

# GHM-GREISINGER



## INDUSTRIAL MEASUREMENT Measuring | Controlling | Regulating

*Product catalog*



# 2014



GHM-Greisinger plant



The **GREISINGER** location was founded in Regenstein on January 1, 1980 and has now been existing for over 30 years.

Our aim is the development and production of measuring and control equipment including suitable sensors. Production occupies a working area of approx. 2250 m<sup>2</sup>. More than 50 employees develop and produce our high-quality but for all that low priced devices using the most up-to-date development, production and inspection equipment.

The company owns a fully equipped screen cabin where EMC tests are performed already during the development of new products. Furthermore to mention is the 60 m<sup>2</sup> air-conditioned calibration lab for calibration and adjustment of e.g. temperature, pressure, humidity products.

For many applications, especially considering the ISO9000ff documented measurements are necessary. All our references can be traced back to national references and are permanently controlled. Most of our products also can be ordered with Calibration or DAKKS-DKD-Certificates to fulfill your quality requirements according to ISO9000.

## Quality Standard and Certification

Fair prices and high-quality products have made us a company to be reckoned with on the measuring device sector. Our development has been steadily going upwards for the past 30 years. Globally operating and well-known companies are now amongst our regular customers.

All our products are developed and produced in Germany - that is one reason for the high-quality standard of our products. Our quality management system is certified according to ISO 9001:2008 and additionally for potentially explosive atmospheres according to EN 13980:2002.

Products intended for use in explosive atmospheres have to comply the requirements of the Directive 94/9/EC („ATEX-directive“) since July 1, 2003. Development, production and marketing are certified according to Directive 94/9/EC since May 1, 2003.

Several products are already examined and certified according to the Directive 94/9/EC.



Dear customers,

Regenstauf, 2013

The GHM Group is keen to further strengthen the focus of their activities on market requirements. Therefore, in summer 2013, the companies Greisinger electronic, Honsberg Instruments, Martens Elektronik and Imtron Messtechnik consolidated to form the new GHM Messtechnik GmbH.

The companies concerned were brought together in 2009 and, today, the resulting GHM Group is an established supplier of the full range of measuring and control equipment components for industrial and laboratory use.

The company names Greisinger, Honsberg, Martens and Imtron will continue to exist as brand names. They will still be managed with the same philosophy and strategy at each of the four locations of the new GHM Messtechnik GmbH. Your normal contact partners will of course remain at all locations.

By consolidating the companies to form the new GHM Messtechnik GmbH we aim to improve our service to customers even further with our comprehensive range of products and goods.

As a result of the consolidation, all rights and obligations from existing contractual relationships will of course transfer in full to the new GHM Messtechnik GmbH.

We would like to thank you for your loyalty up to now and look forward to continued work with you as your competent business partner.



**Günther Oehler**

(Director GHM Messtechnik GmbH)



GERMAN



FRENCH



CZECH



GHM-RING BINDER

## Novelties



### GMH 3431/51

Improved revision of the bestseller GMH 3430: Now also with data logger, automatic calibration and as 4-pole design.

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### GMH 3531/51

Improved revision of the bestseller GMH 3530: Now also with data logger; **New:** Pt 1000 temperature probes can be connected (4-pole Pt100 omitted).

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### GMH 3851

For professional application in moisture rating of firewood. **Now new:** comfortable averaging of three measured values

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### GMH 3161/81-002

New pressure range for our popular manometer series with integrated sensor, all devices now with improved pressure connections.

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### MD600

The extension for analytical measurement technology with pH/conductivity and oxygen measurement technology: Photometric measuring device for monitoring of various water parameters.

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### GTH 175 PT-G & GMH 2710 -G

Both devices now with additional probe option, extremely thin ( $\varnothing$  1.5 mm) but nevertheless robust.

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## OEM- / customer-specific designs

You have not found a device fulfilling all your requirements completely? No problem, we can modify the devices to your specific needs.

### I.) Optical customization

#### • Colours of housing according to your wishes

If we have the colour in stock, we can change the default cover colour to your desired one. For larger orders it is also possible to have the housings specifically manufactured to your wishes.

#### • Modified label

Do you want your logo on the device or the type designation matching to your name policy?

### II.) Hardware and software modifications

To a certain extend the hardware or software can be modified to your requirements.

For example this are realized modifications to customer's specifications:

- Modifying the hardware to another probe characteristic
- Creating an additional material characteristic for the GMH 38xx - series
- and many more

### III.) Customer-specific developments

If there is no device in our standard product proposal fulfilling your individual requirements, there is the possibility to develop a device according to your specifications.

**PLEASE CONTACT US, WE'LL DO OUR BEST TO FULFIL YOUR WISHES!**



**Product overview**

page

**SERVICE**

Calibration, DKD 006

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 Temperature / Pt100 / Pt1000, Thermocouples 007-014  
 Temperature / Hay measuring probe 012  
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**DISPLAY / CONTROLLER**

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**TRANSMITTERS / SENSORS**

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**TEMPERATURE PROBES**

Pt100 / Pt1000, Thermocouples, NTC, PTC 125  
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**ALARM- AND PROTECTION DEVICES**

Alarm-, Protection- and Control devices (Liquid level, Leakage) 141  
 142-148

**EX-PROTECTION**

Measuring instruments (Pressure) 052-058  
 Displays 068-079  
 Transmitters 108  
 Temperature probes 134



Made in Germany



available with calibration certificate



suitable for food applications according to HACCP



available as complete solution

**1. Readjustment**

After a longer period of use, it's recommendable to send in the devices (e.g. humidity) for readjustment. At this, the device will be fully checked up and new adjusted, if required.

for return to national standards

**2. Factory Calibration Certificate**

DIN EN ISO 9000ff demands a traceable calibration of measuring and test equipment. This calibration certificate is a low-priced alternative to the DAkkS-DKD Calibration Certificate.

**3. DKD Calibration Certificate**

The DKD Calibration Certificate always conforms to form, structure and procedures the standards and requirements of the German Calibration Service according DIN EN ISO 17025.

**Which certificate will be required ?**

Factory Calibration Certificate: could be deemed to be sufficient, if the devices act as measuring and test equipment within quality management systems according to DIN EN ISO 9000ff or similar, as long as they are not used as a standard. Furthermore there are some measurement categories, without possibility to get a DKD accreditation.

DKD-Calibration Certificate will be recommended for the recalibration of testing equipment which itself is used as a standard for the monitoring of other measuring and test equipment. It is also possible that internal demands of the particular companies makes a DKD Calibration Certificate necessary.



**1. Readjustment**

(without certificate of calibration) Readjustment of the device



**2. Factory calibration certificate**

Calibration certificates are available for all handheld instruments marked with the symbol . Also possible for measuring transmitters resp. combinations of display instruments and sensors/transmitters.

**Temperature**

**Certificate of calibration WPT**

incl. 1 measurement point

**additional measurement point**

(from -30 to +500 °C)

**additional measurement point**

(>500 to 1300 °C)

**Certificate of calibration WPT2A**

with standard values: 0 °C / +70 °C

**Certificate of calibration WPT2B**

with standard values: 0 °C / +37 °C

**Certificate of calibration WPT3**

with standard values: -20 °C / 0 °C / +70 °C

**Pressure**

**Certificate of calibration WPD5**

5 points ascending, 5 points descending

**Certificate of calibration WPD10**

10 points ascending, 10 points descending

**Humidity**

**Certificate of calibration WPF4**

incl. standard-measuring values (approx. 20 % / 40 % / 60 % / 80 % RH increasing and decreasing; measurement point Temperature: approx. +23 °C)

**Conductivity**

**Certificate of calibration WPL3**

3 points: ~147 µS/cm, ~1412 µS/cm, ~12,90 mS/cm

**Certificate of calibration WPL10**

10 points from 0.9 µS/cm to ~192 mS/cm

**Ultrapure Water**

**Certificate of calibration WPL3-RW**

3 points: ~2,50 µS/cm, ~7,00 µS/cm, ~15,00 µS/cm

**pH**

**Certificate of calibration WPP3**

3 points: 4.00 pH, 6.87 pH, 9.18 pH

**Certificate of calibration WPP10**

10 points from 1.09 pH to 12.75 pH

**Atmospheric Oxygen**

**Certificate of calibration WPO3**

3 points: 0 / 20.9 / 100 % O<sub>2</sub>

**Note:** a replacement of the sensor, before issue the WPO3, is recommended for sensors with an age of one year!

**3. DKD calibration certificates**

(according DIN EN ISO / IEC 17025)

**Temperature**

**DAkkS-DKD-certificate**

(incl. 1 measurement point)

**additional measurement points**

(from -80 to +500 °C)

**Pressure (for each order a add. handling charge of € 25,- must paid)**

**Over pressure -1 ... 100 bar**

(incl. 9 points increase and decrease)

**Absolute pressure 0 ... 70 bar**

(incl. 9 points increase and decrease)

**Humidity (incl. 1 temperature value)**

for devices with external sensor

(Testing points: 15 % RH and 70 % RH / at 23 °C)

for devices with fixed attached sensor

(Testing points: 20 % RH, 50 % RH and 80 % RH / at 20 °C)

*For the storage of the devices, we recommend the use of a safe-keeping case.*

**4. Complete Solutions**



**GTH175-PT - WPT2 (immersion probe)**

incl. certificate of calibration WPT2A (0 °C / 70 °C) and case GKK252.

**GTH175-PT-WPT3 (immersion probe)**

incl. certificate of calibration WPT3 (-20 / 0 / +70 °C) and case GKK252.

**GTH175-PT-E-WPT3 (insertion probe)**

incl. certificate of calibration WPT3 (-20 / 0 / +70 °C) and case GKK252.

**GTH1170 incl. GTF900 - WPT**

incl. certificate of calibration WPT (with meas. points: 0 / 100 / 250 / 500 °C) and case GKK1100.

**GFTH200-WPF4**

incl. certificate of calibration WPF4 (~20 % / ~40 % / ~60 % / ~80 % RH increasing and decreasing) and case GKK252.

**GMH3330 incl. TFS0100E - WPF4**

incl. certificate of calibration WPF4 (~20 % / ~40 % / ~60 % / ~80 % RH ascending / descending) and case GKK3500.

**GMH3161-07/-12/-13-WPD5**

incl. certificate of calibration WPD5 (5 points ascending / descending) and case GKK3000.

Handheld instrument  
Display / Controller  
Logger / EASYBus  
Transmitter  
Temperature probe  
Alarm / Protection

## Temperature handheld instruments



Application:	Device	GMH 3710	GMH 3750	GMH 2710-T / -E	GMH 2710-K / -G	GTH 175 PT-T / -E	GTH 175 PT-K / -G	GMH 175	GTH 200 air	GMH 3210	GMH 3230	GMH 3250	GTH 1150	GMH 1150	GTH 1170	GMH 1170	Electronic 0120
Reference- / precision measurement		✓	✓														
Quality management		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	
Difference measurement											✓	✓					
Surface measurement										✓	✓	✓	✓	✓	✓	✓	
Core temperature measurement		✓	✓		✓		✓										✓
High-temperature measurement		✓	✓							✓	✓	✓	✓	✓	✓	✓	
Food, HACCP		✓	✓	✓	✓	✓	✓			✓	✓	✓					
Water-proof				✓	✓												
Air- / gas- / liquids-measurement		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	
indoor temperature									✓								

Function / Equipment:	Device	GMH 3710	GMH 3750	GMH 2710-T / -E	GMH 2710-K / -G	GTH 175 PT-T / -E	GTH 175 PT-K / -G	GMH 175	GTH 200 air	GMH 3210	GMH 3230	GMH 3250	GTH 1150	GMH 1150	GTH 1170	GMH 1170	Electronic 0120
<b>Specification:</b>																	
Sensor element		Pt100	Pt100	Pt1000	Pt1000	Pt1000	Pt1000	Pt1000	Pt1000	J, K, N, S, T	J, K, N, S, T	J, K, N, S, T	K	K	K	K	PTC
(max.) Meas. range [°C]		-200..+850	-200..+850	-200..+200	-200..+250	-199..+199	-199..+199	-199..+199	-25..+70	-220..+1750	-220..+1750	-220..+1750	-50..+1150	-50..+1150	-65..+1150	-65..+1150	-20,0..+120
Accuracy (typ.)		≤ 0,03 °C		± 0,1 °C		± 0,1 % of m.v.		± 0,1 °C	± 0,5 % v. MW. ± 0,1 °C	± 0,03 % of m.v. ± 0,05 % FS (in example for type K)			≤ 1%		± 0,05 % of m.v. ± 0,2 % FS.		± 2 °C
Resolution [°C]		0,01 / 0,1	0,01 / 0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1/1	0,1/1	0,1/1	1	1	1	1	0,1
Plug-in probe		✓	✓					✓		✓	✓	✓	✓	✓	✓	✓	✓
Measurement inputs		1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1
Display rows		2	2	2	2	1	1	1	1	2	2	2	1	1	1	1	1
<b>Functions:</b>																	
Min/Max, Hold, Auto-Off		✓	✓	✓	✓				✓	✓	✓	✓				✓	✓
Alarm (buzzer)			✓									✓					
Data logger			✓									✓					
Interface		✓	✓							✓	✓	✓					
Analog output		✓	✓							✓							
Catalog page:		8	8	10	10	11	11	9	12	13	13	13	14	14	14	14	12

## Pt100 - High-Precision Thermometer



- Suitable for all Pt100 4-wire probes with 4-pin miniature DIN-plug
- Highest accuracy and resolution (0.01 °C)
- Freely adjustable analog output 0-1 V or serial interface
- Offset and slope input, Min-/max- value memory, hold function
- incl. calibration protocol

**REFERENCE METER  
FOR ANY CALIBRATION REQUIREMENT**

### GMH 3710

Pt100 - High-Precision Thermometer, Accessories not incl., 4-wire

### GMH 3750

Pt100 - High-Precision Thermometer, Accessories not incl., 4-wire, Data logger

#### Application:

reference measurements in liquids, soft media, air/gases.

#### Specifications:

<b>Measuring range:</b>	-199.99 ... +199.99 °C resp. -200.0 ... +850.0 °C -199.99 ... +199.99 °F resp. -328.0 ... +1562.0 °F
<b>Resolution:</b>	0.01 °C resp. 0.1 °C; 0.01 °F resp. 0.1 °F
<b>Linearisation:</b>	digital stored characteristic curve GMH 3750 add. supports an userdefined curve.
<b>Auto-Range:</b>	automatically or manually choice of the measuring range
<b>Accuracy:</b>	(±1 digit) (at nominal temperature = 25 °C) ≤ 0.03 °C / 0.06 °F at resolution 0.01° ≤ 0.1 °C / 0.2 °F at resolution 0,1°
<b>Temperature drift:</b>	≤ 0.002 °C / K
<b>Probe/Input:</b>	Pt100, 4-wire, in acc. to DIN EN 60751 probe connection via 4-pin miniature DIN-plug
<b>Nominal temperature:</b>	25 °C
<b>Working temperature:</b>	-25 ... +50 °C
<b>Relative humidity:</b>	0 ... +95 % RH (non-condensing)
<b>Storage temperature:</b>	-25 ... +70 °C
<b>Display:</b>	two 4½ digit LCDs (12.4 mm or 7 mm high), as well as additional arrows.
<b>Pushbuttons:</b>	6 membrane keys
<b>Output:</b>	3-pin jack connector Ø 3.5 mm, choice between serial interface or analog output
<b>- serial interface:</b>	direct connection to RS232 or USB interface of a PC via electrically isolated interface adapter GRS 3100 or GRS 3105 resp. USB 3100 N (p.r.t. accessories).
<b>- analog output:</b>	0 - 1 V, freely adjustable (resolution 13 bit, accuracy 0.05 % at nominal temperature)
<b>Power supply:</b>	9 V-battery, type IEC 6F22 (included) as well as additional d.c. connector for external 10.5-12 V voltage supply. (suitable power supply: GNG10/3000)
<b>Low battery warning:</b>	bAt
<b>Power consumption:</b>	approx. 1 mA
<b>Dimensions:</b>	142 x 71 x 26 mm (H x W x D) Impact-resistant ABS plastic housing, membrane keyboard, transparent panel. Front side IP65, integrated pop-up clip
<b>Weight:</b>	approx. 155 g

#### additional functions of the GMH 3750

- 2 integrated logger functions
- Optical and acoustic min-/max- alarm
- Userdefined sensor curve (50 interpolation points)te
- Real-time clock with day, month and year

#### Functional range:

##### Min./Max. value memory:

Memorizing of max. and min. values.

##### Hold function:

By pressing a button the current values will be „frozen“.

##### Auto-Off-Function:

1 ... 120 min (can also be deactivated).

##### Offset and slope input:

Offset- and scale correction can be entered digitally.

#### Additional functions of the GMH 3750:

##### Min-/Max-alarm:

the measuring value is constantly monitored if it remains within the min./max. limits (can also be deactivated).

##### - Alarm:

- 3 different alarm settings
- off: alarm function not activated
- on: visual alarm via display, integrated buzzer and interface
- no Sound: alarm via display and interface

##### - Controlling function:

with the help of the switching module GAM3000 (optionally) electric equipment can be switched on/off or get alarm monitored

##### Logger functions:

- **manually:** 99 data sets (data recall via keyboard or interface)
- **cycle:** 16.384 data sets (data recall via interface)  
adjustable cycle time: 1 s ... 1 h

Logger start and stop via the keyboard or interface.  
Comfortable read-out and display software (GSOFT3050) available as additional equipment.

**Real-time clock:** clock with day, month and year

#### Accessories and spare parts:

##### plug-in probes Pt100

p.r.t. page 126

##### GLF 401 Mini

Air probe (p.r.t. p. 126) for fast and accurate measurements in ambient air



##### GKK 1100

case (340 x 275 x 83 mm) with foam lining for universal use

##### USB 3100 N

interface converter

##### GSOFT 3050

software (p.r.t. p. 66)

##### ST-R1

device protection bag (p.r.t. p. 64)

##### GNG 10 / 3000

power supply

## Calibrated Systems



**Scope of supply:**  
Measuring device GMH 3750  
or GMH 3710, temperature  
probe GTF 401 1/3 DIN,  
plastic case GKK 3500 and  
certificate of calibration with  
3 calibration points.

**General:**

The overall error of a measuring device consists of the sum of the instrument error and the probe error. To minimize the overall error, we offer calibrated and optimized systems below.

Due to their excellent system accuracy they are especially suitable for quality assurance according to ISO9000ff, as reference instruments in manufacturing processes, laboratory, service and maintenance, etc.

The system optimization is done via a special characteristic curve which is determined for each temperature probe separately and stored in the instrument (GMH 3750) or with probe adjusting via offset and slope input (GMH 3710).

**GMH 3750 / SET1**

incl. certificate of calibration

**Specifications:**

**optimized measuring range:** -20 ... +70 °C

**Temperature probe:** GTF 401 1/3 DIN, Pt100, 4-wire  
(for tech. data please refer to p. 126)

**System accuracy:** better than 0,07 °C (at opt. range)

**Calibration points:** -20 °C / 0 °C / 70 °C

**GMH 3750 / SET2**

incl. certificate of calibration

**Specifications:**

**optimized measuring range:** 0 ... +250 °C

**Temperature probe:** GTF 401 1/3 DIN, Pt100, 4-wire  
(for tech. data please refer to p. 126)

**System accuracy:** better than 0,3 °C (at opt. range)

**Calibration points:** 0 °C / 100 °C / 250 °C

**GMH 3710 / SET1**

incl. certificate of calibration

**Specifications:**

**optimized measuring range:** -20 ... +70 °C

**Temperature probe:** GTF 401 1/3 DIN, Pt100, 4-wire  
(for tech. data please refer to p. 126)

**System accuracy:** better than 0,1 °C (at opt. range)

**Calibration points:** -20 °C / 0 °C / 70 °C

**GMH 3710 / DKD1**

incl. DKD calibration certificate DIN 17025

**Specifications:**

**optimized measuring range:** -20 ... +70 °C

**Temperature probe:** GTF 401 1/3 DIN, Pt100, 4-wire  
(for tech. data please refer to p. 126)

**System accuracy:** better than 0,1 °C (at opt. range)

**Calibration points:** -20 °C / 0 °C / 70 °C

**Accessories and spare parts:**

**GMHKonfig** free  
(visit our homepage: Download --> Software)

**Software description:**

Comfortable software to edit the user defined sensor curve of the GMH 3750.  
(e.g. for calibration laboratories etc.)

**Note:**

please note that for the interface communication with the device a interface converter (GRS 3100, GRS 3105 or USB 3100 N) is necessary (p.r.t. page 65).

## Precision Thermometer Pt1000



**PLUG-IN PROBE, BATTERY AND  
PERMANENT MAINS OPERATION POSSIBLE**

**GMH 175**

Precision Thermometer

Battery/mains operation, for plug-in probes, Pt1000 2-wire

**Application:**

high-precision measurements in liquids, soft media, air/gases

**Specifications:**

**Measuring range:** -199.9 ... +199.9 °C

**Resolution:** 0.1 °C

**Accuracy: (at nominal temperature = 25 °C)**

**Device:** 0.1 °C ± 1 digit (within range of: -70.0 ... +199.9 °C)

**Probe:** Pt1000 probe, 2-wire,  
probe connection via 3.5 mm Ø jack connector.

**Probes not included - please order separately!**

**For suitable sensors see below or refer to page 127.**

**Display:** 3½ digit, approx. 13 mm high

**Working temperature:** -30 ... +45 °C  
(low temperature - for use in cold storage rooms!)

**Storage temperature:** -30 ... +70 °C

**Power supply:** 9 V-Battery type IEC 6F22 (included) as well as additional  
d.c. connector for external 10.5-12 V direct voltage supply.  
(suitable power supply: GNG10/3000)

**Battery service life:** approx. 200 operating hours

**Low battery warning:** „BAT“

**Dimensions:** approx. 142 x 71 x 26 mm (H x W x D).  
impact resistant ABS plastic case, front side IP65, integrated  
pop-up clip for table top or suspended use.

**Weight:** approx. 160 g (incl. battery)

**Accessories and spare parts:**

**Suitable plug-in temperature probes:**  
(Probes interchangeable without recalibration)

**GTF 175**  
immersion probe for liquids and aggressive gases

**GES 175**  
insertion probe for soft media

**GOF 175**  
surface probe for solid surfaces

**GLF 175**  
air/gas probe for clean media

Detailed description and more probes please refer to page 127

**ST-R1**  
device protection bag with cut-out for probe connection, suitable for GMH175, ...

**GB 9 V**  
spare battery

## Water-proof HACCP thermometer with Pt1000 probe



**WATER-PROOF  
DEVICE AND PROBE**

- Easy handling, min-/max- value memory
- High resolution ( $\pm 0.1\text{ }^{\circ}\text{C} \pm 1$  digit)
- Detection of stable measuring values (auto-hold)
- Battery life time > 6000 hours
- Incl. calibration certificate

**LIQUIDS  
AIR / GAS**

GMH 2710-T

**SOFT MEDIA**

**NEW**

GMH 2710-E

**CORE TEMPERATURE  
Ø 3 MM**

GMH 2710-K

**NEW**

**CORE TEMPERATURE  
Ø 1.5 MM**

GMH 2710-G

### GMH 2710-T

Temperature measuring device incl. universal probe

### GMH 2710-E

Temperature measuring device incl. insertion probe

### GMH 2710-K

Temperature measuring device incl. Teflon insertion probe

### GMH 2710-G

Temperature measuring device incl. mini Teflon probe

#### Application:

Accurate measurements for laboratories, quality management, and monitoring of production processes

#### Area of application:

Food (HACCP), medical / pharmaceutical science, chemistry, aquaristics, fish farming, aquaculture, etc.

