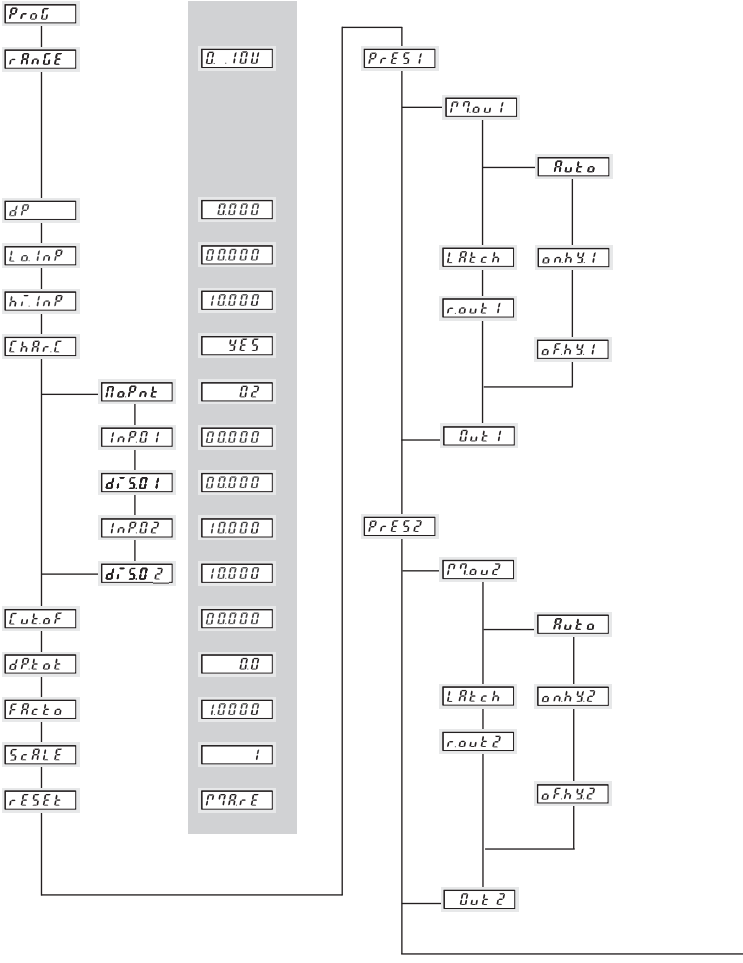
Operating instructions

DA5-IU-2K-C/DA5-IU-2K-V

Digital LED display with analogue inputs and limit values

PEPPERL+FUCHS
SENSING YOUR NEEDS


Prog
rAnGE
0..10V
dP
0000
Lo inP
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hi inP
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EhArC
YES
AoPnt
02
inP01
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diS01
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inP02
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diS02
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FActo
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ScALE
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PrES1
Pout1
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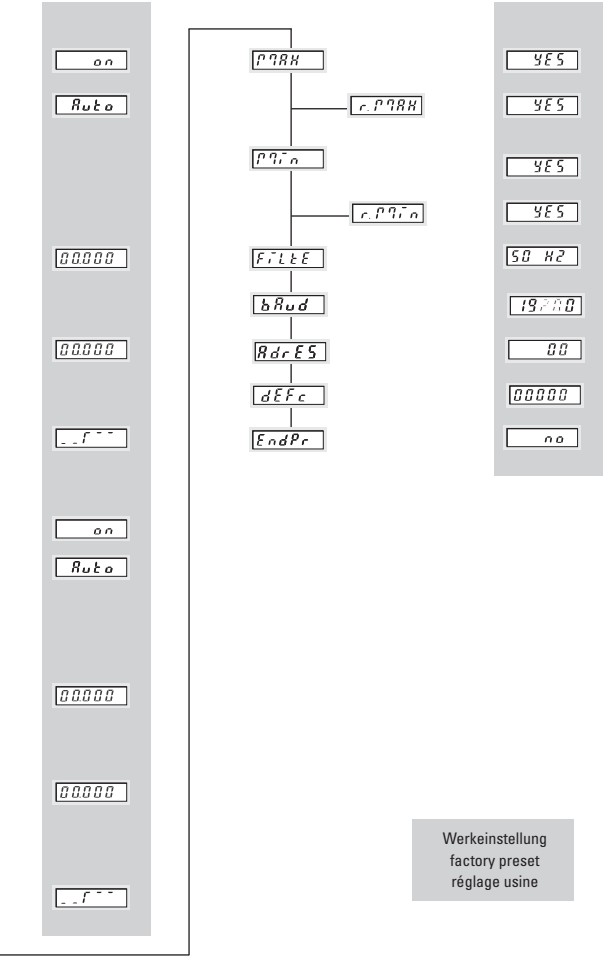


