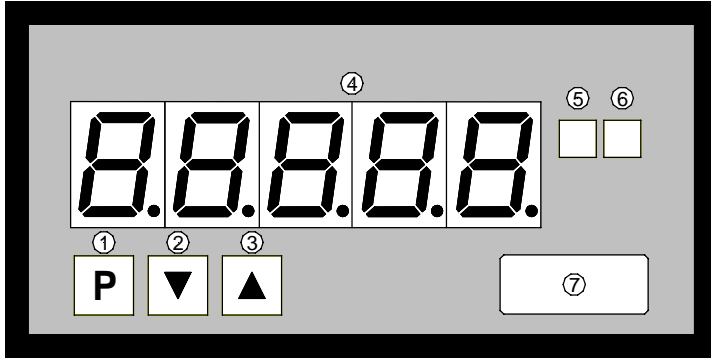


# Operation instructions PVE5

## Panel meter for standard signals

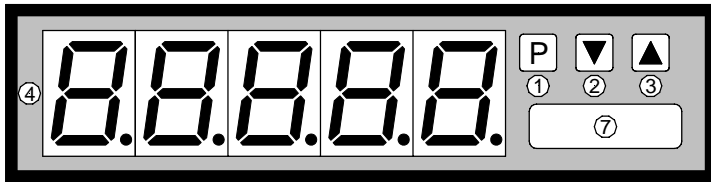
Free scalable display with setpoints from -9999 up to 55000

Housing size 96x48

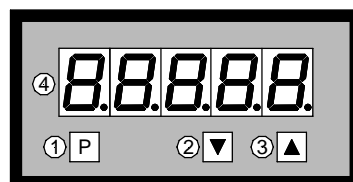


- ① Program key
- ② Minus key
- ③ Plus key
- ④ 7-segment display
- ⑤ Setpoint indication 1
- ⑥ Setpoint indication 2
- ⑦ Insertable dimension strip

Housing size 96x24

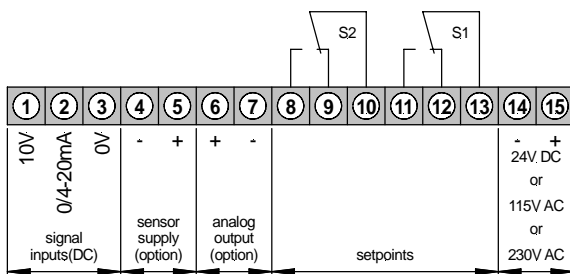


Housing size 48x24

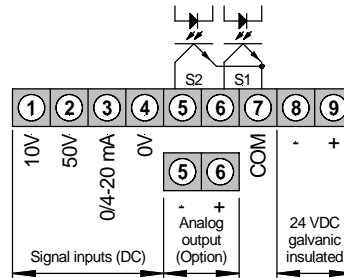


## Terminal connection

Housing size 96x48 and 96x24



Housing size 48x24



## Ordering code

### TYPE ORDER NUMBER (housing size 96x48)

PVE 5.001.1522B	Power supply 230 VAC	terminal connection	15=L	14=N
PVE 5.001.1422B	Power supply 115 VAC	terminal connection	15=L	14=N
PVE 5.001.1722B	Power supply 24 VDC (galvanic insulated)	terminal connection	15=L+	14=L-5

### TYPE ORDER NUMBER (housing size 96x24)

PVE 5.001.3522B	Power supply 230 VAC	terminal connection	15=L	14=N
PVE 5.001.3422B	Power supply 115 VAC	terminal connection	15=L	14=N
PVE 5.001.3722B	Power supply 24 VDC (galvanic insulated)	terminal connection	15=L+	14=L-

## TYP BESTELLNUMMER (Baugröße 48x24)

PVE 5.001.7782B Versorgungsspannung 24 VDC  
(galvanisch getrennt)