#### Specifications:

##### Measuring range:

GMH 2710-T	-199.9 ... +200.0 °C
GMH 2710-E	-199.9 ... +200.0 °C
GMH 2710-K	-199.9 ... +250.0 °C
GMH 2710-G	-199.9 ... +250.0 °C

##### Resolution:

0.1 °C

##### Accuracy:

at -20.0 ... 100.0 °C	$\pm 0.1\text{ }^{\circ}\text{C} \pm 1$ digit
at -70.0 ... 200.0 °C	$\pm 0.1\%$ of meas. value $\pm 2$ digit sensor calibrated together with device

##### Probe:

Pt1000, 2-wire, isolated water- and steam-proof, permanently connected to device

GMH 2710-T	plastic handle 135 mm long (max. 70 °C) 1 m PVC cable (max 100 °C) Ø 3 mm / length: 100 mm
GMH 2710-E	plastic handle 135 mm long (max. 70 °C), additionally with slim insertion tip for all soft media. 1 m PVC cable (max 100 °C) Ø 3 mm / length: 100 mm
GMH 2710-K	design type with big Teflon handle and 1 m Teflon cable, with slim insertion tip, handle and cable are resistant to temperatures up to 250 °C air temperature. Stainless steel kink protection, Ø 3 mm / length: 100 mm
GMH 2710-G	design type with small Teflon handle and 1 m Teflon cable, with slim insertion tip, handle and cable are suitable for permanent application at temperatures up to 250 °C. Stainless steel kink protection, Ø 1.5 mm / length: 100 mm

Response time $T_{90}$ :	approx. 10 s
Display:	two 4-digit LCD (12.4 mm and 7 mm)
Nominal temperature:	+25 °C
Working temperature:	-25 ... +50 °C
Storage temperature:	-30 ... +70 °C
Power supply:	2 x AAA batteries
Battery life time:	> 6000 hours
Protection class:	IP65 / IP67
Dimensions:	154 x 81 x 31 mm (H x W x D) housing made of impact-resistant ABS
Weight:	215 g (incl. battery and probe)

#### Functions:

- Auto-Power-Off
- Min / Max value memory
- Calibratable (offset & slope)
- Automatic stable value recognition
- Battery change indicator „BAT“

#### Accessories and spare parts:

- K 50 BL**  
Silicone protection cover blue
- K 50 RE**  
Silicone protection cover red
- GKK 1105**  
Case (340 x 275 x 83 mm) with cut-outs



## Precision pocket thermometer with probe



GTH 175 PT-T

HIGH ACCURACY  
AND PRECISION

LIQUIDS  
AIR / GAS

SOFT MEDIA

CORE TEMPERATURE  
Ø 3 MM

CORE TEMPERATURE  
Ø 1.5 MM

NEW

GTH 175 PT-T

GTH 175 PT-E

GTH 175 PT-K

GTH 175 PT-G

**GTH 175 PT-T**

Temperature measuring device incl. universal probe

**GTH 175 PT-E**

Temperature measuring device incl. insertion probe

**GTH 175 PT-K**

Temperature measuring device incl. Teflon insertion probe

**GTH 175 PT-G**

Temperature measuring device incl. mini Teflon probe

**Application:**

Accurate measurements in liquids, as core measuring device (with insertion probe), for air/gas measurements or as reference device for much more expensive measuring systems. Handle and cable of -T and -E are resistant to temperatures up to 100 °C, -K and -G up to 250 °C.

**Options:****- WD**

Probe design: water-proof

Probe as for GTH 175 PT-T and GTH 175 PT-E, but with PVC cable (max. 100 °C) and sealed handle (max. 70 °C).

(Not possible for GTH 175 PT-K and GTH 175 PT-G.)

**Special designs upon request:**

e.g. longer cable or probe tube.

**Accessories and spare parts:****GB 9 V**

Spare battery

**GKK 1100**

Case (340 x 275 x 83 mm) with foam lining

Full set offer: Device incl. calibration certificate and case, see page 6

**Specifications:**

<b>Measuring range:</b>	-199.9 ... +199.9 °C
<b>Resolution:</b>	0.1 °C
<b>Accuracy: (at nominal temperature)</b>	0.1 % of meas. value ±2 digit (at range: -70.0 ... +199.9 °C), Probe and device are calibrated together, resulting in an error of about 0.1 °C ±1 digit in range 0 ... 100 °C.
<b>Probe:</b>	All probes are permanently connected to device.
<b>GTH 175 PT-T</b>	Pt1000, 2-wire, isolated in V4A tube 3 mm Ø and 100 mm long, plastic handle approx. 135 mm long, kink protection and approx. 1 m highly flexible silicone cable
<b>GTH 175 PT-E</b>	Probe (V4A, Ø 3 mm x 100 mm) as above, but additional slim insertion tip for all soft media. Handle and cable are resistant to temperatures up to 100 °C.
<b>GTH 175 PT-K</b>	Probe (V4A, Ø 3 mm x 100 mm) as above, but with Teflon handle and 1 m Teflon cable. Handle and cable are resistant to air temperatures up to 250 °C.
<b>GTH 175 PT-G</b>	Probe (V4A, Ø 1.5 mm x 100 mm) as above, but with Teflon handle and 1 m Teflon cable. Handle and cable are resistant to air temperatures up to 250 °C.
<b>Display:</b>	3½-digit, 13 mm high LCD display
<b>Nominal temperature:</b>	+25 °C
<b>Working temperature:</b>	-30 ... +45 °C
<b>Storage temperature:</b>	-30 ... +70 °C
<b>Power supply:</b>	9 V battery, type IEC 6F22
<b>Battery life time:</b>	approx. 200 operating hours
<b>Battery change indicator:</b>	„BAT“
<b>Dimensions (device):</b>	approx. 106 x 67 x 30 mm (H x W x D). Housing made of impact-resistant ABS
<b>Weight:</b>	approx. 190 g (incl. battery and probe)

## Precision room thermometer



## hay temperature measuring probe



Hay and straw moisture measuring devices  
look at **BaleCheck** on page 30!

### GTH 200 air

Precision room thermometer

#### General:

The room thermometer GTH 200 air is an essential tool for fast and precise temperature measurements in

- calibration rooms
- production / computer rooms
- living space
- laboratories
- etc.

The exposed but yet protected temperature sensor provides fast and precise measurements of  $\pm 0.2\text{ }^{\circ}\text{C}$  (at  $20\text{ }^{\circ}\text{C}$ ). The device has undergone a streamlining process and is optimized to its key features, ensuring a comfortable and efficient handling with only one hand.

#### Specifications:

<b>Measuring range:</b>	-25.0 ... 70.0 $^{\circ}\text{C}$
<b>Resolution:</b>	0.1 $^{\circ}\text{C}$
<b>Accuracy:</b>	( $\pm 1$ digit) (at nominal temperature) $\pm 0.5\%$ of meas. value $\pm 0.1\text{ }^{\circ}\text{C}$
<b>Sensor:</b>	Pt 1000, 1/3 DIN class B
<b>Response time:</b>	$T_{90}$ = approx. 5 s
<b>Display:</b>	3½ digit, 13 mm high LCD-display
<b>Nominal temperature:</b>	25 $^{\circ}\text{C}$
<b>Working temperature:</b>	-20 ... +70 $^{\circ}\text{C}$
<b>Working humidity:</b>	0 ... 95 % RH (non condensing)
<b>Storage temperature:</b>	-25 ... +70 $^{\circ}\text{C}$
<b>Power supply:</b>	9 V battery, type IEC 6F22 (included)
<b>Current consumption:</b>	max. 0.1 mA
<b>Used battery indicator:</b>	automatically if battery used: "BAT"
<b>Battery service time:</b>	approx. 6000 operating hours with alkaline battery
<b>Auto-Off-funktion:</b>	selectable, 1 ... 120 min or continuous operation
<b>Min-/Max-value memory:</b>	Lowest and highest values are saved.
<b>Housing:</b>	impact-resistant ABS housing, approx. 106 x 67 x 30 mm (H x W x D); additionally the sensor head at the "length" side, 35 mm long, $\varnothing$ 14 mm, resulting total length 141 mm
<b>Weight:</b>	approx. 135 g incl. battery
<b>Scope of supply:</b>	device, operation manual, battery

### Electronic 0120

hay temperature measuring probe

#### General:

We offer a economic measure to avoid damage caused by the self-heating due biological processes in stored hay, straw, etc, which may heat up the stored goods up to self ignition.

- fibre glass measuring rod
- one measuring point at the tip
- economical

#### Specifications:

<b>Measuring range:</b>	-20.0 ... +120.0 $^{\circ}\text{C}$
<b>Resolution:</b>	0.1 $^{\circ}\text{C}$
<b>Accuracy:</b>	$\pm 2\text{ }^{\circ}\text{C}$ (at nominal temperature)
<b>Probe connection:</b>	approx. 3 m long connection cable with cinch plug and connection adaptor GAD-1 Cinch
<b>Measuring rod:</b>	fibre glass probe, approx. 4 m long, approx. 10 mm $\varnothing$ , 1 measuring point in the probe tip
<b>Cutter tip:</b>	double-edged screw-type tip with integrated temperature sensor
<b>Display:</b>	3½-digit, 13 mm high LCD-display, display illumination by keypress
<b>Nominal temperature:</b>	25 $^{\circ}\text{C}$
<b>Working temperature:</b>	0 ... 50 $^{\circ}\text{C}$
<b>Relative humidity:</b>	0 ... 95 % RH (non condensing)
<b>Storage temperature:</b>	-10 ... 60 $^{\circ}\text{C}$
<b>Power supply:</b>	separate supply for measuring electronics and illumination
<b>measuring electronics:</b>	9 V battery, type IEC 6F22 (1 piece)
<b>illumination:</b>	mignon / LR 06 / AA 1,5 V (2 pieces)
<b>Battery life:</b>	
<b>measuring electronics:</b>	approx. 200 hours of operation
<b>illumination:</b>	approx. 50 - 100 hours of operation (depending on battery type)
<b>Dimensions, weight (device):</b>	approx. 160 x 90 x 45 mm, approx. 480 g
<b>Scope of supply:</b>	device, hay temperature probe 4 m, measuring spike, plastic case, batteries, operation manual

#### Accessories and spare parts:

**fiber glass tube**  
4 m, without sensor and without tip

**Cutter tip**  
with integrated temperature sensor

**Measuring device**  
incl. connection cable

**GKK 3600**  
case with foam lining

**GAD 1 CINCH**  
connection adapter for cable to measuring rod

## Digital precision quick-response thermometer for thermocouples



- Correction factor for surface measuring can be switched on / off
- Serial interface

**5 DIFFERENT THERMOCOUPLES CAN  
BE USED! (TYPES J, K, N, S, T)**

suitable probes p.r.t. p. 128-130!

additional functions of GMH 3230 and GMH 3250

- 2 plug-in probes can be connected and read simultaneously
- Temperature differences

additional functions of GMH 3250

- 2 integrated logger functions
- Optical and acoustic min-/max- alarm
- Real-time clock with day, month and year

additional functions of GMH 3210

- Analog output 0 - 1 V

**GMH 3210**

precision quick-response thermometer, accessories not included, 1 plug-in probe input

**GMH 3230**

precision quick-response thermometer, accessories not included, 2 plug-in probe inputs

**GMH 3250**

precision quick-response thermometer, accessories not included, 2 plug-in probe inputs

Specifications:	GMH 3210	GMH 3230	GMH 3250
Thermocouples:	J, K, N, S, T	J, K, N, S, T	J, K, N, S, T
Resolution:	0.1 °C or 1 °C	0.1 °C or 1 °C	0.1 °C or 1 °C
Measuring range:	-220 °C ... +1750 °C (depending on thermocouples)		
Measuring ranges: (extract)			
Type K:	(MB1) -65.0 ... +300.0 °C		-199.9 ... +999.9 °C
	(MB2) -220 ... +1372 °C		-220 ... +1372 °C
	further measuring ranges online at <a href="http://www.greisinger.de">www.greisinger.de</a>		
Accuracy: (extract)			
Type K:	(for MB1) ±0.03 % of m.v. ±0.05 % f.s.	±0.03 % of m.v. ±0.05 % f.s. (T≥-60 °C) ±0.2 % of m.v. ±0.05 % f.s. (T<-60 °C)	
	(for MB2) ±0.08 % of m.v. ±0.1 % f.s.	±0.08 % of m.v. ±0.1 % f.s. (T≥-100 °C) ±1 °C ±0.1 % f.s. (T<-100 °C)	
Working temperature:	-25 ... +50 °C		-25 ... +50 °C
Probe connections:	1	2	2
Display:	two 4-digit LCDs (12.4 mm and 7 mm high)		
Output:	3-pin jack connector Ø 3.5 mm, configurable		
Serial interface:	direct connection to RS232 or USB interface of a PC via electrically isolated interface adapter GRS 3100 or GRS 3105 resp. USB 3100 N (p.r.t. accessories).		
Analog output:	x	-	-
Power supply:	9V-battery, type IEC 6F22 (included) as well as additional d.c. connector for external 10.5-12 V direct voltage supply. (suitable power supply: GNG10/3000)		
Power consumption:	approx. 0.3 mA	approx. 1.6 mA	approx. 1.6 mA
Housing:	aus schlagfestem ABS, Folientastatur, Klarsichtscheibe. Frontseitig IP65, integrierter Aufstell-/Aufhängebügel		
Dimensions:	142 x 71 x 26 mm (H x W x D), weight: approx. 155 g		

Functions:	GMH 3210	GMH 3230	GMH 3250
Min./Max. value memory	x	x	x
Hold function	x	x	x
Auto-Off-function	x	x	x
Low battery warning	x	x	x

Special applications:	GMH 3210	GMH 3230	GMH 3250
Compensation value for surface measurements	x	x	x
Zero-point offset entry	x	x	x
Difference measurements	-	x	x
Tare/diff-function	-	x	x
Min-/Max-alarm	-	-	x
Logger functions	-	-	x
Real-time clock	-	-	x

**Functions:****Compensation value for surface measurements:**

A compensation value (to compensate for the loss when transferring heat from the meas. object to the probe) can be set and switched on/off for surface measurements if required.

**Zero-point offset entry:**

By entering the offset temperature the parameter can be moved parallel to the calibration graph.

**Difference measurements:**

Temperature difference probe 1 - probe 2 can be displayed if 2 probes are connected.

**Tare/diff-function:**

Press button to set the difference display ,probe 1 - probe 2' to zero.

**Analog output:**

0 - 1 V, freely adjustable, resolution 13 bit, accuracy 0.05 % at nominal temperature

**Min-/Max-alarm:**

The meas. values of probe 1 or 2, probes 1 and 2 or the temperature difference are constantly monitored reg. the min. and max. values set.

**- Alarm:**

3 different alarm settings  
 off: alarm function not activated  
 on: visual alarm via display, integrated buzzer and interface  
 no Sound: alarm via display and interface

**- Controlling function:**

with the help of the switching module GAM3000 (optionally) electric equipment can be switched on/off or alarm memorised (see accessories).

**Logger functions:**

- manually: 99 data sets  
 (data recall via keyboard or interface)  
 - cycle: 9.999 data sets (data recall via interface)  
 adjustable cycle time: 1 s ... 1 h  
 Logger start and stop via the keyboard or interface. Comfortable read-out and display software (GSOFT 3050) available as additional equipment.

**Real-time clock:** clock with day, month and year.

## Quick response thermometer

## Precision quick response thermometer Type K



### GTH 1150

Quick response thermometer, battery operation, for plug-in probes

### GMH 1150

Quick response thermometer, battery/mains operation, for plug-in probes

#### Application:

quick response measurements on surfaces, in liquids, soft media, air/gases, at the smallest objects etc. For all applications where a resolution of 1 °C is sufficient.

#### Specification:

<b>Measuring range:</b>	-50 ... +1150 °C
<b>Resolution:</b>	1 °C
<b>Accuracy:</b> (at nominal temperature)	≤ 1 % ± 1 digit (from -20 ... +550 and 920 ... 1150 °C) ≤ 1.5 % ± 1 digit (from 550 ... 920 °C) from -20 ... -50 °C according to attached correction table
<b>Probe connection:</b>	standard flat-pin plug (free of thermo-voltage) suitable for all NiCr-Ni (type K) - probes. Probe is not included in scope of supply - optimum probe to be ordered separately depending on desired application! Refer to pages 128 - 132.
<b>Display:</b>	3½ digit, approx. 13 mm high
<b>Nominal temperature:</b>	25 °C
<b>Working temperature:</b>	0 ... 45 °C
<b>Storage temperature:</b>	-20 ... +70 °C
<b>Power supply:</b>	9 V battery type IEC 6F22 (included). Additional at GMH 1150: d.c. connector for external 10.5-12 V direct voltage supply. (suitable power supply: GNG10/3000)
<b>Power consumption:</b>	approx. 0.4 mA
<b>Battery service life:</b>	approx. 700 operating hours
<b>Low battery warning:</b>	„BAT“
<b>Dimensions:</b>	GTH ...: approx. 106 x 67 x 30 mm (H x W x D). impact resistant ABS plastic housing. GMH ...: approx. 142 x 71 x 26 mm (H x W x D). impact resistant ABS plastic housing, front side IP65, integrated pop-up clip for table top or suspended use.
<b>Weight:</b>	approx. 150 g (GTH 1150), approx. 160 g (GMH 1150)

#### Accessories and spare parts:

<b>GTF 300</b> wire probe (for measuring ranges -65 ... 300 °C)	
<b>additional NiCr-Ni probes (type K)</b>	p.r.t. page 128 - 132
<b>GB 9 V</b> spare battery	
<b>GKK 252</b> case (235 x 185 x 48 mm) with foam lining	
<b>GKK 3000</b> case (275 x 229 x 83 mm) with punched lining, suitable for all devices of the GMH3xxx-series, GMH 1150	
<b>ST-KN</b> device protection bag, suitable for GTH 1150	
<b>ST-N1</b> device protection bag, suitable for GMH 1150	
<b>GNG 10 / 3000</b> power supply	

### GTH 1170

Precision quick response thermometer, battery operation, for plug-in probes, °C / °F (0.1° or 1°), min./max. value memory, hold, automatic-off, offset/scale

### GMH 1170

Precision quick response thermometer, battery operation, for plug-in probes, °C / °F (0.1° or 1°), min./max. value memory, hold, automatic-off, offset/scale

#### Application:

quick response measurements on surfaces, in liquids, air/gases etc.

#### Specification:

<b>Measuring ranges:</b>	-65.0 ... +199.9 °C or -65 ... +1150 °C (-85.0 ... +199.9 °F or -85 ... +1999 °F)
<b>Resolution:</b>	0.1 °C or 1 °C (0.1 °F or 1 °F)
<b>Accuracy: ± 1 digit</b> (at nom. temperature)	-65.0 ... 199.9 °C: ±0.05 % of m.v. ±0.2 % FS -65 ... 1150 °C: ±0.1 % of m.v. ±0.2 % FS
<b>Temperature drift:</b>	0.01 %/K
<b>Point of comparison:</b>	±0.3 °C
<b>Probe connection:</b>	standard flat-pin plug (free of thermo-voltage) suitable for all NiCr-Ni (type K) - probes. (for suitable probes please refer to pages 128 - 132)
<b>Offset und Scale:</b>	digital offset and scale adjustment for optimum precision
<b>Display:</b>	3½ digit, approx. 13 mm high
<b>Working temperature:</b>	-25 ... +50 °C
<b>Storage temperature:</b>	-25 ... +70 °C
<b>Power supply:</b>	9 V-Batterie Type IEC 6F22 (included).
<b>Measuring interval:</b>	approx. 3 meas. / s
<b>Power consumption:</b>	approx. 0.15 mA
<b>Battery service life:</b>	approx. 2000 operating hours
<b>Low battery warning:</b>	„BAT“
<b>Auto-off-function:</b>	selectable from 1 to 120 min. or deactivated
<b>Min./Max. value memory:</b>	memorizing of max. and min. values
<b>Hold function:</b>	By pressing a button the current values will be memorized
<b>Dimensions:</b>	GTH ...: approx. 106 x 67 x 30 mm (H x W x D). impact resistant ABS plastic housing. GMH ...: approx. 142 x 71 x 26 mm (H x W x D). impact resistant ABS plastic housing, front side IP65, integrated pop-up clip for table top or suspended use.
<b>Weight:</b>	approx. 135 g (GTH 1170), approx. 150 g (GMH 1150)

#### Accessories and spare parts:

<b>NiCr-Ni (type K) probes</b>	p.r.t. page 128 - 132
<b>GB 9 V</b> spare battery	
<b>GKK 252</b> case (235 x 185 x 48 mm) with foam lining	
<b>GKK 3000</b> case (275 x 229 x 83 mm) with punched lining, suitable for all devices of the GMH3xxx-series, GMH 1170	
<b>ST-KN</b> device protection bag, suitable for GTH 1170	
<b>ST-N1</b> device protection bag, suitable for GMH 1170	
<b>Komplett-offering</b> device incl. certificate of calibration and case	p.r.t. page 6

## Infrared thermometer



Application:	device	MT 400	GIM 530 MS	ST 512	GIM 3590
Precision measurement			✓		✓
Fast scanning of surfaces		✓	✓	✓	✓
food		✓	✓	✓	✓
Data storage					✓
Quality management		✓	✓	✓	✓
Universal use (due to adjustable emission rate)			✓	✓	✓

Function/ Equipment:	device	MT 400	GIM 530 MS	ST 512	GIM 3590
<b>Specification:</b>					
Measuring range [°C]		-20 ... +343	-32 ... +530	-50 ... +1000	-35 ... +900
Resolution [°C]		0.1	0.1	0.1	0.1
Response time T <sub>95</sub>		< 1 s	300 ms	150 ms	150 ms
Laser		single	single	dual	cross
additional probe connection					Type K
Optical resolution (Distance / Spot size)		8:1	20:1	30:1	75:1
emissivity		0.95 fix	0.100 ... 1.000	0.10 ... 1.00	0,100 ... 1,100
<b>Functions:</b>					
General functions		Min/Max, Hold	Min/Max, Hold, Offset	Min/Max, Hold	Min/Max, DIF, Hold, AVG
Alarm			optical, acoustical		optical, acoustical
Data storage and visualisation					100 measuring protocols, software for visualisation
Interface					✓
Catalog page:		16	16	17	17

## Infrared thermometer



### MT 400

Infrared thermometer with laser

#### General:

The MT 400 is small, lightweight and easy-to-use. Just aim, trigger and read the temperature from the display... and that's it. Anyone, who searches for fast and reliable temperature measurement, should take a closer look on the MT 400 infrared thermometer.

#### Application:

- **Electrics** – locating overheated cables and contacts
- **Heating / ventilation / air-conditioning** monitoring of heat exchanger
- **Food** – Checking the temperature of stored food

#### Specification:

**Measuring range:** -20 °C ... +343 °C

**Resolution:** 0.1 °C, 0.1 °F

**Accuracy:** (@ 18 °C ... 28 °C and < 80 % RH)

< -7 °C: ±4 °C

≥ -7 °C: ±2% of meas. value + 2 °C

**Optical resolution (D:S):** approx. 8:1

**Response time (T<sub>95</sub>):** < 1 s

**Spectral range:** 8 - 14 μm

**Emission rate:** permanently set to 0.95

**Sight:** single laser

**Working temperature:** 0 ... 50 °C

**Storage temperature:** -20 ... 60 °C

**Power supply:** 9 V battery

**Features:** BAT, Min-/Max, Hold, °F, background illumination

**Dimensions:** 82 x 41,5 x 160 mm

**Weight:** 180 g

**Scope of supply:** 1 device, 1 operation manual, 1 battery

#### Accessories and spare parts:

##### GKK 252

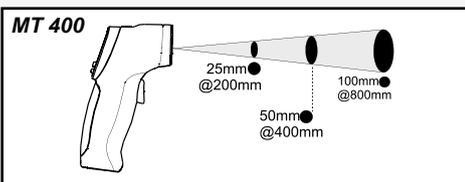
small case (235 x 185 x 48 mm) with foam lining

##### GKK 3100

case (275 x 229 x 83 mm) with foam lining

##### GB 9 V

spare battery



## Infrared thermometer with precision glass optic



### GIM 530 MS

Infrared thermometer with laser

#### General:

User-friendly industrial design combined to state of the art technology are setting a new standard in professional and all day non-contact temperature measuring.

The large temperature range of -32 to 530 °C, the targeting laser and the optical resolution of 20:1 allow very precise measuring of surfaces in a variety of applications. Simply aim at the target with the laser, push the trigger and the value is displayed within 0.3 seconds plus several other informations.

