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IMTRON
Member of GHM GROUP

English

Operating manual

SensorSimulator
GHM-SIM -1
GHM-SIM-1F

Company / brands of GHM

Members of GHM GROUP
GREISINGER
HONSBERG
Martens
IMTRON
DeltaOHM

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Save for later reference.

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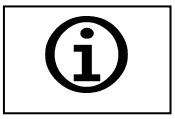
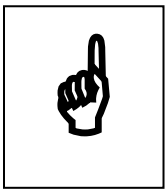
1 Intended use (areas of application)



Refer to the chapter 'Product description' for detailed specifications for the area of application.

The operational safety of the device is only assured when used as intended in accordance with the specifications in the operating manual.

Intervention beyond the actions described in the operating manual may only be carried out by personnel authorised by the manufacturer for safety and warranty reasons. Conversions or modifications made on one's own authority are expressly prohibited.



Application-specific dangers can emanate from this device when used improperly or not as intended.

The device is **not** intended for use in explosion-prone areas and safety-related system parts in accordance with SIL.

General safety instructions, use

This operating manual must be kept in a location such that qualified personnel can refer to it at all times.

Any processes described in this operating manual may only be carried out by trained, qualified personnel who are authorised by the owner and wearing protective clothing. All rights reserved.

1.1 Safety signs and symbols

Warning notices are identified in this document as described below:

 **DANGER**	Warning! This symbol warns of imminent danger which can result in death, severe bodily injury, or severe property damage in case of non-observance.
	Attention! This symbol warns of potential dangers or harmful situations which can cause damage to the device or to the environment in case of non-observance.

ⓘ	Note! This symbol indicates processes which can have a direct influence on operation or can trigger an unforeseen reaction in case of non-observance.

1.2 Safety instructions

Read the product description before commissioning the device. Ensure that there are no limitations for use of the product for the relevant applications.

The owner is responsible for ensuring the fault-free operation of the device. The owner is obligated to ensure compliance and to observe the required work and safety measures of the current applicable regulations for the entire duration of use.

The protective devices supported by the device can be impaired if the device is not used as specified.

1.3 Product liability and warranty

Exclusion of liability:

The contents of the operating manual have been checked to ensure conformity with the described device. However, deviations cannot be entirely ruled out. Therefore, we cannot assume any guarantee for complete conformity. The specifications in this document are checked regularly and any necessary corrections are incorporated into subsequent versions. This document is subject to technical changes. In addition, all claims are based on the valid 'Standard Terms for the Supply of Products and Services of the Electrical Industry'.

2 Product description

The GHM SensorSimulator emits various current and voltage signals. With the additional return measurement of feed voltages and currents of the connected measuring amplifier, the GHM SensorSimulator can also optimally simulate sensors such as PT100 and strain gauge sensors true to the original. It can be used to calibrate and check indicators, sensors or transducers or entire measured sections. Voltages and currents can also be measured with the device.
The device fulfils the test requirements for portable test and measuring devices and is designed for rechargeable battery operation.

2.1 Scope of delivery

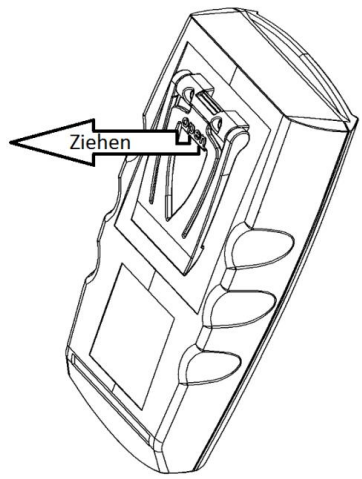
- SensorSimulator (GHM-SIM-1) with Li-ion battery
- Mains connector with Micro USB plug connector
- Adapter cable
- Operating manual

3 Operation

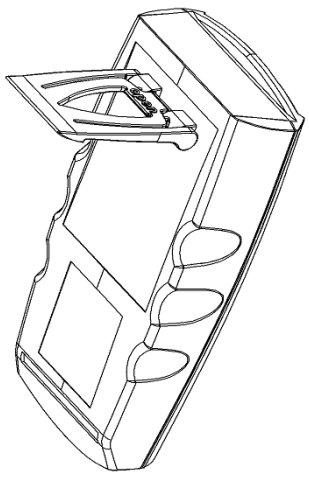
3.1 Support stand

Function:

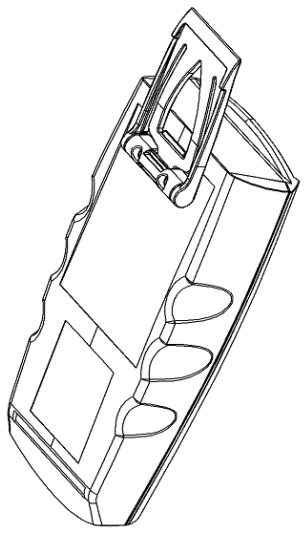
- Pull the support stand at the ‘open’ marking in order to fold out the stand.
- Pull the support stand at the ‘open’ marking again in order to fold out the stand to the next position.



