



Operating Manual

PA418
Process display

EN-US

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1 About this document

1.1 Purpose and scope of application

This document enables safe and efficient sensor parameterization using various interfaces. The manual describes the available functions to support installation and software use via the interfaces.

The illustrations are examples only. Deviations are at the discretion of Baumer at all times. The manual is a supplementary document to the existing product documentation.

1.2 Applicable documents

- Available for download at www.baumer.com:
 - Data sheet
 - Functional and interface description
 - EU Declaration of Conformity
- Attached to product:
 - Quickstart
 - General information sheet (11042373)

1.3 Labels in this manual

Identifier	Usage	Example
<i>Dialog element</i>	Indicates dialog elements.	Click the OK button.
<i>Unique name</i>	Indicates the names of products, files, etc.	<i>Internet Explorer</i> is not supported in any version.
Code	Indicates entries.	Enter the following IP address: 192.168.0.250

1.4 Warnings in this manual

Warnings draw attention to potential personal injury or material damage. The warnings in this manual indicate different hazard levels:

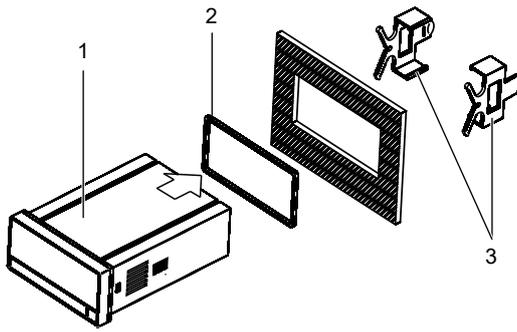
Symbol	Warning term	Explanation
	DANGER	Indicates an imminent potential danger with high risk of death or serious personal injury if not being avoided.
	WARNING	Indicates potential danger with medium risk of death or (serious) personal injury if not being avoided.
	CAUTION	Indicates a danger with low risk, which could lead to light or medium injury if not avoided.
	NOTE	Indicates a warning of material damage.
	INFO	Indicates practical information and tips that enable optimal use of the devices.

2 General functionality

The process display is intended for visualizing, monitoring, control and calculation of measured values in industrial applications.

- For voltage ± 10 V or current ± 20 mA
- For thermocouples J, K, T, N, Pt100
- For weight, pressure, torsion, strain
- For potentiometers
- 11 supporting points for parameterization of Input characteristic
- Three control inputs, programmable
- Display stabilization filter
- LED display, 5-digit, 3-color, programmable
- Function tare, min, max
- DIN housing 96 x 48 mm

3 Mounting the process display



Instruction:

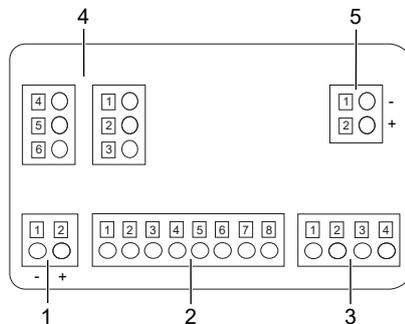
- a) Prepare the cut-out according to the dimensions.
- b) Push device (1) with seal (2) into the cut-out.
- c) Secure the device from behind using the clamping frame (3).
- d) Perform the electrical connection.

4 Electrical connection of the process display

Instruction:

- Make sure the device is disconnected from power supply and not live.
- Connect the device according to the pin assignment.

Pin assignment (at rear)



Operating voltage (1)

Pin	VAC	VDC
1	Phase	-
2	Neutral	+

Input signal (2)

Pin	Current/voltage
1	Sensor supply -
2	Sensor supply +24 V
3	n.c.
4	n.c.
5	Current input +
6	Voltage input +
7	n.c.
8	Current/voltage -

Pin	Thermocouple	Pt100
1	n.c.	n.c.
2	n.c.	n.c.
3	n.c.	n.c.
4	n.c.	Pt100 A
5	n.c.	n.c.
6	n.c.	n.c.
7	Thermo+	Pt100 B
8	Thermo-	Pt100 B Common

Pin	Strain gauge
1	Sensor supply -
2	n.c.
3	Sensor supply +5V / +10 V
4	n.c.
5	n.c.
6	n.c.
7	Input mV+
8	Input mV-

Control input (3)

Pin		
1	Common	
2	Tara*	
3	Reset Tara*	
4	Hold*	

* Factory settings. Other functions can be assigned via configuration.