#### Specification:

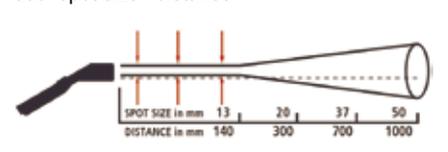
- Electrical and mechanical service and maintenance
- Heating, ventilation, air-conditioning - finding thermal bridges etc.
- Motor vehicle diagnosis, electricity, home improvement
- Checking food temperature during keeping warm or storing



#### Display

- current temperature value
- MIN-/MAX-value: current and last
- HIGH-/LOW-alarm
- HOLD-function
- emission rate
- symbol for display illumination and laser

optical diagram:  
ratio: spot size / distance



- adjustable emission rate from 0.100 to 1.000 (for numerous materials important)
- Adjustable visible and audible alarm
- Constant measuring area in between the distance of 13 to 140 mm
- Targeting laser for exact aiming of the object to be measured
- Fast scanning of hot and cold spots within 0.3 seconds

#### Specification:

**Measuring range:** -32 ... + 530 °C (-20 ... +980 °F)

**Resolution:** 0.1 °C (0.1 °F)

**Temperature display:** °C or °F selectable

**System accuracy** (at ambient temperature = 23 °C ±5 °C)

±1 % or ±1 °C from 0 °C ... 530 °C (highest value shall be valid)

±1 °C ± 0.07 °C/°C from 0 °C ... -32 °C

**Repeat accuracy:** ±0.5 % or ±0.7 °C from 0 °C to 530 °C (highest value shall be valid)  
±0.7 °C ±0.05 °C/°C from 0 °C bis -32 °C

**Optical Resolution 20 : 1 (D:S):**

**Response time (t<sub>95</sub>):** 0.3 s

**Spectral range:** 8 - 14 μm

**Emission rate:** 0, 100 ... 1,000, free selectable

**Laser:** < 1 mW laser class IIa

**Configuration:** Min/Max/Scan/Hold/Offset/°C/°F

**Display illumination:** yes

**Alarm function:** optical and acoustic HIGH-/LOW- alarm

**Working temperature:** 0 ... 50 °C

**Storage temperature:** -20 ... 60 °C (without battery)

**Power supply:** 9 V alkaline battery

**Battery service life:** approx. 20 hours for use with laser and illumination

**Weight / Dimensions:** approx. 150 g; 190 x 38 x 45 mm (H x W x D)

**Scope of supply:** Device with battery, operating manual, device bag made of nylon

#### Accessories and spare parts:

##### GKK 252

small case (235 x 185 x 48 mm) with foam lining

##### Calibration certificate

(testpoints at +24 °C, +166 °C and +500 °C)



## Infrared thermometer



- Dual-laser
- Alarm function

CONTACT-FREE SURFACE  
TEMPERATURE  
MEASUREMENTS WITHIN SECONDS

## ST 512

Infrared thermometer with dual laser

## General:

- **Monitoring of circuit boards:** overheated parts
- **Heating / ventilation / air-conditioning:** detecting bad isolation, untight pipes, energy consumption, general service measurements, etc.
- **Electrical systems, machines, power engines:** detecting hot spots at electric connections, temperature rises at motors, bearings, pumps, compressors, etc.
- **Food processing and monitoring:** food temperature, process temperature, etc.
- **Medical technology, biological and chemical analysis:** contact-free temperature measurements within seconds, no longer problems with dangerous, aggressive or similar media
- **Industry, engineering, craft:** Surface temperature measurements of rotating parts (barrels, drums, shafts, printing machines, plastic welding, bitumen, concrete, etc.)

## Specification:

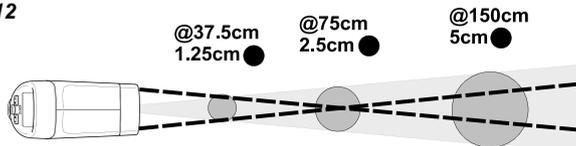
Measuring range:	-50 ... 1000 °C
Resolution:	0.1 °C
Accuracy: (at ambient temperature = 23 °C ... 25 °C)	-50 °C ... -23 °C ±7 °C (typical) -23 °C ... -2 °C ±4 °C -2 °C ... 94 °C ±2.5 °C 94 °C ... 204 °C ±(1.0 % of meas. value + 1 °C) 204 °C ... 426 °C ±(1.5 % of meas. value + 1 °C) 426 °C ... 1000 °C ±(3 % of meas. value + 1 °C)
Reproducibility:	±0.5 % of meas. value or ±1 °C
Response time (T <sub>95</sub> ):	150 ms
Emission rate:	0.10 ... 1.00, selectable
Spectral range:	8 ... 14 μm
Optical resolution (D/S):	approx. 30:1
Sight:	dual laser
Power supply:	9 V battery
Display:	LCD-display with function indicator symbols and background illumination
Working conditions:	0 °C ... 50 °C, 10 ... 90 % RH
Storage temperature:	-10 ... 60 °C
Features:	HOLD, Min-/Max, °F, LOCK, Alarm
Alarm function:	selectable min / max alarm, with integrated buzzer
Dimensions:	146 x 104 x 43 mm
Weight:	163 g
Scope of supply:	device, operation manual, battery

## Accessories and spare parts:

## Calibration certificate (25 / 100 / 200 °C)

Initial calibration at first delivery

## ST 512



## Infrared thermometer



INCL. SOFTWARE AND  
CALIBRATION PROTOCOL

## GIM 3590

Infrared thermometer with cross-hair laser

## General:

- The measured point will be marked exactly with the precision of a laser cross-hair. The integrated sharp point optics allows measurements of even smallest measuring objects down to 1 mm. Its position sensor turns the display always to the most comfortable orientation.
- switchable focus point optics
- laser cross-hair shows real measuring point size
- Flip-display
- additional thermocouple input
- USB interface and graphical software

## Specification:

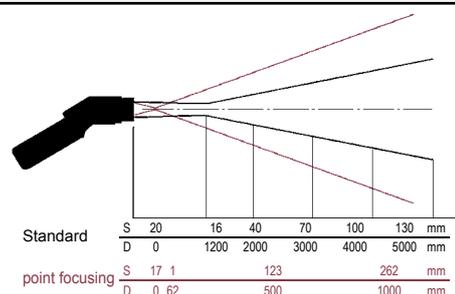
Measuring range:	-35.0 ... +900.0 °C (IR and thermocouple type K)
TC input:	thermocouple type K
Resolution:	0.1 °C
Accuracy IR:	±0.75 °C or ± 0.75 % of m.v.
Accuracy type K:	±0.75 K or ± 1 % m.v. (at 23 °C ± 5 °C)
Response time (t <sub>95</sub> ):	150 ms
Optical resolution:	75:1 16 mm @ 1200 mm
at focus point optic:	1 mm @ 62 mm
Rate of emission:	0.100 to 1.100, selectable
Meas. functions:	MAX / MIN / HOLD / DIF / AVG / °C / °F
Alarm functions:	acoustic / visual high-low-alarm
Display:	LC Flipwith position sensor / bar graph
Backlight:	green or alarm colours (red / blue)
Spectral range:	8 - 14 μm
Working temperature:	0 ... 50 °C
Relative humidity:	10 ... 95 % RH (non condensing)
Data logger:	100 measurements protocols
Interface:	USB
Software:	oscilloscopstyle software, 20 readings / s
Voltage supply:	2 x AA alkaline battery or USB
Weight:	420 g
Scope of supply:	Device incl. USB cable & software, bag, insertion probe type K, batteries, carrying loop, calibration protocol, transport case

## Accessories and spare parts:

## Certificate of calibration

## Tripod

## GIM3590



## Humidity / flow rate handheld instruments



Application:	Device	GMH 3330 + TFS 0100 E	GMH 3350 + TFS 0100 E	GFTH 95	GFTH 200	GFTB 200
Air conditioning		✓	✓	✓	✓	✓
Ambient air monitoring		✓	✓	✓	✓	✓
Meteorology						✓
Room climate						✓
Flow measurement		✓	✓			
Air pressure measuring						✓
<b>Calculation of:</b>						
Dew point Td		✓	✓		✓	✓
Wet bulb temperatur Twb					✓	✓
Moisture content x						✓
Absolute humidity d						✓
Dew point distance		✓	✓			
Enthalpy		✓	✓			

Function/ Equipment:	Device	GMH 3330 + TFS 0100 E	GMH 3350 + TFS 0100 E	GFTH 95	GFTH 200	GFTB 200
<b>Specification:</b>						
<b>Meas. range</b>						
Humidity		0.0 ... 100.0 % RH		10.0 ... 95.0 % RH	0.0 ... 100.0 % RH	0.0 ... 100.0 % RH
Humidity (rec. range)		11 ... 90 % RH		30 ... 80 % RH	11 ... 90 % RH	11 ... 90 % RH
Temperature		-40 ... +120 °C / add. external probe		-20 ... 70 °C	-25 ... +70 °C	-25 ... +70 °C
Flow		0.05 ... 5.00 or 0.55 ... 20.00 m/s		-	-	-
Pressure		-		-	-	10 ... 1100 mbar
<b>Accuracy</b>						
Humidity (rec. range)		± 2.5 % with TFS 0100 E		± 3 %	± 2.5 %	± 2.5 %
Temperature		± 0.2 % (Pt1000) / ± 0.5 % of m.v. ± 0.5 °C (NiCr-Ni)		± 0.5 % of m.v. ± 0.1 °C	± 0.5 % of m.v. ± 0.1 °C	± 0.5 % of m.v. ± 0.1 °C
Flow		± 0.1 %		-	-	-
Pressure		-		-	-	± 1.5 mbar
<b>Resolution</b>		0.1 % RH / 0.1 °C / 0.01 m/s		0.1 % RH / 0.1 °C	0.1 % RH / 0.1 °C	0.1 % RH / 0.1 °C / 0.1 mbar
<b>Plug-in probe</b>		✓	✓		✓	
<b>Functions:</b>						
<b>General functions</b>		Min/Max, Hold, Auto-Off	Min/Max, Hold, Auto-Off		Min/Max, Hold, Auto-Off	Min/Max, Hold, Auto-Off
<b>Serial interface</b>		✓	✓			✓
<b>Alarm</b>			✓			✓
<b>Data logger</b>			✓			
<b>Catalog page:</b>		20	20	22	22	19

## Climate measuring device – Precision Hygro- / Thermo- / Barometer



**ALARM FUNCTION  
WITH INTEGRATED BUZZER**

- air humidity, temperature and air pressure measurement
- additional display for further parameters, e.g. dew point temperature and absolute humidity
- min / max value memory
- very low power consumption (> 6500 operating hours)
- PC interface

**GFTB 200**

Digital-Hygro-/Thermo-/Barometer

**General:**

The GFTB 200 is designed for measuring air pressure, air humidity and temperature within seconds. It reaches remarkable accuracy because of its high precision sensors. The dew point temperature monitoring with GFTB 200 provides efficient protection from moisture damage potentially caused by condensation water and therefore helps preventing mold infestation. The integrated alarm function can be used to acoustically remind the user to ventilate in order to optimally and efficiently use heating energy. The integrated interface together with the software EBS 20M (optional) allow the use as mobile weather station with additional long-term recording. The GFTB 200 can precisely and clearly display the air condition with parameters like wet bulb temperature, absolute humidity and moisture content of the air.

**Application:**

- mobile weather station
- housing space, indoor swimming pools
- offices and production rooms, laboratories, storage rooms
- museums, gallery, churches
- Cooling and climate technology
- construction, building physics, loss assessment

**Specifications:****Measuring ranges:**

<b>Temperature:</b>	-25.0°C ... +70.0 °C
<b>Air humidity:</b>	0.0 ... 100.0 % RH (recommended range: 11 ... 90 % RH)
<b>Air pressure:</b>	10.0 ... 1100.0 mbar

**Calculated parameters:**

<b>Dew point temperature Td:</b>	-40.0 ... 70.0 °C
<b>Wet bulb temperature Twb:</b>	-27.0 ... 70.0 °C
<b>mixing ratio x:</b>	0.0 ... 280.0 g/kg
<b>Absolute humidity d:</b>	0.0 ... 200.0 g/m <sup>3</sup>
<b>Resolution:</b>	0.1 % RH; 0.1 °C / 0.1 °F, 0.1 mbar

**Accuracy: (±1 digit) (at nominal temperature = 25 °C)**

<b>Temperature:</b>	±0.5 % v.MW. ±0.1°C (Pt1000 1/3 DIN B)
<b>Air humidity:</b>	±2.5 % RH (at range 11 ... 90 %)
<b>Air pressure:</b>	±1.5 mbar (750 ... 1100 mbar)

**Sensors:**

<b>Temperature:</b>	Pt1000
<b>Air humidity:</b>	capacitive polymer humidity sensor
<b>Air pressure:</b>	piezo-resistive sensor hybrid

**Response time:** T<sub>90</sub> = 10 s**Display:** 4½ -digit, approx. 11 mm high LCD-display with additional displays**Operation elements:** 3 keys for ON/OFF, min/max value display, hold**Nominal temperature:** 25 °C**Working conditions:**

<b>Electronics:</b>	-25 ... 70 °C; 0 ... 80 % RH (non condensing)
<b>Sensors:</b>	-25 ... 70 °C; 0 ... 100 % RH

**Power supply:** 9 V battery Typ IEC 6F22**Current consumption:** approx. 30 µA at 1 measuring / 60 s (mode SLOW)  
approx. 70 µA at 1 measuring / s (mode FAST)**Low battery warning:** „BAT“

<b>Auto-off-function:</b>	When Auto-off is activated, the device switches automatically off, if keypad is not attended for a longer time (selectable 1 ... 120 min).
<b>Interface:</b>	Serial interface, via electrical isolated interface converter USB 3100 N (accessories) directly connectable to PC.
<b>Min / max value memory:</b>	Lowest and highest values are saved for all units.
<b>Hold function:</b>	The current displayed value is 'frozen' (all units are affected)
<b>Configurable display:</b>	choice between automatically displaying all values rotationally (cycle of 2 or 4 s) or manual selection, units not needed can be excluded
<b>Sea level correction:</b>	The displayed value of the barometer can be converted to air pressure at sea level (therefore the altitude above sea level has to be entered)
<b>Tendency indicator (for barometer):</b>	air pressure falling/increasing
<b>Offset and scale:</b>	digital offset- and scale adjustment of measurements
<b>Housing:</b>	impact-resistant ABS housing: approx. 106 x 67 x 30 mm (H x W x D), additionally the sensor head at the "length" side, 35 mm long, Ø 14 mm; resulting total length 141 mm
<b>Weight:</b>	approx. 130 g incl. battery

**Options (upon upcharge):****- KIT**

- USB-interface kit, consisting of:
  - USB interface converter USB 3100 N
  - multi channel software EBS20M (to record all device units) (ordering description: GFTB 200 / KIT)

**Accessories and spare parts:****GKK 252**

case (235 x 185 x 48 mm) with foam lining

**WPF4**

Certificate of calibration, humidity, for ISO9000ff (p.r.t. p. 6)

**WPD5**

Certificate of calibration, pressure, for ISO9000ff (p.r.t. p. 6)

**GFTB 200 SET**

Measurement set GFTB200 incl. infrared thermometer GIM 530 MS and case GKK 3000

**General:**

The additional infrared thermometer contained in the GFTB 200 SET makes it easy to check mould-problem areas on walls etc. The wall can easily be scanned by means of the laser beam within very short time. When wall temperature falls below the critical dewpoint (this is, when the wall gets wet), the device alerts with an audible signal.

**Additional advantages GFTB 200 SET:**

- blindingly easy search for thermal bridges
- targeting laser for precise location even of inaccessible areas
- audible alarm below dewpoint
- fast evaluation of mould-problem areas

**Note:**

for technical data for the infrared thermometer GIM530MS please refer to catalog page 16.



## humidity, temperature and flow rate measuring device



**DOUBLE DISPLAY OF HUMIDITY AND TEMPERATURE**

- Calculation of dew point temperature, dew point distance and enthalpy
- Min-/Max value memory, hold function
- Serial interface
- Additional temperature input (type K)

### additional functions of GMH 3350

- 2 integrated logger functions
- Optical and acoustic min-/max- alarm
- Real-time clock with day, month and year

### GMH 3330

climate measuring device, probe not included

### GMH 3350

climate measuring device, probe not included, with data logger

Please order probes separately! (p.r.t. next page)  
(No re-calibration required for probe exchange!)

#### Specification:

#### Measuring ranges:

Relative humidity:	0.0 ... 100.0 % RH
Ambient temperature:	-40.0 ... +120.0 °C (depending on TFS-probe)
Surface temperature:	-80.0 ... +250.0 °C
Flow rate:	depending on STS probe (p.r.t. next page)
Resolution:	0.1 % RH, 0.1 °C / 0.1 °F, 0.01 m/s

#### Accuracy (device) (±1 digit) (at nominal temperature = 25 °C)

Relative humidity:	±0.1 %
Ambient temperature (Pt1000):	±0.2 %
Surface temperature (NiCr-Ni):	±0.5 % of m.v. ±0.5 °C
Flow rate:	±0.1 %

**Probes:** No calibration required for exchange of humidity/temperature or flow rate probe. (p.r.t. page 21)

**Probe connection:** 6-pin screened Mini-DIN-socket

**NiCr-Ni-connection:** for miniature flat-pin plug

**Display:** two 4½ digit LCDs (12.4 mm or 7 mm high), as well as additional functional arrows.

**Working temperature:** -25 ... +50 °C

**Relative humidity:** 0 ... 95 % RH (non-condensing)

**Storage temperature:** -25 ... +70 °C

**Pushbuttons:** 6 membrane keys

**Interface:** serial interface, direct connection to RS232 or USB interface of a PC via electrically isolated interface adapter GRS 3100 or GRS 3105 resp. USB 3100 N (p.r.t. accessories).

**Power supply:** 9 V battery, type IEC 6F22 (included) as well as additional d.c. connector for external 10.5-12 V direct voltage supply. (suitable power supply: GNG10/3000)

**Auto-Off-Function:** 1 ... 120 min (can also be deactivated).

**Power consumption:** approx. 2.5 mA (incl. TFS0100)

**Low battery warning:** Δ and 'bAt'

**Housing dimensions:** (device): 142 x 71 x 26 mm (H x W x D)  
Impact-resistant ABS plastic housing, membrane keyboard. Front side IP65, integrated pop-up clip for table top or suspended use.

**Weight:** approx. 160 g (incl. battery)

#### Functions:

**Min-/Max-value memory:** memorizing of max. and min. values for humidity, temperature, dew point etc.

**Hold function:** By pressing a button the current values will be „frozen“.

**Calculation of dew point:** based upon humidity and temperature.

**Calculation of dew point distance:** by means of a surface measurement

**Calculation of enthalpy** (thermal content h of the air)

**Adjustment-function for atmospheric humidity measurements**

**NiCr-Ni-temperature measuring:** any standard NiCr-Ni-probe (type K) can be plugged in. Recommendation: GOF400VE (p.r.t. p. 128). A compensation value can be set for surface measurement if necessary.

#### Flow measurements:

Two different systems for averaging are integrated:

- **continuous averaging:** the average value displayed is calculated using the last measurements during the averaging time set.
- **averaging upon request:** by starting the current measuring value will be displayed for the averaging time. As soon as the time has expired the average value will be displayed, the device is in HOLD mode.
- **selectable averaging time:** 1 ... 30 seconds

#### Additional functions of the GMH3350:

**Min-/Max-alarm:** the measuring value is constantly monitored if they remain within the min./max. limits set.

#### - Alarm: 3 different alarm settings

- off: alarm function not activated
- on: visual alarm via display, integrated buzzer and interface
- no Sound: alarm via display and interface

- **Controlling function:** with the help of the switching module GAM3000 (optionally) electric equipment can be switched on/off or alarm memoried (p.r.t. accessories)

#### Logger functions:

- **manually:** 99 data sets (data recall via keyboard or interface)
- **cycle:** 5.400 data sets (data recall via interface)  
adjustable cycle time: 1 s ... 1 h

Logger start and stop via the keyboard or interface. Comfortable read-out and display software (GSOFT3050) available as additional equipment.

**Real-time clock:** clock with day, month and year.

#### Accessories and spare parts:

##### GNG 10/3000

plug-in power supply

##### GKK 3500

case with cut-outs for GMH3xxx

##### GKK 3600

case with foam lining for universal use

##### USB 3100 N

interface converter, electrically isolated

##### ST-RN

device protection bag with cut out for sensor connection, suitable for: GMH3330, GMH3350

##### GSOFT 3050

software for the setting, data read-out and printing of all logger data stored for devices of the GMH3xxx-series with logger function

##### GAM 3000

Switching module for devices of the GMH3xxx-series incl. alarm output

##### GMH3330 incl. TFS0100E and WPF4

device incl. measuring probe, certificate of calibration and case (p.r.t. page 6)

## Measuring probes for GMH 3330 and GMH 3350

## Humidity / temperature



## Humidity/temperature:

**TFS 0100 E**

(0.0 ... 100.0 % RH)

Humidity/temperature probe, exchangeable

Specification:	
<b>Measuring ranges:</b>	
<b>Humidity:</b>	0.0 ... 100.0 % RH (rec. range of application: 11 ... 90 % RH)
<b>Temperature:</b>	-40.0 ... +120.0 °C (attention: working temperature of electronics!)
<b>Accuracy: (at nominal temperature = 25 °C)</b>	
<b>Humidity:</b>	±2.5 % RH
<b>Temperature:</b>	±0.5 °C
<b>Sensors:</b>	
<b>Humidity:</b>	capacitive polymer humidity sensor
<b>Temperature:</b>	Pt1000, 1/3 DIN
<b>Electronics:</b>	
PC board with amplifier and data memory for sensor data (calibration, etc.) integrated in probe handle.	
<b>Working temperature:</b>	
-25 ... +60 °C (handle and electronics)	
-40 ... +100 °C (for short time up to +120 °C) (sensor head and tube)	
<b>Relative humidity:</b>	
0 ... +100 % RH	
<b>Dimensions:</b>	
Probe tube: Ø14 x 119 mm, plastic handle: Ø 19 x 135 mm, approx. 1 m PVC connection cable with 6-pin Mini-DIN-plug	
<b>Weight:</b>	
approx. 90 g	

**Accessories: calibration device**

Humidity reference cells works on the basis of physiochemical processes. A specific value of relative humidity adjusts itself over a saturated salt solution. The test chamber is separated from the solution by a diaphragm so that the sensor under test is protected against contamination by the solution. The test container can be used in all mounted positions.

**GFN-SET1**

Humidity reference cells for ~33 and ~76 %RH,  
probe adapter and robust carry case

**GFN 33**

humidity reference cell for ~33 % RH, incl. adapter

**GFN 76**

humidity reference cell for ~76 % RH, incl. adapter

## Surface temperature:

**GOF 400VE**

(p.r.t. page 128)

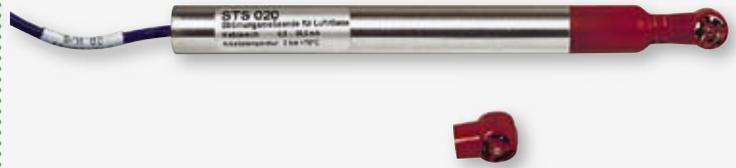
Quick-response surface probes for walls, floors etc.

**GTF 300**

(p.r.t. page 130)

Quick-response basic thermocouple probe for universal applications (surface measurement)

## flow speed



## Water:

**STS 005**

(0.05 ... 5.00 m/s)

Flow measuring probe with snap-on head, exchangeable

Specification:	
<b>Sensor type:</b>	windmill-type anemometer
<b>Measuring range:</b>	0.05 ... 5.00 m/s (water)
<b>Accuracy:</b>	of range ± 3 % of meas. value (at nominal temperature = 25 °C)
<b>Permiss. angle flow:</b>	±20°, without additional measuring faults
<b>Working temperature:</b>	0 ... +70 °C
<b>Relative humidity:</b>	0 ... +100 % RH (non-condensing)
<b>Dimensions:</b>	Probe head: Ø 11 x 15 mm, tube: Ø 15 mm, overall length 165 mm, required insertion opening: Ø 16 mm, approx. 5 m PVC connection cable with 6-pin Mini-DIN-plug
<b>Weight:</b>	approx. 75 g

## Air:

**STS 020**

(0.55 ... 20.00 m/s)

Flow measuring probe with snap-on head, calibrated and exchangeable.

Specification:	
<b>Sensor type:</b>	windmill-type anemometer
<b>Measuring range:</b>	0.55 ... 20.00 m/s (air)
<b>Accuracy:</b>	±1 % of range ± 3 % of meas. value (at nominal temperature) = 25 °C)
<b>Permiss. angle flow:</b>	±20°, without additional measuring faults
<b>Working temperature:</b>	0 ... +70 °C
<b>Relative humidity:</b>	0 ... +100 % RH (non-condensing)
<b>Dimensions:</b>	Probe head: Ø 11 x 15 mm, tube: Ø 15 mm, overall length 165 mm, required insertion opening: Ø 16 mm, approx. 5 m PVC connection cable with 6-pin Mini-DIN-plug
<b>Weight:</b>	approx. 75 g

**Accessories and spare parts:****STE 005**

Spare snap-on head for STS 005

**STE 020**

Spare snap-on head for STS 020

**GTS**

GTS Telescopic rod (overall length 1 m)

Please specify when ordering - no retrofit assemblage possible!



picture shows GTS with assembled STS 020

## Humidity/Temperature Measuring Device



### GFTH 95

Hygro-/Thermometer

#### Application:

Quick-response humidity and temperature measurements in EDP rooms, museums, galleries, churches, office complexes, workshops, storage rooms, swimming-baths, private buildings, greenhouses, for refrigeration engineering, air conditioning, for building sites/technology, for inspectors or rendering of expert opinions etc.

#### Specification:

##### Measuring range:

°C:	-20,0 ... 70,0 °C
% RH:	10 ... 95 % RH (recommended range: 30 ... 80 %)

Resolution: 0.1 °C or 0.1 % RH

##### Accuracy: (±1 digit) (at nominal temperature = 25 °C)

temperature:	±0.5 % of m.v. ±0.1 °C
humidity:	±3 % RH (for range 30 ... 80 %)

##### Measuring probe:

temperature:	Pt 1000
humidity:	capacitive polymer humidity sensor

Response time  $T_{90} = 15$  s

Display: 3½-digit, 13 mm high LCD-display

Operation elements: slide switch for selection of measuring range

Nominal temperature: 25 °C

##### Operating conditions:

Electronic: -20 ... 70 °C; 0 ... 80 % RH (non-condensing)

Sensors: -20 ... 70 °C; 0 ... 100 % RH

Power supply: 9 V-battery type IEC 6F22 (in scope of supply)

Power consumption: max. 0.1 mA

Low battery warning: „BAT“ displayed automatically in display of low battery condition.

