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GREISINGER

Member of GHM GROUP

Installation and operating manual

Universal display for 4-20 mA - transmitter

GIA 0420 VO(T)
GIA 0420 WK(T)
GIA 0420 M12(T)

ab Version 1.0

GIA 0420 VO

GIA 0420 WKT

GIA 0420 M12T

CE

☞ Please read these instructions carefully before use!

☞ Please consider the safety instructions!

☞ Please keep for future reference!

Made in Germany

WEEE-Reg.-Nr. DE 93889386

GHMGROUP
Specialists by Competence.

GHM GROUP - Greisinger
GHM Messtechnik GmbH | Hans-Sachs-Str. 26 | 93128 Regenstauf | GERMANY
Tel.: +49 9402 9383-0 | info@greisinger.de | www.greisinger.de

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1 General note

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

2 Designated Use

2.1 Intended Use

The GIA 0420 VO(T), GIA 0420 M12(T) and GIA 0420 WK(T) are microprocessor controlled display devices for 4..20 mA input signals.
They do not require an auxiliary voltage source but can be supplied directly from the measuring current.

The GIA 0420 … is designed for the connection of any measuring transducers (with a 4 to 20 mA output).
The maximum connection values (please refer to specification) must be observe.

Only technically qualified persons are permitted to carry out installation, commissioning, operation and decommissioning. The qualified personnel must have carefully read and understood the operating manual before beginning any work.

This device must not be used at potentially explosive areas, as safety or emergency stop devices or in any other application where failure of the product could result in personal injury or material damage.
This device must not be used at a patient for diagnostic or other medical purpose

The liability and warranty of the manufacturer for damages and consequential damages are voided with misuse, disregard of this operating manual, assignment of inadequately qualified technical personnel and arbitrary modifications of the product.

2.2 Safety signs and symbols

Warnings are labelled in this document with the followings signs:

Caution!
This symbol warns of imminent danger, death, serious injuries and significant damage to property at non-observance

Attention!
This symbol warns of possible dangers or dangerous situations which can provoke damage to the device or environment at non-observance.

Note!
This symbol point out processes which can indirectly influence operation or provoke unforeseen reactions at non-observance.

2.3 Skilled personnel

are persons who are familiar with the set-up, installation, commissioning and operation of the product and have appropriate qualification for their work. For example:

- Training or instruction and/or authorisation, power circuits and devices/systems in accordance with the standards of safety for activation, deactivation, disconnection, earthing and identification.
- Training or instruction in accordance with the standard of safety technology for care and use of suitable safety equipment.

2.4 Safety guidelines

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 advises given in this manual will be adhered to when using the device.

1. 

Install the displaying device according to the manufacturer's specifications and the valid standards and regulations.

2. 

Modifications or repairs of the device may not be performed by the customer.
For maintenance or repair the device must be sent to the manufacturer.

3. 

To configure GIA 0420 VO, GIA 0420 WK and GIA 0420 M12 the cover has to be carefully removed to get access to the needed buttons. Exposed parts must not be damaged!
This has to be done only by trained personnel and with consideration of adequate ESD safety precautions.
Take care to insert the sealing correctly when reassemble the cover.

4. 

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”.

5. 

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.

6. 

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.

7. 

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.

8. 

This device must not be used at potentially explosive areas!

9. 

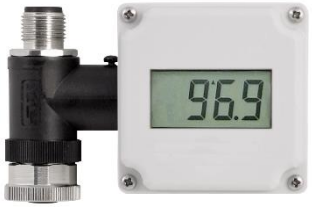
This device must not be used at a patient for diagnostic or other medical purpose.

3 Product description

3.1 Scope of supply

- display device
- each 1 erection crew M3 x 68, M3 x 75 (only for GIA 0420 VO..)
- mounting and operating manual

3.2 Design types

GIA 0420 VO	GIA 0420 WK	GIA 0420 M12
		

GIA 0420 VOT	GIA 0420 WKT	GIA 0420 M12T
		

3.3 Function description

The GIA 0420 VO(T), GIA 0420 WK(T) and GIA 0420 M12(T) are microprocessor controlled display devices.

