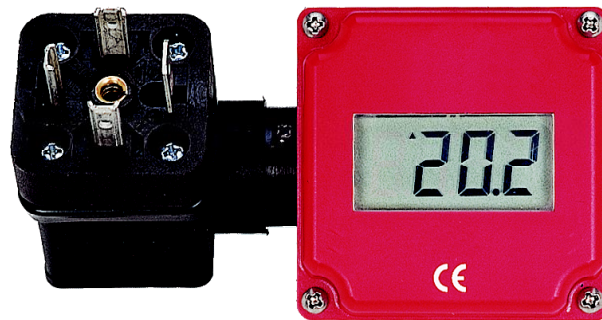


Universal display for 0-10V - transmitter

GIA 010 VO(T) GIA 010 WK(T)

as of version 1.0

Operating manual



GIA 010 VO



GIA 010 WK(T)

GIA 010 VOT



WEEE-Reg.-Nr. DE93889386



GREISINGER electronic GmbH

D - 93128 Regenstauf, Hans-Sachs-Straße 26

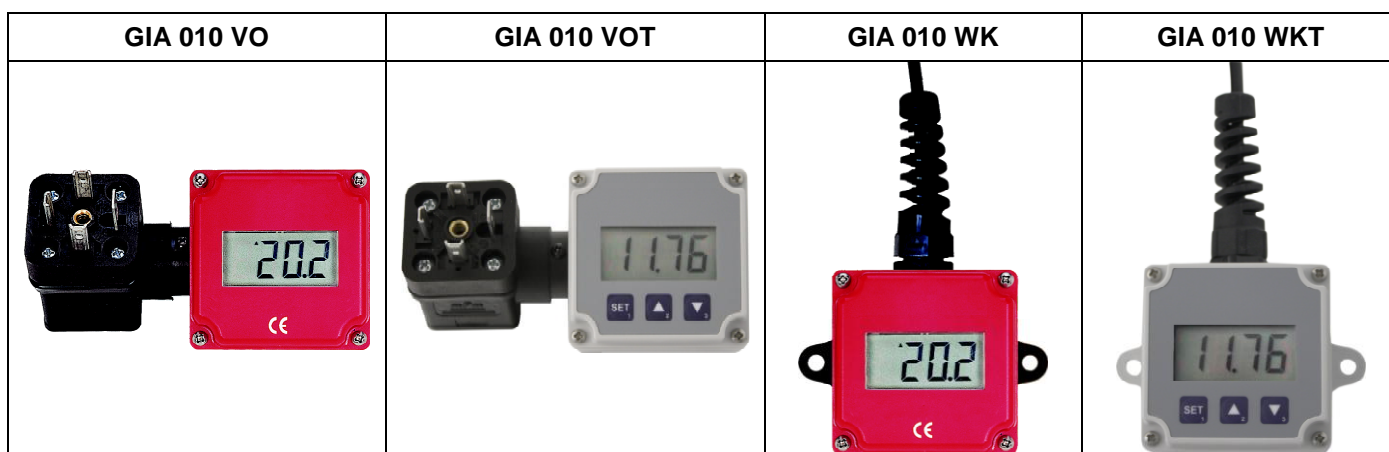
+49 (0) 9402 / 9383-0 +49 (0) 9402 / 9383-33 info@greisinger.de

Index

1	DESIGNATED USE	2
2	SAFETY REQUIREMENTS	3
2.1	GENERAL SAFETY ADVICES	3
2.2	SKILLED PERSONNEL	3
3	GENERAL NOTE	3
4	DISPOSAL NOTES	3
5	ELECTRIC CONNECTION	4
5.1	GIA 010 WK(T)	4
5.1.1	Terminal assignment	4
5.2	GIA 010 VO(T)	4
5.2.1	Assignment of the angle-type plug	4
5.2.2	Adjustment of the GIA 010 VO(T) - connections:	4
5.3	ASSIGNMENT OF SWITCHING OUTPUTS (AT OPTION S2)	5
5.3.1	Example assignment for switching output (i.e. switching of relays)	5
6	CONFIGURATION	6
6.1	ADDITIONAL PARAMETER FOR OPTION S2	7
7	SELECTION OF SWITCHING AND ALARM POINTS	9
8	OFFSET AND SLOPE ADJUSTMENT	10
9	MIN-/MAX- VALUE MEMORY	10
10	ERROR CODES	11
11	SPECIFICATIONS	12

1 Designated Use

The GIA 010 VO(T) and GIA 010 WK(T) are microprocessor controlled display devices.



