FACTORY AUTOMATION

Operating instructions

KT-LED-96-2R-230VAC
KT-LED-96-2R-24VDC

Process Controller
for thermocouples
measuring resistors
resistance thermometers
sensors im mV range
with 2 alarms

$C\,C$

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1 Safety instructions and warnings

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Only use this display
– **in a way according to its intended purpose**
– **if its technical condition is perfect**
– **adhering to the operating instructions and the general safety instructions.**

1. Before carrying out any installation or maintenance work, make sure that the power supply of the digital display is switched off.
2. Only use this digital display in a way according to its intended purpose.
3. If its technical condition is perfect.
4. Adhering to the operating instructions and the general safety instructions.
5. Adhere to country or user specific regulations.

6. The digital display is not intended for use in areas with risks of explosion and in the branches excluded by the standard EN 61010 Part 1.
7. The digital display shall only operated if it has been correctly mounted in a panel, in accordance with the chapter "Main technical features".

1.1 Use according to the intended purpose

The digital display may be used only as a panel-mounted device. Applications of this product may be found in industrial processes and controls, in manufacturing lines for the metal, wood, plastics, paper, glass, textile and other processing industries.
Over-voltages at the terminals of the digital display must be kept within the limits in Category II

If the digital display is used to monitor machines or processes in which, in case of a failure of the device or an error made by the operator, there might be risks of damaging the machine or causing accidents to the operators, it is your responsibility to take appropriate safety measures.

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2. Technical Data

2.1 Miscellaneous Data

Display	5 digit red LED, 14.2 mm high
Display range	–19999 ... 99999, with leading zeros suppression
Out of range Indication	Under-range uuuuu / Over range ooooo
Data storage	EEPROM, 1 Million storage cycles or 10 Years
Test voltage	EN 61010 Part 1 ; overvoltage category 2, Test voltages level 2
EMC	Interference emissions EN 50081-2 / EN 55011 Class B Interference resistance EN 61000-6-2

2.2 Electrical Data
2.2.1 Power supply

AC power supply	90 ... 260 V AC/max. 6 VA external fuse 100 mA/T
DC power supply	10 ... 30 V DC, max. 2 W, galvanically isolated with inverse polarity protection external fuse 250 mA/T
Mains Hum Filter	digital filter 50 Hz or 60 Hz, programmable

2.2.2 Inputs
Measurement ranges

Thermocouples	Ranges	Accuracy
Type B	400,0 °C ... 1820,0 °C	± 1,5 °C
E	–200,0 °C ... 1000,0 °C	± 0,5 °C
J	–210,0 °C ... 1200,0 °C	± 0,5 °C
K	–200,0 °C ... 1372,0 °C	± 0,5 °C
N	–200,0 °C ... 1300,0 °C	± 0,5 °C
R	–50,0 °C ... 1760 ,0 °C	± 1,0 °C
S	–50,0 °C ... 1767,0 °C	± 1,0 °C
T	–210,0 °C ... 400,0 °C	± 0,5 °C
Resolution	0,1 °C (0,1 °F)	
Cold-junction compensation	internal or external (programmable)	

Input for resistance thermometers (RTD probes)

Resistance thermometer	Ranges	Accuracy
Type Pt100	–200.0 °C ... 800,0 °C	± 1,0 °C
Pt1000	–200,0 °C ... 800,0 °C	± 1,0 °C
Resolution	0,1 °C (0,1 °F)	
Type	2 wire, 3 wire and 4 wire technology, programmable	
Current	800 µA at Pt100 80 µA at Pt1000	

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Input for resistance

	Ranges	Accuracy
Resistance	0 ... 400 Ω	± 0,2 Ω
Resistance	0 ... 4000 Ω	± 2,0 Ω
Resolution	14 bit	
Measuremend mode	2 wire, 3 wire and 4 wire technology, programmable	
Current	800 µA at 400 Ω	
	80 µA at 4000 Ω	

Voltage measurement

	Ranges	Accuracy
Voltage	0 .. +100 mV DC	< 0,1% ± 1 Digit
Voltage	−100 .. +100 mV DC	< 0,1% ± 1 Digit
Resolution	14 bit	
Input resistance	> 2 MΩ	

Further data for the measurement input

A/D transducer	Dual-Slope
Measuring speed	approx.. 1 measurement/sec
Zero adjustment	automatically

Digital input

Input	MPI*	Function of the input depends on set-up
1. Function: Display-Hold		to stop the instantaneous value
2. Function Reset		Reset the alarm value
Alarm Latch		

*Multi Purpose Input

Input Key	Keypad lock-out of alarm settings
Switching level	
logical 0	0 ... 2 V DC
logical 1	4 ... 30 V DC
Min. pulse duration	> 5 ms

The MPI Input is galvanically isolated from the rest of the unit´s electronics

2.2.3 Outputs
Alarm 1/Alarm output 2

Relay output with volt-free changeover contacts
can be setup as normally closed or normally open

Switching voltage	250 V AC/300 V DC
Switching current	max. 3 A AC/DC, min. 30 mA DC
Switching power	2000 VA / 50 Ω

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or NPN-**optocoupler** with open collector and open emitter

Switching power	30 V DC/15 mA
UCEsat at Ic = 15 mA	max. 2.0 V DC
UCEsat at Ic = 5 mA	max. 0.4 V DC

Auxiliary power supply output for measuring transducer/sensor

AC models	voltage output 10 V DC ±2%, 30 mA
	and
	voltage output 24 V DC ±15%, 50 mA
DC models	only voltage output 10 V DC ±2%, 30 mA

The auxiliary power supply is galvanically isolated from the inputs, outputs and the interface.

2.3 Mechanical Data

Housing	Housing for control panel 96 x 48 mm according to DIN 43 700, RAL 7021
Dimensions (W x H x D)	96 x 48 x 90 mm
Panel cut-out (B x H)	$92^{+0,8}$ x $45^{+0,6}$ mm
Mounting depth	approximately 83 mm
Weight	approximately 220 g
Protection	IP 65 (on the front side)

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Connections

Power supply and output:	1 x screw terminal, 8-pole, RM 5.08
Measurement and control input:	1 x screw terminal, 11-pole, RM 3.81
Interfaces:	(*) 1 x screw terminal, 5-pole, RM 3.81
Cleaning:	The front of the unit is only to be cleaned with a soft wet (water !) cloth.