Housing: impact resistant ABS-housing 106 x 67 x 30 mm, plus sensor head protruding at the longer side 35 mm long and 14 mm Ø, ie. overall length 141 mm.

Weight: approx. 135 g incl. battery

#### Accessories and spare parts:

**GKK 252 case**  
(235 x 185 x 48 mm) with foam lining

**GKK 1100 case**  
(340 x 275 x 83 mm) with foam lining

**GB 9 V** spare battery

**Certificate of calibration WPF4**  
for ISO9000ff (p.r.t. page 6)

## Humidity / Temperature / Dew Point Measuring Device



### GFTH 200

Hygro-/Thermometer

### GFTH 200 SET

Measuring set incl. infrared thermometer  
GIM 530 MS and case GKK 3000

#### General:

Because of the low power consumption and the integrated min-/max-value memory the **GFTH200** is perfectly suitable for long term climate surveillances.

The additional infrared thermometer contained in the **GFTH 200 SET** makes it easy to check mould-problem areas on walls etc. The wall can easily scanned by means of the laser beam within very short time. When wall temperature falls below the critical dewpoint (this is, when the wall gets wet), the device alerts with an audible signal.

#### Advantages GFTH 200:

- relative humidity, temperature and dew point in just one instrument
- high accuracy by means of digital works calibration
- min-/max-value memory for all measurements
- external Pt1000 temperature probe connectable
- offset and slope correction for easy adjustment
- extrem low power consumption

#### Additional advantages GFTH 200 SET:

- blindingly easy search for thermal bridges
- targeting laser for precise location even of inaccessible areas
- audible alarm below dewpoint
- fast evaluation of mould-problem areas

#### Accessories and spare parts:

**GKK 252 case**  
(235 x 185 x 48 mm) with foam lining

**GOF 175 Mini temperature probe**  
for surface temperature measuring (p.r.t. page 127)

**further temperature probe refer to page 125**

**Certificate of calibration WPF4**  
for ISO9000ff (p.r.t. page 4)

**GFTH200 - WPF4 complete-offering**  
device incl. certificate of calibration and case (p.r.t. page 6)



#### Specification:

##### Measuring range:

Temperature: -25.0 ... +70.0 °C; -13.0 ... +158.0 °F

% RH: 0.0 ... 100.0 % RH  
(recommended range: 11 - 90 % RH)

Td: (Dewpoint) -40.0 ... +70.0 °C or  
-40.0 ... +158.0 °F

Resolution: 0.1 % RH, 0.1 °C or 0.1 °F

##### Accuracy: (±1 digit) (at nominal temperature = 25 °C)

Temperatur (internal): ±0.5 % of m.v. ±0.1 °C

Temperature (external): 0.1 °C (device) + probe accuracy

humidity: ±2.5 % RH (for range 11 to 90 %)

##### Measuring probe:

temperature: Pt 1000

humidity: capacitive polymer humidity sensor

Response time:  $T_{90} = 10$  s

terminal for external probe: for connection of any Pt1000-probes with 3.5 mm mono plug (for suitable probes p.r.t. page 127)

Display: 3½-digit, 13 mm high LCD-display

operation elements: 3 keys for On/Off, min-/max-value display and hold. Slide switch for selection of measuring range.

Nominal temperature: 25 °C

##### Operating conditions:

Electronic: -25 ... 70 °C; 0 ... 80 % RH (non-condensing)

Sensors: -25 ... 70 °C; 0 ... 100 % RH

Power supply: 9 V-battery type IEC 6F22

Power consumption: approx. 9 µA at 1 measuring / 60 s  
approx. 100 µA at 1 measuring / s (mode FAST)

Low battery warning: „BAT“

Min./max. value memory: Min and Max measuring values are stored for all 3 ranges.

Hold key: The current measuring will be „frozen“ (for all three ranges).

Housing: impact resistant ABS-housing 106 x 67 x 30 mm, plus sensor head protruding at the longer side 35 mm long and 14 mm Ø, ie. overall length 141 mm.

Weight: approx. 135 g incl. battery

#### GIM 530 MS:

for technical data for this instrument please refer to page 16.

## Material moisture handheld instruments



Application:	Device	GMK 210	GMK 100	GMI 15	GMR 110	GMH 3810	GMH 3830 + appropriate electrode	GMH 3851 + appropriate electrode	BaleCheck 100	BaleCheck 200
Carpenter, joiners			✓	✓	✓	✓	✓			
DIY / Hobby			✓	✓	✓	✓	✓			
Boat & Caravan (wood & GFK)		✓								
Certified glue lam							✓	✓		
Foelwood, wooden log					✓	✓	✓	✓		
Wood chips							✓	✓		
Plaster, screed			✓	✓	✓	✓	✓	✓		
Concrete, bricks, lime mortars			✓	✓	✓	✓	✓	✓		
Construction-damage assessment			✓	✓	✓	✓	✓	✓		
Water damage restoration			✓	✓	✓	✓	✓	✓		
Hay bale / bale of straw							✓	✓	✓	✓
Corn (barley, wheat)							✓	✓	✓	✓

Function / Equipment:	Device	GMK 210	GMK 100	GMI 15	GMR 110	GMH 3810	GMH 3830 + appropriate electrode	GMH 3851 + appropriate electrode	BaleCheck 100	BaleCheck 200
Specification:										
Method		capacitive (non-destructive)				resistive (Resistance)				
Sensor / Probe		integrated			integrated	external		external GSF 40	external GSF 40TF	
Measuring range		material moisture: 0 ... 100 %			material moisture: 0 ... 100 %					
Characteristics		14	18		4	494		4	494	
Programmabel user curves								4		
Functions:										
General functions		Hold, Auto-Off	Hold, Auto-Off		Hold, Auto-Off	Hold, Auto-Off, Sort	Hold, Auto-Off, Sort	Hold, Auto-Off, Sort	Hold, Auto-Off	Hold, Auto-Off, Sort
Interface							✓	✓		✓
Analog output							0 ... 1 V, freely adjustable	0 ... 1 V, freely adjustable		0 ... 1 V, freely adjustable
Data logger								✓		
Catalog page:		25	25	24	29	29	26	26	30	30

## Methods

- **Resistive measuring method**  
(GMR 100, GMH 3810, GMH 3830, GMH 3850)

The electrical resistance often depends on the material moisture. Therefore the devices measure the (possibly extremely high) values of resistance and convert them to the displayed value by means of integrated characteristic curves. The temperature has to be compensated especially at the measurement of wood – all GREISINGER- instruments have an integrated temperature compensation. In most cases the contact is realised by nails that are driven into the material are used to contact.

- **Capacitive measuring method**  
(GMK 210, GMK 100, GMI 15)

The dielectric properties of an object are often a good indicator for its material moisture. The dielectric coefficient of water is considerably higher than that of dry lumbers or building materials. Therefore the total dielectric coefficient of the measuring object can be easily used to get its material moisture. For the measurement the device has to be applied on the material.  
Precondition therefore: planar surfaces, no metallic elements.

- **relative humidity**  
(i.e. with GMH 3330 + TFS 0100 E)

Another method is to measure the material moisture indirectly by means of the relative humidity: The humidity in a sealed hole within a material depends on the material moisture. By means of a so-called sorption isotherm or a corresponding table the material moisture can be calculated from the humidity.

- **dry method**

The oven dry method can be used for reference point measurement with highest accuracy.  
The moist material is weighed and afterwards dried at increased temperature until no weight loss is detectable anymore. The material moisture can be calculated from the moist and arid weight.

## Units

- **Material moisture u (also „atro“):**

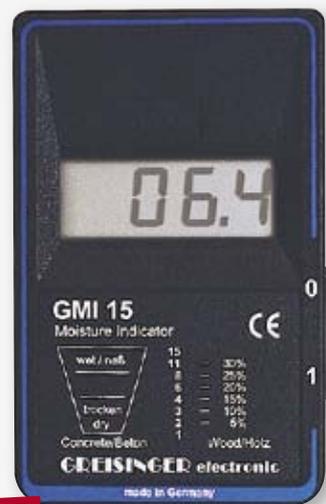
relating to dry mass  
**material moisture u [%] =**  
**(mass wet - mass dry) / mass dry \* 100**  
Particularly important for carpenters, joiners, etc.

- **Moisture content w:**

material moisture related to wet total mass  
**moisture content w [%] =**  
**(mass wet - mass dry) / mass wet \* 100**  
Particularly important for the evaluation of combustibles.

- **“Digit“ (GMI 15)**

The displayed value is relative, that means without a physical unit. This can be used to get comparative moisture information of the same materials. Lower values indicate less moisture, higher values indicate therefore more moisture.



**NONDESTRUCTIVE  
MEASUREMENT**

## GMI 15

Indicator for moisture in wood and buildings

### General:

Device for high-speed determination of moisture in buildings, contracting work etc. The GMI 15 allows detection of moisture in wood down to a depth of approx. 3 cm and in concrete or wash floor down to a depth of approx. 4 cm. Detection of moisture behind ceramic tiles and/or various wall or floor coverings.

To check moisture simply place device on the surface to be measured - no injection into the measuring object required.  
The displayed values by „digit“ are relative, that means the values can be well compared.

### Application:

Humidity indication for i.e. estate agents (for fast control state of buildings), property management, house owners, architects, building experts, building contractors, mobile homes (moist in insulations), polyester / GRP boats

### Note:

The GMI 15 is an indicator for the fast estimation - it does not replace precision instruments like the GMH 3810, GMH 3830, GMH 3850 or GMK 100.

### Specification:

<b>Display:</b>	3½-digits, 13 mm high LCD
<b>Display range:</b>	
<b>concrete / floor pavement</b>	0 ... 5 = dry 6 ... 9 = humid, normal humidity level 10 ... = wet
<b>wood / fibre glass reinforced polyester</b>	0 ... 3 ~ 0 ... 12 % : dry 3 ... 6 ~ 12 ... 20 % : air-dry 6 ... 11 ~ 20 ... 30 % : wind-dry 11 ... ~ 30 % ... : wet
<b>Power supply::</b>	9 V-battery (type IEC 6F22)
<b>Power consumption:</b>	approx. 5 mA
<b>Low battery warning:</b>	„BAT“, displayed automatically in case of low battery.
<b>Working temperature:</b>	0 ... 50 °C (not frozen)
<b>Storage temperature:</b>	-20 ... +70 °C
<b>Relative humidity:</b>	0 ... 80 % RH (non-condensing)
<b>Housing:</b>	Impact resistant ABS plastic housing, approx. 106 x 67 x 30 mm (H x W x D).
<b>Weight:</b>	approx. 150 g (ready for use)

For further information on this topic please see the devices' manuals and our homepage [www.greisinger.de](http://www.greisinger.de) under Download -> Documents

## Measuring device moisture in wood and buildings



### GMK 100

Measuring device moisture in wood and buildings

#### General:

The GMK 100 is a capacitive material moisture measuring device with direct moisture display in percent. It is optimally suited for home and handcraft. Depending on the application, it is possible to display the material moisture "u" or the water content "w".

The humidity is measured by a measuring plate on the back of the device. With a side-mounted switch the measuring depths can be changed. With the help of measurements in different depth a statement could be made if for example the material dries already or if the moisture is just on the surface of the material.

#### Application:

Humidity measurement and indication of Wood, Concrete, Screed, Plaster, etc.

#### Features:

- Non-destructive measurement
- Moisture display in percent
- Acoustical and visual moisture rating
- 18 material characteristics for wood and building materials
- 2 different measurement depth
- Backlight

#### Specification:

<b>Display:</b>	2 displays for material and measured value, in % material moisture or in % moisture content, backlight
<b>Moisture rating:</b>	
<b>Visual:</b>	Rating of the moisture in 6 levels from WET to DRY
<b>Acoustic:</b>	Signal tone
<b>Measurement depths:</b>	10 mm and 25 mm
<b>Materials:</b>	18 characteristic curves for wood (with assignment label for wood species) and popular materials, additionally reference curve (rEF) for high-resolution relative measurements
<b>Working temperature:</b>	-25 ... 50 °C (not frozen)
<b>Storage temperature:</b>	-25 ... 70 °C
<b>Power supply:</b>	9 V-battery (Type IEC 6F22)
<b>Power consumption:</b>	approx. 0.12 mA
<b>Power backlight:</b>	approx. 2.5 mA (Auto-Off)
<b>Functions:</b>	Used-battery-display, Auto-Off-Function, Hold
<b>Housing:</b>	impact-resistant ABS plastic housing, plastic foil keyboard, clear screen, front: IP65
<b>Dimensions:</b>	approx. 106 x 67 x 30 mm (H x W x D)
<b>Weight:</b>	approx. 145 g (incl. battery)

#### Accessories and spare parts:

<b>PW 25</b>	Testing probe to control the device
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## Material moisture measuring device for caravan and boat



### GMK 210

Material moisture measuring device for caravan and boat

#### General:

The GMK 210 is a capacitive material moisture measuring device with direct moisture display in percent. It is optimally suited for home and handcraft. Depending on the application, it is possible to display the material moisture "u" or the water content "w".

The humidity is measured by a measuring plate on the back of the device. With a side-mounted switch the measuring depth can be changed. With the help of measurements in different depth a statement could be made if for example the material dries already or if the moisture is just on the surface of the material.

#### Application:

Humidity measurement and indication of Wood, GFK (glass fiber reinforced plastic)

#### Features:

- Non-destructive measurement
- Moisture display in percent
- Acoustical and visual moisture rating
- 14 material characteristics for wood and GFK
- 2 different measurement depth
- Backlight
- Search mode for quickly locating humidity and the like

#### Specification:

<b>Display:</b>	2 displays for material and measured value, in % material moisture or in % moisture content, backlight
<b>Moisture rating:</b>	
<b>Visual:</b>	Rating of the moisture in 6 levels from WET to DRY
<b>Acoustic:</b>	Signal tone
<b>Measurement depths:</b>	10 mm and 25 mm
<b>Materials:</b>	14 characteristic curves for wood (with assignment label for wood species) and GFK, insulating materials i.e. Styropor; additionally reference curve for high-resolution relative measurements
<b>Working temperature:</b>	-25 ... 50 °C (not frozen)
<b>Storage temperature:</b>	-25 ... 70 °C
<b>Power supply:</b>	9 V-battery (Type IEC 6F22)
<b>Power consumption:</b>	approx. 0.2 mA
<b>Power backlight:</b>	approx. 2.5 mA (Auto-Off)
<b>Functions:</b>	Used-battery-display, Auto-Off-Function, Hold
<b>Housing:</b>	impact-resistant ABS plastic housing, plastic foil keyboard, clear screen, front: IP65
<b>Dimensions:</b>	approx. 106 x 67 x 30 mm (H x W x D)
<b>Weight:</b>	approx. 145 g (incl. battery)

#### Accessories and spare parts:

<b>PW 25</b>	Testing probe to control the device
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# Precision material moisture measuring device for wood, building materials, straw, hay, paper, textiles, etc.



- Moisture rating
- Display in material moisture *u* or water content *w*
- Connection of external temperature probes
- serial interface or analog output 0-1 V, freely scalable
- incl. calibration protocol

**466 WOOD TYPE CHARACTERISTICS**  
**28 CONSTRUCTION MATERIALS**

MPA certified appr. for glued timber construction acc. to DIN 1052-1

additional functions of GMH 3851

- Average function e.g. for firewood moisture
- 2 integrated logger functions
- 4 programmable characteristics
- Real-time clock

**NEW**

<b>Output:</b>	3-pole jack connector Ø 3.5 mm, either with serial interface or analog output
<b>- Serial interface:</b>	connectable to RS232 or USB interface of PCs via electrically isolated interface converter GRS 3100, GRS 3105 or USB 3100 N (accessories).
<b>- Analog output:</b>	0 - 1 V, freely scalable
<b>Power supply:</b>	9 V battery, additional socket for external 10.5-12 V direct current power supply (adequate PSU: GNG10/3000).
<b>Power consumption:</b>	approx. 2.5 mA
<b>Dimensions / weight:</b>	142 x 71 x 26 mm, 155 g
<b>Housing:</b>	impact-resistant ABS, front side IP65, integrated pop-up clip for table top or suspended use.

### Functions:

**Hold, Auto-Hold** Automatic „freezing“ of stable measuring values

**Battery change indicator**  $\Delta$  and „bAt“

**Sort** Limits the characteristics selection to up to 8 favorite curves.

**Auto Power Off**

**additional functions of GMH 3851:**

**Data logger:** This instrument is essential for the documentation of material state by quality assurance systems, etc.

By means of the integrated data logger there can be up to 10000 measuring values recorded and processed on demand. Additionally it is possible to individually program 4 material curves (e.g. with dry oven or CM-method). This instruments finally makes paper correction tables unnecessary.

**Logger functions:**

**- manual:**

99 data sets (the data can be read out by keypress or interface)

**- cyclic:**

10,000 data sets (data can be read out by interface)

adjustable cycle time: 30 s ... 1 h

The logger is started by keypress or interface.

There is a comfortable software GSOFT 3050 (accessories) available for read-out of the logger data.

**Real-time clock:** clock with day, month and year

**User specific characteristics:** 4, freely programmable

**Interpolation points per curve:** approx. 20

By means of the gratis software GMHKonfig the interpolation points can be comfortably edited and stored to the instrument.  
(Required accessories: interface converter)

### Accessories and spare parts:

**GSOFT 3050**

Logger operation software

**GRS 3100**

RS232 interface converter

**USB 3100 N**

Interface converter

**GKK 3500**

case (394 x 294 x 106 mm)

additional accessories: see next page

## GMH 3830

Resistive material moisture and temperature measuring device, w/o accessories

## GMH 3851

Resistive material moisture and temperature measuring device, w/o accessories with data logger and programmable characteristic curves memory

### Description:

The GMH 3830 and GMH 3851 offer decisive advantages in handling, user-friendliness, functional range and accuracy. The absolute moisture of 494 material types is displayed directly and can be automatically converted to water content. The cumbersome usage of calculation tables becomes a thing of the past. Additionally you get a moisture rating (wet ... dry) of the measured material.

### Application:

Precision measurements in cut-wood, chip board, veneer, sawdust, wood chips, wood wool, flax, straw, hay, concrete, gas concrete, bricks, wash floor, cast, limestone mortar, cement mortar, paper, carton, textiles etc.

### User:

architect, expert, inspector, building contractor, painter, carpenter, parquet joiner, floor tiler, wood works, timber desiccation plant, building repair company, textile industry etc.

### Specifications:

#### Measuring principle:

**Moisture:** Resistive material moisture measurement acc. to DIN EN 13183-2:2002

#### Temperature:

**external:** thermocouple, NiCr-Ni (type K)

**internal:** NTC

**Characteristics:** 494 material characteristics

#### Measuring range:

**Moisture:** 0.0 ... 100 % *u* (material moisture)  
0.0 ... 50 % *w* (water content, wet basis)  
(depends on selected characteristic)

**Temperature:** -40.0 ... +200.0 °C (-40.0 ... +392.0 °F)

**Moisture rating:** 9 steps (dry ... wet)

**Resolution:** 0.1 % or 0.1 °C (0.1 °F)

#### Device accuracy: (at nominal temperature)

**Wood:** ± 0.2 % material moisture (deviation from corresponding characteristic curve in range 6 ... 30 %)

**Building material:** ± 0.2 % material moisture (deviation from corresponding characteristic curve)

**Temperature:** (external) ± 0.2 % of m.v. ± 0.3 °C

**Temperature compensation:** automatic or manual

#### Sensor connection:

**Moisture:** BNC

**Temperature:** thermovoltage-free Type K (NiCr-Ni) socket

**Perm. working temperature:** -25 ... 50 °C

**Display:** two 4-digit LCD displays (12.4 mm and 7 mm high), additional indicator arrows

## Accessories

**GMK 38**

Connection cable  
(BNC to 2 x banana plug) approx. 90 cm long

**GHE 91**

Reciprocating piston electrode \*  
to drive measuring nails into material without auxiliary devices

**GSE 91**

Impact electrode \*  
to drive measuring nails into material

**GEG 91**

Handle  
suitable for GSE 91

**GSG 91**

Penetration electrode \*  
adequate for steel nails and measuring rods

**GST 91**

steel nails  
9 steel nails (3 pieces each, 12, 16 and 23 mm long) in plastic case, Ø 2.5 mm

**GST 91/40**

steel nails  
10 steel nails, 40 mm long, Ø 2.5 mm, in plastic case

**GST 45i**

steel nails  
2 Teflon isolated steel nails, 45 mm long, Ø 2.5 mm

**GST 60i**

steel nails  
2 Teflon isolated steel nails, 60 mm long, Ø 2.5 mm

**GOK 91**

measuring cap  
Surface measuring caps (pair)  
(for use with GSG 91 or GSE 91)

**GMS 300/91**

Measuring rods  
300 mm long (pair), for wood chips, wood wool, paper, carton, etc. (for use with GSG 91 or GSE 91)

**GST 15B**

steel nails \*  
2 steel nails with bore hole, 15 mm long, Ø 3.8 mm (for direct connection of measuring cable GMK 38)

**GST 25B**

steel nails \*  
as above, Ø 3.8 x 25 mm

**GST 40B**

steel nails \*  
as above, Ø 3.8 x 40 mm

**GBSK 91**

Wire brush (pair) short \*  
for depths up to approx. 100 mm

**GBSL 91**

Wire brush (pair) long \*  
for depths up to approx. 300 mm

**GEF 38**

Flat electrode (pair) \*  
for screed, paper, etc.

**GLP 91**

conducting paste \*  
100 ml, for surface measurements and depth indication in walls, wash floors etc. with brush probes

**GSP 91**

sensor for surface measurements \*  
on paper, textiles etc.

**GSP 91 ES**

spare sensor element  
for GSP 91

**GSF 50 (110 cm)  
GSF 50K (43 cm)**

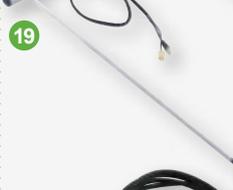
Injection probe  
(without temperature sensor) for measurement up to a depth of 40 cm or 107 cm, incl. 1 m connection cable. Suitable for: wood chips, wood wool, straw, hay, grain, saw dust, etc.

**GSF 50TF (110 cm)  
GSF 50TFK (43 cm)**

Injection probe  
(with temperature sensor) for measurement up to a depth of 40 cm or 107 cm, incl. 1 m connection cable. Suitable for: wood chips, wood wool, straw, hay, grain, saw dust, etc.

**GSF 40 (67 cm)**

Injection probe  
(without temperature sensor) for measurement of pressed bales up to a depth of 60 cm, incl. 1 m connection cable. Suitable for: pressed hay or straw bales, grain

**GSF 40TF (67 cm)**

Injection probe  
(with temperature sensor) for measurement of pressed bales up to a depth of 60 cm, incl. 1 m connection cable. Suitable for: pressed hay or straw bales, grain

**GTF 38**

NiCr-Ni temperature probe  
voltage-free, Ø 2.2 x 25 mm, 1 m cable  
(recommended for wood moisture measurements)

**GES 38**

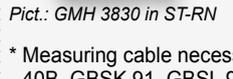
NiCr-Ni injection probe  
voltage-free, Ø 4 x 150 mm, 1 m cable  
(recommended for wood moisture measurements)

**GPAD 38**

Test adapter  
(with 2 reference values) for testing GMH 38xx and GMR 110

**GKK 3500**

Plastic case  
(394 x 294 x 106 mm) with cut-outs for device and accessories

**ST-RN**

Protection bag  
with blanked out sensor connections  
(suitable for GMH 3830, GMH 3850)

Pict.: GMH 3830 in ST-RN

\* Measuring cable necessary for GHE91, GSE 91, GSG 91, GST 15B / 25B / 40B, GBSK 91, GBSL 91, GEF 38, GLP 91, GSP 91



SET WITHOUT DEVICE

1 3 6 20 23

### SET 38 HF

Wood moisture set

**Content:**

- GKK 3500 (case)
- GMK 38 (measuring cable)
- GSE 91 (impact electrode)
- GST 91 (measuring nails)
- GTF 38 (temperature probe)

**Application:**

wood and timber



SET WITHOUT DEVICE

1 3 6 9 11 14 20 23

### SET 38 BF

Wood and building moisture set

**Content:**

- GKK 3500 (case)
- GMK 38 (measuring cable)
- GSE 91 (impact electrode)
- GST 91 (measuring nails)
- GTF 38 (temperature probe)
- GMS 300/91 (measuring rods)
- GBSK 91 (wire brush)
- GLP 91 (conductive paste)

**Application:**

wood, concrete, screed, plaster



SET WITHOUT DEVICE

1 2 6 20 23

### SET 38 MPA

MPA wood moisture set

**Content:**

- GKK 3500 (case)
- GMK 38 (measuring cable)
- GHE 91 (Reciprocating piston electrode)
- GST 91 (measuring nails)
- GTF 38 (temperature probe)

**Application:**

wood, gluelam

## Resistive material-moisture measuring device



**FOR WOOD AND  
BUILDING  
MATERIALS**

### GMH 3810

material-moisture measuring device with integrated measuring pins

#### General:

The measuring pins integrated on the reinforced front numerous measurements can be done without additional accessories.