The different design types of the device have an input for: standard signal 0 - 10 V

The measuring value is displayed on a 4-digit LCD display with max. display area ranging from -1999 to +9999 digits.

The device optionally features a switching output (NPN-output) which can be configured as 2-point controller or min-/max alarm. The state of the output is displayed with an arrow at the LCD.

The GIA 010 ... is designed for the connection of any measuring transducers (with a 0 - 10 V output)

Parameter and limit values are entered via three keys which are accessible after removal of the cover (design type VO and WK).

Devices of the design type VOT and WKT have that keys freely accessible at top of the device.

The operating range of the display device can be directly adjusted to the transmitter without any additional accessories by simply entering the maximum and minimum measuring range limits as well as the decimal point position. All programmable parameters of the device are saved in an EEPROM. In case of a current failure they will remain there for at least 10 years.

The device is equipped with a self-diagnosis system continuously monitoring the essential parts of the device for their perfect functioning. Both the self-diagnosis and the measuring sensor monitoring for values exceeding or falling below permissible limits ensure maximum operational reliability of the device.

Prior to delivery the device will be tested and completely calibrated.

However, prior to you starting your operation make sure to configure the device for your application. Please also refer to chapter "Configuration".

2 Safety Requirements

2.1 General safety advices

This device has been designed and tested in accordance with the safety regulations for electronic devices. However, its trouble-free operation and reliability cannot be guaranteed unless the standard safety measures and special safety advices given in this manual will be adhered to when using the device.

1. Trouble-free operation and reliability of the device can only be guaranteed if the device is not subjected to any other climatic conditions than those stated under "Specification".
2. Standard regulations for operation and safety for electrical, light and heavy current equipment have to be observed, with particular attention having to be paid to national safety regulations (e.g. VDE 0100).
3. When connecting the device to other devices (e.g. PC) the interconnection has to be designed most thoroughly as internal connections in third-party devices (e.g. connection GND with protective earth) may lead to undesired voltage potentials.
4. If there is a risk whatsoever involved in running it, the device has to be switched off immediately and to be marked accordingly to avoid re-starting.

Operator safety may be a risk if:

- there is visible damage to the device.
- the device is not working as specified.
- the device has been stored under unsuitable conditions for a longer time.

In case of doubt, please return device to manufacturer for repair or maintenance.

5. **Warning:** Do not use these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury or material damage.
Failure to comply with these instructions could result in death or serious injury and material damage.

2.2 Skilled Personnel

Are persons familiar with installation, commissioning and operation of the product and have professional qualification relating to their job.

For example:

- Training or instruction resp. Qualification to switch on or off, isolate, ground and mark electric circuits and devices or systems.
- Training or instruction according to the state.
- First-aid training.

3 General Note

Read this document carefully and get used to the operation of the device before you use it. Keep this document within reach for consulting in case of doubt.

4 Disposal Notes



The device must not be disposed in the unsorted municipal waste!
Send the device directly to us (sufficiently stamped), if it should be disposed.).
We will dispose the device appropriate and environmentally sound.

5 Electric connection

5.1 GIA 010 WK(T)

The connection of the GIA ... WK occurs via 3- or 5-wire connection cable.

Supply voltage: 12 ... 28 V or according device declaration

Electric connection and commissioning of the device must be carried out by trained and skilled personnel.

Wrong connection may lead to the destruction of the display device, in which case we cannot assume any warranty!

5.1.1 Terminal assignment

connection number	wire colour	GIA 010 WK(T)
1	white	supply +
2	brown	supply -, GND
3	green	signal +

5.2 GIA 010 VO(T)

To connect the GIA 010 VO it is simply plugged into an existing transmitter by means of a special adapter for the cubic plug according to DIN EN 175301-803 A (ex. DIN43650 A).

Supply voltage: 12 ... 28 V or according device declaration

Electric connection and commissioning of the device must be carried out by trained and skilled personnel.