Werkeinstellung
factory preset
réglage usine

1. Safety instructions and warnings

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 only may be used as a panel-mounted device. Applications of this product may be found in industrial processes and controls, in the branch of the manufacturing lines for the metal, wood, plastics, paper, glass, textile, etc., processing industries.
Overvoltages at the terminals of the digital display must be limited to the values of overvoltage 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 up to you to take appropriate safety measures.

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 voltages	EN 61010 Part 1 ; overvoltage category 2, 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	
Current input (DC)	
Ranges	0 ... 20 mA, 4 ... 20 mA
Resolution	2 µA
Voltage drop	max. 2 V bei 20 mA
Max. current	50 mA
Voltage input (DC)	
Ranges	0 ... 10 V, 2 ... 10 V, ±10 V
Resolution	1 mV
Input resitance	> 2 MΩ
Max. voltage	± 30 V
A/D converter	Dual-Slope
Measuring speed	approx. 2 measurements/s
Linearity	< 0,1% ±1 Digit for the whole measuring range at an ambient temperature of 20°C
Zero calibration	automatic
Temperature drift	100 ppm/K

Digital inputs

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

*MPI: 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

Input MPI and Input KEY are galvanically isolated

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

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	approx. 83 mm
Weight	approx. 220 g
Protection	IP 65 (on the front side)

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.

2.4 Environmental Conditions

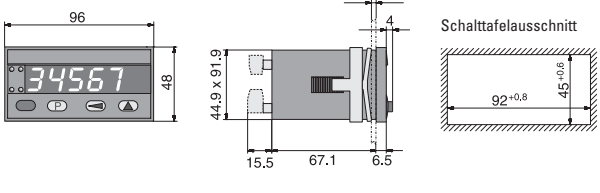
Ambient temperature	–20°C ... +65°C
Storage temperature	–40°C ... +85°C
Climatic stability	relative humidity < 75%, without condensation

2.5 Delivery includs:

Process display: **DA5-IU-2K-C oder DA5-IU-2K-V**
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

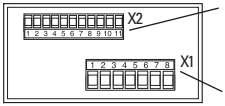
* only with the interface option

3. Mounting



4. Electrical connections

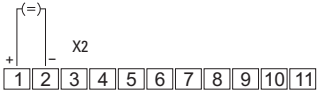
View of rear of unit



Warning: for 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.

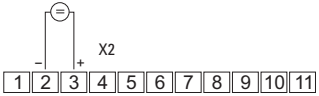
4.1 Measuring Inputs

Current input



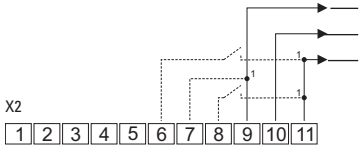
1	Current input (I) 0 ... 20 mA / 4 ... 20 mA
2	GND1 (Analogue)

Voltage input



2	GND1 (Analogue)
3	Voltage input (U) 0 ... 10 V, 2 ... 10 V, -10 ... +10 V

4.2 Control inputs and auxiliary power supply (U_{out})

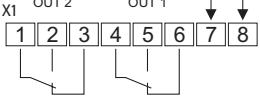


1 Alternatively connect directly to DC supply (galvanic separation of control and measurement inputs)

9	GND3 (for Uout)
10	Uout +10 V/30 mA
11	Uout +24 V/50 mA only for power supply 90 ... 260 V AC
8	MP-Input "Reset-Alarm-Latch/ Display-Hold
7	GND2 (KEY/MPI)
6	Keypad lock-out "Key"

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~)

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.

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 themselve 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 Parameter Mode

To put the unit into set-up mode
1. keep the (P) key pressed
2. connect the unit with the power supply
3. When the display shows [PrOG] 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
[rAnGE]		[0 ..10U]

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 (P) key. The selected parameter will be stored. The next menu item appears

– 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 the (◄) key to switch to the next digit.