The different design types of the device have an input for:
- standard signal 4 – 20 mA

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

The GIA 0420 … is designed for the connection of any measuring transducers (with a 4 to 20 mA output).
This design type doesn't need an auxiliary supply as it is supplied by the measuring current.

The option "**S2**" provides 2 additional switching outputs (NPN-output) that can be configurated as 2-point-controller, 3-point-controller, 2-point-controller with min/max alarm or as min/max alarm (separate or together).
The states of the switching outputs are displayed with 2 arrows at the upper edge of the 7-segment display.

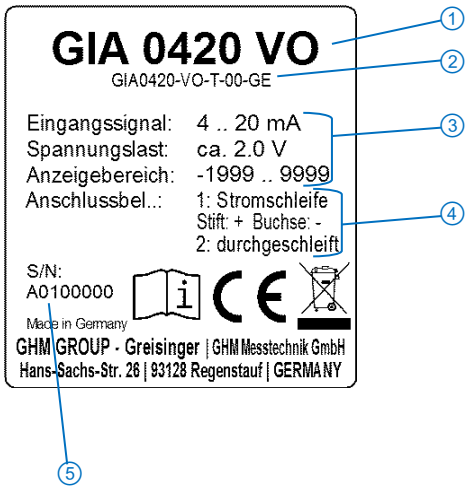
Parameter and limit values are entered via three keys which are accessible after removal of the cover (design type VO, WK and M12).
Devices of the design type VOT, WKT and M12T have that keys freely accessible at top of the device.

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.

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

3.4 Identification

Examples for type plates



① Device type

② Variante code

③ Information to measuring input (refer to chap. 11)

④ Information to assignment (refer to chap. 4)

⑤ Serial number

Disposal note (refer to chap.10.2)

lease refer to manual:
Read the mounting- and operating manual carefully, before you connect and use the device.

3.5 Display and operating elements

Display fort he state oft he switching output 1

Display fort he state oft he switching output 2

Main display

SET 1	Button 1, >2s:	activates menu "switching points ..." (refer to chap.6) *(only available for devices with option S2)*
	In menu:	**save value or step** to next parameter
▲ 2	Button 2, short	display max. value
	Button 2, >2s:	activates configuration menu (refer to chap.5)
	Button 2 + 3, >2s:	reset min-/max. value
	In menu:	press short= increase value.
		press long = roll-function with overflow-function.*)
▼ 3	Button 3, short	display min. value
	Button 2, >2s:	activates offset/slope menu " (refer to chap. 7)
	Button 2 + 3, >2s:	reset min-/max. value
	In menu:	press short= increase value.
		press long = roll-function with overflow-function.*)

*) *The input is made with the buttons 2 and 3. When pressing the button once the value will be raised (button 2) by one or lowered (button 3) by one.*
When holding the button pressed for longer than 1 sec. the value starts counting up or down, the counting speed will be raised after a short period of time.
The device also features a 'overflow-function', when reaching the upper limit of the range, the device switches to the lower limit, vice versa.

4 Electric connection

4.1 GIA 0420 WK(T)

The connection of the GIA 0420 WK occurs via 2-wire connection cable.

Supply voltage: device takes power from measuring current

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!
! Mind the maximum input current rating of 40mA under any circumstances !

4.1.1 Terminal assignment

connection number	wire colour	GIA 0420 WK(T)
1	white	signal +
2	brown	signal -

4.2 GIA 0420 VO(T)

To connect the GIA 0420 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: device takes power from measuring current

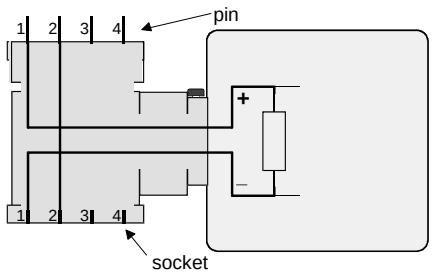
Electric connection and commissioning of the device must be carried out by trained and skilled personnel.
Wrong connection may lead to the destruction of the display device, in which case we cannot assume any warranty!
! Mind the maximum input current rating of 40mA under any circumstances!