Support stand closed

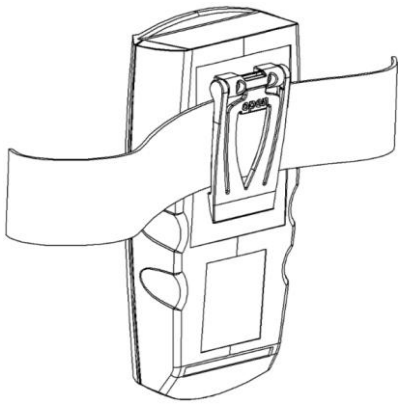


Support stand in 90° position



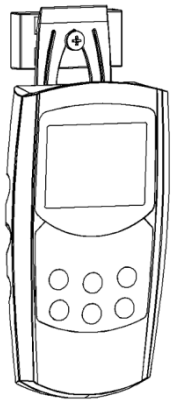
Support stand in 180° position

- The device can lay flat on a table with the support stand closed or it can be hung on a belt, etc.
- The device can be placed in a raised position on a table or similar surface with the support stand in the 90° position.
- The device can be hung on a screw or GMH 1300 magnetic holder with the support stand in the 180°.



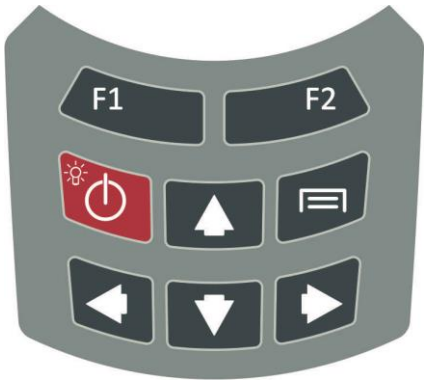
Device hung on a belt

Device in the raised position on a table



Device hung on the GMH 1300 magnetic holder

3.2 Controls



ON/OFF switch, light
Press briefly: Switch on the device
and/or activate the lighting
Press and hold: Switch off the device

Menu:
Currently has no function.

Up / Down:
For navigation in the selected menu.
To change values in the selected menu.

Left / Right:
Selection of the value position.

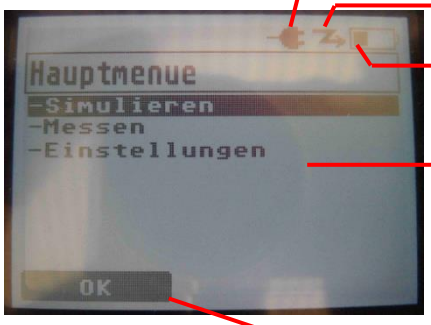
F1 (context function):

1. Select the selected menu item.
2. Confirmation of the adjusted value.
3. Exit the current menu item and return to the main menu

F2 (context function):