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

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		Display range
rAnGE	0. 10U		(–0,500 ... 10,500)
▲	2. 10U	2 ... 10 V	(01,500 ... 10,500)
▲	-10.10U	-10 ... +10 V	(–10,500 ... 10,500)
▲	020mA	... 20 mA	(–01,000 ... 21,000)
▲	420mA	4 ... 20 mA	(03,000 ... 21,000)
▲	0. 10U	0 ... 10 V	(–0,500 ... 10,500)

press key (P) to accept the selection

5.2.2 Set the decimal point for the Instantaneous value

Menu <-->	Selection		Display range
dP	0		–19999 ... 99999
▲	0.0	0,0	–1999,9 ... 9999,9
▲		0,00	–199,99 ... 999,99
▲		0,000	–19,999 ... 99,999
▲	0.0000	0,0000	–1,9999 ... 9,9999

press key (P) to accept the selection

The position of the decimal point has no influence on the measuring accuracy. The maximum display value must be within the display range. After the decimal point is set up, the leading zeros in the display will be suppressed.

5.2.3 Changing the Range Limits

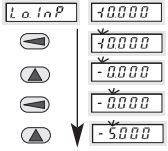
The given limits for the input range can be entered as is, or adjusted.

	Parameter LoinP Possible range of values	Parameter hiinP Possible range of values
0 .. 10 V	–0.500 ... 10.500	–0.500 ... 10.500
2 .. 10 V	01.500 ... 10.500	01.500 ... 10.500
-10 .. +10 V	–10.500 ... 10.500	–10.500 ... 10.500
0 .. 20 mA	–1.000 ... 21.000	–1.000 ... 21.000
4 .. 20 mA	03.000 ... 21.000	03.000 ... 21.000

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 key, when the settings are correct.

Lower limit

Menu <–> Selection



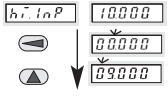
press the P key to accept the selection

When the signal drops below the value set here, then the signal alternates with the message Lo

Under-range: if the signal is less then –13,60 V than uuuuu appears in the display.
Current values < 0.0 mA will not be measured.

Upper limit

Menu <–> Selection



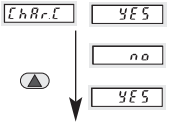
press the P key to accept the selection

When the signal exceeds the value set here, then the signal alternates with the message hi

Over-range: if the signal is higher than 11.00 V or 21.5 mA, then ooooo appears in the display.

5.2.4 Changing the Scaling Slope

Menu <–> Selection



Example: Yes

use the scaling slope curve, ⇨ Chapter 5.4, 15

Enter or alter scaling slope curve ⇨ Chapter 5.3, 13

press the P key to accept the selection

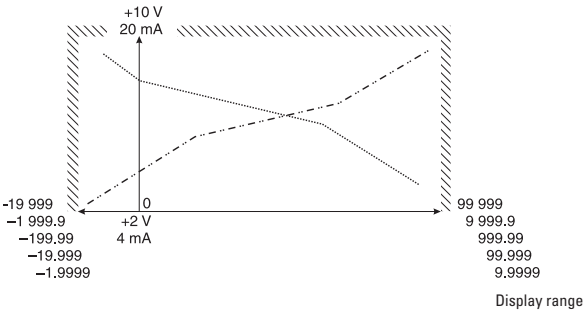
5.3 Setting the Scaling Slope

At least two points (2 pairs of value) for the starting and the end points respectively of the characteristic curve are reqquiered. The curve can be ascending or descending.
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.

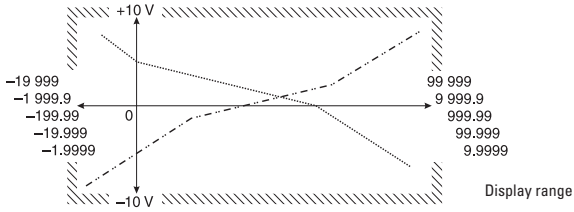
However it should be noted that in all cases, whether the slope rises or falls, the values that are inputted (Inp.01 … InP.24) must increase sequentially.