Wrong connection may lead to the destruction of the display device, in which case we cannot assume any warranty!

5.2.1 Assignment of the angle-type plug

contact number	wire colour (socket contact)	GIA 010 VO(T)	
		pin	socket
1	grey	connected,	signal +
2	red	connected	
3	black	connected,	supply +
4	yellow	connected,	GND / signal -

5.2.2 Adjustment of the GIA 010 VO(T) - connections:

The pins 1, 3 and 4 of the elbow-type plug are directly connected with the socket. The device is connected to contact 1 (signal +), contact 3 (supply +) and contact 4 (GND/signal -).

Pin 2 is directly connected to the socket or is used for the switching output (switching against supply +) in case of the option with switching output.

If your transducer has another assignment for 'supply +', 'signal +' and 'GND/signal -' you have to adjust the angle-type plug assignment accordingly:

To do so open the angle-type plug (refer to the "general instructions for change") and detach the wires leading into the housing (blue, black and yellow). Then screw the wires to the contacts that correspond to signal + (blue wire), supply + (black wire) and GND/signal - (yellow wire) at your transducer.

Then exchange and rewire the contacts in the angle-type plug of your connecting cable corresponding to the GIA 010 VO(T) connection.

General instructions for change of the angle-type plug assignment:

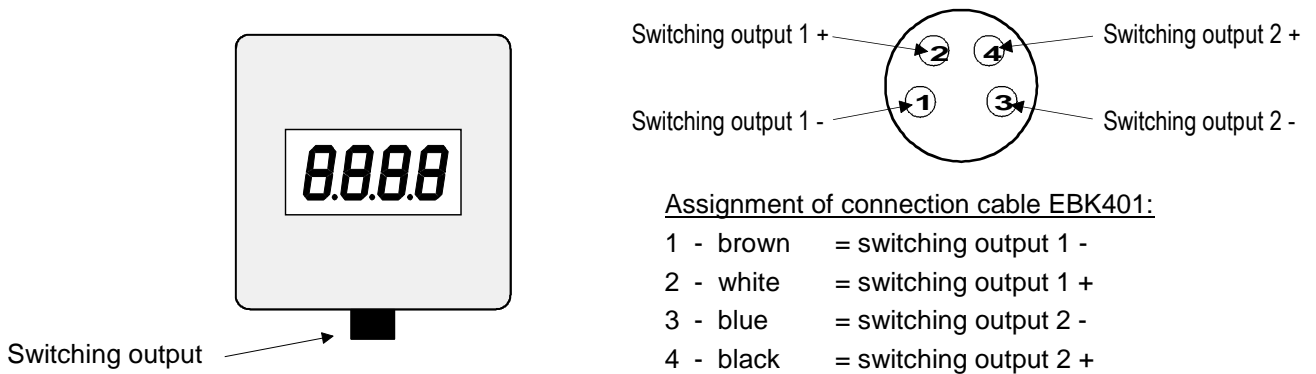
Remove the coupling insert by means of a screw driver at the position indicated (arrow).

Change the assignment according the notes of the respective input signal.

Latch coupling insert in cover. You have a choice between 4 different orientations – each of them spaced 90°.

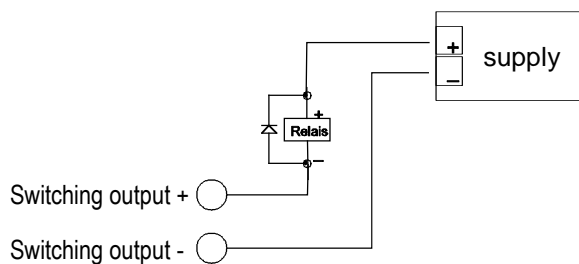
Put on angel-type plug and connect plugs using the long screw delivered (do not forget seals).