Anschlussklemme 9=L+ 8=L-

Options	Housing 96x48	Housing 96x24	Baugröße 48x24
LED green	X	X	X
Protection IP54 front side	X	X	X
Protection IP65 front side	X	X	X
Plug in terminal with protection IP40	X	X	
Plug in terminal with protection IP54	X	X	
Plug in terminal with protection IP65	X	X	
Sensor supply 24 VDC/50 mA	X		
Sensor supply 24 VDC/50 mA (for U <sub>B</sub> 24 VDC)		X	
Sensor supply 24 VDC/20 mA (for U <sub>B</sub> 230 VAC)		X	
Sensor supply 24 VDC/20 mA (for U <sub>B</sub> 115 VAC)		X	
Sensor supply 10 VDC/20 mA	X	X	
Analogue output 0-10 VDC (12 bit)	X	X	X
Analogue output 0-20 mA/load ≤ 500 Ω	X	X	X
Analogue output 4-20 mA/load ≤ 500 Ω	X	X	X
Measuring input 0...1 mA (S191)	X	X	X
Measuring range 1 A on request (S108)	X	X	X
Dimension strips on request	X	X	X
Other power supplies on request	X	X	X

## Programming (see also programming example)

1. Connect device in line with connection diagram. Connect screen of the sensor line with suitable potential.
2. Switch on supply voltage. This is followed by a segment test with subsequent switching to operating mode.
3. Press program key [P]. Program number 0 is displayed.
4. Change program number by simultaneously pressing program key [P] and ▲ key.
5. By pressing the ▲ or ▼ key, the display changes to the value stored under this program number.
6. Change displayed value by pressing the ▼ or ▲ key.
7. With program numbers 1 and 2, the applied voltage (sensor calibration under program number 0 active) can be saved by simultaneously pressing the [P] and ▼ keys. This is confirmed by the appearance of a horizontal bar in the display. If a different calibration mode (1, 2, 3) is selected, it is not necessary to apply a voltage to the measuring input. In these modes, all that is needed is to assign certain display data to the stored restart points (offset and full-scale). The programming is also carried out under the program numbers 1 and 2 and must be saved with the [P] and ▼ keys. The appearance of horizontal bars in the display confirms that the save was successful.
8. If no further keys are pressed, the device changes back to operating mode after approx. 7 seconds. This definitively saves all the data, which do not have to be explicitly saved with the P and ▼ keys.

# MIN/MAX data

## Additional functions in normal mode for memory inquiry of the MIN/MAX data

The MIN/MAX memory is a volatile memory in which, after switching on the device or since the last erasure, the relevant minimum and/or maximum values are stored.

- By pressing the ▲ key, the MAX memory is displayed.
- By pressing the ▼ key, the MIN memory is displayed.
- Simultaneously pressing the ▼ and ▲ keys erases the memory stored in the display.

## Switching on

### Notes, factory settings and error elimination

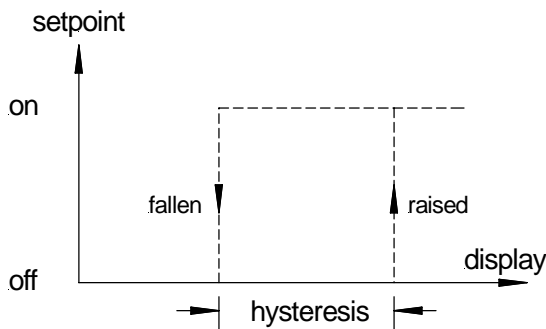
After the supply voltage is switched on, the device performs a reset including a segment test (all LED light up). It then carries out a self-test. Should any fault occur during this procedure, the word HELP appears in the display. This also applies to normal operation. This function serves to protect the surrounding components and units. If the word HELP appears in the display, a reset must be made to the factory settings. A reset is performed by switching on the supply voltage with the **P** key pressed. The display remains until the P key is released in the segment test, after which the default data are stored. The unit must now be reprogrammed to the user-specific data.