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

Input range 0 ... 10 V, 2 ... 10 V, 0 ... 20 mA, 4 ... 20 mA

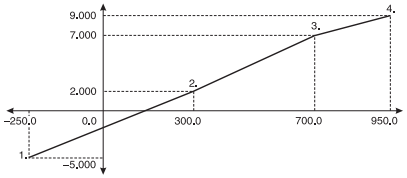


Input range –10 ... + 10 V



Example with 4 scaling points

For the input range –10 ... +10 V

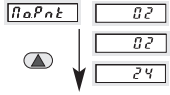


Scaling point range	Input	Display value
1	–5,000	–250,0
2	2,000	300,0
3	7,000	700,0
4	9,000	950,0

It is advisable to make a note of the desired pairs of values for the scaling points of the slope before starting the set-up.

5.3.1 Enter the number of scaling points

Menu <–> Selection



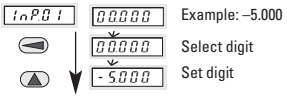
Example: 2
Pressing the ▲ key will increase the value by one. After reaching 24 the value jumps back to 2.

press the P key to accept the selection

5.3.2 Define first Scaling point

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

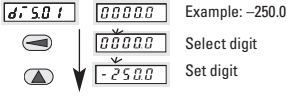
Menu <–> Selection



press the (P) key to accept

Than set the **display value** for the start of the slope

Menu <–> Selection



press the (P) key to accept

5.3.3 Define the second scaling point

Set **input value**

Menu <–> Selection

press the (P) key to accept

Set **display value**

Menu <–> Selection

press the (P) key to accept

5.3.4 Define further scaling points

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

5.4 Alarms/Alarm outputs

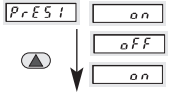
One, two or no alarms can be active.

When exceeding	Signal on	LED display
Alarm 1	Output 1	AL1 on
Alarm 2	Outout 2	AL2 on

5.4.1 Alarm 1/Alarm output 1

5.4.1.1 Alarm 1 off/on

Menu <–> Selection



Example: on

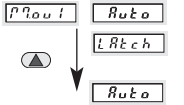
Alarm 1 not active ⇨ Chapter 5.5.2 📄 23

Alarm 1 active

press the (P) key to accept the selection

5.4.1.2 Mode for Alarm output 1

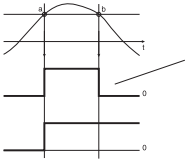
Menu <–> Selection



Latch mode, Latch signal reset at output 1
⇨ Chapter 5.4.1.5 📄 22

Auto mode

press the (P) 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.

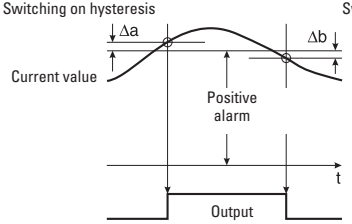
Output mode "Latch": Manual and/or electrical resetting of signal and LED

5.4.1.3 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.

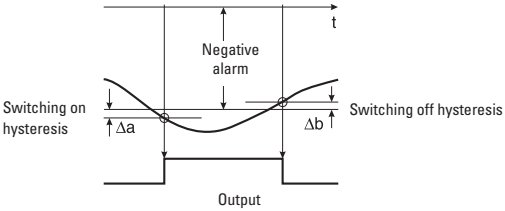
Note:
Alarm value and hysteresis are always based on the displayed current value and not on the input signal value.

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.

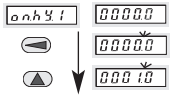
For negative alarm value:



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.

Set switching on hysteresis Δa for alarm 1

Menu <–> Selection



Example 1.0

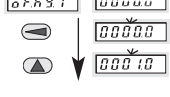
Select digit

Set digit

press the (P) key to accept the selection

Set switching off hysteresis Δb for limit 1

Menu <–> Selection



Example: 1,0

Select digit

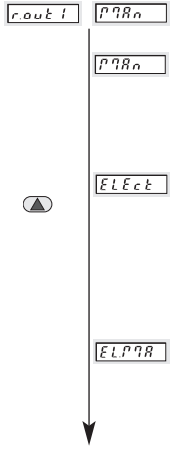
Set digit, then select signal form for output 1, ⇨

Chapter 5.4.1.5 🗋 19

press the (P) key to accept the selection

5.4.1.4 Reset Latch signal at output 1

Menu <–> Selection



rSRo: Manual reset with red key

Alarm output can only be reset manually if Act, rSi.o or rSRH is selected as the function and is displayed.