For measuring of very hard materials we suggest the components shown at the accessories section.

- 494 characteristic curves
- incl. calibration protocol

#### Specifications:

##### Measuring principle:

**moisture:** resistive material-moisture-measuring matching DIN EN 13183-2:2002

**temperature internal:** NTC

**Characteristic curves:** 494

##### Measuring range:

**moisture:** 0.0 ... 100.0 % moisture content  
0.0 ... 50.0 % water content  
(depending on characteristic curve)

**temperature:** -25.0 ... +50.0 °C (-13.0 ... +122.0 °F)

**Estimation** in 9 steps (dry ... wet)

**Resolution:** 0.1 % resp. 0.1 °C (0.1 °F)

**Accuracy device: (at nominal temperature = 25 °C)**

**wood:** ±0,2 % moisture content  
(deviation from characteristic curve at range 6 ... 30 %)

**building material:** ±0,2 % moisture content  
(deviation from characteristic curve)

**Temperature compensation** automatically or manual

**Measuring probe:** 2 pin holders M6 x 0.75 with 19 mm pins (12 mm utilisable)

**Perm. working temperature** 0 ... 50 °C (not frozen)

**Storage temperature:** -25 ... +70 °C

**Relative humidity:** 0 ... 95 % RH (non-condensing)

**Display:** two 4-digit LCDs

**Power supply:** 9 V-battery, type IEC 6F22

**Power consumption:** approx. 2.5 mA

**Dimensions/Weight:** 142 x 71 x 26 mm, 175 g

**Housing:** Impact-resistant ABS plastic housing, membrane keyboard, transparent panel. Front side IP65, integrated pop-up clip

#### Functions:

Auto-Hold, Sort, Auto Power Off, Hold

#### Accessories and spare parts:

**GST 3810**  
replacement pins (10 pcs.)

**GMK 3810**  
1 m connection cable with 2 x banana plug and 2 adapters. Allows connection of accessories (except GSF38..., GTF38 and GES38) on GMH3810/GMR110.

**GSE 91**  
impact electrode



## Resistive material-moisture measuring device



- automatic temperature compensation
- material tables on rear side of device
- comfortable characteristic and rating display

**WITH INTEGRATED  
MEASURING NEEDLES**

### GMR 110

Resistive material moisture measuring device with integrated measuring needles.

#### General:

Compact and robust measuring device for fast evaluation of material moisture in firewood, timber, flake board, inlay, plaster, cement and lots more. A suitable characteristic is selected with help of material table on the rear side of the device before measuring. The material is contacted by pressing the measuring needles into it. The measured value is displayed only a short time afterwards. The device is especially designed for precise firewood and timber measurements, however, a lot of additional building materials can be rated.

- Material tables on rear side of device
- Integrated, exchangeable measuring needles
- Moisture rating (wet/dry) via bar graph
- Display of material moisture or water content
- Integrated temperature compensation
- Characteristic curve display

#### Characteristic curves:

##### 3 wood groups:

- h.01 spruce, pine  
h.02 maple, birch, beech, larch (EUR), ash (EUR), fir  
h.03 oak, ash (AM), poplar, douglas fir  
a lot of additional wood types can be determined with the table of the instruction manual

##### 8 building material curves:

- c.01 cement screed, concrete  
c.02 anhydrite screed  
c.03 plaster, lime mortar  
c.04 cement mortar  
c.05 gas concrete  
c.06 lime sand brick  
c.07 clay brick  
c.08 gypsum plaster

#### Specifications:

<b>Measuring principle:</b>	resistive material moisture measurement acc. to DIN EN 13183
<b>Characteristic curves:</b>	3 different wood groups (h.01, h.02, h.03) for a total of 130 wood types and 8 different building material curves (c.01, c.02, c.03, c.04, c.05, c.06, c.07, c.08)
<b>Measuring rang:</b>	0.0 ... 100 % material moisture (depends on selected characteristics)
<b>Moisture rating</b>	in 6 steps (wet ... dry)
<b>Resolution:</b>	0,1 % (<20 %), 1 % (>20 %)
<b>Accuracy: (at nominal temperature = 25 °C)</b>	
<b>wood:</b>	±0,2 % material moisture (Deviation to wood characteristic curve in range 6 ... 20 %)
<b>building materials:</b>	±0,2 % material moisture (Deviation to corresponding characteristic curve)
<b>Temperature compensation:</b>	automatically or manual
<b>Measuring probe:</b>	2 needle holder M6 x 0.75 with 19 mm measuring needles (12 mm usable length)
<b>Working temperature:</b>	-5 ... 50 °C (not frozen)
<b>Storage temperature:</b>	-25 ... +70 °C
<b>Working humidity:</b>	0 ... 95 % RH (non condensing)
<b>Display:</b>	2 LCD displays for characteristic and measuring value
<b>Power supply:</b>	9 V battery, type IEC 6F22
<b>Current consumption:</b>	approx. 1.8 mA
<b>Housing:</b>	made of impact-resistant ABS, plastic foil keyboard, clear screen. IP65 at front
<b>Dimensions:</b>	110 x 67 x 30 mm + needles 26 mm
<b>Weight:</b>	approx. 155 g
<b>Scope of supply:</b>	device, 2 needle protection caps, battery, operation manual

#### Functions:

Hold, Auto-Hold, Auto Power Off

#### Accessories and spare parts:

**GST 3810**  
spare measuring needles (10 pieces)

**GMK 3810**  
measuring cable incl. socket adaptor  
*additional special accessories at page 27*

**GKK 252**  
case (235 x 185 x 48 mm) with foam lining

**GB 9 V**  
spare battery

## Hay and straw humidity measuring device



- easy and comfortable handling
- robust 60 cm V4A measuring rod
- characteristics for hay, straw and grain
- percent display
- moisture rating

MATERIAL-MOISTURE  
MEASURING DEVICE

### BaleCheck 100

Hay and straw humidity measuring device (incl. measuring rod and protective bag)

#### General:

The BaleCheck 100 is a professional measuring device for measuring the moisture in bales of pressed hay and straw. It allows to easily determine the suitability for storage and quality of hay and straw – important especially in agriculture, stock breeding and horse keeping. The slim but robust measuring rod should be used for measurements in different depths. If the maximal moisture is < 16.0 % u, the material can be stored or spent without hesitation.

#### Application:

- agriculture
- processing or storing of hay or straw
- hay and straw trading
- stock breeding
- horse keeping

#### Specifications:

<b>Measuring range:</b>	0.0 ... 100 % u (material moisture) 0.0 ... 50 % w (water content)
<b>Resolution:</b>	0.1 % (till 19,9 %) and 1 % (from 20 %)
<b>Characteristics:</b>	hay, straw, grain, reference characteristics
<b>Moisture rating:</b>	6-step bar graph (wet ... dry)
<b>Temperature compensation:</b>	manual
<b>Display:</b>	2 displays for characteristics and measuring value
<b>Housing/weight:</b>	impact-resistant ABS, 110 x 67 x 30 mm (H x W x D), 155 g
<b>Working conditions:</b>	-25 ... +50 °C (device), 0 ... +100 °C (rod), 0 ... 95 % RH (non condensing)
<b>Measuring rod:</b>	V4A stainless steel, 600 mm x Ø 10 mm, 1 m connection cable with BNC-plug, 260 g, design of probe handle offers comfortable operation
<b>Features:</b>	Auto-Power-Off, HOLD, auto-HOLD
<b>Power supply:</b>	9 V battery, type 6F22 (included)
<b>Current consumption:</b>	approx. 1.8 mA
<b>Scope of supply:</b>	device, measuring rod, protective bag, operation manual

## Hay and straw humidity measuring device incl. temperature measurement



- fast temperature measurement integrated
- easy and comfortable handling
- robust 60 cm V4A measuring rod
- characteristics for hay, straw and grain
- percent display
- moisture rating

MATERIAL-MOISTURE AND  
TEMPERATURE  
MEASURING DEVICE

### BaleCheck 200

Hay and straw humidity measuring device  
incl. temperature measurement (incl. measuring rod and protective bag)

#### General:

The BaleCheck 200 is a professional measuring device for measuring the moisture in bales of pressed hay and straw. It allows to very precisely determine the suitability for storage and quality of hay and straw as well as grain – important especially in agriculture, stock breeding and horse keeping. The slim but robust measuring rod should be used for measurements in different depths. If the maximal moisture is < 16.0 % u, the material can be stored or spent without hesitation. The additional temperature measurement makes an automatic temperature compensation possible and supports fire prevention (proof of due diligence).

#### Application:

- fire prevention
- agriculture
- processing or storing of hay or straw
- hay and straw trading
- stock breeding
- horse keeping

#### Specifications:

<b>Measuring range:</b>	0.0 ... 100.0 % u (material moisture) 0.0 ... 50.0 % w (water content) -40.0 ... +200.0 °C (device)
<b>Resolution:</b>	0.1 %, 0.1 %
<b>Characteristics:</b>	hay, straw, grain, reference characteristics approx. 480 additional material moisture characteristics
<b>Moisture rating:</b>	9-step bar graph (wet ... dry)
<b>Temperature compensation:</b>	automatic or manual
<b>Display:</b>	two 4-digit LCD displays (12.4 mm and 7 mm)
<b>Housing/weight:</b>	impact-resistant ABS, 142 x 71 x 26 mm (H x W x D), 155 g
<b>Working conditions:</b>	-25 ... +50 °C (device), 0 ... +100 °C (rod), 0 ... 95 % RH (non condensing)
<b>Measuring rod:</b>	V4A stainless steel, 600 mm x Ø 10 mm, 1 m connection cable with BNC-/type K- plug, temperature 0 ... 100 °C, 260 g
<b>Features:</b>	sort (limit material selection to up to 8 favorites), auto-power-off, HOLD, auto-HOLD, interface, analog output (0-1 V), power supply terminal (10.5-12 VDC)
<b>Power supply:</b>	9 V battery, type 6F22 (included)
<b>Current consumption:</b>	approx. 2.5 mA
<b>Scope of supply:</b>	device, measuring rod with temperature sensor, protective bag, operation manual

BaleCheck200 is the successor of GMH 3830 LW.

## Conductivity handheld instruments



Application:	Device	GMH 5430	GMH 5450	GMH 3431	GMH 3451	GLF 100	GLF 100 RW
Waters measuring, fishkeeping, aquafarming (fresh- / marine waters)		✓	✓	✓	✓	✓	
Drinking water-, process monitoring, ground measurements		✓	✓	✓	✓	✓	
Cleaning processes		✓	✓	✓	✓	✓	✓
Pure and ultrapure water		✓	✓				✓
Food production and -control		✓	✓	✓	✓	✓	
Quality management		✓	✓	✓	✓	✓	✓
Data storage			✓		✓		
Water-proof		✓	✓				
electrodes for replacement		✓	✓				

Function / Equipment:	Device	GMH 5430	GMH 5450	GMH 3431	GMH 3451	GLF 100	GLF 100 RW
<b>Specification:</b>							
<b>Measuring range Conductivity</b>		0.0..5.000 $\mu\text{S/cm}$ to 0..1000 mS/cm (5 ranges available) depends on electrode	0.0..5.000 $\mu\text{S/cm}$ to 0..1000 mS/cm (5 ranges available) depends on electrode	0.0..200.0 $\mu\text{S/cm}$ to 0.0..200.0 mS/cm (4 ranges available)	0.0..200.0 $\mu\text{S/cm}$ to 0..400 mS/cm (5 ranges available)	0..2000 $\mu\text{S/cm}$ to 0.0..100.0 mS/cm (3 ranges available)	0.000..2.000 $\mu\text{S/cm}$ to 0.0..100.0 $\mu\text{S/cm}$ (3 ranges available)
<b>Resistance</b>		0.005 ... 500.0 kOhm*cm	0.005 ... 500.0 kOhm*cm	0.005 ... 100.0 kOhm*cm	0.005 ... 100.0 kOhm*cm	--	0.01 ... 20.00 MOhm*cm
<b>TDS</b>		0 ... 5000 mg/l	0 ... 5000 mg/l	0 ... 1999 mg/l	0 ... 1999 mg/l	0 ... 2000 mg/l	--
<b>Salinity</b>		0.0 ... 70.0	0.0 ... 70.0	0.0 ... 70.0	0.0 ... 70.0	0.0 ... 50.0	--
<b>Temperature</b>		-5.0 ... +150.0 °C	-5.0 ... +150.0 °C	-5.0 ... +100.0 °C	-5.0 ... +100.0 °C	-5.0 ... +100.0 °C	-5.0 ... +100.0 °C
<b>Sensor connection</b>		7-pole bayonet	7-pole bayonet	fixed connection	fixed connection	fixed connection	fixed connection
<b>Electrode</b>		2- or 4-pole	2- or 4-pole	2-pole graphite electrode	4-pole graphite electrode	2-pole graphite electrode	2-pole graphite electrode
<b>Functions:</b>							
<b>General functions</b>		Min/Max, Hold, Auto-Off	Min/Max, Auto-Off, Hold, Calibration memory	Min/Max, Hold, Auto-Off	Min/Max, Hold, Auto-Off	Min/Max, Hold, Auto-Off	Min/Max, Hold, Auto-Off
<b>Interface</b>		✓	✓	✓	✓		
<b>Alarm</b>			✓		✓		
<b>Data logger</b>			✓		✓		
<b>Catalog page:</b>		32-33	32-33	34	34	35	35

# Water-proof handheld device for conductivity measurement with external electrodes



**WATER-PROOF  
DEVICE AND PLUG CONNECTIONS**

- Serial interface
- Analog output (GMH 5450)
- Data logger and alarm function (GMH 5450)
- Measurement of conductivity, resistance, salinity, TDS
- Robust silicone protection cover
- Large double display with background illumination
- Automatic cell correction with reference solutions
- Incl. calibration protocol

## GMH 5430

Water-proof handheld device without electrode

## GMH 5450

Water-proof handheld device with analog output and data logger, without electrode

### Application:

#### Mobile use for:

- industry and craft
- measurements of waters and aquaristics, fish farming
- drinking water monitoring, process control, soil measurements
- food production and control
- quality management

#### Additional applications at laboratory:

- medicine, pharmacy, chemistry

### Specifications:

#### Measuring range:

Number of meas. Ranges: 5

**smallest range:** 0.000 ... 5.000  $\mu\text{S}/\text{cm}^*$  or 0.0 ... 500.0  $\mu\text{S}/\text{cm}^{**}$

**biggest range:** 0 ... 5000  $\mu\text{S}/\text{cm}^*$  or 0 ... 1000  $\text{mS}/\text{cm}^{**}$

**Resistivity:** 0.005 ... 500.0  $\text{k}\Omega\text{m}^*$  (depends on cell constant)

**TDS:** 0 ... 5000  $\text{mg}/\text{l}$  (depends on cell constant)

**Salinity:** 0.0 ... 70.0 (g salt / kg water)

**Temperature:** -5.0 ... +100.0  $^{\circ}\text{C}$ , Pt1000 or NTC (10 k)

**Supported cell constants:** 4.000 ... 15.000 /  $\text{cm}$  - 0.4000 ... 1.5000 /  $\text{cm}$  - 0.04000 ...

0.15000 /  $\text{cm}$  - 0.004000 ... 0.015000 /  $\text{cm}$

#### Accuracy (at nominal temperature = 25 $^{\circ}\text{C}$ ):

**Conductivity:**  $\pm 0.5\%$  of m.v.  $\pm 0.1\%$  FS (depends on electrode)

**Temperature:**  $\pm 0.2\text{ K}$

#### Connection:

**Conductivity, temperature:** 1x 7-pole bayonet connector for connection of different measuring cells, supported temperature sensors: Pt1000 or NTC (10 k)



**Interface / ext. supply:** 4-pole bayonet connector for serial interface and supply (with accessory: USB adapter USB 5100)

**Display:** 4 1/2 digit 7-segment, illuminated (white)

**Operating conditions:** -25 ... 50  $^{\circ}\text{C}$ , 0 ... 95 % RH (non-condensing)

**Storage temperature:** -25 ... 70  $^{\circ}\text{C}$

**Housing:** Impact-resistant ABS plastic housing, integrated pop-up clip

**Protection class:** IP65 / IP67

**Dimensions:** 160 x 86 x 37 mm (H x B x T) incl. silicone protection cover

**Weight:** approx. 250 g incl. battery and protection cover

**Power supply:** 2x AAA battery (included), power consumption 6.25 mA

**Battery life time:** approx. 160 h (without background illumination)

*depends on cell constant of used electrode*

*\* cell constant 0.01 / cm    \*\* cell constant 0.1 ... 1.2 / cm (standard)*

### Functions:

**Min / Max Value Memory:** highest and lowest measured value is saved

**Auto-Hold:** automatic freezing of a constant measuring value

**Auto Power Off:** device is automatically switched off after a selected period if unused (0 to 120 min, or deactivated)

**Status display for battery** (bar) and **Low Battery Display "BAT"**

**Background illumination:** duration adjustable (off, 5 s ... 2 min)

**Cell correction:** manually or automatically with reference solution

**Automatic temperature compensation:** As conductivity depends strongly on temperature, each conductivity value is only valid at the corresponding temperature. Therefore the device supports temperature compensation, i.e. referring the conductivity to a reference temperature (selectable: 20  $^{\circ}\text{C}$  or 25  $^{\circ}\text{C}$ ).

#### Supported types of compensation:

- nLF: Non-linear function of natural waters acc. to DIN EN 27888 (ISO 7888) (Reference temperature 25  $^{\circ}\text{C}$ )
- Lin: adjustable linear compensation
- off: no compensation

**Salinity measurement:** Salinity means the sum of the concentrations of all dissolved salts in water. The unit is g/kg. (equals PSU = Practical Salinity Unit).

**TDS measurement (total dissolved solids):** TDS means the mass concentration of dissolved media in a liquid. The unit is  $\text{mg}/\text{l}$ .

	GMH 5430	GMH 5450
<b>GLP (Good Laboratory Practice)</b>	adjustable calibration intervals	adjustable calibration intervals Calibration memory: latest 16 calibrations
<b>Real-time clock</b>	-	X
<b>Analog output</b>	-	0 - 1 V, freely adjustable, connection with 4-pole bayonet connector, Resolution 13 bit, accuracy 0.05 % at nominal temperature
<b>Data logger</b>	-	cyclic: 10.000 data sets manual: 1.000 data sets (with measuring point input, 40 adjustable measuring point texts or measuring point numbers)
<b>Min-/max-alarm</b>	-	Permanent monitoring of alarm boundaries for conductivity (or Resistivity, TDS, SAL) and temperature 3 alarm conditions - off: Alarm function inactive - on: Alarm report via display, integrated buzzer and interface - no Sound: Alarm report only via display and interface

## Accessories

## Electrodes:



	LF 200 RW	LF 210
<b>Measuring range:</b>	0 ... 100 $\mu$ S/cm	0 ... 1000 $\mu$ S/cm
<b>Cell constant*:</b>	approx. 0.1	approx. 1
<b>Temperature measurement:</b>	NTC 10k	NTC 10k
<b>Dimensions:</b>	$\varnothing$ 12 mm	$\varnothing$ 12 mm
<b>Characteristics:</b>	2-pole stainless steel	2-pole glass/platinum
<b>Applications:</b>	Pure and ultra pure water	Alcohol, fuel, diesel
<b> cable length:</b>	1 m	1 m



	LF 400	LF 425
<b>Measuring range:</b>	0 ... 200 mS/cm	0 ... 1000 mS/cm
<b>Cell constant*:</b>	approx. 0.55	approx. 0.42
<b>Temperature measurement:</b>	NTC 10k	Pt 1000
<b>Dimensions:</b>	$\varnothing$ 12 mm	$\varnothing$ 16 mm
<b>Characteristics:</b>	4-pole graphite	4-pole graphite
<b>Applications:</b>	Universal application, Economy Class	Tight tolerances, robust and precise for highest demands, High End Class
<b> cable length:</b>	2 m	1 m

\* **Note:** The particular cell constant (appears in calibration protocol and electrode's label) has to be entered to device. Then it is ready-to-use.

## Accessories and spare parts:

<b>GEH 1</b> Electrode holder for measuring electrodes with plastic handle (p.r.t. page 64)
<b>GKL 100</b> Conductivity control solution (100 ml bottle with 1413 $\mu$ S/cm according to DIN EN 27888)
<b>GKL 101</b> Conductivity control solution (250 ml bottle with 84 $\mu$ S/cm)
<b>GKL 102</b> Conductivity control solution (100 ml bottle with 50 $\mu$ S/cm)
<b>EBS 20M</b> software for long-term monitoring (p.r.t. page 66)
<b>GSOFT 3050</b> Software for operation of logger devices (p.r.t. page 66)
<b>USB 5100</b> Electrically isolated interface converter, supplied via USB
<b>GNG 5 / 5000</b> Plug-in power supply 5 V DC, suitable for devices of the series GMH 5000 (p.r.t. page 65)
<b>GKK 3500</b> Device case (394 x 294 x 106 mm) with eggcrate foam and cut-outs for 1 device (p.r.t. page 64)

## Handheld instruments incl. electrode



i.e. GMH 5450

**GMH 5430-400**

Handheld instrument incl. electrode LF 400

**GMH 5450-400**

Handheld instrument incl. electrode LF 400, with data logger

**GMH 5430-425**

Handheld instrument incl. electrode LF 425

**GMH 5450-425**

Handheld instrument incl. electrode LF 425, with data logger

**Description:**

All sets get preadjusted and are ready-for-use. They do not include a case.

**Accessories and spare parts:**

**GKK 3500**  
Case with foam lining and cut-outs for 1 device (394 x 294 x 106 mm)

## Conductivity measuring device



**NEW**

**GMH 3431: COST EFFICIENT!**

**MEASURING RANGE FROM 0,0 µS/CM TO 200,0 mS/cm**

**GMH 3451 WITH DATA LOGGER AND ANALOG OUTPUT**

**EXTERMLY LONG-TERM STABLE 4-POLE ELECTRODE UP TO 400 mS/cm**

- Display of resistivity, salinity or TDS (dry residue of filtrate)
- Conform to the regulations of the drinking water ordinance (TrinkwV 2001) and DIN EN 27888

### GMH 3431

Conductivity measuring device incl. 2-pole measuring cell

### GMH 3451

Conductivity measuring device incl. 4-pole measuring cell, with data logger

#### Specifications:

##### Measuring range:

<b>Conductivity:</b>	0.0 ... 200.0 µS/cm 0 ... 2000 µS/cm 0.00 ... 20.00 mS/cm 0.0 ... 200.0 mS/cm 0 ... 400 mS/cm (only GMH3451) manually selectable or AutoRange
----------------------	--

##### Temperature:

-5.0 ... +100.0 °C

##### Resistivity:

0.005 ... 100.0 kOhm \* cm

##### Salinity:

0.0 ... 70.0

##### TDS:

0 ... 1999 mg/l

##### Accuracy: (±1 digit) (at nominal temperature = 25 °C)

**Conductivity:** ±0.5% of m.v ±0.3 % FS or ±2 µS/cm

##### Temperature:

±0.2% of m.v ±0.3 K

##### Cell correction:

adjustable 0.800 ... 1.200 cm<sup>-1</sup>, manually or automatically with selectable reference solution

##### Temperature compensation:

off or automatically (by temperature sensor integrated to electrode)

##### Type of compensation:

-nLF: Non-linear function of natural waters acc. to DIN EN 27888 (ISO 7888) (Reference temperature selectable: 20 °C or 25 °C)  
-Lin: linear compensation from 0.3 ... 3.0 %/K (Reference temperature selectable: 20 °C or 25 °C)  
-off: no compensation.

##### Display:

two 4-digit LCD displays (12.4 and 7 mm high) for current conductivity (resistivity, salinity, TDS) and temperature, or for min-, max- value, hold function, etc. and additional indicator arrows.

##### Measuring cell:

2-pole (GMH 3431), 4-pole (GMH3451) conductivity measuring cell; temperature sensor integrated in shaft. Electrode material: graphite. The graphite electrodes are the optimum solution for sewage and can be cleaned easily.