## Setpoints

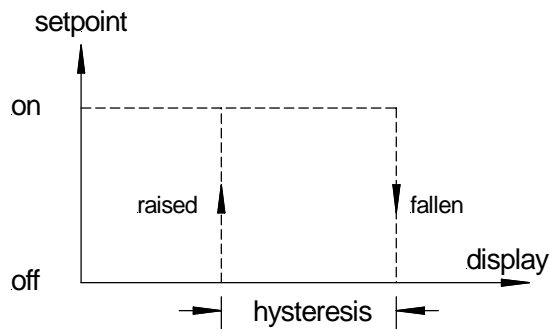
### Operating characteristics of the relays

The following diagrams illustrate the behavior of the setpoints (relays). The hysteresis can be programmed freely for each setpoint. In open circuit mode, the respective relay rises on reaching the threshold, while in closed circuit mode, the respective relay falls when the threshold is reached. By using the closed circuit mode, for example, a breakdown of the supply voltage can be signaled in the form of an alarm.

Definition: The hysteresis is the width of the window between the two threshold values of a setpoint!



Open circuit mode

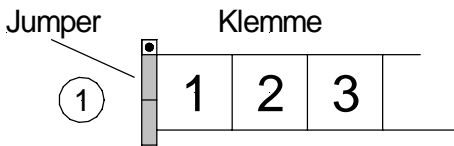


Closed circuit mode

# Programming lock

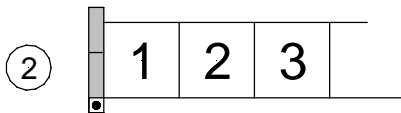
## Keyboard lock (for housing size 96x48 and 96x24 only)

Possible jumper settings on the back



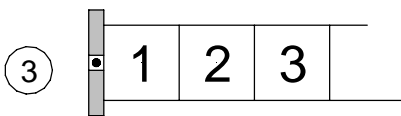
### Variation 1

Unrestricted programming. The user has access to all program numbers.



### Variation 2

Programming locked, programming is not possible. The programming mode is blocked.



### Variation 3

Restricted programming. The program numbers 1...6 are blocked for the user. The program number 61...68 (setpoints) can be freely configured.

## Program table

Program number	Function	Remark	Display	Factory setting
<b>Measuring input</b>				
0	Calibration mode	0 = sensor calibration 1 = 0...10 V 2 = 0...20 mA 3 = 4...20 mA (Save with P and ▼)	0 / 1 / 2 / 3	0
1	Input of desired indication value for full scale	Dependent on selected calibration mode e.g. 10 V measuring input = end value 300.00 (Save with P and ▼)	-9999... 55000	20000
2	Input of offset for indication value	Dependent on selected calibration mode e.g. 4 mA measuring input = initial value 0.00 (Save with P and ▼)	-9999... 55000	0
3	Setting of decimal point	With ▲ to the desired decimal point		no decimal point
4	Input of display time	Display time = measuring time Integrated measuring process	0,5...10,0s	1,0
<b>Analogue output</b>				
5	Input of final value for analogue output	e.g. 300.00 as in programming example	-9999... 55000	20000
6	Input of offset for analogue output	e.g. 0.00 as in programming example	-9999... 55000	0

Program number	Function	Remark	Display	Factory setting
<b>Setpoint S1</b>				
61	Threshold	Threshold	-9999... 55000	5000
62	Hysteresis	Width of window between the two threshold values of a setpoint	0...55000	1
63	Closed circuit / open circuit	Working principle	0 / 1	1
<b>Setpoint S2</b>				
66	Threshold	Threshold	-9999... 55000	15000
67	Hysteresis	Width of window between the two threshold values of a setpoint	0...55000	1
68	Closed circuit / open circuit	Working principle	0 / 1	1

## Notes on programming

The following programming examples describe the two different tuning methods for setting the device. A brief explanation will first be given on documenting the display procedure after pressing the [P] key.