Relay output (4), optional

Pin	Two relays	
1	normally closed 1	
2	Inverter 1	
3	normally open 1	
4	normally closed 2	
5	Inverter 2	
6	normally open 2	

Pin	Four relays	
1	normally closed 1	
2	normally closed 2	
3	normally closed 3	
4	normally closed 4	
5	n.c.	
6	Common	

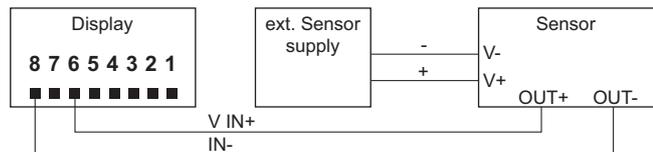
Analog output (5), optional

Pin	
1	(-) 4 ... 20 mA / 0 ... 10 V
2	(-) 4 ... 20 mA / 0 ... 10 V

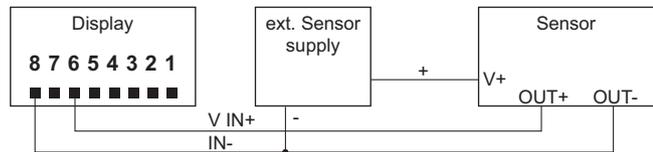
4.1 Connection examples

Input voltage

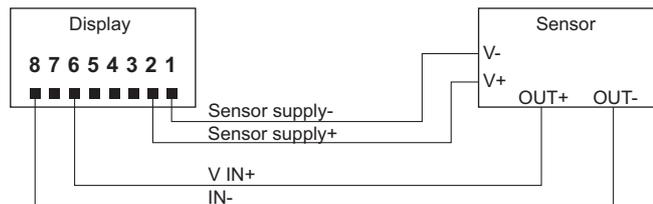
4-wire sensor, external supply



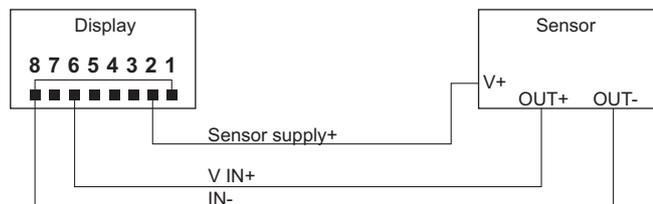
3-wire sensor, external supply



4-wire sensor, supplied by device

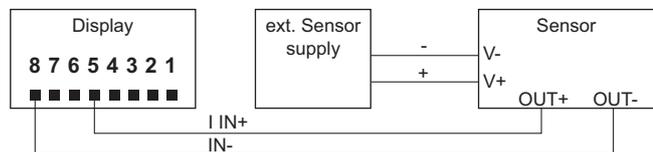


3-wire sensor, supplied by device

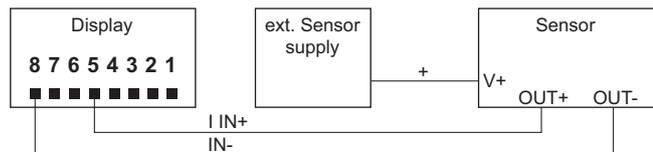


Input current

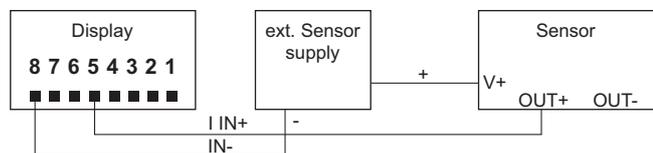
4-wire sensor, external supply



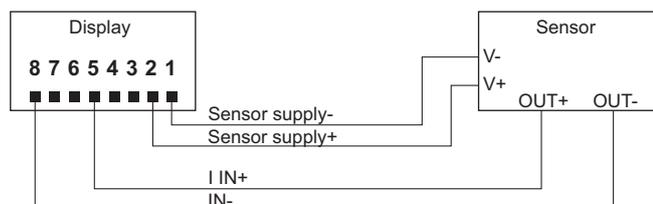
3-wire sensor, external supply

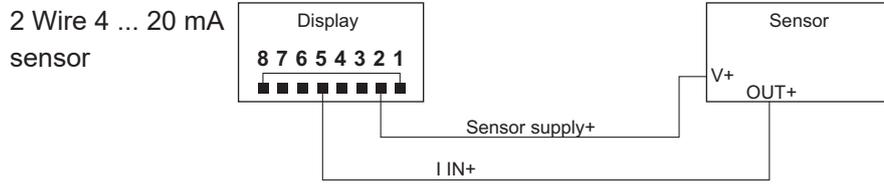
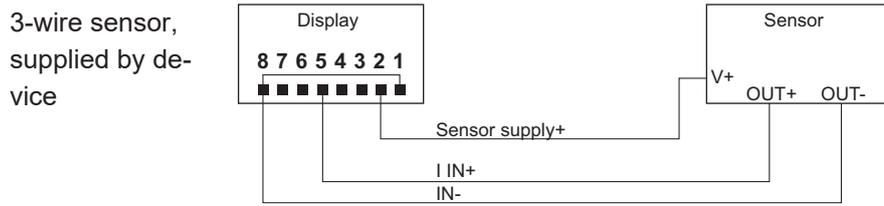