ELEct: Electrical reset with MPI-Input

Alarm output can only be reset electrically, if Act, rSi.o or rSRH is selected as the function and is displayed.

Note: The Display Hold funktion is off.

ELrSR: Both manual and electrical reset

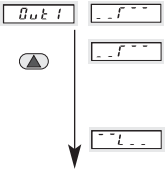
Alarm output can either be reset manually via the red key or via a reset pulse on the MP input.

Note: The Display Hold function is off.

press the (P) key to accept

5.4.1.5 Select Signal Form for Output 1

Menu <--> Selection



Positive output signal
Output is **activated**, when the instantaneous value > alarm 1

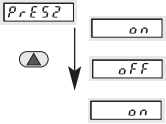
Negative output signal
Output is **deactivated**, when the instantaneous value > limit 1.

press the (P) key to accept

5.4.2 Alarm 2/Alarm output 2

5.4.2.1 Alarm2 on / off

Menu <--> Selection



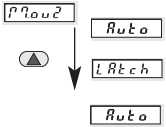
Example: on

Alarm 2 not activated, ⇨ Chapter 5.5, 🗋21

Alarm 2 not activated, press the (P) key to accept the selection

5.4.2.2 Mode for Alarm output 2

Menu <--> Selection



Example: on

Reset Latch mode, Latch signal at output 2 ⇨ Chapter 5.4.2.4 , 🗋20

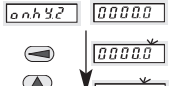
Auto mode

press the (P) key to accept the selection

5.4.2.3 Hysteresis for Alarm 2

Set switching on hysteresis Δa for Alarm 2

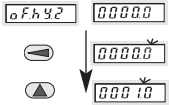
Menu <–> Selection



press the (P) key to accept the selection

Set switching off hysteresis Δb for Alarm 2

Menu <–> Selection

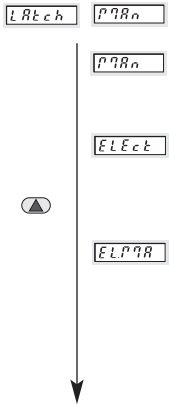


Chapter 5.4.2.5 select signal for output 2

press key (P) to accept

5.5.2.4 Reset Latch signal at Output 2

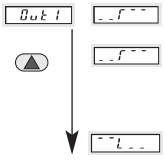
Menu <–> Selection



press the (P) key to accept

5.4.2.5 Select signal form for output 2

Menu <–> Selection



Positiv output signal
Output is **activated**, when the instantaneous value > limit 1

Negativ output signal
Output is **deactivated**, when the instantaneous value > limit 1.

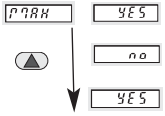
press the (P) key to accept

5.5 MIN/MAX value acquisition

The maximum value may be captured, saved and consulted during operation by pressing a key.

5.5.1 Capture of MIN/MAX Values

Menu <–> Selection



Example: Yes

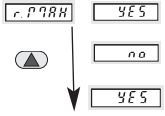
Not monitored ⇨ Chapter 5.5.2 , 21

Monitored and saved.

press the (P) key to accept the selection

5.5.1.1 Reset Maximum value

Menu <–> Selection



Example: Yes

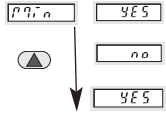
not resettable

Resettable via 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

5.5.2 MIN Value Monitor

Menu <–> Selection



Example: Yes

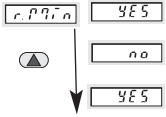
Not monitored ⇨ Chapter 5.5 , 21

Monitored and saved.

press the (P) key to accept the selection

5.5.2.1 Reset Minimum value

Menu <–> Selection



Example: Yes

not resettable

resettable via 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 to accept

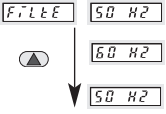
5.5.3 Effects resulting from exceeding the measuring range limits or of Overload/Underload on MIN/MAX.

If the signal measured lies outside the measuring range limits Lo.inP or hi.inP then the current measured value will be recorded either as a MIN value uuuuu or as a MAX value ooooo. If the signal is in an overload or underload condition, then it will be saved either as as a MIN value uuuuu or as a MAX value ooooo. .