If the keyboard lock is not set (see programming lock), pressing the [P] key will always switch to programming mode with the program number 0. For approx. 3 seconds, a 0 will appear in the display, preceded by a **P** – see programming examples. After 3 seconds, the calibration mode 0 will flash alternately with the program number 0 for a further 4 seconds. By pressing the ▼ or ▲ keys, the value stored for the calibration mode is displayed for approx. 3 seconds, during which it can be changed with the ▼ or ▲ keys. After the three seconds have elapsed, the program number 0 flashes alternately with the currently set calibration mode for a further 4 seconds. The changed value can be saved by simultaneously pressing the [P] and ▼ keys simultaneously. The device acknowledges this by displaying 4 horizontal bars. Changing to program number 1 is done by pressing the [P] and ▲ keys.

All further settings can be made by following the above procedure. If you are in programming mode and do not press any key within 7 seconds, the device automatically reverts from the programming mode to the operating mode. You can change back again to programming mode at any time by pressing the [P] key.

## Programming example

### 1. Sensor calibration / Tuning the measuring section to a real measuring value

When using the sensor calibration, a voltage or current signal must be applied to the display unit for the scaling. Furthermore, it must be ensured that the device is supplied with the correct auxiliary voltage. During **sensor calibration**, the device is tuned to a **real measuring value**.

The basis for this programming example are the basic values after resetting to the factory settings.

For the sensor calibration, a 0 must always be stored under program number 0!

Measuring input: 0/4...20 mA  
 Measuring signal: 4...20 mA  
 Display: 4 mA = 0.00  
 20 mA = 300.00  
 Display time: 2.0 seconds  
 Setpoint S1: 60.00 and closed circuit  
 falling at 60.00 and rising at 58.00  
 (corresponding hysteresis = 2.00)  
 Setpoint S2: 150.00 and open circuit  
 Rising at 150.00 and falling at 80.00  
 (corresponding hysteresis = 70.00)  
 Analogue output: Measuring signal 4 mA corresponds to a display of 0.00 and 0 V at the analogue  
 output.  
 Measuring signal 20 mA corresponds to a display of 300.00 and  
 10 V at the analogue output.

## Programming example

### Start of programming

Switch on supply voltage!

Segment test

8.8.8.8.8.

Operating mode

□ □ □ □ 0

### Calibration mode

Enter program mode

P □ □ □ 0  
P □ □

To memorized value with ▼.

□ □ □ □ 0  
□ ▼ □

### Full scale

Connect 20 mA to the measuring input. To program number 1 with P and ▲.

P □ □ □ 1  
P □ ▲

To memorized value with ▼ or ▲.

20000  
□ ▼ ▲

Set free scalable value.

30000  
□ ▼ ▲

Memorize value with P and ▼.

Take over by display of transversal bars.

— — — — —  
P ▼ □

### Offset

To program number 2 with P and ▲.

P □ □ 2  
P □ ▲

Connect measuring value 4 mA.  
To memorized value with ▼ or ▲.

□ □ □ □ 0  
□ ▼ ▲

Memorize value with P and ▼.  
Take over by display of transversal bars.

— — — — —  
P ▼ □

### Decimal point

To program number 3 with P and ▲.

P □ □ 3  
P □ ▲

To memorized value with ▼ or ▲.

□ □ □ □ 0  
□ ▼ ▲

Set decimal point.

□ □ 0.00  
□ □ ▲

### Display time

To program number 4 with P and ▲.

P □ □ 4  
P □ ▲

To memorized value with ▼ or ▲.



Set display time.



## Analogue output (optionally)

### Final value

To program number 5 with P and ▲.



To memorized value with ▼ or ▲.



Frei skalierbarer Anzeigeendwert für Analogausgang einstellen.



### Offset

To program number 6 with P and ▲.



To memorized value with ▼ or ▲.



### Setpoint S1

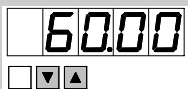
To program number 61 with P and ▲.



To memorized value with ▼ or ▲.



Set free scalable value for setpoint S1.



### Hysteresis S1

To program number 62 with P and ▲.



To memorized value with ▼ or ▲.



Set hysteresis for S1.

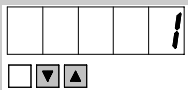


### Working principle S1

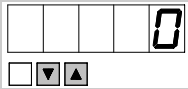
To program number 63 with P and ▲.