* only with interface option

2.4 Environmental conditions

Ambient temperature	–20°C ... +65°C
Storage temperature	–40°C ... +85°C
Climatic stability	relative humidity < 75%, without condensation

2.5 Delivery includes:

Process display
Screw terminal, 8-pole, RM 5.08
Screw terminal, 11-pole, RM 3.81
Screw terminal, 5-pole, RM 3.81(*)
Clamping bracket
Gasket
Multilingual operating instructions
1 set of self-adhesive symbols
* only with the interface option

2.6 Order code

230 V AC: KT-LED-96-2R-230VAC
24 V DC: KT-LED-96-2R-24VDC

3. Mounting

Panel cut out

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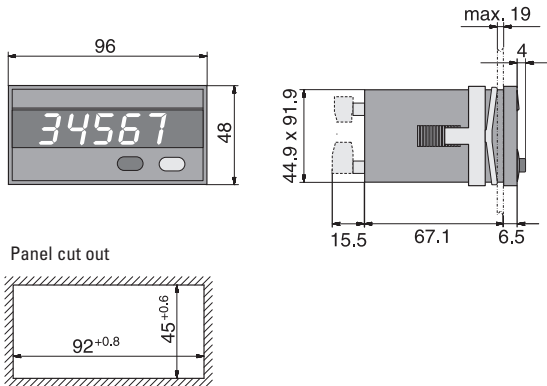
4. Electrical Connections

View of rear of unit

Measuring- and control inputs as well as auxiliary signals

Interface

Power supply and limit outputs
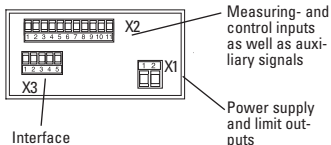
Warning: for 90 ... 260 V ACversion. Please apply the power supply after the complete installation. Danger of Death! Please check unit label before applying the power supply.

4.1 Messeingänge

4.1.1 Thermocouples

| 1 | Positive leg of thermocouples |
| 2 | Negative leg of thermocouples |

4.1.2 Resistance measurement
Pt100 or 0 ... 400 Ω
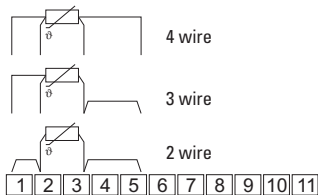
4.1.3 Resistance measurement
Pt1000 or 0 ... 4000 Ω

4.1.4 Voltage measurement
0 ... 100 mV, or –100 ... 100 mV

| 1 | Voltage input (U) 0 ... 100 mV, –100 ... 100 mV |
| 2 | GND 1 (analogue) |

4.2 Control Inputs and Auxiliary Signals (U_{out})

9	GND3 (for U_{out})
10	Uout +10 V/30 mA
11	Uout +24 V/50 mA
	only for power supply 90 ... 260 V AC
8	MP-Input
	"Display-Hold"
7	GND2 (KEY/MPI)

X2

1	2	3	4	5	6	7	8	9	10	11
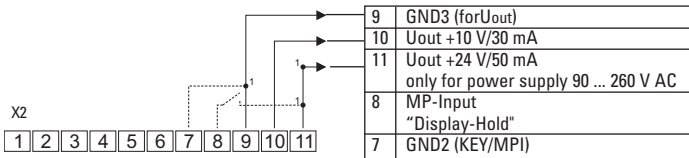
1 Alternatively connect directly to DC supply
  (galvanic separation of control and measure-
  ment inputs)

4.3 Power supply and alarm outputs

Relay output
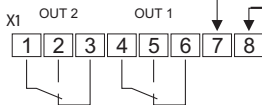
	DC voltage	AC voltage
7	10 ... 30 V DC	90 ... 260 V AC (N~)
8	GND4 (0 V DC)	90 ... 260 V AC (L~)

X1   OUT 2   OUT 1

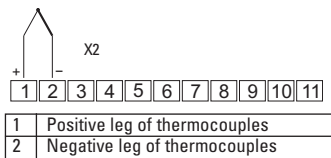| 1	2	3	4	5	6	7	8

Warning: at 90 ... 260 V AC version.
Please apply the power supply
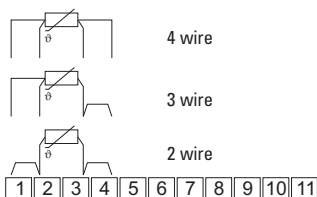after the complete installation.
Danger of Death! Please check
unit label before applying the power supply.

Optocoupler output

X1   OUT 2   OUT 1
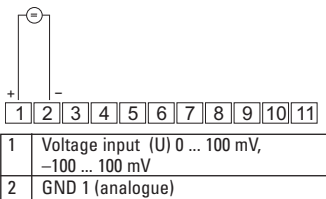
1	2	3	4	5	6	7	8

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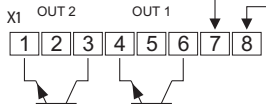
5 Parameter setup

The parameters have to be set up before putting the unit into operation.

– Input parameter

The parameters of the scaling slope must be set up depending on the sensor used.

– Scaling scope

The correspondence between the input signal and the displayed value is given by the scaling slope. The scaling slope is set up by entering pairs of values.

– Alarms/outputs

Either none, one or two alarm values can be active. Hysteresis and output parameters are also set up. If the set-point is exceeded, a signal will be sent out at the corresponding output and the corresponding LED will be switched on.

The alarms themselves are set up in the operating mode!

– Mains Hum Filter

To reduce operational interference caused by the 50/60 Hz mains supply you can choose the local mains frequency.

5.1 Setup Mode

To put the unit into set-up mode
1. keep the ⓟ key pressed
2. connect the unit with the power supply
3. When the display shows $\boxed{Pro5}$ release the key.

### Getting acquainted with the displays and keys

The selection or the settings can be run through as often as required thanks to the step-through programming method

Menu item:

The display alternates every 2 seconds between

    Menu   <->   Selection
    $\boxed{rAn5E}$ $\boxed{thErc}$

Entering into the menu:

Either a selection has to be made or a value has to be set up.

Press the ⊜ key . The display stops alternating.

– Making a selection:

Pressing the ⬆ key displays all the possible settings one after the other.

– Enter the selection:

Press the ⓟ key. The selected parameter will be stored. The next menu item appears $\boxed{00001}$

– Entering a value:

The flashing digit indicates that it is enabled for entry.

Press the ⬆ key, the number will be incremented.

Where negative values are permitted, the highest digit will switch from "9" to "–" and only then to "0".

Press key ⊜ to switch to the next digit.

Enter value: Press key ⓟ, the value will be stored. The next menu item appears.