4.2.1 Assignment of the angle-type plug

Standard assignment of the angle-type plug:

contact number	wire colour (socket contact)	GIA 0420 VO(T)	
		pin	socket
1	grey	GIA.. +	GIA.. -
2	red	connected	
3	--	n.c.	n.c.
4 (⏚)	--	n.c.	n.c.

n.c. = non connected



assignment of GIA 0420 VO(T) – ex (standard)

4.2.2 Adjustment of the connections of the GIA 0420 VO(T):

Pin 2 of the elbow-type plug is directly connected with the socket.
The GIA 0420 VO(T) is between pin 1 (+) and socket contact 1 (-).

If the '*Signal/GND*'-line in your transmitter is not assigned to contact 2 and if the '*-Ub*'-line is not assigned to contact 1, please do not forget to adjust the GIA..-angle-type plug and the external angle-type plug accordingly:

To do so open the GIA..-angle-type plug (refer to the “general instructions for change ....” on the next page) and exchange the wire of contact 1 and contact 2 against the wire of the contact representing the connection in your transmitter. Then exchange and rewire the two contacts in the angle-type plug of your connecting cable.

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).

4.3 GIA 0420 M12(T)

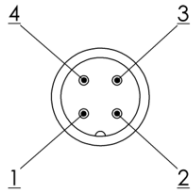
The connection of the GIA 0420 M12 is simply done by plugging in the instrument on an existing transmitter by means of the adapter construction for 4-pole M12-A and fixing the screw locks.

Supply voltage: device takes power from measuring current

Electric connection and commissioning of the device has to 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!
! Mind the maximum input current rating of 40 mA under any circumstances !

4.3.1 Assignment of the M12 Connectors

Pls. have in mind that there are existing different versions of the pin assignment of M12-A connectors and therefore different variants of the GIA 0420 M12(T) are available:



view to pin contacts

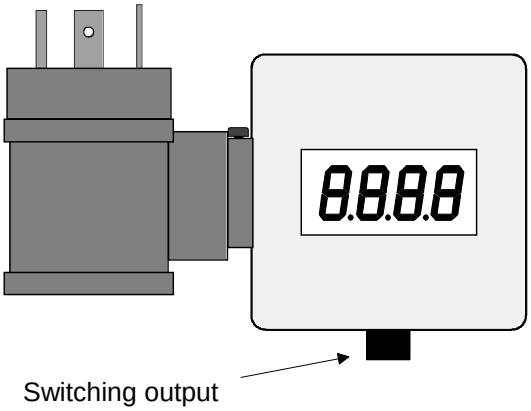
contact number	Device variant					
	… - 12		… - 13		… - 24	
	pin	socket	pin	socket	pin	socket
1	GIA.. +	GIA.. -	GIA.. +	GIA.. -	n.c.	n.c.
2	connected		n.c.	n.c.	GIA.. +	GIA.. -
3	n.c.	n.c.	connected		n.c.	n.c.
4	n.c.	n.c.	n.c.	n.c.	connected	

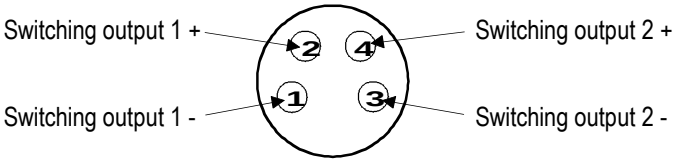
n.c. = non connected

ATTENTION

Pls. remind that when using shielded connection cables the adapter construction has no shield connection. If a shield is connected via the screw of a connection cable, it is not carried through the instrument. The shielding connection is cut by plugging in the instrument.