To memorized value with ▼ or ▲.

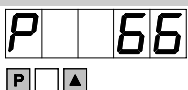


Set open circuit.



### Setpoint S2

To program number 61 with P and ▲.



To memorized value with ▼ or ▲.



### Hysteresis S2

To program number 67 with P and ▲.



To memorized value with ▼ or ▲.



Set hysteresis for S1.

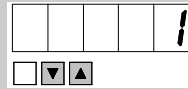


### Working principle S2

To program number 63 with P and ▲.



To memorized value with ▼ or ▲.



Programming terminated

## 2. Factory calibration (standard signals)

When using the factory calibration, there is no need to apply a measuring voltage to the display unit for scaling. It must be ensured that the device is supplied with the correct auxiliary voltage and that the correct measuring input is selected. The settings refer to calibration values preset in the factory. These calibration values are an integral part of the device programming and cannot be erased by resetting to the factory settings.

The starting basis for this programming example are the basic values following a reset to the factory settings.

With the factory calibration, a 1, 2 or 3 must be stored under program no. 0.

## Programming example

Measuring input: 0/4...20 mA  
 Measuring signal: 4...20 mA  
 Display: 4 mA = 0.0  
 20 mA = 300.00  
 Display time: 2.00 seconds  
 Setpoint S1: 60.00 and closed circuit  
 falling at 60.00 and rising at 58.00  
 (corresponding hysteresis = 2.00)  
 Setpoint S2: 150.00 and open circuit  
 rising at 150.00 and falling at 80.00  
 (corresponding hysteresis = 70.00)  
 Analogue output: Measuring signal 0 V corresponds to a display of 0.00 and  
 0 V at the analogue output.  
 Measuring signal 10 V corresponds to a display of 300.00 and  
 10 V at the analogue output.

### Start of programming

Switch on supply voltage!

Segment test

Operating mode

### Calibration mode

Enter program mode

To memorized value with ▼ or ▲.

Select parameter 1 for input  
0...10 V.

Memorize value with P and ▼.  
Take over by display of transversal bars.

### Full scale

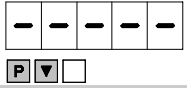
Select program number 1: full  
scale

To memorized value with ▼ or ▲.

Set free scalable value

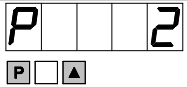


Memorize value with **P** and ▼. Take over by display of transversal bars.

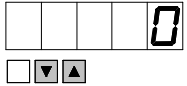


## Offset

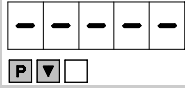
Select program number 2: Offset



To memorized value with ▼ or ▲.

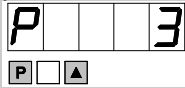


Memorize value with **P** and ▼. Take over by display of transversal bars.

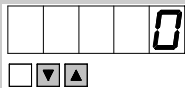


## Decimal point

Select program number 2: Decimal point



To memorized value with ▼ or ▲ or ▲.