5.3 Assignment of switching outputs (at option S2)

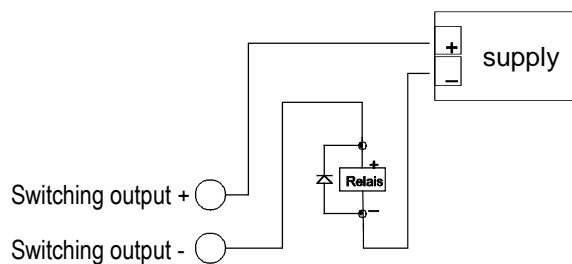


Please note that the maximal permissible voltage as well as the maximal switching current of the switching outputs must not be exceeded (not even for a short time). Especially if inductive loads (i.e. relays, coils, etc.) are switched, it is important to limit the occurring voltage peaks by adequate protective measures. If big capacitive loads are switched it is necessary to limit the switch-on current to permissible values by inserting a resistor or a current limiting. The same applies to bulbs, because they can also produce high switch-on currents due to their low cold resistance.

5.3.1 Example assignment for switching output (i.e. switching of relays)



Assignment as low-side switch



Assignment as high-side switch

6 Configuration

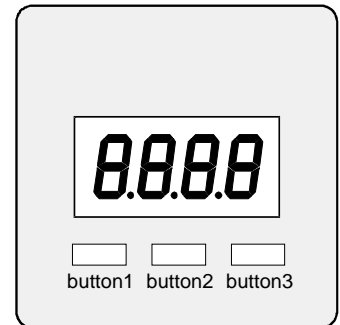
Note: To configure GIA ... VO and GIA ... WK the cover has to be removed carefully to get access to the needed buttons.

Take care of adequate ESD safety precautions to prevent damage to the exposed parts!

Follow these instructions to configure the device:

- Press **button 2** for 2 seconds during actual value display, „dP“ is displayed.
- Set parameter value with **button 2** and **button 3**.
- Save the set with **button 1**, the parameter name is displayed again.
- Proceed to the next parameter with **button 1**, the name of that parameter is displayed.

If there is no key pressed within 60 seconds the configuration is cancelled.
The settings already entered are lost.



Parameter	Value	Description
Button 1	Button 2 and 3	
dP	Position of decimal point	
	----	Max. display range: -1999 ... 9999
	---.-	Max. display range: -199.9 ... 999.9
	--.---	Max. display range: -19.99 ... 99.99
	-.---	Max. display range: -1.999 ... 9.999
d _i .Lo	Lower display range limit (display low)	
	-1999 ... 9999	This value is displayed for input signal = 0 V.
d _i .Hi	Upper display range limit (display high)	
	-1999 ... 9999	This value is displayed for input signal = 10 V.
L	(Measuring range) limit	
	oFF	deactivated: Exceeding of the measuring range limit is tolerable as long as value is within measuring range (p.r.t. note).
	on.Er	active, (display error): The measuring range limit is exactly bounded by the input signal. When exceeding or short falling the input signal the device will display an error message.
	on.rG	active, (display measuring range limit): The measuring range limit is exactly bounded by the input signal. When exceeding or short-falling the input signal the device will display the selected lower/upper display value. <i>e.g. humidity: when shortfalling or exceeding, the device will display 0% or 100%.</i>
	<i>Note:</i> When exceeding the measuring range, the device will always display an error message (.Err.1. or .Err.2.) independent of the current limit settings. The measuring range is from approx 10.5 V (a falling below 0V will not be detected).	
FiLl	Filter	
	oFF	Filter deactivated
	0.1 ... 2.0	Filter active: Prevents "jumping" of the last digit and filters short noise pulses. Higher numbers imply stronger filtering Attention: this causes higher response times of the switching functions!

The configuration is done at this point for devices without option "switching output". Press **button 1** one more time after the input of the last parameter to close the configuration menu. The device restarts (segment test).

6.1 Additional parameter for option S2

The adjustment of the switching and alarm points follows the filter setting. The following points are added to the configuration menu:

Parameter	Value	Description
Button 1	Button 2 and 3	
outP	Output function	
	<i>no</i>	No output, device used as display
	<i>2P</i>	2-point-controller (output 1)
	<i>AL.F1</i>	Min- / max- alarm, together (output 2, inverted)
	<i>3P</i>	3-point-controller (output 1 and output 2)
	<i>2P.AL</i>	2-point-controller (output 1) with min- / max- alarm (output 2, inverted)
<i>AL.F2</i>	Min- / max- Alarm, separate (output 1 = min alarm inverted, output 2 = max alarm inverted)	

Depending on the selected output function further parameters have to be adjusted.