4.4 Assignment of switching outputs (at option S2)



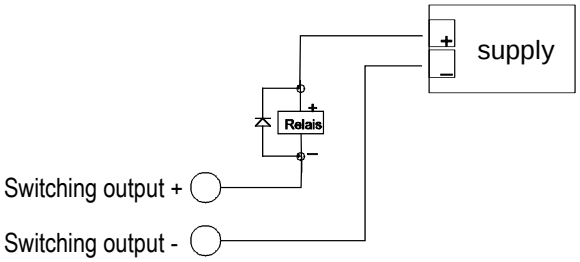


Assignment of connection cable EBK401:

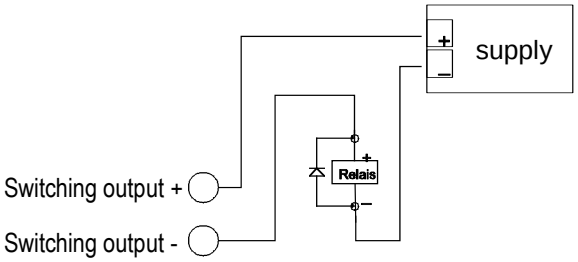
1 - brown = switching output 1 -
2 - white = switching output 1 +
3 - blue = switching output 2 -
4 - black = switching output 2 +

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.

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



Assignment as low-side switch



Assignment as high-side switch

4.5 Adjusting the display orientation

The flexible adjustable display orientation is a key feature of the instruments

4.5.1 Adjusting the display of plug in variants

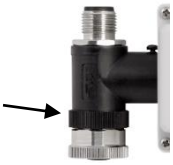
The cable adaptor construction can be turned 340° against the display orientation.

ATTENTION ***Do not use force against the endpoints, which are limiting the turning angle, otherwise there may be damage to the internal cabling!***

Furthermore, there is the possibility to change the orientation of the connector blocks in the adapter construction

GIA 0420 VO(T): The connector block can be turned in 90° steps 360°,
for this please refer to 4.2.2 Adjustment of the connections of the GIA 0420 VO(T):

GIA 0420 M12(T) The connector block can be turned in 45° steps 360°,
for this please
- dismantle the black fastening nut of the adaptor
- pull connector block out straight until you are able to turn it
  (do not pull further – this may harm the cabling)
- turn the block carefully to the desired orientation
- remount the block and tighten the fastening nut again



4.5.2 Adjusting orientation of display in the housing

All variants have the possibility of adjusting the LCD module within the housing in 90° steps.

ATTENTION ***This only has to be done with disconnected device!***

ATTENTION ***This has to be done only by trained personnel and with consideration of adequate ESD safety precautions. The touchable components are not to be damaged!!***
Take care to insert the sealing correctly when reassemble the cover.

Procedure:

- dismantle the 4 housing screws and lift of the lid
- take out PCB carefully, best using the LCD as a grip and turn to the desired orientation. Reinsert PCB.
- check the sealing and its correct position in the housing, mount the lid and screw in the 4 housing screws with care: Avoid to high force, otherwise the housing may be damaged

5 Configuration

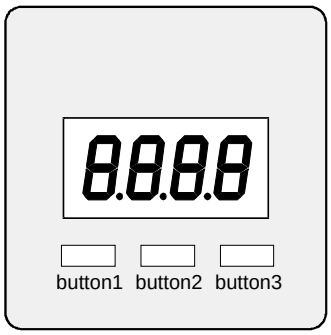
Note: ***To configure GIA 0420 VO, GIA 0420 WK and GIA 0420 M12 the cover has to be removed carefully to get access to the needed buttons.***
Take care of adequate ESD safety precautions to prevent damage to the exposed parts!

Please note: measuring current should be at least 4 mA during configuration!

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
di .Lo	**Lower display range limit (display low)**	
	-1999 … 9999	This value is displayed for input signal = 4mA.
di .Hi	**Upper display range limit (display high)**	
	-1999 … 9999	This value is displayed for input signal = 20mA.
Li	**(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. *e.g. humidity: when shortfalling or exceeding, the device will display 0% or 100%.*
	<u>Note:</u> 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 *3,7 and 20,8 mA.*	
FILt	**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 <u>without option “switching output</u>”. Press **button 1** one more time after the input of the last parameter to close the configuration menu. The devices restarts (segment test).