2 Wire 4 ... 20 mA sensor, external supply

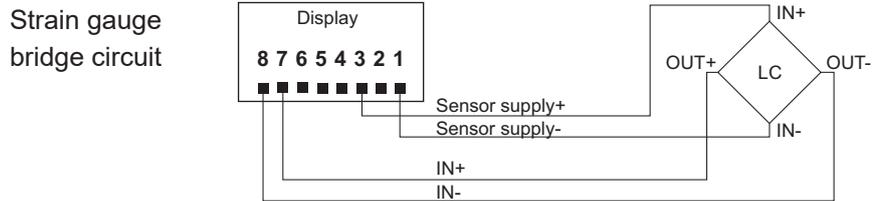


4-wire sensor, supplied by device



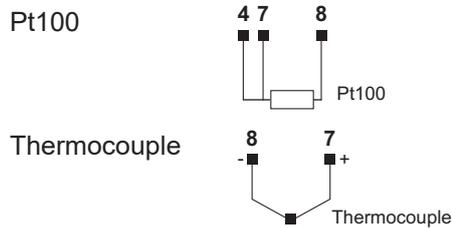


Input strain gauge

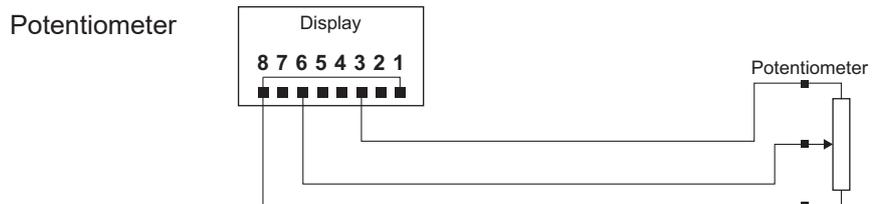


Device can directly supply two strain gauge sensors with 5 V or 10 V max. 60 mA. Connecting more than 3 strain gauge sensors calls for parallel circuit configuration and external supply.

Input temperature



Potentiometer input



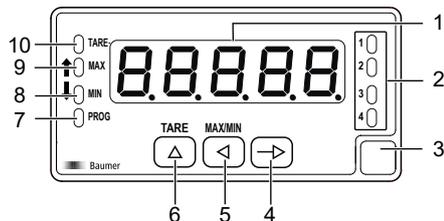
5 Interfaces

This section describes the interfaces via which you can communicate with the device.

All functions can be set directly on the device via the display and the membrane buttons.

5.1 LED indicator

The device's LED display makes it easy to operate and monitor measured values.



After power on the device is in **RUN** mode. The current value (actual value) is displayed.

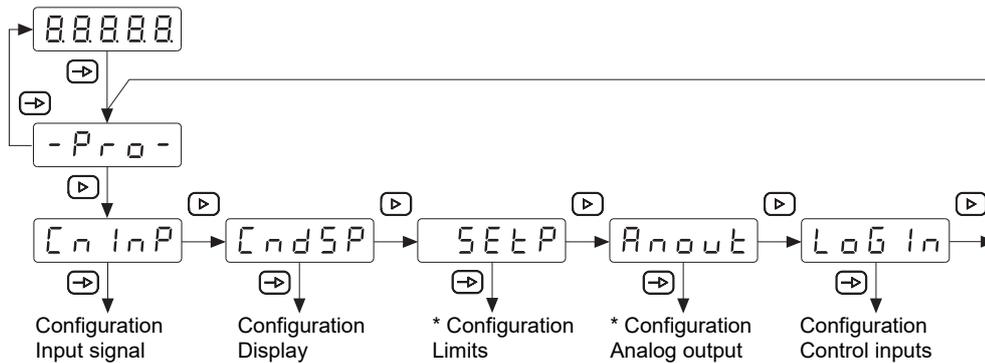
Mode **PROG** enables the entire device configuration.

No.	Designation	Function in mode	
		RUN	PROG
1	Display	5-digit LED display	
2	LED 1 to 4	Output 1 ... 4 active	
3	Label	Position for unit sticker	
4	Button 	Call mode PROG	Programming line selection
5	Button 	MIN/MAX display	Digit/Function selection
6	Button 	Trigger TARE	Incrementing the selected digit
7	LED PROG		Programming mode active
8	LED MIN	MIN value display	
9	LED MAX	MAX value display	
10	LED TARE	TARA value stored	

Mode PROG (configuration mode)

The programming mode allows the complete configuration of the process display. It comprises several modules:

- Input signal configuration
- Configuration of the display
- Limit value output configuration
- Analog output configuration
- Control input configuration



III. 1: Block diagram of the configuration modules

* As an option, according to product variant (see data sheet)

Programming process

Instruction:

- a) Press to have appear on the display as initial view of the programming level.
- b) Select the required configuration module with button . The individual modules provide short descriptions. (CnInP, CndSP, etc.).
- c) Confirm selected module with and start parameterization of the desired functions using buttons , and . Having confirmed the final parameter, appears again on the display. Press button to select another configuration module or to exit the programming level.