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5.2 Input Parameters for Instantaneous value

All set-ups related to the input signal and the corresponding displayed value are carried out here. The displayed value is displayed from the input signal via the scaling slope.

5.2.1 Select range for the input signal

Menu <–> Selection

| `r A n G E` | `t h E r c` |

| | `r E S i S` | $\Longrightarrow$ 5.3.2, Resistance measurement 🗋 14 |

(Pt100, Pt1000, 0 ... 400 Ω and 0 ... 4000 Ω)

⊙   `1 0 0 P P` $\Longrightarrow$ 5.3.2, Input range 0 ... 100 mV 🗋 16

`1 0 0 b P` $\Longrightarrow$ 5.3.4, Input range –100 ... 100 mV 🗋 17

`t h E r c` $\Longrightarrow$ 5.3.1, Thermocouples 🗋 12
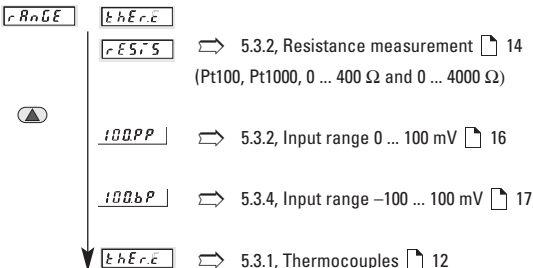
press key Ⓟ to accept the selection

5.3 Select the input signal

Menu <–> Selection

| `r A n G E` | `t h E r c` |

press the Ⓟ keys to accept the selection

5.3.1 Thermocouples
5.3.1.1 Select Type of Thermocouples

Menu <–> Selection

| `t h t Y P` | `b` |

	`b`	Type B
	`E`	Type E
	`J`	Type J
	`K`	Type K
	`n`	Type N
	`r`	Type R
	`S`	Type S
	`t`	Type T
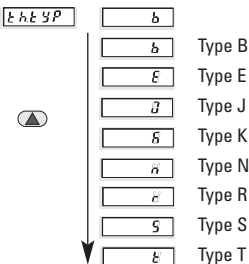
For the thermocouples specified here, scaling slopes with 24 pairs of values are stored in the unit. Intermediate input values between the stored pairs of values are linearly interpolated.

press key Ⓟ to accept the selection

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5.3.1.2 Display unit

The selection made here is also used for the cold junction compensation and for the correction (offset) value.

Menu <–> Selection

| Unit | | °C |

(▲)   °C   Display in °C

     °F   Display in °F
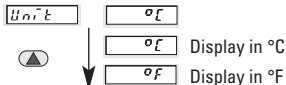
press key (P) to accept the selection

5.3.1.3 Cold junction compensation

The temperature measured by the thermocouple can be compensated either by the temperature measured internally in the unit (int.) or by an external reference value.
In addition, a correction value can be added. The unit takes this value into account and displays the result.

Menu <–> Selection

| rEF.Ju | | int |

(▲)   int   Internal cold junction compensation

     (temperature sensor within the unit))

     ⟹ 5.3.1.5 Correction value 📄 14

     EHt   External cold junction compensation
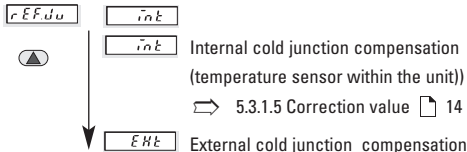
press key (P) to accept the selection

5.3.1.4 Adjust the cold junction compensation

Entry of the known value of an external reference , to one decimal point.

Menu <–> Select

| t.Junc | | 00000 |

(▲)   00000   Set digit,

(◁)   00000   Select digit

press key (P) to accept the selection

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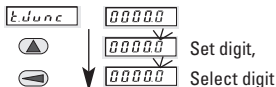
5.3.1.5 Correction value

Entry of a correction (offset) value, by which the measured value will be adjusted. The value will be added to the measured value. Positive as well as negative correction values are possible. The entry is always carried out to one decimal point.

Menu <–> Select

Adjust	00000
▲	00005	Set digit,
⬤	-0015	Select digit
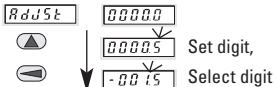
press key Ⓟ to accept the selection

Assuming the measured value is 28.45 and the correction value is –1.5, the display will indicate 26.95 .

5.3.2 Resistance Measurement

Menu <–> Selection

| rAnGE | rES.S |

press key Ⓟ to accept the selection
Also suitable for non-linear resistances

5.3.2 1 Select Measuring Mode

Menu <–> Selection

mEth	2wir
▲	2wir	2 wire
	3wir	3 wire
	4wir	4 wire
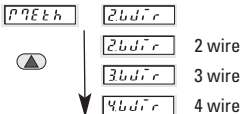
press key Ⓟ to accept the selection

⟹ *4. electrical connections* 🗋 *9*

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5.3.2 2 Measurement range
Menu <–> Selection

| r E S o L | | 0. 4 0 0 |

| 0. 4 0 0 | 0 ... 400 Ω ⇨ 5.3.2.5 Decimal point ▯ 16 |

| 0.4 0 0 0 | 0 ... 4 kΩ ⇨ 5.3.2.5 Decimal point ▯ 16 |

| P t 1 0 0 | Pt 100 (with stored scaling slope) |
⇨ 5.3.2.3 Display unit ▯ 15

| P 1 0 0 0 | Pt 1000 (with stored scaling slope) |
⇨ 5.3.2.3 Display unit ▯ 15
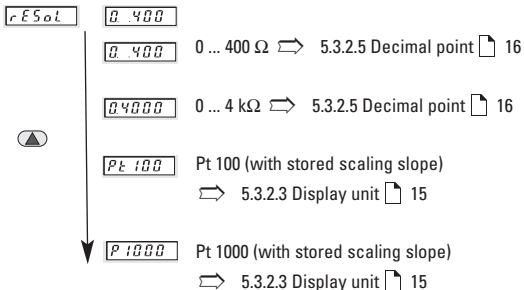
press key Ⓟ to accept the selection

5.3.2 3 Display Unit (Pt100, Pt1000)
Menu <–> Selection

| U n i t | | °C |

| °C | Display in °C
| °F | Display °F
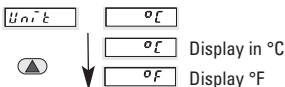
press key Ⓟ to accept the selection

5.3.2.4 Correction value (Pt100, Pt1000)
Entry of a correction (offset) value, by which the measured value will be adjusted. The value will be added to the measured value. Positive as well as negative correction values are possible. The entry is always carried out to one decimal point.
Menu <–> Selection

| R d J 5 t | | 0 0 0 0 0 |

| 0 0 0 0 5 | Set digit,
| - 0 0 1 5 | Select digit

press key Ⓟ to accept the selection

*Assuming the measured value is 28.45 and the correction value is –1.5,
the display indicates 26.95.*

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5.3.2 5 Decimal Point (400 Ω/4000 Ω)

Menu <–> Selection

| dP | 0 |

⬆️

0.0	0.0
	0.00
	0.000
0.0000	0.0000

press key Ⓟ to accept

Please note:
The decimal point is only visual. It influences neither the measuring accuracy nor the actual resolution, that means for example, shifting 2 digits left results in a display in unit of hundreds.
After the decimal point is set up, the leading zeros will be suppressed.