5.1 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**	
	no	No output, device used as display
	2P	2-point-controller (output 1)
	AL.F1	Min- / max- alarm, together (output2, inverted)
	3P	3-point-controller (output 1 and output 2)
	2P.AL	2-point-controller (output 1) with min- / max- alarm (output 2, inverted)
	AL.F2	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 only at outP = 2P, 3P, 2P.AL	**Switch-on point of output 1**	
	di.Lo … di.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.AL	**Switch-off point of output 1**	
	di.Lo … di.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.

1.dEL only at outP = 2P, 3P, 2P.AL	**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.AL	**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**	
	di.Lo … di.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**	
	di.Lo … di.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).
AL.Hi only at outP = AL.F1, 2P.AL, AL.F2	**Max-alarm point**	
	AL.Lo … di.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.
AL.Lo only at outP = AL.F1, 2P.AL, AL.F2	**Min-alarm point**	
	di.Lo … 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 = AL.F1, 2P.AL, AL.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).

6 Selection of switching and alarm points

Only at option switching output (GIA 0420 … / 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)

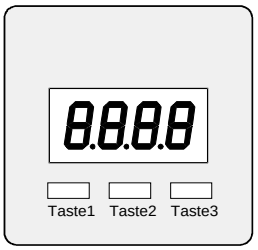
Depending on the selected output function different parameters have to be adjusted.
The configuration menu automatically skips parameters not needed for the selected output function.

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.AL	**Switch-on point of output 1**	
	di.Lo … di.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.AL	**Switch-off point of output 1**	
	di.Lo … di.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**	
	di.Lo … di.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**	
	di.Lo … di.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 = AL.F1, 2P.AL, AL.F2	**Max-alarm point**	
	AL.Lo … di.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.
AL.Lo only at outP = AL.F1, 2P.AL, AL.F2	**Min-alarm point**	
	di.Lo … 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 = AL.F1, 2P.AL, AL.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.

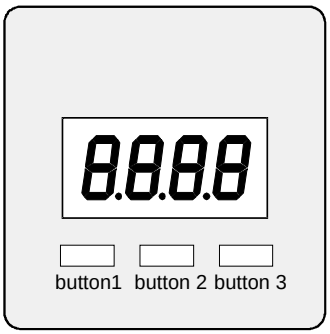
Press **button 1** one more time after the input of the last parameter to close the configuration menu. The devices restarts (segment test).

7 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%)*

8 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.

9 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
- Sensor shorted (at 0(4)-20mA)

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
- Current below 4mA
- Sensor broken (at 4-20mA)

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

10 Decommissioning, reshipment and disposal

10.1 Reshipment

All devices returned to the manufacturer have to be free of any residual of measuring media and other hazardous substances. Measuring residuals at housing or probe may be a risk for persons or environment.

Use an adequate transport package for reshipment, especially for fully functional devices. Please make sure that the device is protected in the package by enough packing materials.

10.2 Disposal instructions

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.

11 Specifications

Input signal:		4 ... 20 mA (2-wire)
Voltage load:		approx. 2.0 V (at option S2: approx. 3V)
max. permissible input:		25 mA (40 mA short time)
Supply current:		from current loop
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, ..M12 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 %RH (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
	GIA … M12 …	special adapter design for 4-pin M12-A plug connector, for simple intermediate connection
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 approx. 50.5 x 80 x 39.5 mm (L x W x H) with M12 adapter design
Protection rating:	**GIA … VO…**	IP65 (when cubic plug mounted appropriately)
	GIA … WK…	IP65 (IP00 for open cable ends of connection cable)
	GIA … M12…	IP65 (when adapter mounted appropriately)
Directives and standards:		The instruments confirm to following European Directives: 2014/30/EU EMC Directive 2011/65/EU RoHS Applied harmonized standards: EN 61326-1 : 2013 emissions level: class B emi immunity according to table 2 Additional fault: <1 % *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 *Please note: switching output is not short-circuit proof*
Response time:	≤ 250 ms
Connection (output):	separate M8-socket