Result:

- ✓ appears briefly on the display and parameterization is being saved.



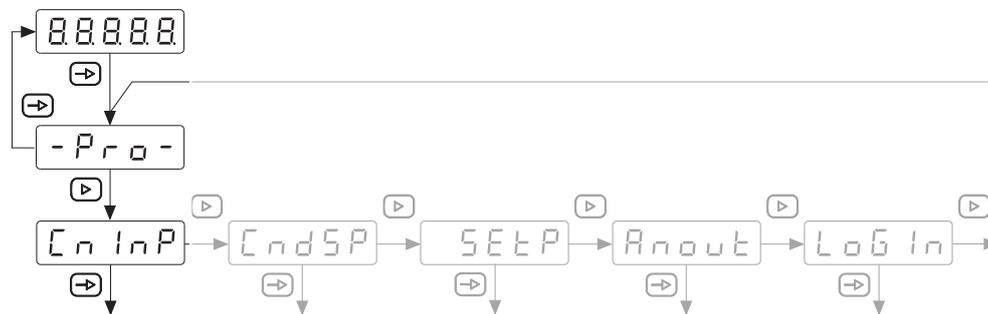
NOTICE

Access to programming can be blocked at programming level. The various programming lines can then only be visualized but not changed. When entering the programming level, then appears instead of .

6 Operating functions

6.1 Input signal configuration

This function is used to configure the input signal.



Configuration
Input signal

- Cn InP** Select the input signal type with **▶**.
- PrOC** Standard signals ± 10 V, ± 20 mA or potentiometer
 - LoAd** Strain gauge (pressure, weight,...)
 - tEMP** Temperature: Thermocouples, Pt100
- Confirm with **→**.

Input standard signals

- PrOC** Select standard signal type with button **▶**.
- 10V** Input voltage ± 10 V/potentiometer
 - 20mA** Input current ± 20 mA
- Confirm with **→**.

Input strain gauge

- LoAd** Select voltage range with **▶**.
- 15mV** ± 15 mV
 - 30mV** ± 30 mV
 - 150mV** ± 150 mV
- Confirm with **→**.

Input temperature

- tEMP** Select temperature sensor with button **▶**.
- Pt100** Pt100
 - tC-** Thermocouple J, K, T, N
- Confirm with **→**.

Pt100**Pt 100**Select the desired unit with button .**- °C -**

Degrees Celsius

- °F -

Degrees Fahrenheit

Confirm with .Select display resolution with button .**0.1 °**

Resolution in 1/10 degrees

1 °

Resolution in degrees

Confirm with .

Proceed with configuration of display offset.

000

Programmable from -9.9 to +99 units depending on resolution.

The offset value can serve to compensate for any difference between actual value and measured value.

Confirm with .**Thermocouple****- E -**Select thermocouple with button .**- J -**

Thermocouple J

- K -

Thermocouple K

- T -

Thermocouple T

- N -

Thermocouple N

Select the desired unit with button .**- °C -**

Degrees Celsius

- °F -

Degrees Fahrenheit

Confirm with .Select display resolution with button .**0.1 °**

Resolution in 1/10 degrees

1 °

Resolution in degrees

Confirm with .

Proceed with configuration of display offset.

000

Programmable from -9.9 to +99 units depending on resolution.

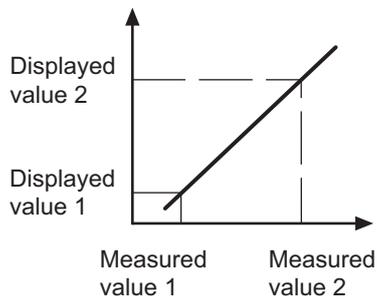
The offset value can serve to compensate for any difference between actual value and measured value.

Confirm with .

6.2 Configuration of the display

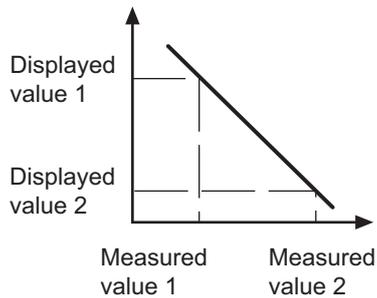
This function is used to configure the representation of the input signal on the display.

