 .20 sec

u1: "Ramp Up" rise time as a percentage of r1

Determines the rise time with respect to a setpoint step response from 0 to 100%.
Default: 99%
Range: 0 .99%

d1: "Ramp Down" fall-time as a percentage of r1

Determines the rise time with respect to a setpoint step response from 100 to 0%.
Default: 99%
Range: 0...99%

G2: "I, Max" in amperes

Corresponds to the maximum current to the solenoid coil (channel 2) at maximum value +10 V (or 20mA). Used e.g. to limit the hydr. parameter.
Default: 860mA at Dxx1 and Dxx2
Area: 50 .100% of I_{max}

o2: "I min" in amperes

Corresponds to the offset streamed to the solenoid coil (channel 2) if the setpoint signal exceeds the threshold of 0.1 V (or 0.1 mA). E.g. used to reduce the zero coverage.
Default: 200mA
Range: 0 .50% of I_{max}.

r2: "Max ramp time in seconds

Determines the time in which the current to the solenoids coil (channel 2) rises from 0 to 100%, triggered by a setpoint signal from 0 to 100%. Also valid for inverse signal course.
Range = 0 .20 sec

u2: "Ramp Up" rise time as a percentage of r2

Determines the rise time with respect to a setpoint on 0 to 100%.
Default: 99%
Range: 0 .99%

d2: "Ramp Down" fall-time as a percentage of r2

Determines the rise time with respect to a setpoint response time on 100 to 0%.
Default: 99% Range: 0 .99%

Fr: dither frequency in Hertz

Determines the PWM frequency of the amplifier, thus indirectly the dither frequency of the solenoid current. This is used to minimize the hysteresis of hydraulic valves. An optimization has to be done to the hydraulic system.
Default: 100Hz at Dxx1 and 200Hz for Dxx2
Area: 50 .400 Hz

U1 and U2: "V max"

Factor for the validation of the setpoint input without loss of resolution. Example: at default mode and 10V setpoint signal, the output current is 1200mA. If U_x changed to now 500, is the amp at 10V only 600mA from.
Default: 1000
Range: 0 .1000

In version Dx1x only the parameters for channel 1 are displayed.

5 - INSTALLATION

The amplifier is foreseen for the installation on rails to DIN EN suitable 50022. The cabling is conducted over a 15-pin terminal block. For the connection of power supply and solenoids please choose cables with a diameter of 0.75 mm² for distances up to 20m and 1.00 mm² for distances up to 40m.

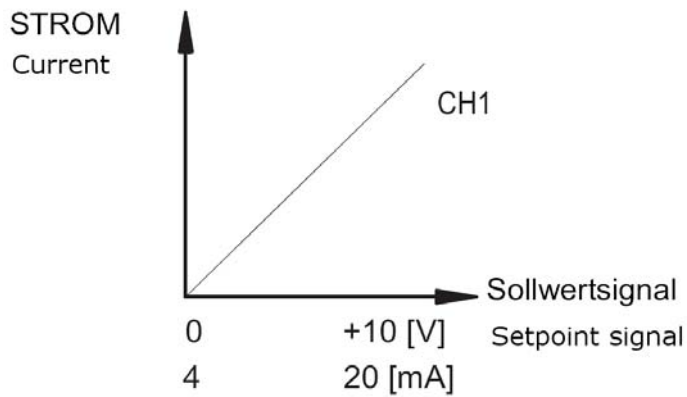
The cross section depends on the length of the cable. For signal lines use shielded, grounded cables at the drive electronics.

NOTE 1

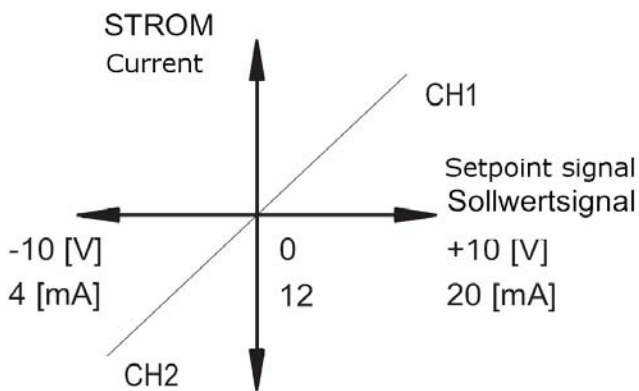
To observe EMC requirements it's important that the control unit electrical connection is in compliance with the wiring diagram of chapter 7. As a general rule, the valve and the electronic unit connection wires must be kept as far as possible from interference sources (e.g. power wires, electrical motors, inverters and electrical switches). **In environments where there are critical electromagnetic interferences, a complete protection of the connection wires can be requested.**