5.6 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



Local power line 60 Hz

Local power line 50 Hz

press the (P) key to accept the selection

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 07459. 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 00000

00000 Select digit

07459 Set digit

press the (P) key to accept the selection

5.9 End of Setup Yes/No?

Menu <–> Selection

EndPr YES

YES Parameters will be stored -> Operation

no Check/alter Parameters ⇨ Chapter 5.11, 24

press the (P) 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 (P) key, otherwise, start the set-up again.

6. Operation

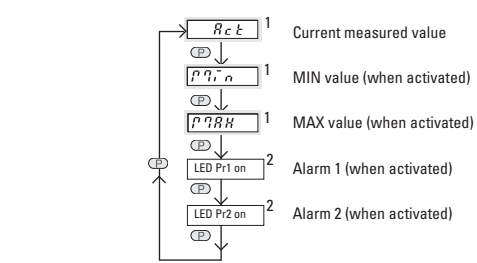
The unit is in the operating mode, when the power supply is switched on or at the end of the set-up. One of the following will be displayed during operation.

32681	326.81 The measuring signal has been applied and lies within the limits of the measuring range. The display will show either the current measured value, the totalizer value, the MAX value or the MIN value.
Lo	The input value is below the lower limit of the measuring range. This message alternates with the current measured value.
hi	The input value is higher than the upper limit of the measuring range. This message alternates with the current measured value.
uuuuu	The input value is less than -13.6 V. Current inputs below 0.0 mA are not measured.
ooooo	The input value is higher than 11.0 V or above 21.5 mA

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.



[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.

6.2 Setting the Alarms during Operation
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

Set Alarm

Display	Action	
0000	◄	Select digit position and
	▲	set digit.
3000		Example: 300.0

press the (P) key to accept and go to Alarm 2

Alarm 2 is displayed. LED 'Pr2' is illuminated

Set Alarm

Display	Action	
0000	◄	Select digit position and
	▲	set digit.
8000		Example 800.0

press the (P) 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

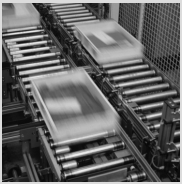
6.4 Display Hold

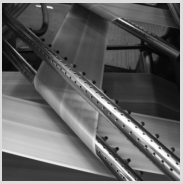
The Display Hold function is only available for use with the current measured value and for the totalizer value.For as long as a high level signal (> 4 V DC) is present at the MP input, then the display is "frozen".

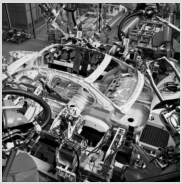
The MIN/MAX capture, alarm monitoring and totalizer functions continue in the background.

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

	Parameter	Settings
Alarm	PrES1 / PrES2	oFF
Alarms	PrES1 / PrES2	on
Output Mode	Pnou1 / Pnou2	Auto
Alarms	PrES1 / PrES2	on
Output Mode	Pnou1 / Pnou2	LAtch
Reset-Alarm-Latch	rout1 / rout1	PnAn







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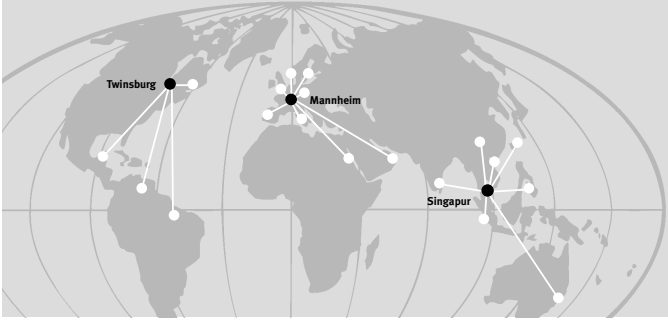

Worldwide Headquarters
Pepperl+Fuchs GmbH
68307 Mannheim · Germany
Tel. +49 621 776-0
E-Mail: info@de.pepperl-fuchs.com

USA Headquarters
Pepperl+Fuchs Inc.
Twinsburg, Ohio 44087 · USA
Tel. +1 330 4253555
E-Mail: sales@us.pepperl-fuchs.com

Asia Pacific Headquarters
Pepperl+Fuchs Pte Ltd. · P+F Building
Singapore 139942
Tel. +65 6779-9091
E-Mail: sales@sg.pepperl-fuchs.com

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