Positive gradient:

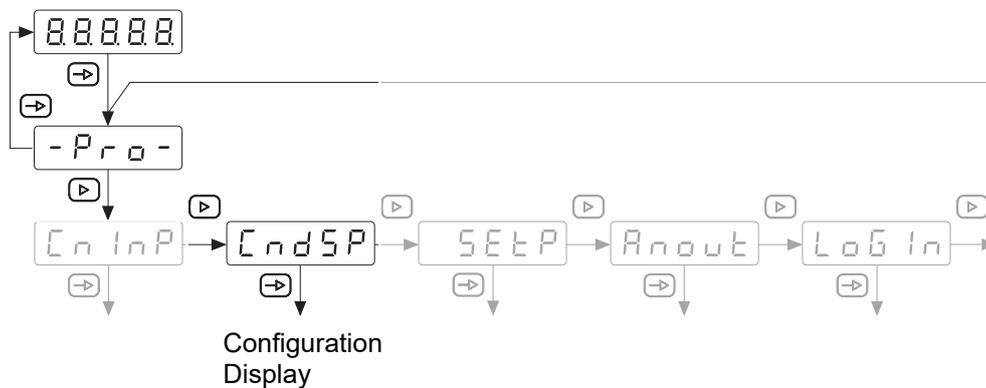


The scaling determines the relationship between the input signal and the display value. For linear behavior, two measured values (*inP*) or display values (*dSP*) must be defined. To achieve the best precision, these 2 points should be selected at both ends of the display range.

Negative gradient:



The coordinates of these two points can be entered directly using the keypad (scaling mode) or the measured values are automatically adopted. Only the assigned display values need to be entered via the keypad (teach mode).



INFO

Only the configuration parameters for the selected input signal can be selected.

- C n d S P Select the parameter to be configured with button ▶.
 - S C A L Scaling mode (teach-in using known support points)
 - T E A C H Teach mode (teach-in using measured support points)
 - F I L T P Display stabilization filter
 - r o u n d Round display value
 - b r I G H Display brightness
 - M o d t A Behavior of TAR function
- Confirm with →.

Scaling mode (teach-in using known support points)

Configuration of input and display values is done manually using the soft-touch keypad at the process display. This method is appropriate if the sensor-supplied signal values are known at each extreme point of the process.

SCAL

INP 1 First measured value

00000 Keypad entries from -19999 to 99999.

dSP 1 Display value for the first measured value

00000 The value entered here will be displayed upon the input signal reaching the first measured value. Ranging from -19999 to 19999

00000 Decimal point dSP1

Positioning decimal point, applies to dSP1 and dSP2.

INP 2 Second measured value

00000 Keypad entries from -19999 to 99999.

dSP 2 Display value for the second measured value

00000 The value entered here will be displayed upon the input signal reaching the second measured value. Ranging from -19999 to 19999

Programming of input characteristic

For measured values without linear behavior, up to 11 interpolation points (measured and display values) can be defined. For programming access to other measuring or display points, press and hold the button for 3 seconds after having programmed the display value assigned to the 2nd point. The new values assigned to the measuring or display points are identified by the messages [Inp xx] and [dSP xx], whereas xx represents the point number (de 03 to 11).

INP xx Measured value xx

00000 Ranging from -19999 to 19999

dSP xx Display value assigned to measured value xx

00000 The value entered here is displayed when the input signal has reached the measured value xx which was entered in the previous step. Programmable from -19999 to 19999.

To interrupt programming of measuring or display points and save the values already entered, press and hold the button for 3 seconds after having entered the previous display value.



INFO

Mandatory to enter the measured or displayed values in ascending or descending order.

Teach mode (teach-in using measured support points)

The input values are read directly at the input at the time the signal is detected at any point in the process. Displayed value configuration is done manually using the soft-touch keypad of the process display. This method is appropriate if the signal values are known at each point but running the process at the conditions defined by these extreme points is not feasible.

TEACH

TECH1 First measured value

00000 The input signal value is automatically adopted.

dSP1 Display value for the first measured value

00000 The value entered here will be displayed upon the input signal reaching the first measured value. Ranging from -19999 to 199999

00000 Decimal point dSP1

Positioning decimal point, applies to dSP1 and dSP2.

TECH2 Second measured value

00000 The input signal value is automatically adopted.

dSP2 Display value for the second measured value

00000 The value entered here will be displayed upon the input signal reaching the second measured value. Ranging from -19999 to 199999

Programming of input characteristic

For measured values without linear behavior, up to 11 interpolation points (measured and display values) can be defined. For programming access to other measuring or display points, press and hold the button for 3 seconds after having programmed the display value assigned to the 2nd point. The new values assigned to the measuring or display points are identified by the messages [InP xx] and [dSP xx], whereas xx represents the point number of (de 03 to 11).