The diagram shows the curve of the current output in function of the setpoint signal

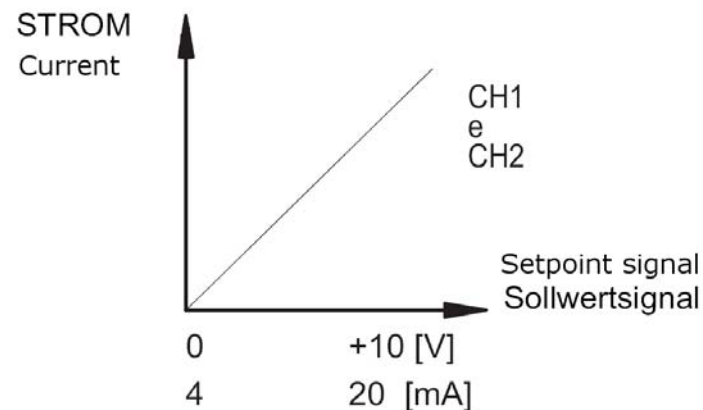
PEM-XD-Dx1x



PEM-XD-Dx2x

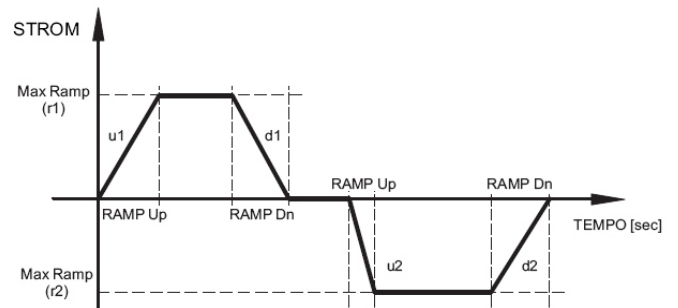
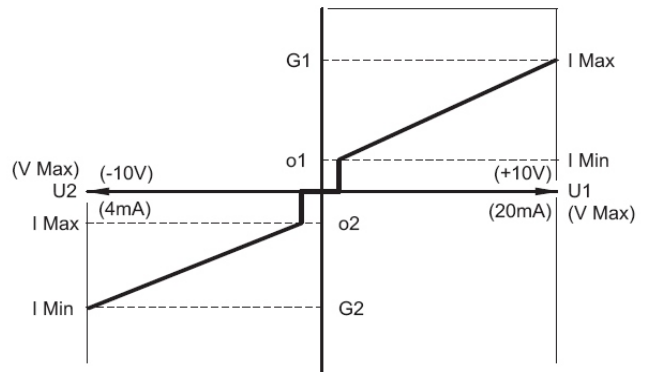