5.3.2 6 Changing the scaling scope (400 Ω/4000 Ω)

Menu <–> Selection

| $ChArC$ | YES |

⬆️

| | no | use the current characteristics curve ⟹ 5.5 Monitoring parameter 📄 21 |
| | YES | Enter or alter scaling scope ⟹ 5.4 Setting the scaling scope 📄 18 |

press key Ⓟ to accept the selection

5.3.3 Input range 0 ... 100 mV DC

Menu <–> Select

| $rAnGE$ | $100PP$ |

press key Ⓟ to accept the selection

5.3.3.1 Decimal Point for Displayed Value

Menu <–> Selection

| dP | 0 |

⬆️

0.0	0.0
	0.00
	0.000
0.0000	0.0000

press key Ⓟ to accept the selection

Please note:
The decimal point is only visual. It influences neither the measuring accuracy nor the actual resolution, that means for example, shifting 2 digits left results in a display in unit of hundreds.
After the decimal point is set up, the leading zeros will be suppressed.

5.3.3.2 Changing the Scaling slope

Menu <–> Selection

| $ChArC$ | YES |

⬆️

| | no | use the current scaling slope ⟹ 5.5 Monitoring parameter 📄 21 |
| | YES | Enter or alter scaling slope ⟹ 5.4 Setting the scaling slope 📄 18 |

press key Ⓟ to accept the selection

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5.3.4 Input range –100 ... 100 mV DC, bipolar

Menu <–> Selection

| `r Rn G E` | `100.b P` |

press key (P) to accept the selection

5.3.4.1 Select Decimal Point

Menu <–> Selection

| `d P` | `0` |

`0.0`	0.0
	0.00
	0.000
`0.0000`	0.0000

Please note:
The decimal point is only visual. It influences neither the measuring accuracy nor the actual resolution, that means for example, shifting 2 digits left results in a display in unit of hundreds.
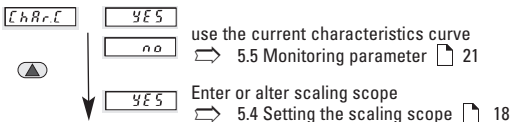After the decimal point is set up, the leading zeros will be suppressed.

press key (P) to accept the selection

5.3.4.2 Changing the Range Limits

The given limits for the input range can be entered as is, or adjusted.

	Parameter `Lo In P` Possible range of values	Parameter `hi In P` Possible range of values
0 ... 100 mV	not adjustable 0.0	not adjustable 100.0
–100 ... 100 mV	–100.00 ... 100.00	–100.00 ... 100.00

If the measured signal falls below or exceeds the programmed value, then the display alternates between `Lo` and the measured value or between `hi` and the the measured value.

Setting values out of the range is not possible. It is only possible to continue with the set-up, using the (P) keys, when the settings are correct.

Lower Limit

Menu <–> Selection

| `Lo In P` | `100.00` | Example.: –50,00 |

`100.00` Select digit
`-00.00` Set digit
`-00.00` Select digit
`-50.00` Set digit

When the input signal falls below the value set here, then `Lo` will be displayed
Under-range: When the input signal falls below –135 mV, then `u u u u u` will be displayed.

press key (P) to accept the selection

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Upper limit

Menu <–> Selection

$hi.InP$	10000	Example: 80.000
⬭	10000	Select digit
▲	88000	Set digit

press key Ⓟ to accept the selection

When the input signal exceeds the value set here, than ▭ hi ▭ is displayed.
Over-range: When the value exceeds 109 mV then ▭ $ooooo$ ▭ is displayed.

5.3.4.3 Changing the scaling slope

Menu <–> Selection

$ChArC$	YES	
	no	use the current scaling slope
		⟹ 5.5 Monitoring parameter 📄 21
▲	YES	Setting the scaling slope
		⟹ 5.4 Monitoring parameter 📄 18

press key Ⓟ to accept the selection

5.4 Setting the Scaling Slope

At least two points (2 pairs of values) are required for the start point and end point of the scaling slope. This slope can be rising or falling. A maximum of 24 scaling points can be used.

However it should be noted that in all cases, whether the slope rises or falls, the values that are inputted (Inp.01 … InP.24) must increase sequentially.

The scaling slope must lie within the limits of the input and display ranges. The first and last points can lie on the limits.

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Input range −100 ... +100 mV

−19 999
−1 999.9
−199.99
−19.999
−1.9999

99 999
9 999.9
999.99
99.999
9.9999
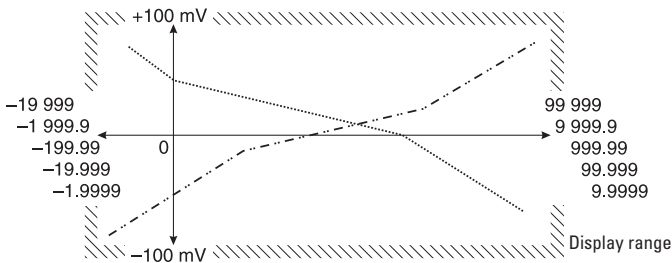
Display range

Example with 4 scaling points
Input range −100 ... +100 mV
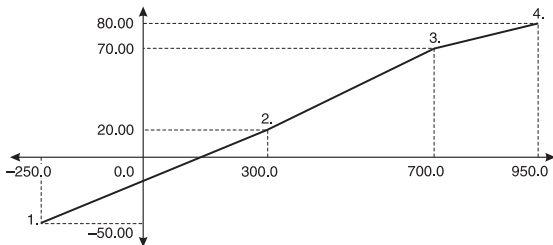
knee points	input-value	display value
1	−50,000	−250,0
2	20,000	300,0
3	70,000	700,0
4	80,000	950,0

We will use this example in the following pages

It is recommended to note down the required pairs of values for the scaling points of the slope before starting the set-up.