InPxx Measured value xx

00000 Ranging from -19999 to 199999

dSPxx Display value assigned to measured value xx

00000 The value entered here is displayed when the input signal has reached the measured value xx which was entered in the previous step. Programmable from -19999 to 199999.

To interrupt programming of measuring or display points and save the values already entered, press and hold the button for 3 seconds after having entered the previous display value.



INFO

Mandatory to enter the measured or displayed values in ascending or descending order.

Display stabilization filter

Defines the limit frequency of the low-pass filter (Fc) applied to smoothen unwanted display fluctuations.

`F ILtP`

`0` Programmable from 0 to 9 with the button .

Increasing the filter value reduces the response time of the display. The value 0 deactivates the filter.

Confirm with .

Round display value

`round`

`01` Change display value in steps of 1

`05` Change display value in steps of 5

`10` Change display value in steps of 10

Confirm with .

Display brightness

`br 16H`

`-H,-` High brightness

`-Lo-` Low brightness

Confirm with .

TARA function

`ModtA`

Select the TARE button functionality with .

`tArE1` Every press on button  will reset the display to zero and save the input signal value as an offset; the TARE LED lights up.

To reset the offset value, press and hold button  for 3 seconds.

`tArE2` Enter the tare value using the keypad, it will be subtracted from the displayed value after saving operation `StorE` (*).

`tArE3` Press the button to set the display to the entered tare value (*).

(*) Tare input in RUN or operator level

Confirm with .

tArE1 Example: Tare value 100

In RUN mode, press button  and hold for 3 seconds

Enter value 100 with button  and 

Save with button  (`StorE`)

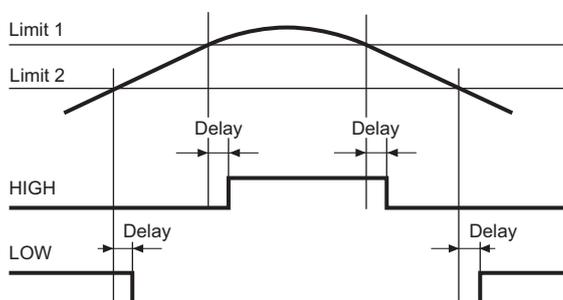
- tArE2 Example: Display value before tare entry = 1000.
 Display value after tare entry and saving operation = $1000 - 100 = 900$.
- tArE2 Example: Display value before tare entry = 1000.
 Display value after tare entry and confirmation with  = 100.

6.3 Configuration of the limit value outputs

Device can be ordered with max. 4 relay limit outputs. Configuration with *High* or *Low* defines output trigger either at display value \geq or \leq limit value. The outputs can be programmed with a time delay or with a hysteresis.

Time delay of the limit value outputs

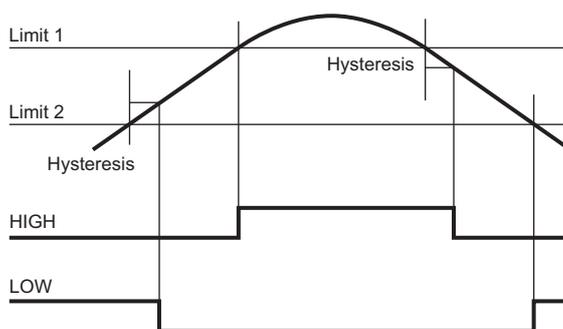
The time delay is programmable from 0 to 99 s. This acts both when the limit value outputs are switched on and off.



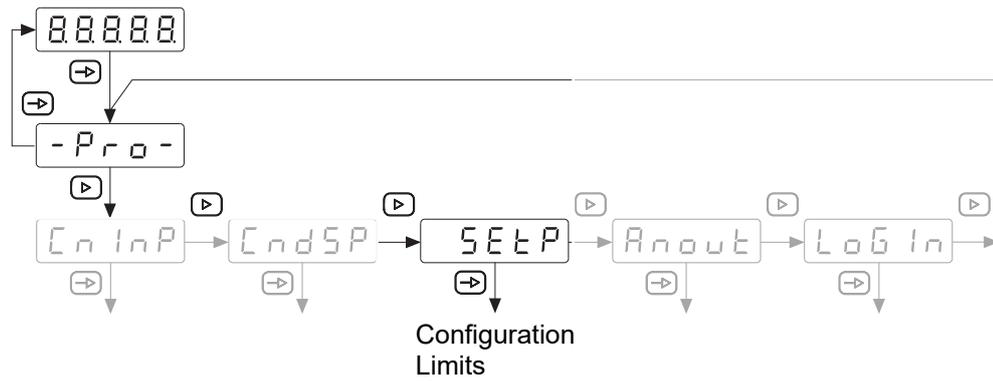
///. 2: Limit value outputs - Time delay

Asymmetric hysteresis

The hysteresis is programmed in display units from 0 to 9999. This only takes effect when the limit value outputs are switched off.