PEM-XD-Dx3x



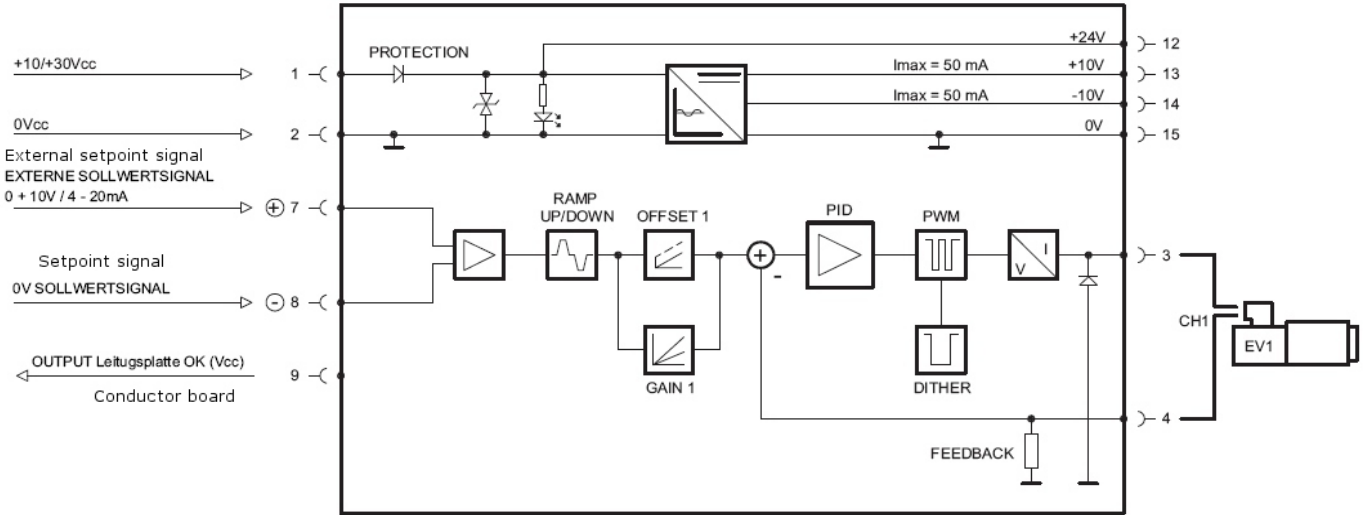
5.2 FUNCTION of the ramps

Example: parameters for PEM-XD-Dx2x

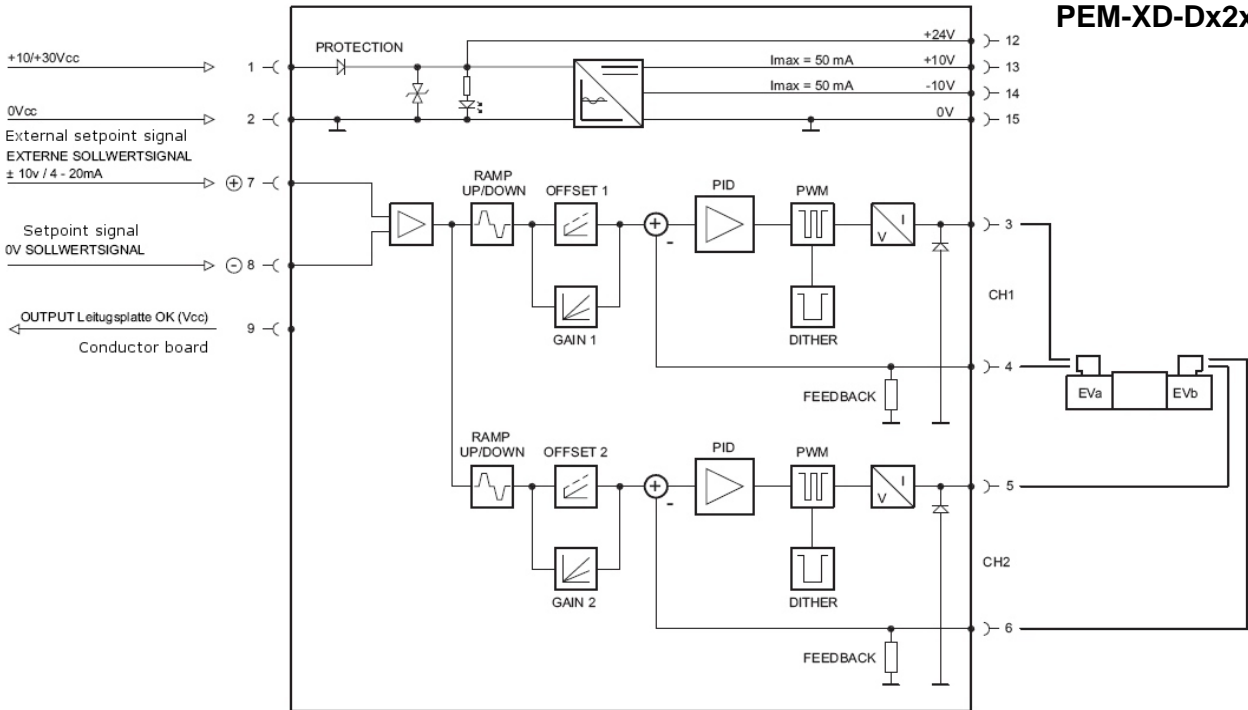


BLOCK DIAGRAMS

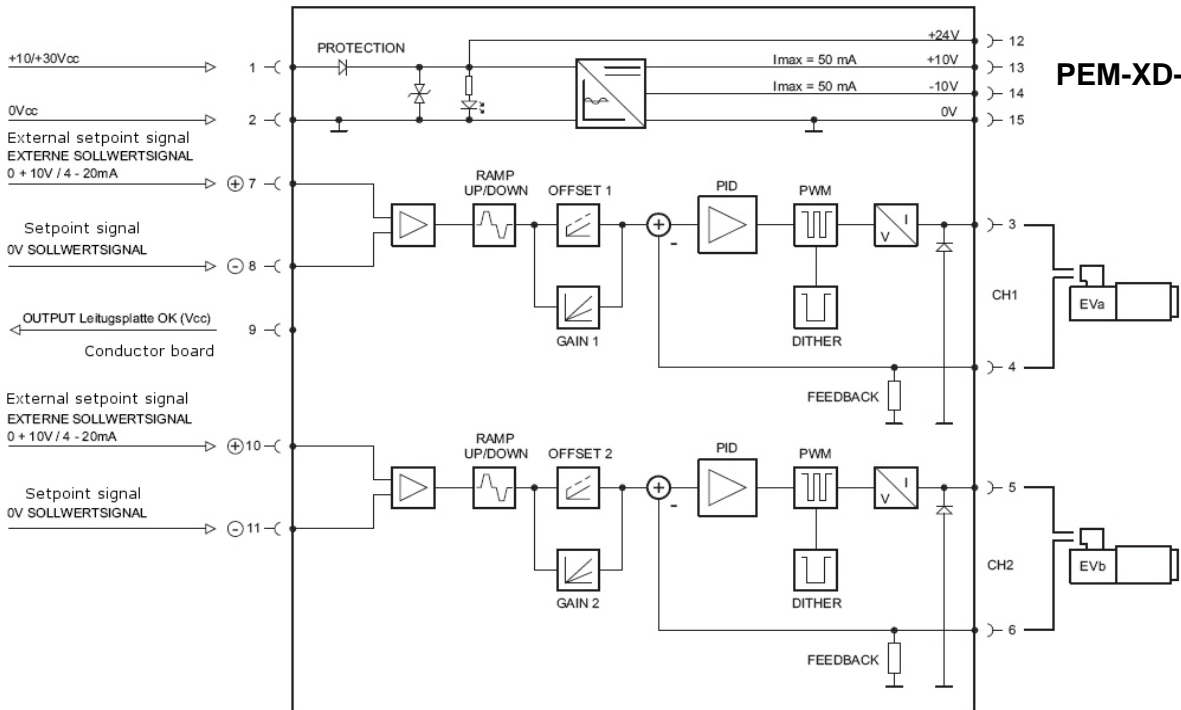
PEM-XD-Dx1x