1. Cancel the current menu item and return to the previous menu.
2. Enabling of adjustment possibility

3.3 LC display of the main menu



Display of the mains operation

Charge display

Charge status display

Menu/menu item

Function

3.4 Connection

Micro USB socket: Voltage supply of the battery charge function

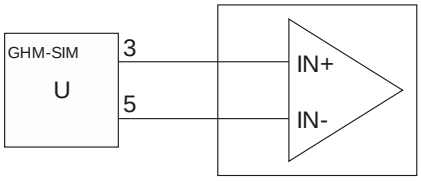
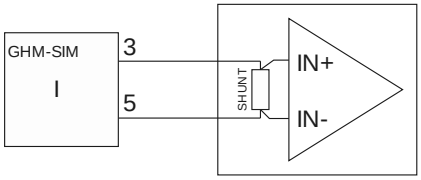
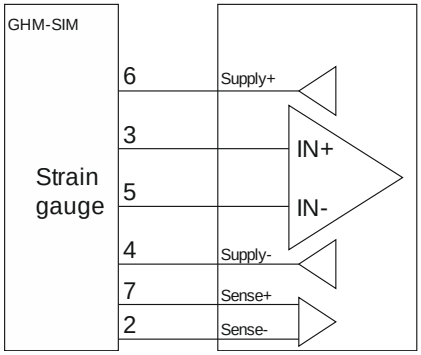
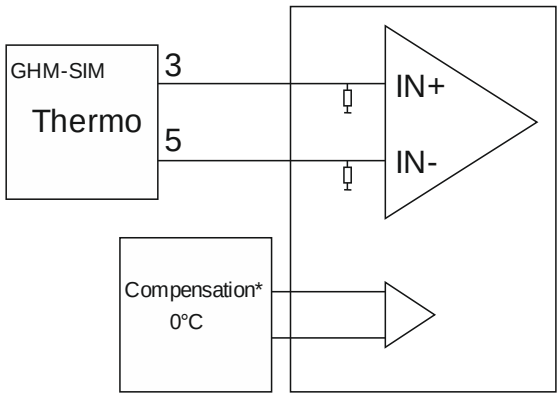
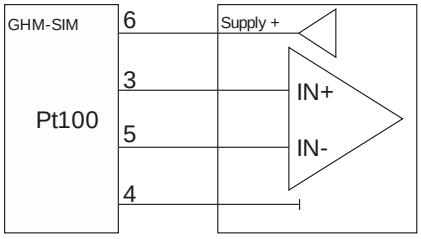
BINDER socket: Connection for the output and input signals

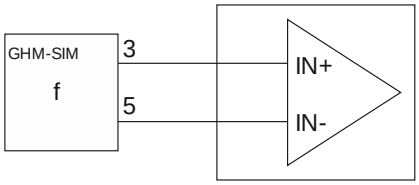
Mating plug connector:
BINDER series 680 Art. no.: 09 0325 09 07

Assignment of the BINDER socket:

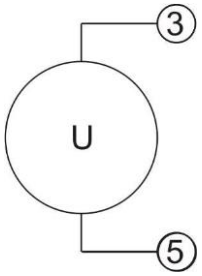
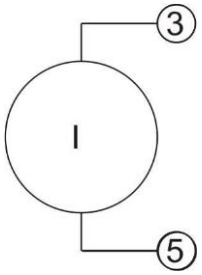
1 - not assigned	
2 - Sense -	(output)
3 - Signal +	(input/output)
4 - Supply voltage -	(input)
5 - Signal -	(input/output)
6 - Supply voltage +	(input)
7 - Sense +	(output)

3.5 Connection diagrams for simulation

Voltage	
Current	
Strain gauge	
Thermocouple * Compensation point 0 ° C does not apply to the use of the compensation point with internal temperature measurement, here the measured value is used	
Pt100	

Frequency	

3.6 Connection diagrams for measuring

Voltage	
Current	

4 Commissioning

Switch on the device with the  button.

The device briefly displays the greeting screen with information about its hardware version. Then the device displays the main menu and is ready for operation.

Press and hold the  button for at least 3 seconds to switch off the device.

4.1 Menu structure

Main menu

|- Simulate

- |- Voltage
- |- Current
- |- Strain gauge
- |- Thermocouple
  - |- Thermocouple type K
  - |- Thermocouple type S
  - |- Thermocouple type N
  - |- Thermocouple type J
- |- Pt-100
- |- Frequency

|- Measure

- |- Voltage
- |- Current

|- Settings

- |- Language
  - |- German
  - |- English
- |- Backlight
  - |- Auto Off
  - |- On

|- Off
|- Auto Standby
|- On
|- Off
|- TC Ref. temperature
|- Measured
|- Always 0°C

4.2 Function call-up

Select the desired menu entry with the  and  buttons.

Activate the selected menu entry with the 

button = OK.

4.3 Settings

Most possibilities for settings are self-explanatory with the relevant menu item.

Details for the following settings are provided below:

Menu item	Meaning
Lighting → Auto Off	Lighting is dimmed after approx. 3 seconds if no operation takes place. The lighting is switched off after an additional approx. 30 seconds. This function is activated with ‘On’. This function is deactivated with ‘Off’.
Auto Standby	The device is switched off after approx. 45 minutes if no operation has taken place. This function is activated with ‘On’. This function is deactivated with ‘Off’.

4.4 Instructions for use

Strain gauge
In the simulation mode Strain Gauge, a tare has to be executed for the correct function. For this, the value 0.0 mV / V has to be set and the tare function of the connected device (display, measuring transducer etc.) has to be executed.