##### Warranty for sensor element:

12 months

##### Working conditions:

device: -25 ... +50 °C, 0 ... 95 % RH  
measuring cell: -5 ... +80 °C (permanent), up to +100 °C (short-term)

##### Relative humidity:

0 ... +95 % RH (non condensing)

##### Interface:

serial interface; connectable to RS232 or USB interface of PCs via electrically isolated interface converter GRS 3100, GRS 3105 or USB 3100 N (accessories).

##### Operation buttons:

6 membrane keys for ON/OFF-switch, selection of meas. range, min- and max-value memory, hold-function, etc.

##### Power supply:

9 V-battery, type IEC 6F22 (included) as well as additional PSU connector (internal pin Ø 1.9 mm) for external 10.5-12 V DC supply. (suitable power supply: GNG10/3000)

##### Power consumption:

approx. 3.5 ... 6.7 mA

##### Dimensions (device):

142 x 71 x 26 mm (L x W x D)  
impact-resistant ABS housing, membrane keyboard, transparent panel. Front side IP65, integrated pop-up clip for table top or suspended use.

#### Dimensions

approx. 120 mm long, Ø approx. 12 mm, 1 m of fixed connection cable between electrode and device

#### Weight:

approx. 255 g (incl. battery and measuring cell)

#### Functions:

**Min-/max- value memory:** highest and lowest value and corresponding temperature are saved.

**Hold function:** current value and corresponding temperature are „frozen“ by keypress.

**Automatic-Off function:** Power-off delay: 1 ... 120 min or off.

**Battery change indicator:** Δ and „bAt“

**AutoRange:** Automatic selection of to the optimum measuring range for conductivity measurements. AutoRange mode can be deactivated by menu.

**Salinity determination:** Salinity is understood to be the sum of concentrations of all salts dissolved in water. Displayed in g/kg.

**TDS-determination (total dissolved solids):** The dry residue of filtrate is understood to be the concentration of substances dissolved in a liquid. Displayed in mg/l

#### additional functions of GMH 3451:

**Real-time clock:** clock with day, month and year

**Analog output:** 0 - 1 V, freely scalable, connection via 3-pole jack socket Ø 3.5 mm, resolution 13 bit, accuracy 0.05 % at nominal temperature

**Data logger:** cyclic 10,000 data sets, manual: 1,000 data sets (with measuring point input, 40 adjustable measuring point texts or measuring point numbers)

**Min- / max- alarm:** continuous checking of alarm boundaries for conductivity (or resistivity, TDS, SAL) and temperature

3 alarm settings:

- off: alarm inactive
- on: alarm via display, internal buzzer and interface
- no Sound: alarm only via display and interface

#### 4-pole measuring cell:

Better long-term stability at high conductivity values (>20 mS/cm) and for harsh environments, stable measuring values even in polluted media (e.g. sewage)

#### Option:

##### LTG

for organic matter (alcohol, petrol, diesel)  
up to 1000 µS/cm with glass shaft, platinum electrodes,  
1.35 m PUR-cable permanently connected to device

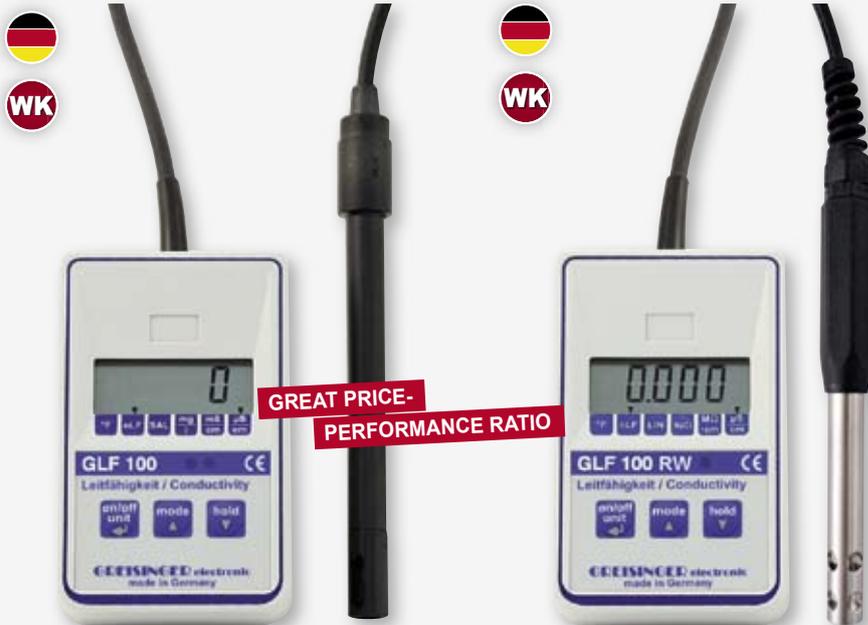
#### Accessories and spare parts:

##### GKL 100

100 ml conductivity test solution  
(100 ml bottle with 1413 µS/cm, acc. to DIN EN 27888)



## Conductivity measuring devices



- 3 conductivity measuring ranges
- Automatic measuring range change-over
- Min/max-value memory, Hold function
- Automatic temperature compensation via integrated temperature sensor
- Adjustable

**GLF 100**

Universal conductivity measuring device  
(incl. calibration protocol)

**Application:**

- Fresh and sea water aquaristics
- Fish farming / water monitoring
- Drink water monitoring, etc.

**GLF 100 RW**

Conductivity meter for ultra-pure water

**Application:**

- Checking of pure and ultra-pure water
- Checking of boiler water
- Functional check of ion exchangers

**The measuring cell:**

The measuring head is designed without compromise. The holes ensure the well exchange of the measuring fluid, nonetheless the sensor is protected against mechanical loads. The integrated temperature sensor has very quick response time. Compared to simpler electrode designs the measurements are much more accurate and faster.

**GLF 100:**

Graphite used as material for the electrodes makes the applicability up to 100 mS/cm possible – a must have in seawater analytic

**GLF 100 RW:**

Universal applicability at highest standards is made possible by the use of stainless steel electrodes (1.4404, 1.4435).

**Option:****LTG**

(just with GLF 100)  
for organic matter (alcohol, petrol, diesel) up to max. 1000  $\mu$ S/cm with glass shaft, platinum electrodes, 1.35 m PUR-cable, fix connected with device

**Accessories and spare parts:****GKL 100**

Conductivity control solution (100 ml bottles with 1413  $\mu$ S/cm (acc. to DIN EN 27888))

**GKL 101**

Conductivity control solution (250 ml bottles with 84  $\mu$ S/cm)

**GKL 102**

Conductivity control solution (100 ml bottles with 50 mS/cm)

**GEH 1**

Swivel-arm electrode-retainer (for up to 4 electrodes / probes)

**GWZ-01**

Flow-through chamber (for measuring cell with  $\varnothing$  12 mm, hose connection  $\varnothing$  6 mm)

Specification:	GLF 100	GLF 100 RW
<b>Measuring ranges:</b>		
<b>Conductivity:</b>	0 ... 2000 $\mu$ S/cm 0.00 ... 20.00 mS/cm 0.0 ... 100.0 mS/cm	0.000 ... 2.000 $\mu$ S/cm 0.00 ... 20.00 $\mu$ S/cm 0.0 ... 100.0 $\mu$ S/cm
<b>Temperature:</b>	-5.0 ... +100.0 °C	-5.0 ... +100.0 °C
<b>TDS:</b>	0 ... 2000 mg/l	--
<b>Salinity:</b>	0.0 ... 50.0	--
<b>Resistivity:</b>	--	0.0100 ... 0.2000 M $\Omega$ *cm 0.010 ... 2.000 M $\Omega$ *cm 0.01 ... 20.00 M $\Omega$ *cm
<b>Accuracy: (<math>\pm 1</math> digit, at nominal temperature = 25 °C)</b>		
<b>Conductivity:</b>	$\pm 0.5$ % of m.v. $\pm 0.5$ % FS	typ. $\pm 1$ % of m.v. $\pm 0.5$ % FS
<b>Temperature:</b>	$\pm 0.3$ °C	$\pm 0.3$ °C
<b>Temperature-compensation:</b>	off: deactivated nLF: non-linear, acc. to EN 27888 -- --	off: deactivated nLF: non-linear, acc. to EN 27888 LIN: linear, with adjustable coefficients NaCl: compensation for weak NaCl-solutions acc. to EN 60746-3
<b>Reference temperatures:</b>	20 and 25 °C	20 and 25 °C
<b>Measuring cell:</b>	2-pole measuring cell, $\varnothing$ 12 mm (graphite) Cable length: 1.2 m, with integrated temperature sensor	2-pole measuring cell, $\varnothing$ 12 mm (stainless steel: 1.4404, 1.4435) Cable length: 1.2 m with integrated temperature sensor
<b>warranty for sensor element:</b>	12 months	
<b>Display:</b>	approx. 11 mm high, 4 $\frac{1}{2}$ -digit LCD-display	
<b>Working conditions:</b>		
<b>Device:</b>	-25 ... +50 °C, 0 ... 95 % RH (non condensing)	
<b>Measuring cell:</b>	-5 ... +80 °C (for short-time: 100 °C)	
<b>Power supply:</b>	9 V-battery, type 6F22 (in scope of supply)	
<b>Power consumption:</b>	< 1.5 mA	
<b>Housing:</b>	impact resistant ABS, membrane keyboard, transparent panel, front side IP65	
<b>Dimensions (device):</b>	110 x 67 x 30 mm (L x W x D)	
<b>Weight:</b>	approx. 155 g	

**Functions:**

**Hold function:** by keypress the current measuring value will be "frozen"

**Min/max-value memory:** the min. and max. measured value is stored

**Power-Off-function:** device turns off after some time (adjustable: 1-120 min or deactivated), if no operating has taken

## pH / Redox and oxygen (O<sub>2</sub>) handheld instruments



### pH / Redox

### dissolved oxygen

Application:	Device	GMH 5530	GMH 5550	GMH 3531	GMH 3551	GPH 014	GMH 3610	GMH 3630	GOX 20
Waters measuring, fish-keeping, aquafarming		✓	✓	✓	✓	✓	✓	✓	✓
Drinking water-, process monitoring, ground measurements		✓	✓	✓	✓	✓	✓	✓	✓
Food production and -control		✓	✓	✓	✓	✓			
Precision measurement		✓	✓	✓	✓				
Laboratory (GLP)		✓	✓						
Quality management		✓	✓	✓	✓				
Data storage			✓		✓				
Water-proof		✓	✓						
incl. air pressure measuring								✓	

Function / Equipment:	Device	GMH 5530	GMH 5550	GMH 3531	GMH 3551	GPH 014	GMH 3610	GMH 3630	GOX 20
<b>Specification:</b>									
<b>Measuring range</b>									
pH		-2.000 ... 16.000 pH			0.00 ... 14.00 pH		0.0 ... 25.0 mg/l		
Redox		-2000.0 ... 2000.0 mV			-1999 ... 2000 mV		0 ... 300 %		
rH		0.0 ... 70.0 rH			0.0 ... 70.0 rH		0.0 ... 70.0 mg/l		
O <sub>2</sub> -Concentration							0 ... 600 %		0.0 ... 20.0 mg/l
O <sub>2</sub> -Saturation							0 ... 1200 hPa		
O <sub>2</sub> -Partial pressure							500 ... 1100 hPa		
Pressure							0.0 ... 50.0 °C		
Temperature		-5.0 ... +150.0 °C			-5.0 ... +150.0 °C		0.0 ... 50.0 °C		0.0 ... 40.0 °C
<b>Accuracy</b>		±0.005 pH ±0.05 % FS (mV) Redox/mV ±0.1 rH			±0.01 pH ±0.1 % FS (mV) ±0.1 rH		±0.02 pH		±0.2 % v. MW. ±0.2 mg/l
<b>Luftdruck</b>							±0.5 % FS ±1 digit		±0.3 °C (0-30 °C)
<b>Temperature</b>							±0.1 °C ±1 digit		
<b>Connections</b>		BNC-socket 2 banana-jack			BNC-socket 2 banana-jack		CINCH-socket --		6-pole Mini-DIN-socket
<b>Temperature</b>		BNC-socket 2 banana-jack			BNC-socket 2 banana-jack		CINCH-socket --		6-pole Mini-DIN-socket
<b>Temperature-compensation</b>		automatic and manual (Pt1000, NTC 10k)			automatic and manual (Pt1000)		manual		automatic
<b>Functions:</b>		automatic			automatic		automatic		automatic
<b>General functions</b>		Min/Max, Hold, Auto-Off, adjustable calibration intervals			Min/Max, Hold, Auto-Off		Min/Max, Hold, Auto-Off		Min/Max, Hold, Auto-Off, correction of salinity
<b>Interface</b>		✓	✓	✓	✓		✓	✓	
<b>Analog output</b>			✓		✓				
<b>Calibration memory</b>			✓						
<b>Data logger, alarm</b>			✓		✓				
<b>Catalog page:</b>		38	38	37	37	39	42	42	42

## pH / ORP / temperature measuring device



NEW

- ORP mode allows for automatic conversion to hydrogen system electrodes
- Automatic or manual temperature compensation
- Automatic buffer detection
- Rating function of electrode's quality

NOW WITH PT1000 PROBE  
 GHM 3551 WITH DATA LOGGER  
 AND ANALOG OUTPUT

**GMH 3531**

pH / ORP / temperature measuring device w/o accessories

**GMH 3551**

pH / ORP / temperature measuring device with data logger w/o accessories

**GMH 55 ES**

Additional set:

pH-electrode GE100BNC, temperature probe GTF 55 B (Pt1000), case GKK3500, GAK1400

**Specifications:****Measuring ranges:**

Temperature:	-5.0 ... +150.0 °C or 23.0 ... +302.0 °F
pH:	0.00 ... 14.00 pH
Redox (ORP):	-1999 ... +2000 mV Based on hydrogen system (DIN 38404): -1792 ... +2207 mV <sub>H</sub>
rH:	0.0 ... 70.0 rH

**Accuracy: (device) ±1 digit at nominal temperature = 25 °C**

Temperature:	±0.2 °C (at range -5 ... 100 °C)
pH:	±0.01 pH
Redox (ORP):	±0.1% FS (mV or mV <sub>H</sub> )
rH:	±0.1 rH

**Sensor connections:**

Temperature:	2 x 4 mm banana socket for Pt1000, 2-wire
pH, Redox:	BNC socket

Display: two 4-digit LCD displays (12.4 and 7 mm high)

Working temperature: 0 ... +50 °C

Storage temperature: -20 ... +70 °C

Interface: serial interface; connectable to RS232 or USB interface of PCs via electrically isolated interface converter GRS 3100, GRS 3105 or USB 3100 N (accessories).

Power supply: 9 V battery, additional socket for external 10.5-12 V direct current power supply (adequate PSU: GNG10/3000).

Current consumption: &lt; 1 mA

Dimensions (device): 142 x 71 x 26 mm (L x W x D). Impact-resistant ABS housing, membrane keyboard, transparent panel. Front side IP65, integrated pop-up clip for table top or suspended use.

Weight: approx. 165 g

**Functions:**

Min / max value memory

Hold function

Automatic off function

Battery warning

**Automatic temperature compensation:**

In operation mode „pH“ an automatic temperature compensation (ATC) is possible in the range 0 ... 105 °C if a temperature probe is connected. Otherwise a manual input of temperature is possible.

**pH calibration:**

The buffer type is automatically detected. The temperature dependency of the buffer is automatically compensated.

permitted electrode data: asymmetry: ±55 mV  
slope: 45 ... 62 mV/pH

Sensor evaluation depending on calibration results (10 to 100 %). Opt. 2- or 3-point-calibration with bend of the characteristics for GREISINGER-standard-buffer, buffers acc. to DIN19266 (A,C,D,F,G) or manual buffer entry

**ORP measurement (Redox):**

There are 2 choices:

„mV“: standard ORP or mV measurement  
„mV<sub>H</sub>“: temp. compensated conversion to hydrogen system acc. to DIN38404 part 6, table 1 based on the standard ORP electrode (e.g. GE105 with Ag/AgCl system and 3 mol KCl) used.**rH measurement:**

Calculation of the rH value by means of a ORP measurement and by manually entering the pH-value. The pH-value may also be taken from a previous pH measurement.

**additional functions of GMH 3551:****Real-time clock****Analog output:** 0 - 1 V, freely scalable, connection via 3-pole jack socket Ø 3.5 mm, resolution 13 bit, accuracy 0.05 % at nominal temperature**Data logger:** cyclic 10,000 data sets, manual: 1,000 data sets (with measuring point input, 40 adjustable measuring point texts or measuring point numbers)**Min- / max- alarm:**continuous checking of alarm boundaries for pH (or mV, mV<sub>H</sub>, ORP)

3 alarm settings:

- off: alarm inactive
- on: alarm via display, internal buzzer and interface
- no Sound: alarm only via display and interface

**Accessories and spare parts:****GTF 55 B**

Temperature probe, Pt1000 (see p. 39)

**GE 100-BNC**

Standard electrode, BNC plug

**GE 117-BNC**

pH electrode with integrated Pt1000 sensor (see p. 40)

**GNG 10/3000**

Plug-in power supply

**GKK 3000**

Case with cut-outs for GMH 3xxx

**USB 3100 N**

Interface converter to USB, electrically isolated

**EBS 20M**

Software for read-out, recording and archiving of measuring data (see p. 66)

## Waterproof handheld measuring device for pH / Redox with external probe



**WATER-PROOF  
DEVICE AND PLUG CONNECTIONS**

- Serial Interface
- analog output (GMH 5550)
- Data logger- and alarm function (GMH 5550)
- GLP-features (Good Laboratory Practice)
- Robust silicone protection cover
- Big dual display with background illumination
- High resolution (0.001pH / 0.1 mV)
- Incl. calibration protocol

### GMH 5530

Waterproof handheld measuring device without electrode

### GMH 5550

Waterproof handheld measuring device with analog output and data logger, without electrode

#### Application:

- Waters measuring, fishkeeping, aquafarming
- Drinking water monitoring, process control, soil measuring
- Food production and monitoring
- Laboratory: Medicine, pharmaceuticals, chemistry
- Quality management

#### Specification:

##### Measuring ranges:

pH:	-2.000 ... 16.000 pH
Redox / mV:	-2000.0 ... 2000.0 mV (for hydrogen system DIN38404: -1792 ... +2207 mV <sub>H</sub> )
Temperature:	-5.0 ... +150.0 °C 23.0 ... 302.0 °F
rH:	0.0 ... 70.0 rH

##### Accuracy:

pH:	±0.005 pH
Redox / mV:	±0.05 % FS (mV or mV <sub>H</sub> )
Temperature:	±0.2 °C (in the range of -5,0 ... 100,0 °C)
rH:	±0.1 rH

##### Connections:

pH, Redox:	BNC-female connector, compatible to standard BNC-plugs and waterproof BNC-plugs, additional banana-jack (4 mm) for separate reference electrode, input resistance: 10 <sup>12</sup> Ohm
Temperature:	2 banana-jacks (4 mm) for temperature probes (Pt1000 or NTC 10K)
Interface / Supply:	4-pole bayonet connector for serial interface and supply (with accessory USB 5100)

**Working conditions:** -25 ... 50 °C; 0 ... 95 % RH (non condensing)

**Display:** two 4½ - digit seven-segment display (15 mm and 12 mm)

##### pH-Calibration:

<b>Automatically:</b>	1-, 2- or 3- point calibration, GREISINGER-Standard-Buffer or Puffer to DIN19266 (A,C,D,F,G)
<b>Manually:</b>	1-, 2- or 3- point calibration

**Housing:** impact resistant ABS housing with pop-up clip

**Protection class:** IP65 / IP67

**Dimensions:** 160 x 86 x 37 mm (H x W x D) incl. protection cover

**Weight:** 250 g incl. battery and protection cover

**Power supply:** 2 x AAA-battery (incl. in scope of supply)  
power consumption: <1.0 mA

**Battery life time:** 1000 hours



#### Functions:

**Min / Max Value Memory:** highest and lowest measured value is saved

**Hold:** displayed value gets frozen by keypress

**Auto-Hold:** automatic freezing of a constant measuring value

**Auto Power Off:** device is automatically switched off after a selectable period if unused (0 to 120 min, or deactivated)

**Additional Display for pH-Electrode and Battery:** Bar graph display

**Low Battery Display „BAT“**

**Background illumination:** duration adjustable (off, 5 s ... 2 min)

#### Automatic Temperature Compensation:

There is an automatic temperature compensation (ATC) in the range of 0-105 °C for operation mode "pH" and if a temperature probe is connected. Without connected probe the temperature can be input manually.

#### pH-Calibration:

The used buffer is detected automatically. The temperature dependency of the buffer is automatically compensated.  
Permissible electrodes' data: Asymmetry: ±55 mV / Slope: 45 ... 62 mV/pH  
The condition of pH-Electrode is checked at each calibration.  
1-, 2- or 3- point calibration with characteristics bend for GREISINGER-Standard-Buffer, buffer to DIN 19266 or manual buffer input

#### Redox-Measurement (ORP): 2 choices:

"mV" Standard-redox-, ORP or mV- measurement  
„mV<sub>H</sub>“ Conversion to hydrogen systems according to DIN38404 Teil 6

**rH-Measurement:** The rH-value is calculated from a measured Redox-value and a manually input pH-value.

	GMH 5530	GMH 5550
<b>Adjustable calibration intervals (GLP)</b>	x	x
<b>Calibration memory (GLP)</b>	-	x (last 16 Calibrations)
<b>Real-time clock</b>	-	x
<b>Analog output</b>	-	0 - 1 V, freely adjustable, connection with 4-pole bayonet connector, Resolution 13 bit, accuracy 0.05 % at nominal temperature
<b>Data logger</b>	-	With measuring point input Recording interval: 1 s ... 1 h Recording period: 416 days at interval 1 h Value memory: cyclic: 10000 data sets; manual: 1000 data sets
<b>Min-/max-alarm</b>	-	Permanent monitoring of alarm boundaries (pH / mV and temperature) 3 alarm conditions - off: Alarm function inactive - on: Alarm report via display, integrated buzzer and interface - no Sound: Alarm report only via display and interface

## pH / Redox accessories

## Accessories and spare parts:

**GMH 55 ES**

Supplementary set, including pH-electrode (GE 100 BNC), temperature probe (GTF 55 B), case (GKK 3500), working and calibration set (GAK 1400)

**GE 125-BNC**

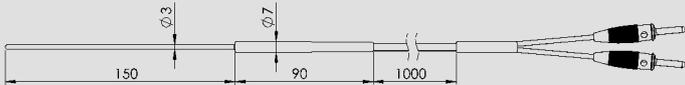
waterproof pH-electrode with integrated Pt1000 temperature sensor incl. waterproof BNC-plug and two banana plugs (p.r.t. page 40)

**GE 117-BNC**

pH-electrode with integrated Pt1000 temperature sensor (p.r.t. page 40)

**GTF 55 B**

Pt1000 temperature immersion sensor for liquids  
1 m PVC-cable with two banana plugs

**GE 100-BNC**

pH-electrode (p.r.t. page 40)

**GE 105-BNC**

Redox-electrode (p.r.t. p. 40)

**GAK 1400**

Working and calibration set

**PHL 4**

ready-to-use buffer solution (pH 4.01 / 25 °C) 250 ml

**PHL 7**

ready-to-use buffer solution (pH 7.00 / 25 °C) 250 ml

**PHL 10**

ready-to-use buffer solution (pH 10.01 / 25 °C) 250 ml

**KCL 3 M**

3 mol KCl electrolyte for refill or storage (filled in the protective cap) of electrodes with 3 mol KCl electrolyte. 100 ml plastic vial.

**CaCl**

1000 ml, solution for measuring the pH value of soil

**GRL 100**

Pepsin cleansing solution, 100 ml

**GRP 100**

ORP buffer solution (220 mV at 25 °C), 100 ml

**EBS 20M**

Software for long-term monitoring (p.r.t. page 66)

**GSOFT 3050**

Software for operation of logger devices (p.r.t. p. 66)

**USB 5100**

Electrically isolated interface converter with supply of device via USB

**GNG 5 / 5000**

Plug-in power supply 5 V DC, suitable for GMH 5000 - series (p.r.t. page 65)

**GKK 3500**

Device case (394 x 294 x 106 mm) with eggcrate foam and cut-outs for 1 device (p.r.t. page 64)

## digital pH-Meter

**GPH 014**

Device ready for use incl. pH-electrode type GE 014 and battery.  
(no buffer solutions)

**Specification:**

<b>Measuring range (device):</b>	0.00 ... 14.00 pH
<b>Resolution:</b>	0.01 pH
<b>Accuracy (device):</b>	0.02 pH ± 1 digit (at nominal temperature = 25 °C)
<b>Input resistance:</b>	10 <sup>12</sup> Ohm
<b>pH-electrode:</b>	combined measuring and reference electrode type GE 014 with refillable 3 mol-KCl electrolyte, 2-12 pH, 0 ... 60 °C
<b>Calibration:</b>	3 turning knobs for: - temperature compensation 0 ... 90 °C - pH7 value - pH x-value (e.g. 4.0, 10.0, 12.0)
<b>Working temperature:</b>	0 ... 45 °C
<b>Display:</b>	3½-digit LCD display, 13 mm high
<b>Power supply:</b>	9 V battery type JEC 6F22 (incl.)
<b>Battery service life:</b>	approx. 200 operating h
<b>Low battery warning:</b>	automatic; "BAT" displayed in case of low voltage
<b>Dimensions:</b>	approx. 106 x 67 x 30 mm (H x W x D) Impact resistant ABS housing
<b>Weight:</b>	approx. 200 g (incl. battery and electrode)

**GAK 1400**

Working and calibration set

**General:****Working and calibration set consisting of:**

5 buffer capsules each GPH4.0, GPH7.0 and GPH10.0, 3 x 100ml-plastic bottle GPF100, 1 x 3 mol KCL-electrolyte KCL3M and 1 x Pepsin-cleaning agent GRL100.