The configuration menu automatically skips parameters not needed for the selected output function.

The following diagram shows which parameters are successively displayed for each output function.

A description of the single parameters follows afterwards.

Parameter		Switching function					
		no	2P	AL.F1	3P	2P.AL	AL.F2
1.on	Switch-on point (output 1)		√		√	√	
1.oFF	Switch-off point (output 1)		√		√	√	
1.dEL	Delay of switching function (output 1)		√		√	√	
1.Err	Preferred position (output 1)		√		√	√	
2.on	Switch-on point (output 2)				√		
2.oFF	Switch-off point (output 2)				√		
2.dEL	Delay of switching function (output 2)				√		
2.Err	Preferred position (output 2)				√		
AL.Hi	Max-alarm point			√		√	√
AL.Lo	Min-alarm point			√		√	√
A.dE	Alarm delay			√		√	√

Parameter	Value	Description
Button 1	Button 2 and 3	
1.on <small>only at outP = 2P, 3P, 2P.AL</small>	Switch-on point of output 1	
	<i>d₁.Lo ... d₁.Hi</i>	Value at which output 1 should be switched on. Value has to be between upper and lower measuring range limit set at the beginning of the configuration menu.
1.oFF <small>only at outP = 2P, 3P, 2P.AL</small>	Switch-off point of output 1	
	<i>d₁.Lo ... d₁.Hi</i>	Value at which output 1 should be switched off. Value has to be between upper and lower measuring range limit set at the beginning of the configuration menu.

1.dEL only at outP = 2P, 3P, 2P.RL	Delay of switching function of output 1	
	0.0 ... 999.9	The set value is the time [in seconds] the device waits at least after switching-off output 1 to switch it on again.
1.Err only at outP = 2P, 3P, 2P.RL	Preferred position of output 1	
	on, off	If an error occurs, the device switches output 1 to “active” (on) or “inactive” (off).
2.on only at outP = 3P	Switch-on point of output 2	
	d _i .Lo ... d _i .Hi	Value at which output 2 should be switched on. Value has to be between upper and lower measuring range limit set at the beginning of the configuration menu.
2.off only at outP = 3P	Switch-off point of output 2	
	d _i .Lo ... d _i .Hi	Value at which output 2 should be switched off. Value has to be between upper and lower measuring range limit set at the beginning of the configuration menu.
2.dEL only at outP = 3P	Delay of switching function of output 2	
	0.0 ... 999.9	The set value is the time [in seconds] the device waits at least after switching-off output 2 to switch it on again.
2.Err only at outP = 3P	Preferred position of output 2	
	on, off	If an error occurs, the device switches output 2 to “active” (on) or “inactive” (off).
ALHi only at outP = RL.F1, 2P.RL, RL.F2	Max-alarm point	
	RL.Lo ... d _i .Hi	Value, at which max-alarm should be triggered. Value has to be between upper and lower measuring range limit set at the beginning of the configuration menu.
ALLo only at outP = RL.F1, 2P.RL, RL.F2	Min-alarm point	
	d _i .Lo ... ALHi	Value, at which min-alarm should be triggered. Value has to be between upper and lower measuring range limit set at the beginning of the configuration menu.
A.dEL only at outP = RL.F1, 2P.RL, RL.F2	Alarm delay	
	0 ... 9999	The set value is the alarm delay in seconds. The alarm case has to last for the set time to trigger the alarm.

After having set and confirmed the last point (depending on the selected output function) the configuration is done.

Press **button 1** one more time after the input of the last parameter to close the configuration menu. The devices re-starts (segment test).

7 Selection of switching and alarm points

Only at option switching output (GIA 010 ... / S2):

Note: All relevant switching and alarm points can be set at this menu.

(Preferred position and delay of outputs can only be set at configuration menu)

Depending on the selected output function different parameters have to be adjusted.

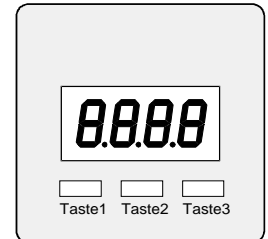
The configuration menu automatically skips parameters not needed for the selected output function.

Note: This menu cannot be called if output function is set off or at devices without option switching output.