Thermocouples
A compensation point must be connected for the correct simulation. Alternatively, a compensation point with internal temperature measurement can be used. The setting can be found in the "Settings" menu item.

4.5 Change output values

The output values can be changed in the simulation functions.
In the Simulate → voltage and current menu items, the values to be output can be freely adjusted within the specified limits.

Select the desired value position with the  and  buttons.

Adjust the desired value with the  and  buttons.

The values can only be adjusted in fixed increments with the simulation modes Strain gauge, Thermocouple Type K and PT100 (see table).

Simulation type	**Range**
Voltage output, freely selectable (up to 2 decimal places)	± 10.00 *V*
Current output, freely selectable (up to 1 decimal place)	± 25.0 *mA*
Strain Gauge	± 0.0 *mV/V* ± 0.5 *mV/V* ± 1.0 *mV/V* ± 2.0 *mV/V* ± 4.0 *mV/V* ± 5.0 *mV/V* ± 10.0 *mV/V* ± 25.0 *mV/V* ± 50.0 *mV/V*
Thermocouple (Simulation values based on a compensating point of 0°C. Alternatively, a compensation point with internal temperature measurement can be used. Upper and lower simulation range limits depending on type of thermocouple.)	-100 °*C* to 100 °*C* in 10 °*C* steps, 100 °*C* to 500 °*C* in 25 °*C* steps, 500 °*C* bis 1000/1250/1600 °*C* in 50 °*C* steps
Pt100	-100 °*C* bis 100 °*C* in 10 °*C* steps, 100 °*C* bis 500 °*C* in 25 °*C* steps, 500 °*C* bis 850 °*C* in 50 °*C* steps

Frequency *(optional)*	1 *Hz* .. 500 *kHz* (steps: 1 .. 10 *Hz*: 1 *Hz* 10 .. 100 Hz: 10 *Hz* 100 *Hz* .. 1 *kHz*: 100 *Hz* 1 .. 10 *kHz*: 1 *kHz* 10 .. 100 *kHz* 10 *kHz* 100 .. 500 *kHz*: 100 *kHz*)

The adjusted value is adopted/output when the value change is confirmed with

= OK.

An additional change of the value is only possible after pressing the

= Adjust button.

4.6 Voltage and current measurement

In the menu items Measure → voltage or current, both physical variables can be measured.

Measuring type	**Measuring range**
Voltage (up to 2 decimal places)	± 30.00 *V*
Current (up to 1 decimal place)	± 30.0 *mA*

5 Technical data

General	
Accuracy	See Simulation and Measure
Connection	7-pol. Binder socket for Signal In- and Output Micro-USB for Supply voltage and charging
Display	Graphic-LCD, monochrome, (180 x 128 Pixel) adjustable backlighting
Operation	Keypad
Languages	German, English
Dimensions	160 x 86 x 37 mm (H x W x D)
Weight	250g (incl. Accu)
Supply voltage	5 V DC (Micro-USB)
Accu	Lithium-Ion
Ambient temperature	0..+50 °C

Simulation		
Voltage	Simulation Range	± 10 V
	Accuracy	± 1 %
Signal Current	Simulation Range	± 25 mA
	Accuracy	± 1 %
Strain Gage	Simulation Range	0, 0.5, 1, 2, 4, 5, 10, 25, 50 mV/V
	Accuracy	± 1 %
	Supply	2,5 V, 5 V, 10 V
Thermo-couple, Type K **(Others opt.)**	Simulation Range	-100..+1000 °C (-100 .. 100 °C: 10°C steps 100 .. 500 °C: 25°C steps 500 .. 1000 °C: 50°C steps)
	Accuracy	simulated compensation: ± 1%; internal temperature measurement: ± 3 K
Thermo-couple, Type J **(Others opt.)**	Simulation Range	-100..+1000 °C (-100 .. 100 °C: 10°C steps 100 .. 500 °C: 25°C steps 500 .. 1000 °C: 50°C steps)
	Accuracy	simulated compensation: ± 1%; internal temperature measurement: ± 3 K
Thermo-couple, Type N **(Others opt.)**	Simulation Range	-100..+1250 °C (-100 .. 100 °C: 10°C steps 100 .. 500 °C: 25°C steps 500 .. 1250 °C: 50°C steps)
	Accuracy	simulated compensation: ± 1%; internal temperature measurement: ± 3 K