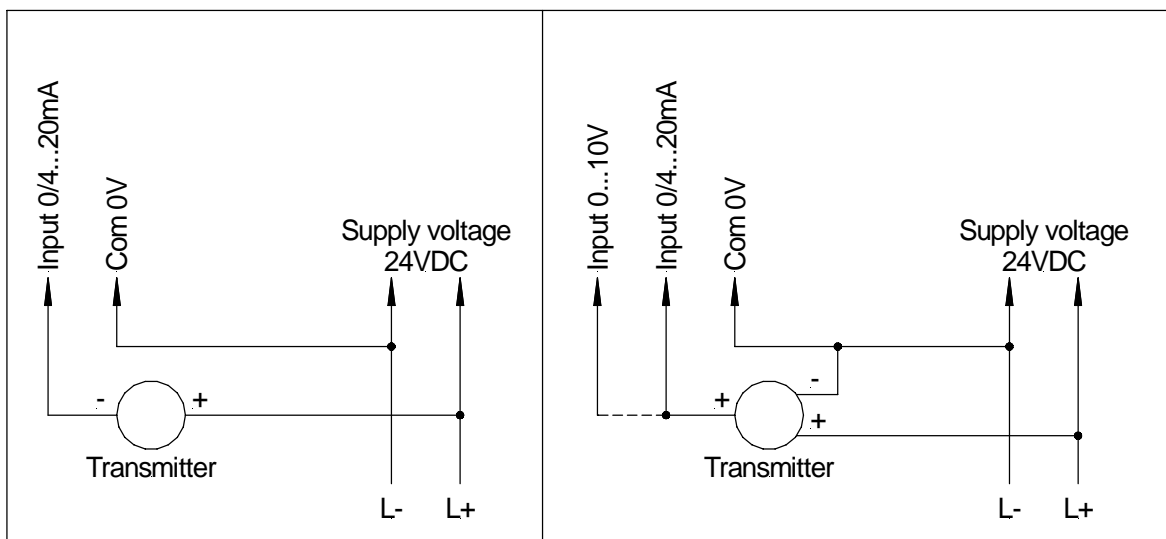
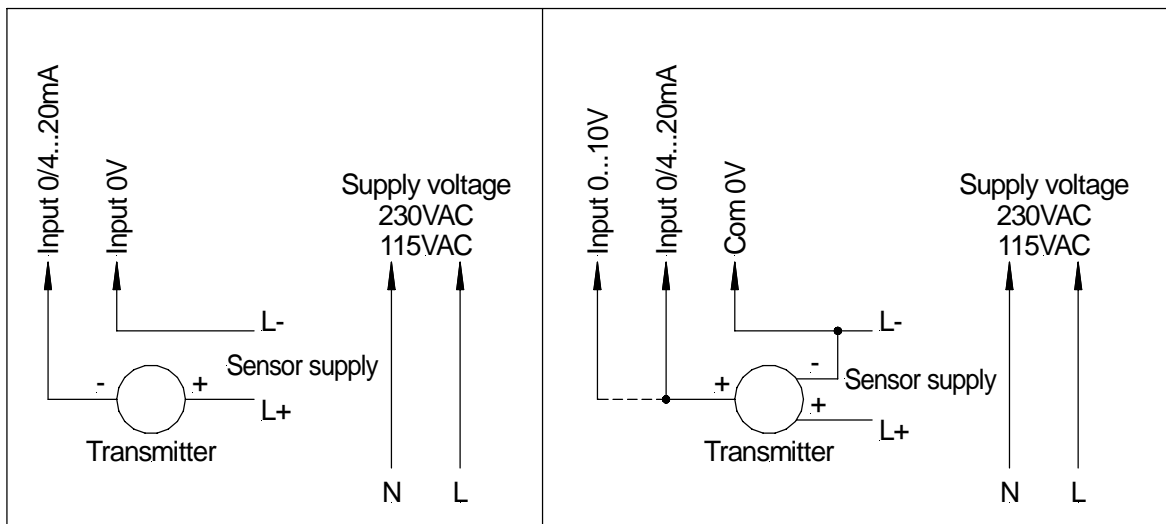
Set decimal point.