PEM-XD-Dx2x



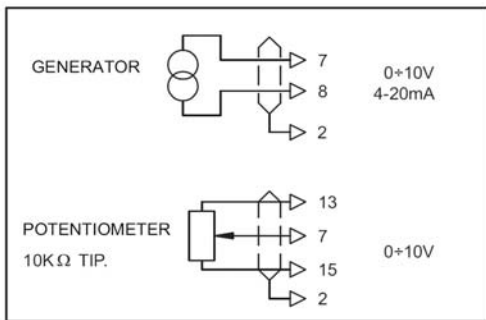
PEM-XD-Dx3x



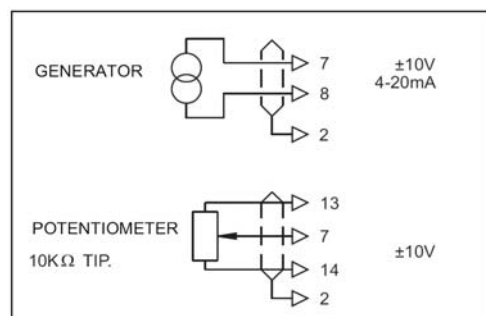
STANDARD MODEL	Part No.
PEM-XD-D021	3493285
PEM-XD-D022	3532186
PEM-XD-D031	3530881
PEM-XD-D032	3530882
Other types on request	