Thermo-couple, Type S **(Others opt.)**	Simulation Range	-50..+1600 °C (-50 .. 100 °C: 10°C steps 100 .. 500 °C: 25°C steps 500 .. 1600 °C: 50°C steps)
	Accuracy	simulated compensation: ± 1%; internal temperature measurement: ± 3 K
Pt100	Simulation Range	-100..+850 °C (-100 .. 100 °C: 10°C steps 100 .. 500 °C: 25°C steps 500 .. 850 °C: 50°C steps)
	Accuracy	± 1 %
Frequency (Option F)	Simulation Range	1 Hz .. 500 kHz (Steps: 1 .. 10 Hz: 1 Hz 10 .. 100 Hz: 10 Hz 100 Hz .. 1 kHz: 100 Hz 1 .. 10 kHz: 1 kHz 10 .. 100 kHz 10 kHz 100 .. 500 kHz: 100 kHz)
	Level (adjustable)	± 10 V
	Accuracy	± 1 %

Measure		
Voltage	Simulation Range	± 1 %
	Accuracy	± 0,5 %
Current	Measuring Range	± 30 mA
	Accuracy	± 0,5 %

Only batteries of the same type are permitted (NITECORE NL147) for replacement!
The rechargeable battery has integrated over-charge and discharge protection!
Disregard entails a risk of fire!

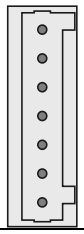
6 Order number

6.1 Basic device

SIM-SenSim-1 [ ] 1.

1.	Option		Order number
		No Option	201164
	F	Frequency output	201366

6.2 Accessoires

Name	Description	Order number
SIM-SenSim-KAB	Adapter cable for SIM-SenSim-1 7-pol. Binder on 7-pol. Wago-clamp (Supplied with the unit)	201367
	Pinning 1 2 3 4 5 6 7  1 - nc 2 - Sense – 3 - Signal + 4 - Supply voltage – 5 - Signal - 6 - Supply voltage + 7 - Sense +	
SIM-SenSim-KAB-BNC	Adapter cable for SIM-SenSim-1 7-pol. Binder on BNC connector Suitable for simulation of voltage, current, frequency and measurement of voltage, current	201337
SIM-SenSim-BANBOX	BreakOutBox with 7 banana jacks for connection to SIM-SenSim-KAB adapter cable	201368
SIM-SenSim-Case	Case for GHM-SenSim-1 and accessories (340 x 275 x 83 mm)	201378
SB-BS7-3..6	7 pin Binder connector Suitable for SIM-SenSim for the self-assembly of connecting cables	200448

7 Maintenance and service

7.1 Maintenance

There is no special maintenance work required for the device.

When cleaning, it must be ensured that the surface of the housing is not corroded by cleaning agents.

7.2 Service

There is no special service work required for the device.

The device must only be repaired by trained personnel in case of a defect.

7.3 Device transport and storage

Gentle and tension-free packaging of the device must be ensured for transport.

The device must be stored in the environmental conditions specified in the technical data.

8 Return to manufacturer

The legal regulations for environmental protection and our personnel require that devices which are sent back which have come into contact with liquid are handled without risk to people or the environment.

If you send a device back to us for inspection or repair, we must request that you strictly observe the following requirements:

On the GHM homepage under: 'Downloads/forms' a return shipment form can be downloaded.

The repair can be performed quickly and without call-back questions if:

1. a filled-in form is provided for each device,
2. the device has been cleaned and packaging which prevents damage to the device is used, and
3. a safety data sheet for the measuring medium is affixed to the outside of the package, if the device has come into contact with a critical substance.

9 Disposal

Separation by material and recycling of device components must take place when the device is disposed of. The valid legal regulations and directives applicable at the time must be observed.

The device may not be disposed of with household waste. If the device should be disposed of, return it to us with the return shipment form filled in. We will then arrange for the proper disposal.

10 Imprint

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11 History

REV.	DATE	AUTHOR	CHANGE / DESCRIPTION
V1.00	23/11/2016	F.Sauder	First issue
V1.04	17/03/2017	ThMa	Updated to latest changes
V1.05	15/04/2017	MaKl	Layout and Pictures
V1.06	19.04.2017	ThMa	Option Frequency added
V1.07	19.04.2017	FrSa	Assignment of accessory 201367 inserted Correction in “Connection diagrams for simulation”
V1.08	29.05.2017	ThMa	Thermocouple type J, N, S added, Point 3.5, 4.1, 4.4, 4.5 changed
V1.09	27.06.2017	ThMa	Added technical data

Operating manual template V1.00