Follow these instructions to adjust switching and alarm points:

- Press **button 1** for 2 seconds during actual value display, "1.on" or "AL.Hi" is displayed.
- Set parameter with **button 2** and **button 3**.
- Save the set value with **button 1**, the parameter name is displayed again.
- Proceed to the next parameter with **button 1**, the name of that parameter is displayed

If there is no key pressed within 60 seconds the configuration is cancelled. The settings already entered are lost.



Parameter	Value	Description
Button 1	Button 2 and 3	
1.on only at outP = 2P, 3P, 2P.RL	Switch-on point of output 1	
	$d_i . Lo \dots d_i . Hi$	Value at which output 1 should be switched on. Value has to be between upper and lower measuring range limit set at the beginning of the configuration menu.
1.off only at outP = 2P, 3P, 2P.RL	Switch-off point of output 1	
	$d_i . Lo \dots d_i . Hi$	Value at which output 1 should be switched off. Value has to be between upper and lower measuring range limit set at the beginning of the configuration menu.
2.on only at outP = 3P	Switch-on point of output 2	
	$d_i . Lo \dots d_i . Hi$	Value at which output 2 should be switched on. Value has to be between upper and lower measuring range limit set at the beginning of the configuration menu.
2.off only at outP = 3P	Switch-off point of output 2	
	$d_i . Lo \dots d_i . Hi$	Value at which output 2 should be switched off. Value has to be between upper and lower measuring range limit set at the beginning of the configuration menu.
AL.Hi only at outP = RL.F1, 2P.RL, RL.F2	Max-alarm point	
	$RL.Lo \dots d_i . Hi$	Value, at which max-alarm should be triggered. Value has to be between upper and lower measuring range limit set at the beginning of the configuration menu.
RL.Lo only at outP = RL.F1, 2P.RL, RL.F2	Min-alarm point	
	$d_i . Lo \dots AL.Hi$	Value, at which min-alarm should be triggered. Value has to be between upper and lower measuring range limit set at the beginning of the configuration menu.
A.del only at outP = RL.F1, 2P.RL, RL.F2	Alarm delay	
	$0 \dots 9999$	The set value is the alarm delay in seconds. The alarm case has to last for the set time to trigger the alarm.

After having set and confirmed the last point (depending on the selected output function) the configuration is done.

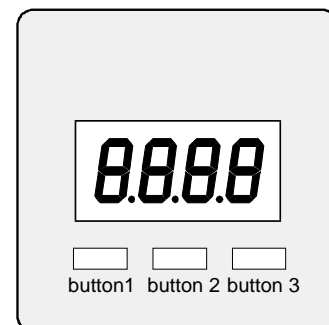
Press **button 1** one more time after the input of the last parameter to close the configuration menu. The devices re-starts (segment test).

8 Offset and slope adjustment

The offset and slope-adjustment function can be used for compensating the tolerance of the used sensor, resp. for vernier adjustment of the used transducer / transmitter.

Follow these instructions to run the offset and slope adjustment of the device:

- Press **button 3** for 2 seconds during actual value display, „OFFS“ is displayed.
- Set parameter value with **button 2** and **button 3**.
- Save the set with **button 1**, the parameter name is displayed again.
- Proceed to the next parameter with **button 1**, the name of that parameter is displayed.



Parameter	Value	Description
Button 1	Button 2 and 3	
OFFS	Offset	
	-5.00 ... 5.00	The offset in digit The set offset value is subtracted from measured value.
ScAL	Scale	
	-5.00 ... 5.00	The scale in %. The displayed value is calculated according to the following formula: Display = (measured value - offset - di.Lo) * (1 + slope adjustment [% / 100]) + di.Lo

Example for offset and slope adjustment:

Connection of pressure transmitter.

The device displays without offset and slope adjustment: at 0 bar = 0.08, at 20 bar = 20.02

From this calculated:

offset:	0.08
slope:	$20.02 - 0.08 = 19.94$
difference:	0.06 (= ideal slope - actual slope = 20.00 - 19.94)

Therefore this values should be set:

offset =	0.08
scale =	0.30 (= difference / actual slope = 0.06 / 19.94 = 0.0030 = 0.30%)

9 Min-/max- value memory

The device features a minimum/maximum-value storage. In this storage the highest and lowest performance data is saved.