5.4.1 Enter the number of scaling points

Menu   <–> Selection

`NoPnt`   `0 2`

`0 2`

(▲)   `2 4`
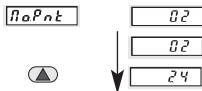
Example: 2
Pressing the key (▲) will
increment the value by one.
After reaching 24 the value jumps
back to 2.

press key (P) to accept the selection

5.4.2 Define first scaling point

Firstly set the input value for the start of
the slope using the respective unit (mA, V)

Menu   <–> Selection

`InP.01`   `0.0.0.0.0`   Example: –50.00

(⊂)   `0.0.0.0.0`   Select digit

(▲)   `- 5.0.0.0`   Set digit

press key (P) to accept the selection

Than set the display value for the start of
the slope

Menu   <–> Selection

`d.i.5.0.1`   `0.0.0.0.0`   Example: –250.0

(⊂)   `0.0.0.0.0`   Select digit

(▲)   `- 2.5.0.0`   Set digit
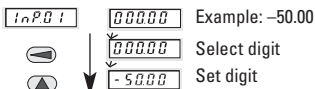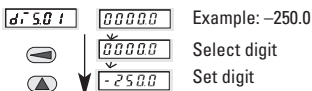
press key (P) to accept the selection

5.4.3 Define second scaling point

Menu   <–> Selection

Example: 20.000

`InP.02`   `0.0.0.0.0`

`0.2.0.0.0`

press key (P) to accept the selection

Set display value

Menu   <–> Selection

`d.i.5.0.2`   `0.0.0.0.0`   Example: 300.0

`0.3.0.0.0`

press key (P) to accept the selection

5.4.4 Define further scaling points

Additional scaling points will be requested
only, when in section 5.3.1 more than 2

scaling points are defined.

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5.5 Alarms/Alarm outputs
One, two or no alarms can be active.

When exceeding	Signal on	LED display	
Alarm 1	Output 1	⌐L 1	on
Alarm 2	Outout 2	⌐L 2	on

5.5.1 Alarm 1/Alarm output 1
5.5.1.1 Alarm 1 off/on
Menu <–> Selection

| $PrESi$ | on | Example: on |

| oFF | Alarm 1 not active $\Rightarrow$ Chapter 5.5.2 🗋 24 |

| on | Alarm 1 active |

press the Ⓟ key to accept the selection

5.5.1.2 Mode for Alarm output 1
Menu <–> Selection

| $Poou1$ | $Auto$ |

| $LAtch$ | Latch mode, Latch signal reset at output 1 $\Rightarrow$ Chapter 5.5.1.4 🗋 23 |

| $Auto$ | Auto mode |

press the Ⓟ key to accept the selection
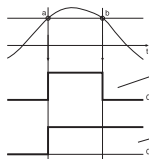
Alarm   a: threshold exceeded
        b: below threshold
Output mode "Auto": automatic resetting of output when the signal falls below threshold, signal set to 0, LED extinguished.

Output mode "Latch": Manual and/or electrical resetting of signal and LED

english

5.5.1.3 Alarm 1 Hysteresis

Here hysteresis means: The difference in thresholds between switching on and switching off. This difference should be selected large enough to avoid undesired switching actions at the output due to the variations of the current instantaneous value.

Note:

Alarm value and hysteresis are always based on the displayed current value and not on the input signal value.

For positive alarm value:
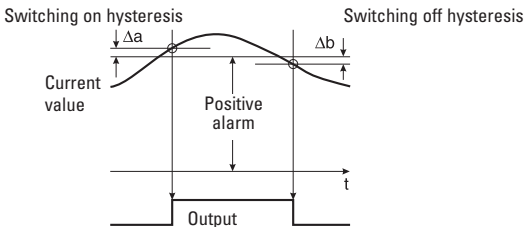
Switching on value = alarm + switching on hysteresis Δa
Switching off value = alarm – switching off hysteresis Δb
The switching on value **must be greater** than the switching off value.

For negative alarm value:
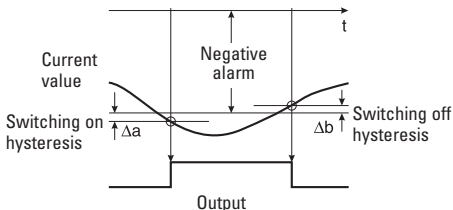
Switching on value = alarm – switching on hysteresis Δa
Switching off value = alarm + switching off hysteresis Δb
The switching on absolute value (numerical value without sign) **must be greater** than the absolute value for switching off.

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Set switching on hysteresis Δa for alarm 1

Menu <–> Selection

$o\,n\,h\,\mathcal{Y}\,l$	$\boxed{\mathit{0\,0\,0\,0\,0}}$	Example 1.0
$\ominus$	$\boxed{\mathit{0\,0\,0\,0\,0}}$	Select digit
$\blacktriangle$	$\boxed{\mathit{0\,0\,0\,1\,0}}$	Set digit

press the $\textcircled{P}$ key to accept the selection

Set switching off hysteresis Δb for limit 1

Menu <–> Selection

$o\,F\,h\,\mathcal{Y}\,l$	$\boxed{\mathit{0\,0\,0\,0\,0}}$	Example: 1,0
$\ominus$	$\boxed{\mathit{0\,0\,0\,0\,0}}$	Select digit
$\blacktriangle$	$\boxed{\mathit{0\,0\,0\,1\,0}}$	Set digit, then select signal form for output 1, $\Longrightarrow$
		Chapter 5.5.1.5 🗋 23

press the $\textcircled{P}$ keey to accept the selection

5..5.1.4 Reset Latch signal at output 1

Menu <–> Selection

$r\,o\,u\,t\,l$	$\boxed{P\,\mathcal{Y}\,\mathcal{R}\,n}$	

$\boxed{P\,\mathcal{Y}\,\mathcal{R}\,n}$ Manual reset with red key $\ominus$
Alarm output can only be reset manually if $\boxed{\mathcal{R}\,c\,t}$, $\boxed{P\,\mathcal{Y}\,\dot{\imath}\,n}$ or
$\boxed{P\,\mathcal{Y}\,\mathcal{R}\,H}$ is selected as the function and is displayed.

$\boxed{E\,L\,E\,c\,t}$ Electrical reset with MPI-Input
Alarm output can only be reset electrically, if $\boxed{\mathcal{R}\,c\,t}$, $\boxed{P\,\mathcal{Y}\,\dot{\imath}\,n}$ or
$\boxed{P\,\mathcal{Y}\,\mathcal{R}\,H}$ is selected as the function and is displayed.