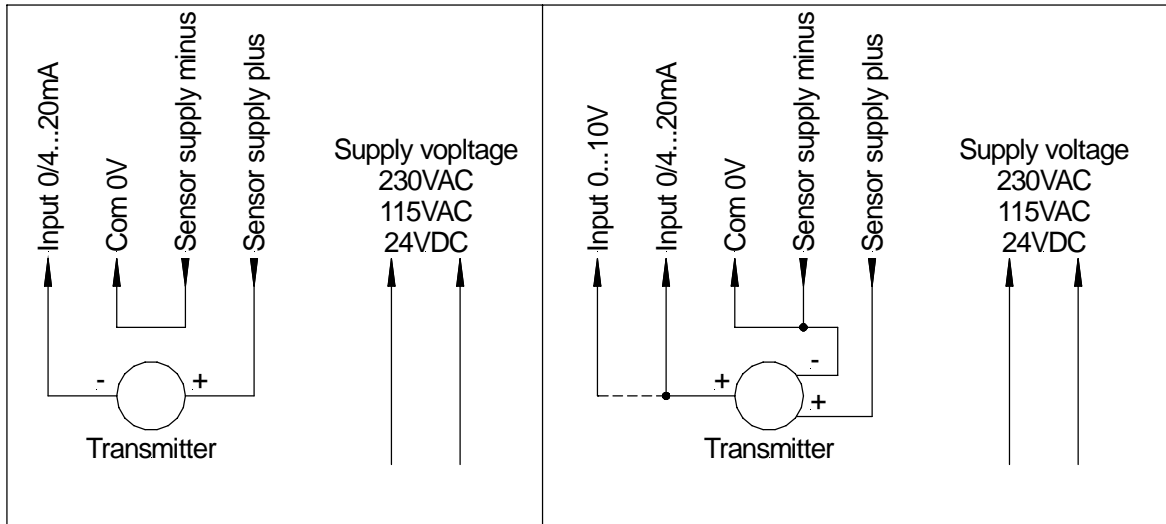


The further settings are the same as in programming example 1.

Proceed to the section on display time.

# Configuration for transmitter connections





## Technical data

### Dimensions

Housing	96 x 48 x 134 mm, including screw terminal
Assembly cut out	92.0 <sup>+0.8</sup> x 45.0 <sup>+0.6</sup> mm
Housing	96 x 24 x 134 mm, including screw terminal
Assembly cut out	92.0 <sup>+0.8</sup> x 22.0 <sup>+0.6</sup> mm
Housing	48 x 24 x 91 mm, (D = 101 mm incl. screw terminal)
Assembly cut out	45.0 <sup>+0.6</sup> x 22.2 <sup>+0.3</sup> mm
Fixing	Snap-in, quick-fix system with plastic clips for wall thicknesses up to 50 mm.
Housing material	PC/ABS blend, colour black, UL94V-0
Protective system	front IP40, connection IP00
Weight (96x48)	approx. 480 g
Weight (96x24)	approx. 290 g
Weight (48x24)	approx. 75 g
Connection	on the back with terminals up to 2.5 mm <sup>2</sup>
Connection (48x24)	on the back via plug in terminals up to 1.5 mm <sup>2</sup>

### Input

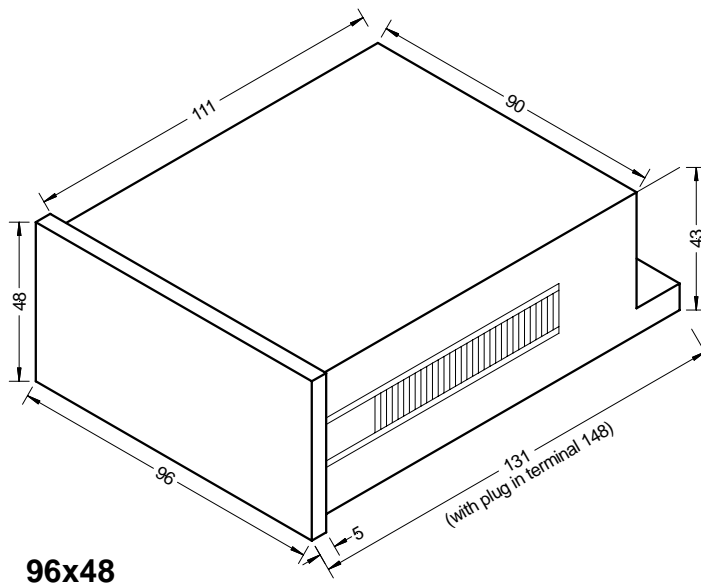
Range (96x48)	0-10 V, 0-20 mA, 4-20 mA
Range (96x24)	0-10 V, 0-20 mA, 4-20 mA
Range (48x24)	0-10 V, 0-50 V, 0-20 mA, 4-20 mA
	The maximum permitted value on the input clips is 120 % of the nominal value.
	All ranges can be selected via connecting clip.
Input resistance	
96x48	Ri with 10 V= 100 kΩ, 20 mA=100 Ω
96x24	Ri with 10 V= 100 kΩ, 20 mA=100 Ω
48x24	Ri with 10 V= ~100 kΩ, 50 V = ~500 kΩ, 20 mA= ~100 Ω