Cabling of the setpoint signal

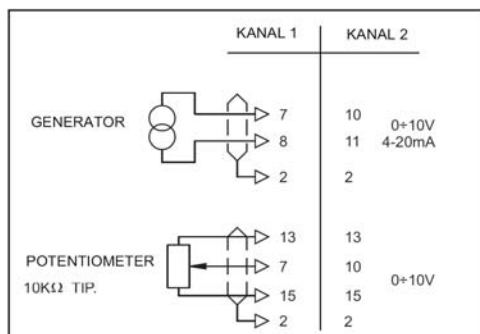
PEM-XD-Dx1x



PEM-XD-Dx2x



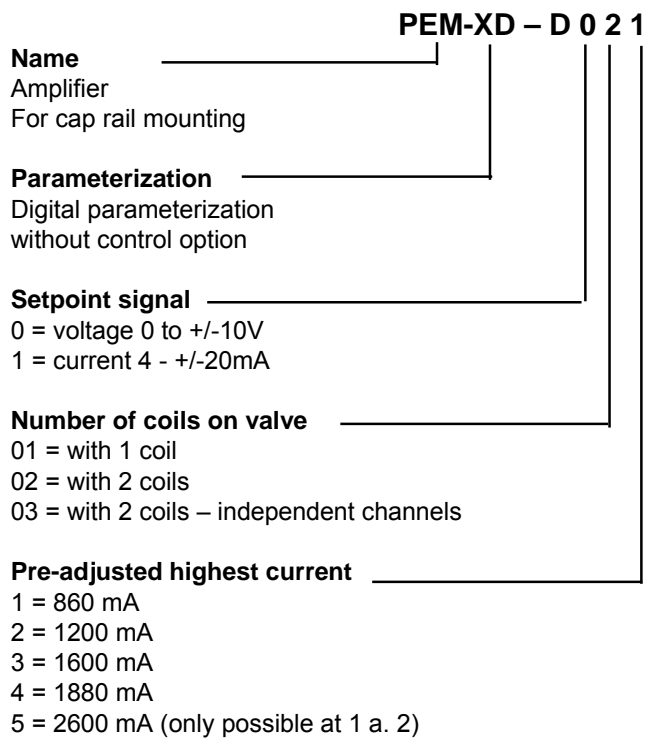
PEM-XD-Dx3x



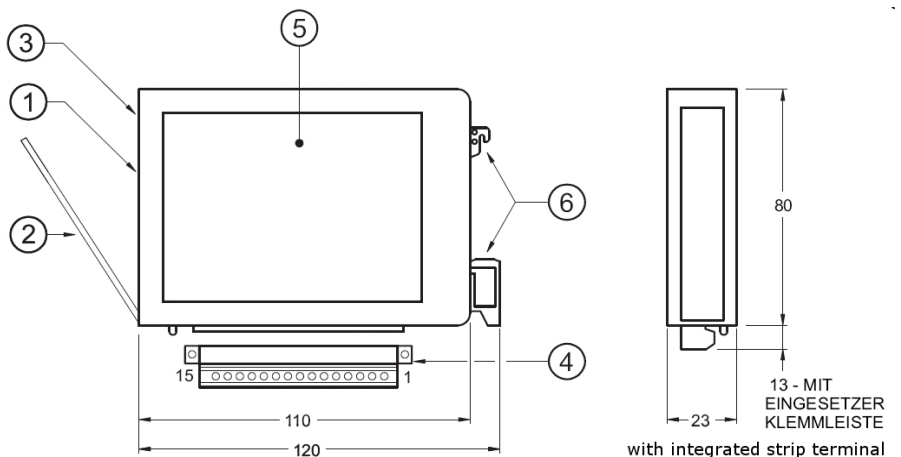
Hint:

If the generator only contains a differential entry (not on ground), clamp 8 (11 for PEM-XD-X3X) Has to be connected with clamp 14

TYPECODE



DIMENSIONS



- 1) Display- and mini USB side
- 2) Knob protections lock
- 3) Display for the signal of the card-supply and failures
- 4) Terminal strip with 15 poles, cable exit to bottom
- 5) Printout of the electric circuit of the PSB and port overview
- 6) Connector for guidances according to DIN EN 50022

Annotation
The technical information in this brochure are relating to the operating conditions and applications. At deviant applications and/or operating conditions please contact the technical dept. Technical information are subject to technical modifications.