GAK1400 is required if no buffer solutions are existing.

**Accessories and spare parts:****GE 014-Cinch**

Spare electrode

**GPH 014 GL**

Loose device (without accessories)

**GE 100-Cinch**

Better electrode (0-14 pH, 0-80 °C)

**GE 101-Cinch**

Injection electrode (2-11 pH, 0-60 °C)

**GE 104-Cinch**

pH-electrode for low-ion water (as of 25 µS/cm)

**GKK 252**

Case (235 x 185 x 48 mm) with foam lining

**GKK 1100**

Case (340 x 275 x 83 mm) with foam lining

**GB 9 V**

Spare battery

additional accessories p.r.t. p. S. 41

## pH electrodes



	GE 100	GE 101	GE 104	GE 108	GE 117	GE 120	GE 125	GE 151	GE 170	GE 173
<b>Measuring unit</b>	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH
<b>Measuring range</b>	0 ... 14 pH 0 ... 80 °C	2 - 11 pH 0 - 60 °C	2 ... 14 pH 0 - 80 °C	0 ... 14 pH 0 ... 80 °C	2 ... 11 pH 0 ... 60 °C	0 - 14 pH 0 - 60 °C	0 ... 14 pH 0 ... 70 °C	0 ... 14 pH -5 ... 80 °C	0 ... 14 pH 0 ... 130 °C	0 ... 14 pH 0 ... 80 °C
<b>Conductivity</b>	> 100 µS	> 100 µS	> 20 µS	> 100 µS	> 100 µS	> 200 µS	> 200 µS	> 100 µS	> 100 µS	> 50 µS
<b>Temp. sensor</b>	no	no	no	no	integr. Pt1000	no	integr. Pt1000	no	no	no
<b>Water-proof</b>	no	no	no	no	no	no	yes	no	no	no
<b>Pressure resistant</b>	no	no	no	6 bar	6 bar	no	1 bar	no	15 bar	6 bar
<b>Cable</b>	1 m <sup>1)</sup>	1 m <sup>1)</sup>	1 m <sup>1)</sup>	2 m <sup>1)</sup>	2 m <sup>2)</sup>	1 m	2 m	1 m <sup>1)</sup>	without	1 m <sup>1)</sup>
<b>Electrolyte</b>	3 mol/l KCL	3 mol/l KCL	3 mol/l KCL	gel electrolyte	gel electrolyte	gel electrolyte	gel electrolyte	3 mol/l KCL	gel electrolyte	gel electrolyte
<b>Diaphragm</b>	2 x ceramic	2 x ceramic	moving joint	2 x ceramic	2 x ceramic	2 x ceramic	1 x ceramic	1 x ceramic	3 x ceramic	joint
<b>Thread</b>	without	without	without	PG 13,5	PG 13,5	without	without	without	PG 13,5	PG 13,5
<b>Temperature connection</b>	-	-	-	-	4 mm banana	-	4 mm banana	-	-	-
<b>Features</b>	Low-cost, universal electrode	tip Ø 6 mm, small sample volume	for low-ion media	low-maintenance	temperature compensated	insertion electrode	submersible, water-proof IP67	for difficult conditions, alkali-resistant	for extreme conditions, up to 130 °C and 15 bar pressure	for process chemistry, bio-chemistry
<b>Connection</b>										
<b>Cinch</b>	•	•	•	•	-	•	-	•	-	•
<b>BNC</b>	•	•	•	•	•	•	•	•	-	•
<b>S7<sup>1)</sup></b>	-	-	-	•	-	-	-	-	•	•

<sup>1)</sup> Note: cable GEAK-2S7-BNC or GEAK-5S7-BNC is needed for connection S7; Electrodes are consumption objects. Lifetime under careful treatment: > 2 years; warranty: 12 months

### Options:

#### Longer cable for <sup>1)</sup>

(available cable lengths: 1, 2 and 5 m)

#### Longer cable for <sup>2)</sup>

(available cable lengths: 1, 2 and 5 m)

#### Special designs upon request

(electrodes with thread, other lengths, special applications etc.)



Cinch connection



BNC connection



S7 connection at shaft

### Diaphragm:

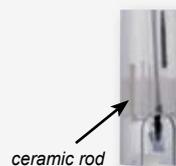
The diaphragm makes the electric connection between reference system and sample. Additionally it should prevent the spoiling of the reference electrolyte by the measured medium.

#### Ceramic diaphragm

Several porous ceramic rods are mounted.

#### Application:

General applications in clean till lightly soiled media.



ceramic rod

#### Joint / movable joint

The roughened surface between the cut glass of the electrode and a cut glass sleeve permits an electrolyte flow of several ml/h.

#### Application:

low-ion or heavily soiled samples



glass sleeve

### Reference electrolyte:

The reference electrolyte offers a constant voltage of the reference system and makes the electrical connection between sample and reference electrode.

#### Liquid electrolyte

Mainly 3 mol KCl is used. Liquid electrolytes offer fast response times in general and can be replaced if contaminated.

#### Gel electrolyte

The electrolyte is solidified for low-maintenance electrodes able to measure irrespective to its position. Under normal measurement conditions no noticeable electrolyte leakage is observable.

## Application areas: Electrodes

Application	Electrode:											
	GE 100	GE 101	GE 104	GE 108	GE 120	GE 151	GE 170	GE 173	GE 117	GE 125		
Sewage								•				
Aquarium water	•			•		•			•			
Emulsions		•	•									
On-site measurements				•					•	•		
Fish farming	•		•	•		•			•	•		
Galvanic baths								•				
Beverages						•		•		•		
Low-ion media			•									
Cosmetics			•									
Food sample		•			•							
Sea water	•	•	•	•	•	•	•	•	•	•		
Process chemistry								•	•			
Swimming pool water	•			•				•				
Suspensions		•	•									
Soil testing		•										
Drinking water	•		•					•				
Water-based lacquers			•					•				

## ORP electrode



**GE 105-Cinch**  
with Cinch connection  
**GE 105-BNC**  
with BNC connection

## Specifications:

Measuring unit:	ORP
Measuring range:	± 2000 mV, 0 ... 80 °C
Conductivity:	> 25 µS
Temperature measurement:	no
Water-proof:	no
Pressure resistant:	no
cable:	1 m <sup>1)</sup>
Electrolyte:	3 mol/l KCL
Thread:	without
Dimensions:	shaft: 120 mm x Ø 12 mm
Minimal depth of immersion:	15 mm

## Electrodes - accessories

## Accessories and spare parts:

**GEAK-2S7-BNC**

Adapter cable S7-BNC, 2 m

**GEAK-5S7-BNC**

Adapter cable S7-BNC, 5 m

**VD120**

Pricker for insertion electrode GE101

**GAD 1 CINCH**

Adapter to connect electrodes with Cinch plug to devices with BNC socket.

**GAD 1 BNC**

Adapter to connect electrodes with BNC plug to devices with Cinch socket.

**GPF 100**

Plastic wide mouth bottle, 100 ml

**GPH 4,0 / 5**

Buffer capsules (5 pieces), pH4.0

**GPH 4,0 / 10**

Buffer capsules (10 pieces), pH4.0

**GPH 7,0 / 5**

Buffer capsules (5 pieces), pH7.0

**GPH 7,0 / 10**

Buffer capsules (10 pieces), pH7.0

**GPH 10,0 / 5**

Buffer capsules (5 pieces), pH10.0

**GPH 10,0 / 10**

Buffer capsules (10 pieces), pH10.0

**GPH 12,0 / 5**

Buffer capsules (5 pieces), pH12.0

**GPH 12,0 / 10**

Buffer capsules (10 pieces), pH12.0

*All buffer capsules are traceable to NIST standards and have ±0.02 pH at 25 °C.*

**GAK 1400**

Working and calibration set; GPH4.0, GPH7.0, GPH10.0 (5 capsules of each type); 3 x GPF100; 1 x 3 mol KCl electrolyte KCL3M; 1 x Pepsin cleaning solution GRL100

**PHL 4**

ready-to-use buffer solution (pH 4.01 / 25 °C)

250 ml

**PHL 7**

ready-to-use buffer solution (pH 7.00 / 25 °C)

250 ml

**PHL 10**

ready-to-use buffer solution (pH 10.01 / 25 °C)

250 ml

**KCL 3 M**

3 mol KCl electrolyte for refilling and storage

(fill into protective cap) of electrodes with 3 mol KCl

electrolyte, injection bottle, 100 ml

**CaCl**

1000 ml, solution for measuring the pH value of soil

**GRL 100**

Pepsin cleaning solution, 100 ml

**GRP 100**

ORP test solution (220 mV at 25 °C), 100 ml

**GWA1Z**

Thread adapter PG13.5 to G1", plastic

**PG 13.5**

Plug-on thread adapter for pressure-less use, for any electrode

## Oxygen measuring devices for dissolved oxygen in liquids



- Automatic air pressure compensation
- Salinity correction
- Extremely small measuring probe
- Min./Max. value memory, Hold function
- Serial interface
- Simple calibration in atmospheric air

MEAS. UNITS: O<sub>2</sub>-CONCENTRATION  
O<sub>2</sub>-SATURATION  
AND O<sub>2</sub>-PARTIAL PRESSURE (GMH3630 ONLY)

### GMH 3610

Oxygen measuring device incl. oxygen electrode

### GMH 3630

Oxygen measuring device incl. oxygen electrode

Specification:	
<b>Measuring ranges: (device)</b>	
<b>O<sub>2</sub>-concentration:</b>	3610: 0.0 ... 25.0 mg/l 3630: 0.0 ... 70.0 mg/l / 0.00 ... 25.00 mg/l
<b>O<sub>2</sub>-saturation:</b>	3610: 0 ... 300 % 3630: 0 ... 600 % or 0.0 ... 250.0 %
<b>O<sub>2</sub>-partial pres.:</b>	3630: 0 ... 1200 hPa O <sub>2</sub> / 0.0 ... 570.0 hPa (0.0 ... 427.5 mmHg or 0 ... 900 mmHg)
<b>Temperature:</b>	3610 / 3630: 0.0 ... 50.0 °C
<b>Pressure:</b>	3630: 500 ... 1100 hPa abs.
<b>Accuracy: (at nominal temperature = 25 °C)</b>	
<b>Oxygen:</b>	3610: ±1.5 % v. MW ±0.2 mg/l 3630: ±1.5 % v. MW ±0.2 mg/l (0...25 mg/l) or ±2.5 % v. MW ±0.3 mg/l (25 ... 70mg/l)
<b>Temperature:</b>	± 0,1 °C ± 1 digit
<b>Pressure:</b>	± 0,5 % FS ± 1 digit
<b>Sensor connection:</b> 6-pin screened Mini-DIN-socket.	
<b>Electrode:</b>	Active membrane type. Electrode-Ø front: approx. 12 mm, overall length: approx. 220 mm, anti buckling glanding, neck collar: Ø approx. 20 mm, 4 m connection cable with Mini-DIN-plug.
<b>Response time:</b>	95 % in 10 s, depends on temperature
<b>Operation life:</b>	approx. 3 years or more, depends on maintenance
<b>Working temp.:</b>	0 ... +40 °C
<b>Working pressure:</b>	max. 3 bar
<b>Flow rate:</b>	min. 30 cm/s
<b>Display:</b>	2x 4 digit LCDs (12.4 / 7 mm high)
<b>Interface:</b>	serial interface, direct connection to RS232 or USB interface of a PC via electrically isolated interface converter.
<b>Power supply</b>	9 V-battery, type IEC 6F22 (included) as well as additional d.c. connector for external 10.5-12 V direct voltage supply. (suitable power pack: GNG10/3000)



### GOX 20

Oxygen measuring device, operative, incl. oxygen probe and battery

Specification:	
<b>Measuring range:</b>	
<b>Temperature:</b>	0.0 ... 40.0 °C
<b>Oxygen:</b>	0.0 ... 20.0 mg/l O <sub>2</sub>
<b>Resolution:</b>	
<b>Temperature:</b>	0.1 °C
<b>Oxygen:</b>	0.1 mg/l O <sub>2</sub>
<b>Accuracy: (at nominal temperature = 25 °C)</b>	
<b>Temperature:</b>	±0.3 °C (range 0-3 °C)
<b>Oxygen:</b>	±2 % of m.v. ±0.2 mg/l
<b>Electrode:</b>	active diaphragm type. Electrode-Ø front: approx. 12 mm, length: approx. 170 mm, connecting cable approx. 2 m permanently connected to device.
<b>Response time:</b>	95 % in 10 s, depending on temperature.
<b>Operation life:</b>	approx. 3 years or more depending on maintenance
<b>Operation pressure:</b>	max. 3 bar
<b>Temperature compensation:</b>	automatically via temperature sensor integrated in electrode
<b>Calibration:</b>	simple quick-calibration in atmospheric air
<b>Display:</b>	3½-digit LCD display, 13 mm high
<b>Working temperature:</b>	0 ... 50 °C
<b>Power supply:</b>	9 V-Battery, included
<b>Power consumption:</b>	max. 1 mA
<b>Low battery warning:</b>	automatic; „BAT“ displayed in case of low voltage
<b>Dimensions:</b>	106 x 67 x 30 mm, ABS plastic housing
<b>Weight:</b>	approx. 250 g (ready for use)
<b>Scope of supply:</b> device incl. electrode, GWOK01 and KOH electrolyte	

#### Options:

electrode with 10 m cable  
electrode with 30 m cable

#### Accessories and spare parts:

**GSKA 3600**  
protection cap for depth measuring

**GWOK 01**  
spare diaphragm head

**GKN 3600**  
calibration refill set (consisting of 100 ml calibration solution, 10 ml catalytic solution, measuring pipette)

#### GAS 3600

Working set (consisting of 3 spare diaphragm heads and 100 ml KOH-electrolyte)

#### GWO 3600

Spare electrode with 4 m cable

#### KOH 100

Spare electrolyte 100 ml

## Mobile multi-parameter photometer



**AUTOMATIC SELECTION  
OF WAVE LENGTH**

**EASY HANDLING**

- Water analysis for variable measurands
- Illuminated display
- Memory
- More than 120 methods
- Infrared interface
- Water-proof housing



## MD 600

mobile multi-parameter photometer with case

## Description:

The state-of-the-art design of the MD 600 combines the mobility of a portable photometer with the specifications of a modern laboratory photometer. The device provides measurements of all relevant parameters of water analysis, from aluminum till zinc. The high accuracy of the Lovibond® reagents and the easy handling of the instrument ensure a reliable and rapid analysis of water samples. Tablet, powder or liquid reagents or cuvette tests (16 mm / 13 mm) are use depending on the application.

The MD 600 operates with 6 interference filters and long-term stable LEDs as light source without any moving parts.

The illuminated display allows comfortable reading of measuring values even in poor light conditions. Up to 1000 data sets can be stored in the memory of the MD 600 and the infrared interface together with IRiM (accessories) offer transmission of the data to a PC or printer (RS 232 / USB).

## Application:

- Sewage, drinking water
- Swimming-pools
- Industrial process water
- Science & research
- State and private laboratories
- Mobile application

## Accessories and spare parts:

**MD-Z01: Round cuvettes set**  
with lid (12 pcs), height 48 mm, Ø 24 mm

**MD-Z02: Round cuvettes set**  
with lid (10 pcs), height 90 mm, Ø 16 mm

**MD-Z03: Cuvette rack**  
for 6 round cuvettes, Ø 24 mm, acrylic glass

**MD-Z04: Cuvette rack**  
for 10 cuvettes (Ø 16 mm or □ 13.5 mm), acrylic glass

**MD-Z05: Sealing ring**  
for cuvettes Ø 24 mm (12 pcs)

**MD-Z06: Cleaning tissue for cuvettes**

**MD-Z07: Plastic funnel with handle**

**MD-Z08: Plastic stirring rod**  
13 cm length, (10 pcs)

**MD-Z10: IRiM**  
Data transmission module

## Specification:

<b>Display:</b>	Graphical display with background illumination
<b>Interfaces:</b>	IR interface for meas. data transfer <sup>1</sup> , RJ45 socket for Internet updates <sup>2</sup> <sup>1</sup> optionally available: IRiM (Infrared interface module) <sup>2</sup> optionally available: connection cable with integrated electronics (RS 232 / RJ-45-socket)
<b>Optics:</b>	LED - photo sensor - pair in transparent test chamber Wave length range: 430 nm IF $\Delta\lambda = 5$ nm 530 nm IF $\Delta\lambda = 5$ nm 560 nm IF $\Delta\lambda = 5$ nm 580 nm IF $\Delta\lambda = 5$ nm 610 nm IF $\Delta\lambda = 6$ nm 660 nm IF $\Delta\lambda = 5$ nm IF = interference filter
<b>Wave length accuracy:</b>	± 1 nm
<b>Photometric accuracy*</b>	2 % FS (T = 20 °C - 25 °C) * measured with standard solutions
<b>Photometric resolution:</b>	0.005 A
<b>Handling:</b>	Acid and solvent resistant, touch-sensitive membrane keyboard with acoustic feedback via integrated beeper.
<b>Power supply:</b>	4 batteries (Mignon AA/LR6); lifetime: approx. 26 h continuous operation or 3500 tests
<b>Auto-Off:</b>	20 min after last keypress, 30 s acoustic signal before turn-off
<b>Dimensions:</b>	approx. 210 x 95 x 45 mm (device) approx. 395 x 295 x 106 mm (case)
<b>Weight (device):</b>	approx. 450 g
<b>Working conditions:</b>	5 - 40 °C at max. 30 - 90 % RH (non condensing)
<b>Languages:</b>	German, English, French, Spanish, Italian, Portuguese, Polish, Indonesian; further languages via Internet update
<b>Memory:</b>	approx. 1000 data sets
<b>Scope of supply:</b>	• device in plastic case • round cuvettes 24 an 16 Ø, 3 of each type • 1 adapter each • plastic stirring rod 13 cm, brush 11 cm, screw driver • operation manual

Please order required reagents separately!

## Reagents (selection):

<b>MD-R01:</b> <b>Ammonium:</b> AMMONIA No.1 + No.2 tablets, pack of 100 pcs. each
<b>MD-R02:</b> <b>Chlorine (free):</b> DPD No.1, tablets, 100 pcs.
<b>MD-R03:</b> <b>Chlorine (total):</b> DPD No.1 + No.3 tablets, pack of 100 pcs. each
<b>MD-R04:</b> <b>Chromium (VI):</b> Chromium Hexavalent Powder reagent, 100 pcs.
<b>MD-R05:</b> <b>Iron (II + III, soluble):</b> IRON LR, tablets, 100 pcs.
<b>MD-R06:</b> <b>Copper:</b> COPPER No.1 + No.2, tablets, pack of 100 pcs. each
<b>MD-R07:</b> <b>Nickel:</b> NICKEL No.1 + No.2, tablets, pack of 100 pcs. each
<b>MD-R08:</b> <b>Nitrate:</b> Vario-Set, 50 reaction cuvettes + powder reagent
<b>MD-R09:</b> <b>Nitrite:</b> Nitrite LR, tablets, 100 pcs.
<b>MD-R10:</b> <b>Phosphate (ortho LR):</b> PHOSPHATE No.1 LR + No.2 LR, tablets, pack of 100 pcs. each
<b>MD-R11:</b> <b>Phosphate (ortho HR):</b> PHOSPHATE No.1 HR + No.2 HR, tablets, pack of 100 pcs. each
<b>MD-R12:</b> <b>Silicone dioxide:</b> SILICA No.1 + No.2 + PR tablets, pack of 100 pcs. each
<b>MD-R13:</b> <b>Zinc:</b> COPPER/ZINK LR + EDTA, tablets, pack of 100 pcs. each
<b>MD-R14:</b> <b>Hardness (total):</b> HARDCHECK P tablets, 100 pcs.

other reagents upon request!

## Gas meter



Application:	Device	GMH 3691 +Sensor	GOX 100	GOX 100T	GCO 100
Measurement of atmospheric oxygen		✓	✓	✓	
O <sub>2</sub> concentration		✓	✓	✓	
O <sub>2</sub> partial pressure		✓			
CO-concentration (carbon monoxide)					✓
Protective gases		✓			
Diving *		✓		✓	✓
Exhaust gas monitoring					✓

\* not suited for „under water“-applications (rebreather, etc.)

Feature / function:	Device	GMH 3691 +Sensor	GOX 100	GOX 100T	GCO 100
<b>Specifications:</b>					
<b>Measuring ranges</b>		0 ... 100 % O <sub>2</sub> concentration 0 ... 1100 hPa O <sub>2</sub> partial pressure -5 ... 50 °C	0 ... 100 % O <sub>2</sub> concentration	0 ... 100 % O <sub>2</sub> concentration	0 ... 1000 ppm CO concentration 0 ... 1250 mg/m <sup>3</sup> 0 ... 60% COHb
<b>Electrode / sensor</b>		Order sensor separately	in external sensor housing		Sensor internal
<b>Sensor connection cable</b>		6-pole mini-DIN socket	0.7 m cable with jack plug		-
<b>Functions:</b>					
<b>General functions</b>		Min/Max, Hold, Auto-Off	Min- / Max, Hold, Auto-Off	Min/Max, Hold, Auto-Off, MOD display	Max, Hold, Auto-Off
<b>Alarm</b>		✓			✓
<b>Interface</b>		✓			✓
<b>Catalog page:</b>		46	48	48	45

## Compact CO - measuring device



**FREELY ADJUSTABLE ALARM BOUNDARIES**  
**INTEGRATED ACOUSTIC ALARM**

- 3 display units selectable (ppm, mg/m<sup>3</sup> and % CO Hb)
- Alert at exceeding the maximum concentration at work (MAK/AGW)
- Automatic zero point adjustment, max. value memory, hold function
- Interface for RS232- or USB-adapter
- Low power consumption (>1000 hours with normal 9 V-battery)
- Battery or power adapter operation, Power-Off-function
- External switching module for 230 V/10 A (= GAM 3000) directly pluggable
- Integrated measuring element - 3 years warranty for the sensor
- incl. calibration protocol

## GCO 100

CO - measuring device

## General:

Carbon monoxide (CO) is created by the combustion of carbon. Depending on the effectiveness of the combustion (oxygen supply) and the temperature of the combustion more or less CO gas is created. The gas is inflammable and highly toxic. It is invisible, tasteless and scentless.

**Even smallest concentrations are dangerous for humans!**

Therefore a directive exists in Germany, which limits the maximum concentration of CO gas at work (MAK / AGW) to 30 ppm.

## Application:

- Control of the air quality (e.g. at work place)
- Checking of heating systems, gas central-heating, fireplace
- Control of the air at maintenance work (tunnel, flue gas tract, ...)
- Detection of CO in the breath of smoker (% CO Hb)
- Cognition of CO poisoning i.e. at burnt offering (fire fighters, ...)

## Specification:

<b>Measuring principle:</b>	electrochemical CO measuring cell		
<b>Measuring range:</b>	0 ... 1000 ppm CO concentration		
<b>Display ranges:</b>	0 ... 1000 ppm CO concentration 0 ... 1250 mg/m <sup>3</sup> CO concentration 0 ... 60.0 % CO Hb (estimation via exhaled breath gas)		
<b>Resolution:</b>	1 ppm, 1 mg/m <sup>3</sup> or 0.1 % CO Hb		
<b>Measuring element:</b>	integrated in device, measuring inlet at front plate, with inner thread for accessories screw in		
<b>Life time:</b>	>5 years at proper usage at air suggested test interval: every 6 months (depending on precision requirements)		
<b>Accuracy: (at range 0 ... 500 ppm)</b>			
<b>linearity:</b>	< ±5 % of measured value ±1 digit		
<b>repeatability:</b>	< ±5 % of measured value ±1 digit		
<b>Interference: (extract)</b>	Concentration (ppm)	residence time (min.)	display (ppm)
<b>sulphur dioxide</b>	50	600	<1
<b>nitrogen dioxide</b>	50	900	-1
<b>nitric oxide</b>	50	5	8
<b>hydrogen</b>	100	5	20
<b>Carbon dioxide</b>	5000	5	0
<b>Display:</b>	approx. 11 mm high, 4½-digit LCD-display		
<b>Pushbuttons:</b>	3 membrane keys		
<b>Nominal temperature:</b>	25 °C		
<b>Ambient condition:</b>	-10 ... +50 °C, 15 ... 90 % RH (non-condensing)		
<b>Storage temperature:</b>	-10 ... +50 °C		
<b>Power supply:</b>	9 V-battery, type IEC 6F22 (in scope of supply) as well as additional d.c. connector for external 10.5 - 12 V direct voltage supply. (suitable power supply: GNG 10 / 3000)		
<b>Power consumption:</b>	<0.25 mA (>1000 operating hours)		

<b>Housing:</b>	impact-resistant ABS plastic housing, membrane keyboard, transparent panel. Front side IP65, integrated pop-up clip for table top or suspended use.
<b>Dimensions:</b>	142 x 71 x 26 mm (L x W x D)
<b>Weight:</b>	approx. 155 g

## Functions:

**Hold function:** by keypress the current measuring will be "frozen"

**Max value memory:** the max. measured value will be stored

**Alarm:** adjustable alarm rail, value depending alarm sound

**Power-Off-function:** device will turn off after the set period off time (1-120 min. or deactiv), when no operating has taken.