Calling of the minimum value:

Press button 3 shortly: the device will display "Lo" briefly, after that the min-value is displayed for about 2 sec.

Calling of the maximum value:

Press button 2 shortly: the device will display "Hi" briefly, after that the max-value is displayed for about 2 sec.

Erasing of the min/max values:

Press button 2 and 3 for 2 sec.: The device will display "CLr" briefly, after that the min/max-values are set to the current displayed value.

10 Error Codes

When detecting an operating state which is not permissible, the device will display an error code. The following error codes are defined:

Err.1: Exceeding of measuring range

Indicates that the valid measuring range of the device has been exceeded.

Possible causes: - Input signal to high

Remedies: - The error-message will be reset if the input signal is within the limits.
- Check transmitter and device configuration (e.g. input signal).

Err.2: Values below measuring range

Indicates that the values are below the valid measuring range of the device.

Possible causes: - Input signal is to low or negative

Remedies: - The error-message will be reset if the input signal is within the limits.
- Check transmitter and device configuration (e.g. input signal).

Err.3: Display range has been exceeded

Indicates that the valid display range (9999 digit) of the device has been exceeded.

Possible causes: - Incorrect scale

Remedies: - The error-message will be reset if the display value is below 9999.

Err.4: Values below display range

Indicates that display value is below the valid display range of the device (-1999 digit).

Possible causes: - Incorrect scale

Remedies: - The error-message will be reset if the display value is above -1999.

Err.7: System error

The device features an integrated self-diagnostic-function which checks essential parts of the device permanently. When detecting a failure, error-message Err.7 will be displayed.

Possible causes: - Actual temperature is below / above the valid temperature range
- Device defective

Remedies: - Stay within valid temperature range
- Exchange the defective device.

Er.11: Value could not be calculated

Indicates a measuring value, needed for calculation of the display value, is faulty or out of range.

Possible causes: - Incorrect scale

Remedies: - Check settings and input signal

11 Specifications

Input signal:	0 ... 10V (3-wire)
Input resistance:	approx. 100 kOhm
max. permissible input:	15 V
Supply voltage:	12 - 28 V
Supply current:	< 10 mA
Display:	approx. 10 mm high LCD-display
Display range:	limits freely adjustable
Max. display value:	9999 digit
Min. display value:	-1999 digit
Recommended range:	≤ 2000 digit
Decimal point:	any position
Accuracy: (at 25°C)	< 0.2% ±1 digit
Temperature drift:	< 100 ppm / K
Measuring rage:	approx. 5 measurements / second
Filter:	adjustable
Operation:	via 3 buttons (at ..VO and ..WK the cover has to be removed)
Min-/max-value memory:	callable via buttons
Nominal temperature:	25 °C
Working conditions:	-20 ... 50 °C, 0 ... 80 % (non condensing)
Connection: GIA ... VO...	special-adapter design for cubic plug according to EN 175301-803 A (ex. DIN43650 A) simple plug-in. 2 screws (68 and 75 mm) included in scope of supply (needed length depends on height of cubic plug)
	GIA ... WK... 2- or 3- respect. 4- or 5-wire cable, approx. 2 m long
Housing:	ABS, front screen made of polycarbonate and plastic foil keyboard approx. 48.5 x 48.5 x 35.5 mm (L x W x H) without cubic plug and cable gland approx. 50.5 x 90 x 39.5 mm (L x W x H) with cubic plug
Protection rating: GIA ... VO...	IP65 (when cubic plug mounted appropriately)
	GIA ... WK... IP65 (IP00 for open cable ends of connection cable)
EMC:	The device corresponds to the essential protection ratings established in the Regulations of the Council for the Approximation of Legislation for the member countries regarding electromagnetic compatibility (2004/108/EG). In accordance with EN61326-1 (table 2, class B), additional fault: < 1% FS When connecting long leads adequate measures against voltage surges have to be taken.
at option -S2 additional:	
Switching functions:	2 electrically isolated open-collector switching outputs
Switch. points, hysteresis:	freely adjustable
Switching voltage:	max. 28 V
Switching current:	max. 1 A <i>Please note: switching output is not short-circuit proof</i>
Response time:	≤ 250 ms
Connection (output):	separate M8-socket