$\blacktriangle$

$\boxed{E\,L\,P\,\mathcal{Y}\,\mathcal{R}}$ Both manual and electrical reset
Alarm output can either be reset manually via the red key or via a reset pulse
on the MP input.

press the $\textcircled{P}$ key
to accept

Note: The Display Hold function is off.

5.5.1.5 Select Signal Form for Output 1

Menu <–> Selection

$\boxed{\mathcal{B}\,u\,t\,l}$	$\boxed{\_\_\,r\,\_\_}$	

$\blacktriangle$ $\boxed{\_\_\,r\,\_\_}$ Positive output signal
Output is **activated**, when the instantaneous value $\geq$ alarm 1

$\boxed{\_\_\,\llcorner\,\_\_}$ Negative output signal
Output is **deactivated**, when the instantaneous value $\geq$ limit 1.

press the $\textcircled{P}$

english

5.5.2 Alarm 2/Alarm output 2
5.5.2.1 Alarm2 on / off
Menu <–> Selection

| $PrES2$ | | on | | Example: on |

| ▲ | | oFF | | Alarm 2 not activated, $\Longrightarrow$ Chapter 5.6, 🗋 25 |

| | | on | | Alarm 2 not activated, press the Ⓟ key to accept the selection |

5.5.2.2 Mode for Alarm output 2
Menu <–> Selection

| $P9ou2$ | | $Auto$ | | Example: on |

| ▲ | | $LAtch$ | | Reset Latch mode, Latch signal at output 2 $\Longrightarrow$ Chapter 5.5.2.4 , 🗋 25 |

| | | $Auto$ | | Auto mode |

press the Ⓟ key to accept the selection

5.5.2.3 Hysteresis for Alarm 2
Set switching on hysteresis Δa for Alarm 2
Menu <–> Selection

| $onh92$ | | $0.0.0.0.0$ | |

| ⊖ | | $0.0.0.0.0$ | Select digit |
| ▲ | | $0.0.0.1.0$ | Set digit |

press the Ⓟ key to accept the selection

Set switching off hysteresis Δb for Alarm 2
Menu <–> Selection

| $oF.h92$ | | $0.0.0.0.0$ | |

| ⊖ | | $0.0.0.0.0$ | Select digit |
| ▲ | | $0.0.0.1.0$ | Set digit $\Longrightarrow$ Chapter 5.5.2.5 select signal for output 2 |

press key Ⓟ to accept

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5.5.2.4 Reset Latch signal at Output 2

Menu <–> Selection

$\boxed{L\,\text{-}\,R\,t\,c\,h}$ $\boxed{P\,9\,R\,o}$

$\boxed{P\,9\,R\,o}$ Manual reset with red key ⬤
Alarm output can only be reset manually if $\boxed{R\,c\,t}$, $\boxed{P\,9\,i\,o}$ or
$\boxed{P\,9\,R\,H}$ is selected..

$\boxed{E\,L\,E\,c\,t}$ Electrical reset with MPI-Input
Alarm output can only be reset electrically, if $\boxed{R\,c\,t}$, $\boxed{P\,9\,i\,o}$ or
$\boxed{P\,9\,R\,H}$ is selected as the function and is displayed.
Note: The Display Hold funktion is off.

$\boxed{E\,L\,P\,9\,R}$ Both, manual and electrical reset
Alarm output can either be reset manually via the red key or via a reset pulse
on the MP input.
press the ⓟ key
to accept **Note:** The Display Hold function is off.

5.5.2.5 Select signal form for output 2

Menu <–> Selection

$\boxed{O\,u\,t\,1}$ $\boxed{\_\_\_\Gamma\,\text{-}\,\text{-}}$

$\boxed{\_\_\_\Gamma\,\text{-}\,\text{-}}$ Positiv output signal
Output is **activated**, when the instantaneous
value $\geq$ limit 2

$\boxed{\text{-}\,\text{-}\,L\,\_\_}$ Negativ output signal
Output is **deactivated**, when the instantaneous
press the ⓟ key to
accept value $\geq$ limit 2.

5.6 MIN/MAX value acquisition
The maximum value may be captured, saved and consulted during operation
by pressing a key.
5.6.1 Monitor maximum values
Menu <–> Selection

$\boxed{P\,9\,R\,H}$ $\boxed{Y\,E\,S}$ Example: Yes

$\boxed{n\,o}$ will not be monitored ⟹ 5.6.2 , 📄 26

$\boxed{Y\,E\,S}$ will be monitored and stored

press the ⓟ key to accept the selection

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5.6.1.1 Reset maximum value

Menu <–> Selection

| r.PYAX | | YES | Example: Yes |

| | no | cannot be reset |

(▲)

| | YES | can be reset with the ⬭ key. |

The MIN value can only be cleared by pressing the red key. In addition "MIN" must be selected as the display source. In parameter set-up "r.MIN" must be programmed as "YES"

press the (P) key

5.6.2 Monitor minimum value

Menu <–> Selection

| PYin | | YES | Example: Yes |

| | no | will not be monitored ⟹ 5.7 , 🗋 26 |

(▲)

| | YES | will be monitored and stored |

press the (P) key to accept the selection

5.6.2.1 Reset minimum value

Menu <–> Select

| r.PYin | | YES | Example: Yes |

| | no | Cannot be reset |

(▲)

| | YES | Can be reset with the key ⬭ . |

The MAX value can only be cleared by pressing the red key. In addition "MAX" must be selected as the display source. In parameter set-up "r.MAX" must be programmed as "YES"

press the (P) key to accept the selection

5.7 Mains Hum Filter

To reduce the interference from mains line and the environment (mains hum), the instrument must be set to the local mains frequency.

Menu <–> Selection

| FiLtE | | 50 H2 |

| | 60 H2 | local power line 60 Hz |

(▲)

| | 50 H2 | local power line 50 Hz |

press the (P) key to accept the selection

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5.8 Setting Default Values

The user has the possibility to set all parameters back to their default values by using the parameter `dEFc` . This parameter `dEFc` must be programmed with the value `9 7059` If you then proceed to the next parameter using the keys, then all parameters are reset to their default values. It is not necessary to finish the programming; a new programming cycle can take place immediately.