///. 3: Limit value outputs - asymmetrical hysteresis



- SEtP** Select the limit to be configured with button .
- SEt1** Limit output 1
 - SEt2** Limit output 2
 - SEt3** Limit output 3
 - SEt4** Limit output 4
- Confirm with .



INFO

If device features two limit outputs only, just **SEt1** and **SEt2** will appear.

Limit output x

Configuration of each limit follows the same procedure. How to proceed is shown in the following using limit 1 as an example.

- SEt1** Enable/disable the limit with button .
- oFF-** Limit disabled
The remaining parameters specified for this limit output do not appear.
 - on-** Limit enabled
 - 00000** Limit
Adjustable from -19999 to 19999

Limit comparison

- Select the type of limit comparison with .
- net** The device compares the limit against the net display value.
 - Gr0S** The device compares the limit value against the net display value + tare value.
- Confirm with .

Limit output enable

Select with button  when the limit output will be enabled.

 HIGH = Enabled at display value \geq limit

 LOW = Enabled at display value \leq limit

Confirm with .

Operating mode

Select operating mode with button .

 Time delay

 Hysteresis

Confirm with .

 Delay or hysteresis value

Programming the delay (dLY) from 0 to 99 s or hysteresis (HYS) from 0 to 9999 display units.

Display color

Use button  to select the display color once limit has been exceeded.

 No color change when reaching the limit.

 Display changes to the selected color if display value \geq limit value

 Each limit can be assigned a color.

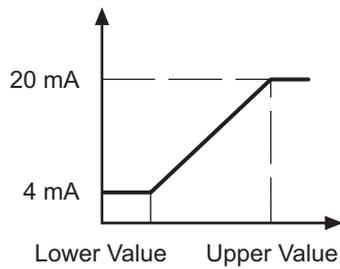


Confirm with .

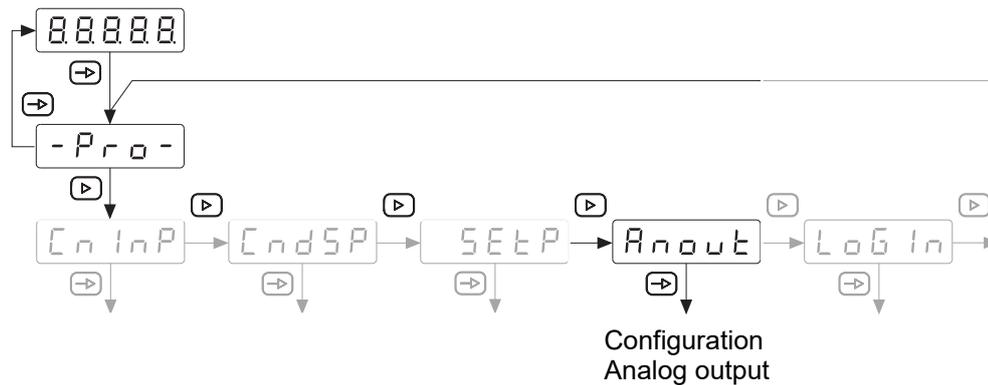
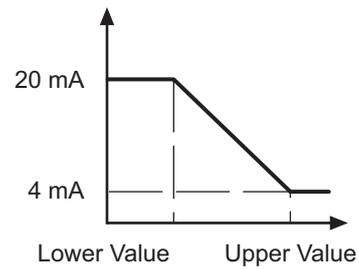
6.4 Configuration of the analog output

Device can be ordered with analog output supplying 4...20 mA or 0...10 V signals.

Output normal



Output inverted



Anout

outHi | Maximum analog value

00000 | At this display value, the analog output is reaching its final value. Value adjustable from -19999 to 19999.

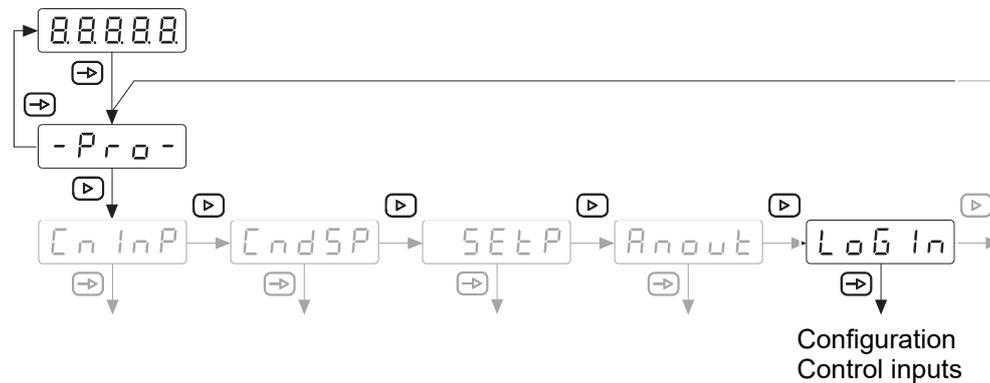
outLo | Minimum analog value

00000 | The analog output starts evolving with this display value. Value adjustable from -19999 to 19999...