<b>Output</b>	Sensor supply	<b>Sensor supplies are galvanic insulated!</b> 24 VDC/50 mA – 10 VDC/20 mA 24 VDC/20 mA for power supply 230/115 VAC 24 VDC/50 mA for power supply 24 VDC/DC (other voltage supplies on demand)
	96x48 96x24	
	Relay output	load 230 VAC/5 A – 30 VDC/2 A load 230 VAC/2 A – 120 VDC/0.5 A
	96x48	
	All other sizes	0-10 VDC (12 bit)
	Analogue output	0-20 mA (12 bit) - load 500 Ohm 4-20 mA (12 bit) - load 500 Ohm
		<b>galvanic insulated!</b> <b>galvanic insulated!</b> <b>galvanic insulated!</b>
<b>Accuracy</b>	Resolution	-9999 up to 55000
	Measuring fault	+/-0.1% of measuring range, +/- 2 digit
	Temp. coeff.	80 ppm/K
	Measuring principle	voltage/frequency converter
<b>Mains unit</b>	Supply voltage	230/115 VAC +/- 10% (50-60 Hz) 24 VDC +/-10 % galvanic insulated
	Power consumption	
	96x48	approx. 5 VA
	96x24	approx. 5 VA
<b>Indication</b>	Display	7-segments-LED, 14 mm or 10 mm high, red (with option RG red/green only 96x48)
	Overflow	indication of 5 transversal bars.
	Display time	adjustable from 0.5....10.0 seconds
<b>Ambient conditions</b>	Working temperature	0... + 60 °C
	Storing temperature	-20... + 80°C

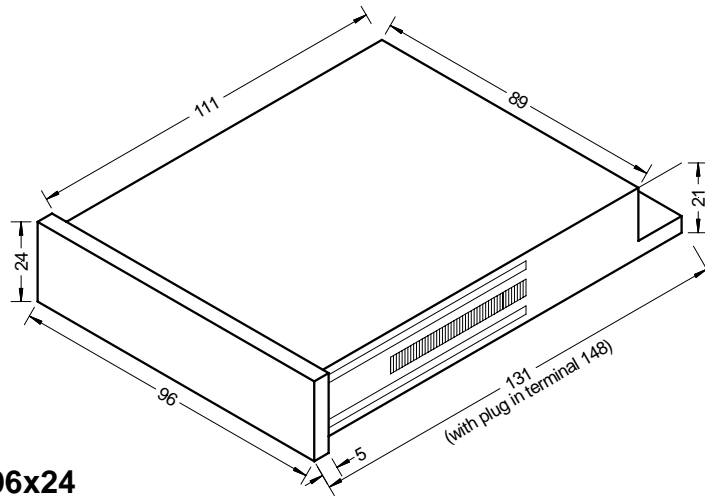
CE symbol

For unrestricted use of the device in accordance with the guideline on electromagnetic compatibility 89/336/EWG, analogue input lines must be screened off. The screen must be places on one side as close to the device as possible.

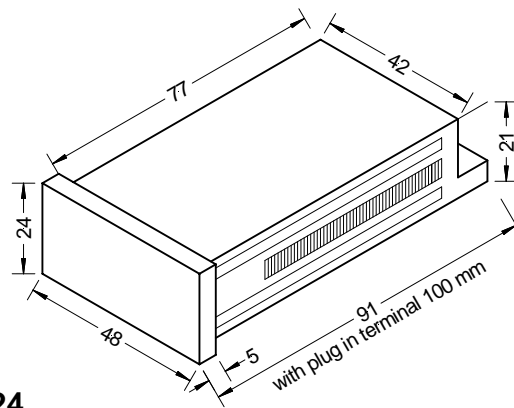
**Housing:**



**Housing:**



**96x24**



**48x24**