Menu   <–>   Selection

`dEFc`   `0.0.0.0.0`

⊜   `0.0.0.0.0`   Select digit

Ⓐ   `9 7059`   Set digit
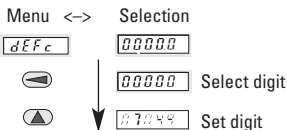
press the Ⓟ key to accept the selection

5.9 End of Setup yes / no ?

Menu   <–>   Selection

`EndPr`   `YES`

Ⓐ   `YES`   Parameter will be stored-> Operation
                `no`   Check/alter Parameters ⇨ 5.11, 28
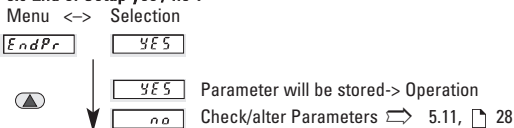
press the Ⓟ key to accept the selection

5.10 Check/Alter Parameters

Menu   <–> Selection

`rAnGE`   `       `   Checking the individual menu items
                      • after every 2 seconds the menu changes
                        to Selection
                      • If the setting is as desired, then switch to the next menu with
                        Ⓟ key, otherwise, start the set-up again.

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6.1 Changing the Display during Operation

Pressing the P key once for 2 sec will identify the function currently selected. If within these 2 sec the P key is pressed again, then the display will proceed to

the next display function. The new identification will be displayed for 2 sec to confirm this. After 2 sec the corresponding value of the selected function will be displayed.

Pressing the ⓟ Key   Message   Display

$\boxed{\mathcal{A} c \, t}$ [1]   Current measured value

ⓟ

$\boxed{\mathcal{P} \mathcal{I} \mathcal{L} \, \eta}$ [1]   MIN value (when activated)

ⓟ

$\boxed{\mathcal{P} \mathcal{I} \mathcal{A} \mathcal{X}}$ [1]   MAX value (when activated)

ⓟ

$\boxed{\text{LED Pr1 ein}}$ [2]   Alarm 1 (when activated)

ⓟ

$\boxed{\text{LED Pr2 ein}}$ [2]   Alarm 2 (when activated)
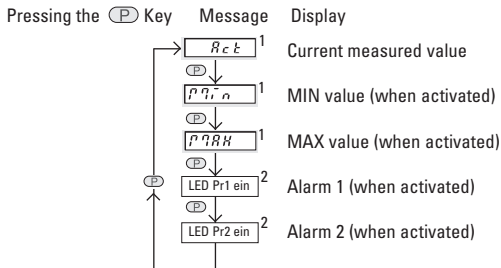
[1]Following actuation the corresponding value of the chosen function remains in the display. During a PowerOff the function currently selected will be saved. At the next PowerOn the corresponding value of this function will be shown again

in the display.

[2]After 4 sec the display automatically switches back to the current measured value and the LED indicators Pr1 or Pr2 are turned off.

Note:
When an alarm value is shown in the display, its set value can be changed.

This can be prevented by disabling the panel keys using the "Key" lock.

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6.2 Setting the Alarms during Operation

Set Alarm

When an alarm value is shown in the display, its set value can be changed.

Note: the "key-lock" should not be enabled.

Alarm 1 is displayed. LED 'Pr1' is illuminated

Display   Action

| 0 0 0 0 |

⬛   Select digit position and

▲   set digit.

| 3 0 0 0 | Example: 300.0

press the Ⓟ key to accept and go to Alarm 2

Alarm 2 is displayed. LED 'Pr2' is illuminated

Set Alarm
Display   Action

| 0 0 0 0 |

⬛   Select digit position and

▲   set digit.

| 8 0 0 0 | Example 800.0

press the Ⓟ key to accept the selection

6.3 Resetting MIN/MAX value

Resetting is only possible if this has been enabled in the parameter mode.

Select Min/Max value display
  • press the red key.
  • the stored value is cleared

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6.4 Display Hold

The Display Hold function is only available for use with the current measured value and for the totalizer value.
For as long as a high level signal (> 4 V DC) is present at the MP input,

then the display is "frozen".

The MIN/MAX capture, alarm monitoring and totalizer functions continue in the background.

The Display Hold function is only active with the following parameter settings:

	Parameter	Settings
Alarms	$PrES1$ / $PrES2$	oFF
Alarms	$PrES1$ / $PrES2$	on
Output Mode	$M ou1$ / $M ou2$	$Auto$
Alarms	$PrES1$ / $PrES2$	on
Output Mode	$M ou1$ / $M ou2$	$LAtch$
Reset-Alarm-Latch	$rout1$ / $rout2$	MAn

english

Prog

rAnGE — rES.S — 100.PP
dP — 0.0

rES.S

P7EEh — 4bdir

rESol — PE100

PE100 — P1000 — 0.400 — 0.4000

Unit — °C — dP — 0.0

AdjSE — 0.0.0.0.0

PrES1 — on
P7ou1 — Auto
Auto
LAEch — onhY.1 — 0.0.0.0.0
rouE1 — 0.0.0.0.0
oFhY.1 — _ _ r _ _
OuE1