Confirm with .

6.5 Control input configuration

This function is for control input configuration.



LoG In

InP 1 Control input pin 2

InP 2 Control input pin 3

InP 3 Control input pin 4

Confirm with .

Control input 1

InP 1

InP-1 Function (see table below)

1 Value between 00 and 15

Confirm with .

Control input 2

InP 2

InP-2 Function (see table below)

2 Value between 00 and 15

Confirm with .

Control input 3

InP 3

InP-3 Function (see table below)

3 Value between 00 and 15

Confirm with .

No.	Function	Description	Activation
0	Disabled	–	–
1	TARE	Copies the current displayed value to the TARA memory and resets display to zero.	Falling edge
2	TARE RESET	Shows the value in the TARA memory on the display and clears the TARA memory.	Falling edge
3	LIST RESET	Execute MIN/MAX limit reset.	Falling edge
4	SEE LIST	Display of maximum limit (MAX.), minimum limit (MIN.), tare, net value (NET) or gross value (GROSS) as selected.	Static low level
5	PRINT LIST	As selected, either MAX, MIN, TARE, SET1, SET2, SET3 or SET4 is transmitted to printer.	Falling edge
6	HOLD	Display freeze, but all outputs remain active.	Static low level
7	BRIGHTNESS	Changes the display brightness from Hi to Low.	Static low level
8	DISPLAY COLOR	Change of display color (green, red or amber)	Static low level
9	SETP PROG/TARE	Configuration of target values or tare according to selection list (TARE, SET1, SET2, SET3 und SET4)	Falling edge
10	FALSE SET-POINTS	Device simulates the option of four target values	Static low level
11	KEYB. EMULATION	Emulating the keypad Tastatur (Input 1 = ENTER, Input 2 = SHIFT, Input 3 = UP)	Static low level
12	RESERVED	–	–

Having selected a function with data print will enable print of date and time upon every command

TIME

With a print command, the device can add command <ESC>H to data sent to print date and time. However, the connected printer must be capable of managing date and time and of understanding the <ESC>H command.

OFF Inactive

ON Enabled

Confirm with .

6.6 Set limit values

Programming is independent of the configuration module programming and can be executed any time.

You are in mode **RUN**.

1. Press button .

Pro] appears on the display to get you started with programming.

2. Select the first limit with button .



Limit 1: LED 1 lights up.

Change the limit using button  and .

3. Press button  to go to the next limit.



Limit 2: LED 2 lights up.

Change the limit using button  and .

4. Press button  to go to the next limit.



Limit 3: LED 2 lights up.

Change the limit using button  and .

5. Press button  to go to the next limit.



Limit 4: LED 4 lights up.

Change the limit using button  and .

6. Press the  button to save the values and exit programming mode.

6.7 Protect programming level via code

The programming can be protected against unwanted changes by a code:

- **Complete**
 - All configuration modules are protected. The various configuration modules can be visualized but not edited.
 - When entering programming mode, [DAtA] is displayed instead of [Pro].
- **Partial**
 - You can select which configuration modules are to be protected. The protected configuration modules can be visualized but not changed.
 - When entering programming mode, [DAtA] is displayed instead of [Pro] if a protected configuration module is selected.

Enter or change code

Instruction:

- a) Press the button  for 3 seconds.
 - ✓ [CodE] appears in the display.
- b) Enter the code by pressing  and . The factory-set code on delivery of the device is 0000.
- c) Use button  to switch to and fro between the functions described below. Select the desired function with button .

 Selecting [LIST] you can define in the following lines which configuration modules are protected by code against unauthorized access.

 Change code

 Display color Selection for operator and programming level

Configuration module protection



 All locked

 No, the various configuration modules can be individually protected.

In the next step, here is to specify which configuration module is protected by 0 or 1 or not protected at all.

- 0: configuration module not protected
- 1: configuration module protected

 Yes, all configuration modules are protected against modification and device exits the programming level.

Change code

`CHANG`

`-----`

Change the code here, the new code is saved into the device and you exit programming level.

Selecting the display color

`Color`

`run`

Selection of display color in RUN mode (operator level).

`Pro`

Selection of display color in programming mode.

Confirm with  .