PrES2 — on
P7ou2 — Auto
Auto
LAEch — onhY.2 — 0.0.0.0.0
rouE2 — 0.0.0.0.0
oFhY.2 — _ _ r _ _
OuE2

```
┌─────────┐                              ┌─────────┐                    ┌─────────┐
│ 100.bP  │                              │ thEr.c  │                    │    A    │
└────┬────┘                              └────┬────┘                    └─────────┘
┌────┴────┐                              ┌────┴────┐                    ┌─────────┐
│   dP    │                              │ thtYP   │                    │   °C    │
└────┬────┘                ┌─────────┐   └────┬────┘                    └─────────┘
┌────┴────┐                │   0.0   │   ┌────┴────┐                    ┌─────────┐
│ Lo.inP  │                └─────────┘   │  Unit   │                    │   int   │
└────┬────┘                ┌─────────┐   └────┬────┘                    └─────────┘
┌────┴────┐                │ 100.00  │   ┌────┴────┐         ┌─────────┐ ┌─────────┐
│ hi.inP  │                └─────────┘   │ rEF.Ju  │─────────│   EXt   │ │ 0000.0  │
└────┬────┘                ┌─────────┐   └────┬────┘         └─────────┘ └─────────┘
     │                     │ 100.00  │        │             ┌─────────┐ ┌─────────┐
┌────┴────┐                └─────────┘        └─────────────│ t.Junc  │ │ 0000.0  │
│ ChAr.C  │                ┌─────────┐                      └─────────┘ └─────────┘
└────┬────┘  ┌─────────┐   │   YES   │
             │ AoPnt   │   └─────────┘
             └────┬────┘   ┌─────────┐
             ┌────┴────┐   │   02    │
             │ InP.01  │   └─────────┘
             └────┬────┘   ┌─────────┐
             ┌────┴────┐   │ 0.00.00 │
             │ diS.01  │   └─────────┘
             └────┬────┘   ┌─────────┐
             ┌────┴────┐   │ 0.000.0 │
             │ InP.02  │   └─────────┘
             └────┬────┘   ┌─────────┐
             ┌────┴────┐   │ 100.00  │
             │ diS.02  │   └─────────┘
             └─────────┘   ┌─────────┐
                           │ 010.0.0 │
                           └─────────┘
```

```
     ┌─────────┐                    ┌─────────┐
     │  PMAX   │                    │   YES   │
     └────┬────┘                    └─────────┘
          │        ┌─────────┐      ┌─────────┐
          └────────│ r.PMAX  │      │   YES   │
                   └─────────┘      └─────────┘
     ┌─────────┐
     │  PMin   │                    ┌─────────┐
     └────┬────┘                    │   YES   │
          │        ┌─────────┐      └─────────┘
          └────────│ r.PMin  │      ┌─────────┐
                   └─────────┘      │   YES   │
     ┌─────────┐                    └─────────┘
     │ FiLtE   │                    ┌─────────┐
     └────┬────┘                    │ 50 HZ   │
     ┌────┴────┐                    └─────────┘
     │  dEFc   │                    ┌─────────┐
     └────┬────┘                    │ 00000   │
     ┌────┴────┐                    └─────────┘
     │ EndPr   │                    ┌─────────┐
     └─────────┘                    │   no    │
                                    └─────────┘
```
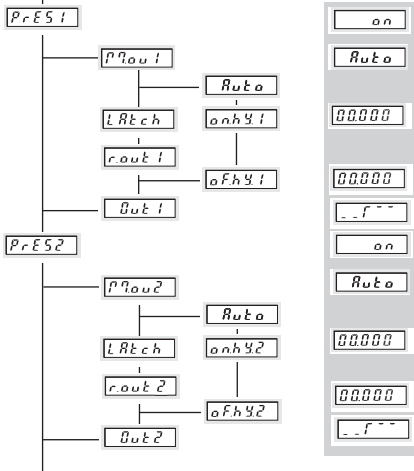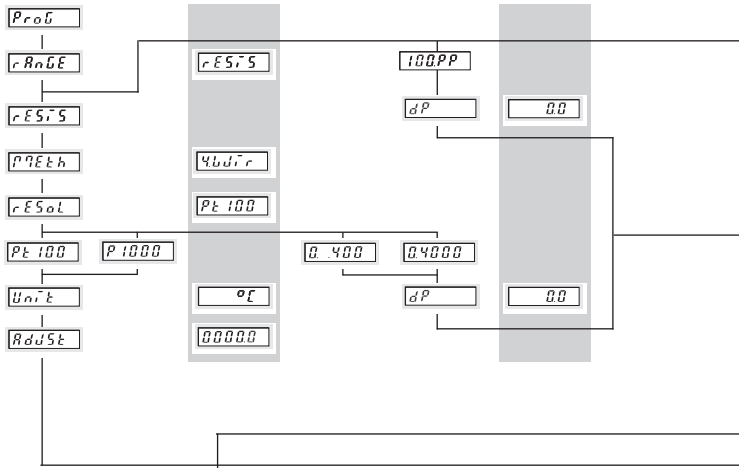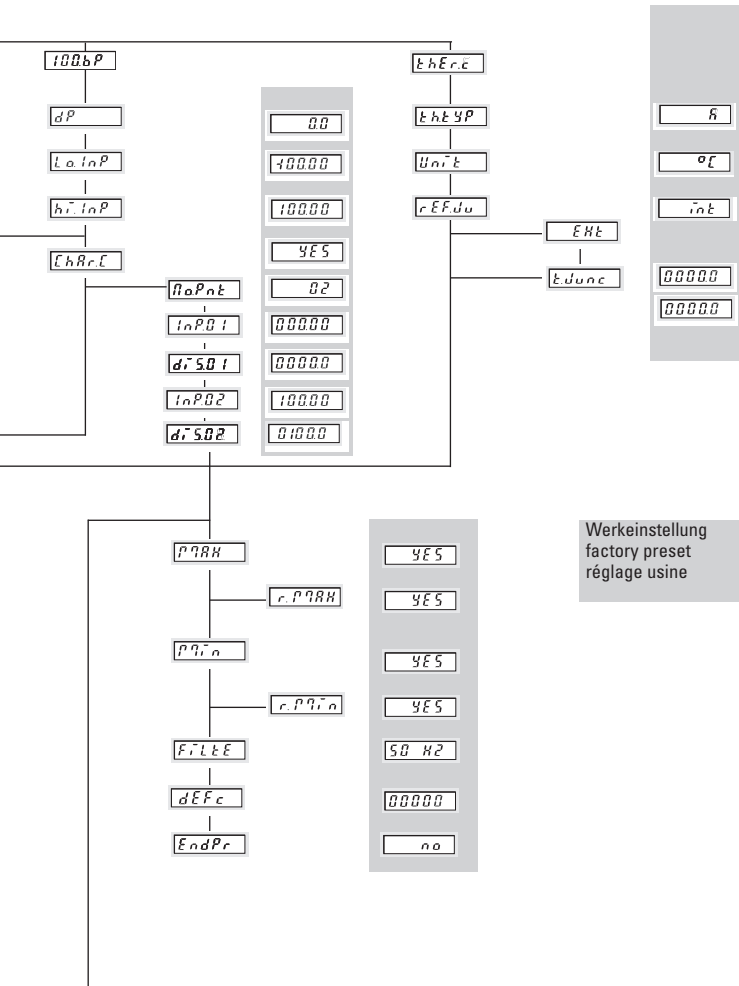
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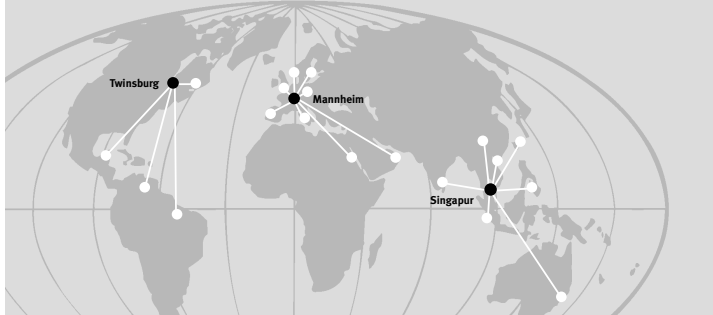
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