## Accessories and spare parts:

## ESA 100

tube-adapter/flow diverter to screw in front plates.

## ZOT 369

T-piece

## GRV 100

non return valve

## MSK 100

mouth piece of plastic

## GAS 100

extension set for exhaled air control  
(consisting of ESA100, ZOT369, GRV 100 and 5x MSK100)

## GZ-10

test gas cap GCO (for controlled flow with test gas)

## GZ-02

gas bottle with 12l test gas: 30 ppm CO

## GZ-03

gas bottle with 12l test gas: 300 ppm CO

## GZ-04

gas valve unit MiniFlo for gas bottles with 12l

## GB 9 V

spare battery 9 V / approx. 300mA/h, type IEC 6F22

## GLI 9 V

Lithium battery 9 V / approx. 1200 mA/h

## GKK 3000

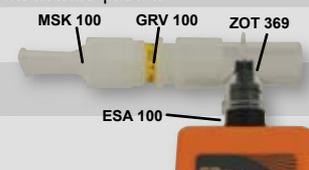
case (275 x 229 x 83 mm) with punched lining

## USB 3100 N

interface converter to USB, electrical isolated

## GAM 3000

switching module for 230 VAC/10 A



## Air oxygen measuring device



**WIDE RANGE OF APPLICATION FOR  
YOUR HOME, JOB AND HOBBY!**

- Double display for oxygen and temperature
- Measured units: O<sub>2</sub> concentration and O<sub>2</sub> partial pressure
- Alarm detector with integrated horn
- Min./Max. value memory, Hold function
- Serial interface
- Battery and d.c. operation
- Most simple calibration in atmospheric air

### GMH 3691

Sensor not included - please order separately!

#### Application:

- **Bio chemistry:**  
Oxygen monitoring in breeding chambers for cell cultures. Monitoring of fermenting process of fruits in fermentation plants etc.
- **Medicine:**  
Monitoring of oxygen concentration in respirators; checking of breathing, monitoring of oxygen concentration in incubators, oxygen tents etc.
- **Food technology:**  
Monitoring of residual oxygen in packages (e.g. coffee, tea, etc.). Monitoring of oxygen content during production processes.
- **Air conditioning and ventilation technology:**  
Oxygen measurements, air quality monitoring, measuring of oxygen concentration in enclosed air conditioning systems, etc.
- **Sport:**  
Checking of oxygen content in compressed air bottles (diving, etc.).

*The device can only be used to check during these applications. It is no substitute for approved monitoring device!*

#### Specification:

##### Measuring ranges:

- Oxygen concentration:** 0.0 ... 100.0 % O<sub>2</sub> (gaseous)
- Partial oxygen pressure:** 0 ... 1100 hPa O<sub>2</sub>
- Temperature:** -5.0 ... 50.0 °C

##### Accuracy: (device) (at nominal temperature = 25 °C)

- Oxygen concentration:** ±0.1% ± 1 digit
- Partial oxygen pressure:** ±1 hPa ± 1 digit
- Temperature:** ±0.1 °C ± 1 digit

**Oxygen electrode:** for suitable sensores p.r.t. next page

**Sensor connection:** 6-pin screened Mini-DIN-socket.

**Display:** two 4 digit LCDs (12.4 mm or 7 mm high), as well as additional arrows.

**Pushbuttons:** 6 membrane keys for ON/OFF-switch, selection of meas. range, min- and max- value memory, hold-function, calibration etc.

**Working temperature:** 0 ... +50 °C

**Relative humidity:** 0 ... +95 % RH (non-condensing)

**Storage temperature:** -20 ... +70 °C

**Interface:** serial interface, direct connection to RS232 or USB interface of a PC via electrically isolated interface converter GRS 3100 or GRS 3105 resp. USB 3100 N (p.r.t. accessories).

**Power supply:** 9 V-battery, type IEC 6F22 (included), as well as additional d.c. connector for external 10.5-12 V direct voltage supply. (suitable power supply: GNG10/3000)

**Power-Off-function:** 1 ... 120 min (can also be deactivated).

**Low battery warning:** and „bAt“

**Power consumption:** approx. 1.5 mA

<b>Dimensions:</b>	142 x 71 x 26 mm (H x W x D) Impact-resistant ABS plastic housing, membrane keyboard, transparent panel. Front side IP65, integrated pop-up clip.
<b>Weight:</b>	approx. 160 g (cpl. with battery)

#### Functions:

- Min-/Max-value memory:** max. and min. values will be memorized.
- Hold function:** by pressing a button the current meas. value will be memorized.
- Alarm:** integrated limit detector for min. or max. alarm.
- Temperature compensation:** automatic via temperature sensor, integrated in probe housing.
- Air pressure compensation:** The O<sub>2</sub> concentration will be compensated according to the absolute atmospheric pressure set (500 ... 2000 hPa).
- Calibration:**
  - 1-point calibration:** extremely simple quick calibration in atmospheric air. (press button to compensate unit to 20.9 %).
  - 2-point calibration:** first point at atmospheric air (20.9 %), second point freely selectable

#### Accessories and spare parts:

Suitable sensores	p.r.t. next page
<b>GKK 3000</b> case (275 x 229 x 83 mm) with punched lining suitable for GMH3xxx	
<b>USB 3100 N</b> interface converter, electrical isolated	
<b>GRS 3105</b> interface converter with 5 connection points, electrical isolated, for the connection of 5 devices to one PC (RS232).	
<b>ST-R1</b> device protection bag with cut-out for probe connection	

## Atmospheric oxygen sensors for GMH3691

## closed sensor type:

**GGO 380**

For low oxygen-concentration, fast response time

**GGO 370**

Universal applications, diving, longlife

**General:**

- suitable for under and over pressure
- for using in gas-tight systems

**Application:**

Suitable for measuring in normal atmosphere and in systems without or with slight under or over pressure. The sensor type features a screw thread and can be built in gas-tight in almost every system directly resp. with tube-adaptor.

**Note:**

not for under water use (Rebreathers)

## open sensor type:

**GOO 380**

for low oxygen-concentration, fast response time

**GOO 370**

universal applications, diving, longlife

**General:**

- suitable for air- or gas-stream
- quick temperature compensation

**Application:**

Because of the special sensor construction the measuring gas streams optimally around the sensor and escapes through holes in the housing into the air. No pressure build-up at slight streaming of the probe, that falsify the result of measurement.

Particularly suitable for measuring of gas out of gas-bottle etc. Even measuring indoor-gas concentration is possible.

Specification:	GGO/GOO 370	GGO/GOO 380
<b>Specific features:</b>	Stronger membrane, coated electronics, temperature compensation	for low oxygen-concentration, fast response time
<b>Measuring range:</b>		
<b>Partial oxygen pressure:</b>	0 ... 1100 hPa O <sub>2</sub>	0 ... 300 hPa O <sub>2</sub>
<b>Oxygen concentration:</b>	0.0 ... 100.0 % O <sub>2</sub>	0.0 ... 25.0 % O <sub>2</sub>
<b>Response time: T<sub>90</sub></b>	< 10 s	< 5 s
<b>Accuracy (at 25 °C, 1013 hPa):</b>		
<2 % O <sub>2</sub>	±0.2 % O <sub>2</sub>	±0.1 % O <sub>2</sub>
<25 % O <sub>2</sub>	±0.5 % O <sub>2</sub>	±0.5 % O <sub>2</sub>
>25 % O <sub>2</sub>	±0.5 % O <sub>2</sub>	no information
<b>Operating conditions:</b>	0 ... 45 °C 0 ... 95 % RH (non-condensing)	0 ... 50 °C 0 ... 95 % RH (non-condensing)
<b>Ambient pressure:</b>	0.5 ... 2.0 bar abs.	
<b>Over-/under-pressure:</b>	max. 0.25 bar (pressure difference sensor membrane to ambient – sensor screwed-in)	
<b>Storage temperature:</b>	-15 ... +60 °C	
<b>Operation life:</b>	on air: >4 years (warranty for sensor element: 12 months)	on air: >2 years (warranty for sensor element: 12 months)
<b>Sensor:</b>	GOEL 370	GOEL 380
<b>Connection:</b>	Oxygen-partial pressure probe, mounted in external sensor housing replaceable (temperature sensor mounted in housing) approx. 1.3 m cable with Mini-DIN-plug.	
<b>Dimensions of housing:</b>	GGO...: approx. Ø 36 mm x 95 mm (150 mm incl. anti-buckl. glanding), GOO...: approx. Ø 40 mm x 105 mm (160 mm incl. anti-buckl. glanding) Housing with M16 x 1-screw thread (sensor can be connected to line tubes by means of an additional adapter)	
<b>Weight:</b>	approx. 135 g (GGO...) or approx. 145 g (GOO..)	
<b>Scope of supply:</b>	GGO... : sensor, flow diverter, T-piece GOO... : sensor, flow diverter	

**Option:**

- Cable length 4 m
- Cable length 10 m

**Accessories and spare parts:****GOEL 380**

spare sensor element for replacement by user, suitable for low oxygen concentrations, fast

**GOEL 370**

spare sensor element for replacement by user, suitable for universal applications, diving, longlife

**GZ-11**

flow rate adapter to measure the oxygen concentration with 6/4 mm tube

**ESA 369**

spare tube-adaptor M16x1, for tubes with a inner-diameter of 15 mm



## Residual oxygen measuring device



### GMH 3691 GOG-H

Residual oxygen measuring device for universal use

### GMH 3691 GOG-L

Residual oxygen measuring device for low oxygen-concentrations with fast response time

#### Application:

If delicate products are conserved at low-oxygen atmospheres (protective gas), these measuring devices will provide a vital check of the residual oxygen content.

- packaging industry
- food industry

#### Specification:

<b>Sensor elements:</b>	- H: GOEL 370	- L: GOEL 380
<b>Measuring range (hPa O<sub>2</sub>):</b>	- H: 0 ... 1100	- L: 0 ... 300
<b>Measuring range(% O<sub>2</sub>):</b>	- H: 0.0 ... 100.0	- L: 0.0 ... 25.0
<b>Response time: T<sub>90</sub></b>	- H: <10 s	- L: <5 s
<b>Accuracy: (whole system - if careful calibration and measuring)</b>		
<b>1-point-calibration:</b>	±0.2 % O <sub>2</sub> ±1 digit (for concentrations < 10 %)	
<b>2-point-calibration:</b>	±0.1 % O <sub>2</sub> ±1 digit (for concentrations < 10 %)	
<b>Oxygen sensor:</b>	Oxygen partial pressure sensor, built in external sensor housing	
<b>Operation life:</b>	12 month warranty for sensor element (if appropriate application and ambient pressure)	
<b>Working pressure:</b>	0.5 ... 2.0 bar abs.	
<b>Over- / under- pressure:</b>	max. 0.25 bar (pressure difference)	
<b>Power supply:</b>	9 V battery, type IEC 6F22	
<b>Dimensions case:</b>	approx. 394 x 294 x 106 mm	
<b>Weight:</b>	approx. 1400 g (cpl. set)	
<b>Scope of supply:</b>	Device GMH3691, hand pump with air tube, GOG oxygen sensor with penetration needle, case GKK3500, spare needle Ø 0.9 mm, rubber foam sticker (40 pieces), operating manual.	

for additional technical data refer to GMH3691 and corresponding sensors on page 46/47.

#### Accessories and spare parts:

##### GOG-SET H

Set without instrument

Scope of supply: GOG oxygen sensor (GOEL 370) with penetration needle, hand pump with air tube, case GKK3500, spare needle and 40 rubber foam stickers

##### GOG-SET L

Set without instrument

Scope of supply: GOG oxygen sensor (GOEL 380) with penetration needle, hand pump with air tube, case GKK3500, spare needle and 40 rubber foam stickers

##### GOEL 370

Spare sensor element, universal applications, diving, longlife

##### GOEL 380

Spare sensor element, for low oxygen-concentration, fast response time

##### GOG-N

Needle, Ø 0.9 mm (5 pieces)

##### GOG-A

rubber foam sticker (40 pieces)

## Compact air oxygen measuring device



### GOX 100

for universal applications

#### General:

- 1-Button calibration
  - Automatic power-off
  - Min-/max- value memory
  - Incl. sensor GOEL 370
- Note:** not for under water use (Rebreathers)

### GOX 100T

for diving applications

#### General:

- 1-Button calibration
  - MOD-Display (Maximum Operating Depth)
  - HOLD function
  - Incl. sensor GOEL 370
- Note:** not for under water use (Rebreathers)

#### Specification:

<b>Measuring range:</b>	0.0 ... 100.0 % O <sub>2</sub>
<b>Accuracy typ.:</b>	±0.1 % O <sub>2</sub> ±1 digit, calibrated device (range from 15 ... 40 % O <sub>2</sub> )
<b>MOD (GOX 100T):</b>	0 ... 100 m / 0 ... 199 ft
<b>Sensor Connection:</b>	0.7 m jack-connector cable
<b>Sensor:</b>	Oxygen-partial pressure probe, mounted in external sensor housing
<b>Warranty:</b>	12 months
<b>Working pressure::</b>	0.5 ... 2.0 bar abs.
<b>Over-/under-pressure:</b>	max. 0,25 bar (pressure difference)
<b>Working temperature:</b>	0 ... 45 °C (sensor), -20 ... 50 °C (device)
<b>Relative humidity:</b>	0 ... 95 % RH
<b>Power supply:</b>	9 V battery type IEC 6F22
<b>Power consumption:</b>	approx. 120 µA (over 2500 h)
<b>Display:</b>	3½-digit, 13 mm high LCD-display
<b>Housing:</b>	ABS-enclosure, front side IP65
<b>Dimensions:</b>	approx. 106 x 67 x 30 mm
<b>Weight:</b>	approx. 185 g
<b>Features:</b>	BAT, Auto-Power-Off
<b>Scope of supply:</b>	Device incl. sensor, T-piece, flow diverter

#### Option:

##### LACK

encapsulated PC board (for applications where condensation is possible)

#### Accessories and spare parts:

##### GOEL 370

Spare sensor element, universal applications, diving, longlife

##### GOEL 380

Spare sensor element, for low oxygen-concentration, fast response time

##### ESA 369

spare tube-adaptor

##### ZOT 369

spare T-piece

## Pressure handheld instruments



Application:	Device	GMH 5130 GMH 5150 GMH 5155	GMH 3111 GMH 3151 GMH 3156	GMH 3161-12 GMH 3181-12	GMH 3161-002 GMH 3161-01 GMH 3161-07... GMH 3161-13	GMH 3181-002 GMH 3181-01 GMH 3181-07... GMH 3181-13	GDH 200-07 GDH 200-13	GDH 200-14	GPB 3300 GTD 1100	GDU 1000
Relative pressure measuring (over, under- and pressure difference)		✓✓✓	✓✓✓		✓✓✓✓	✓✓✓✓	✓✓			✓
Absolute pressure measuring		✓✓✓	✓✓✓	✓✓				✓	✓✓	✓
Heating, ventilation, climate		✓✓✓	✓✓✓	✓✓	✓✓✓✓	✓✓✓✓	✓✓	✓	✓✓	✓
Measuring in liquids		✓✓✓	✓✓✓							✓
Vacuum measuring		✓✓✓	✓✓✓	✓✓				✓		✓
Meteorology				✓✓				✓	✓	
Altitude measuring (sports)									✓	
Water-proof application		✓✓✓								
Optionally EX-protection			✓✓✓	✓✓	✓✓✓✓	✓✓✓✓				

Function/ Equipment:	Device	GMH 5130 GMH 5150 GMH 5155	GMH 3111 GMH 3151 GMH 3156	GMH 3161-12 GMH 3181-12	GMH 3161-002 GMH 3161-01 GMH 3161-07... GMH 3161-13	GMH 3181-002 GMH 3181-01 GMH 3181-07... GMH 3181-13	GDH 200-07 GDH 200-13	GDH 200-14	GPB 3300 GTD 1100	GDU 1000	
<b>Specification:</b>											
Plug-in probe		1 1 2	1 1 2								
measuring range pressure (max.) [mbar]		depends on sensor	depends on sensor	0 ... 1300	...-002: -5 ... 5 ...-01: -1 ... 25 ...-07: -10 ... 350 ...-13: -100 ... 2000		...-07: 0 ... 200 ...-13: 0 ... 2000	0 ... 11000	300 ... 1100	depends on sensor	
Additional measurands									GTD 1100: -10..+50 °C, -500..+9000m		
Units		mbar, bar, Pa, kPa, MPa, mmHg, PSI, mH <sub>2</sub> O						mbar (hPa), mmHg, PSI ...-07: zus. Pa	mbar (hPa), mmHg, PSI	mbar (hPa), mmHg	depends on sensor
<b>Functions:</b>											
Min/Max, Zero, Auto-Off		✓✓✓	✓✓✓	✓✓	✓✓✓✓	✓✓✓✓	✓✓	✓	✓✓	Min/Max, Zero	
Alarm		✓✓	✓✓	✓		✓✓✓✓					
Data logger		✓✓	✓✓	✓		✓✓✓✓					
Interface		✓✓✓	✓✓✓	✓✓	✓✓✓✓	✓✓✓✓					
Analog output		✓✓	✓✓	✓		✓✓✓✓					
Catalog page:		50/51	52/53	56/58	56-58	56-58	59	59	60	61	

## Water-proof handheld device for pressure measurement with external changeable probes



**WATER-PROOF**  
(DEVICE AND PLUG-IN CONNECTIONS)

- Serial interface
- Analog output (GMH 5150 and GMH 5155)
- Data logger and alarm function (GMH 5150 and GMH 5155)
- Peak value detection (1000 measurements / s)
- Robust silicone protection cover
- Large double display with background illumination
- Incl. calibration protocol

### GMH 5130

with 1 sensor connection, without sensor

### GMH 5150

with 1 sensor connection, analog output and data logger, without sensor

### GMH 5155

with 2 sensor connections, analog output and data logger, without sensors

Specification:	GMH 5130	GMH 5150	GMH 5155
Sensor connections:	1	1	2
Suitable probes:	GMSD / MSD sensors, available ranges (resolutions) from -1.999 ... 2.500 mbar (0.001 mbar) to 0 ... 1000 bar (1 bar)		
display range max.:	-19999 ... +19999 digit		
Display unit: *	depends on measuring range selection and sensor: mbar, bar, Pa, kPa, MPa, mmHg, inHg, PSI, mH <sub>2</sub> O		
Measuring frequency:	4 measurements / s or 1000 measurements / s		
Average filter:	adjustable: 1 ... 120 s		
Accuracy:	± 0.1 % FS ± 1 digit		
Connections:			
Sensor	1x 7-pole bayonet connector	1x 7-pole bayonet connector	2x 7-pole bayonet connector
Output / external supply	4-pole bayonet connector for serial interface, * supply (with accessories: USB adapter USB 5100)	analog output 0 ... 1 V	analog output 0 ... 1 V
Display:	4 ½ digit 7-segment, illuminated (white)		
Working temperature:	-25 ... 50 °C, 0 ... 95 % RH (non-condensing)		
Storage temperature:	-25 ... 70 °C		
Housing:	impact resistant ABS housing with pop-up clip		
Protection class:	IP65 / IP67		
Dimensions:	160 x 86 x 37 mm (H x W x D) incl. silicone protection cover (red)		
Weight:	approx. 250 g incl. battery and protection cover		
Power supply:	2 x AAA-battery (included), battery life 500 h (without illumination, 4 measurings / s)		

#### \* = Note to the pressure unit selection:

The choice of a specific pressure unit is possible, if its whole measuring range is displayable within the display of the device and the sensor is supporting these resolution.

## Device for pressure measurement

## Application:

- industry and craft
- HVAC: heating, ventilation, air-conditioning
- leakage test / pressure test
- chimney draft measurement: under pressure
- leakage test at buildings (i.e. 4 Pascal test)
- measurements of gas and oil firings
- automobile trade
- Hydraulic analysis (peak pressure)



## Functions:

**Min / Max Value Memory:** highest and lowest measured value is saved

**Hold:** displayed value gets frozen by keypress

**Auto Power Off:** device is automatically switched off after a selected period if unused (0 ... 120 min, or deactivated)

**Additional Display for Battery:** Bar graph display

**Low Battery Display "BAT"**

**Background Illumination:** duration adjustable (off, 5 s ... 2 min.)

**Adjustment:** offset / slope adjustable in menu

**User-defined displayed unit:** conversion to any unit with help of linear factor

	GMH 5130	GMH 5150	GMH 5155
<b>Leakage test function</b>	-	leak rate display, leak rate alarm (/s, /min, /h)	
<b>Air velocity / flow volume</b>	-	Pitot tube measurement (accessories)	
<b>Analog output:</b>	-	0 - 1 V, freely adjustable, connection with 4-pole bayonet connector, Resolution 12 bit	
<b>Data logger</b>	-	cyclic: 10.000 data sets	cyclic: 8.000 data sets
	-	Single value: 1.000 data sets (with measuring point input, 40 adjustable measuring point texts or measuring point numbers)	
<b>Min-/max- alarm</b>	-	x	3 channels (sensor 1, sensor 2, difference) with individual alarm boundaries
		Permanent monitoring of alarm boundaries 3 alarm conditions - off: Alarm function inactive - on: Alarm report via display, integrated buzzer and interface - no Sound: Alarm report only via display and interface	

## Accessories and spare parts:

**GMSD ... - K51**

pressure sensors (p.r.t. page 54)  
Application field: non-aggressive gases  
for over / under pressure and difference pressure measurements or absolute pressure measurements

**MSD ...**

pressure sensors / stainless steel  
(p.r.t. page 55)  
Application field: air, aggressive gases  
for over / under pressure and relative pressure measurements or absolute pressure measurements

**MSD-K51**

1 m connection cable for MSD sensors

**Pitot tube**

(made of stainless steel) for air velocity / flow volume measurement  
Ø = 3 mm, NL = 300 mm, max. 600 °C

**GDZ-01**

PVC tube 6/4 (6 mm outer Ø, 4 mm inner Ø) (5 bar at 23 °C)

**GDZ-30**

Adapter G1/2" inner to tube 6/4

**EBS 20M**

software for long-term monitoring (p.r.t. page 66)

**GSOFT 3050**

Software for operation of logger devices (p.r.t. page 66)

**USB 5100**

Electrically isolated interface converter, supplied via USB

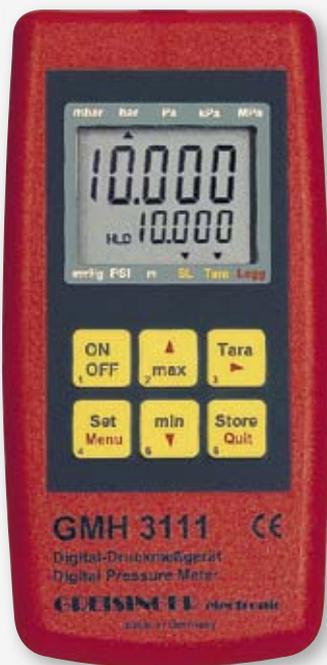
**GNG 5 / 5000**

Plug-in power supply 5 V DC, suitable for GMH 5000 series (see p. 65)

**GKK 3500**

Device case (394 x 294 x 106 mm) with eggcrate foam and cut-outs  
for 1 device (p.r.t. page 64)

## Hand-held pressure measuring device



- one device for any measuring range (2.500 mbar ... 1000 bar)
- tara, hold function, min-/max-value memory, ready for bus operation

**CALIBRATED AND FULLY INTERCHANGEABLE PRESSURE PROBES**

Suitable pressure probes page 54/55

Probes for following pressure ranges are available:

- relative pressure  
2.500 mbar ... 1000 bar rel.
- pressure difference  
2.500 mbar ... 10.00 bar
- absolute pressure  
1300 mbar ... 35.00 bar
- special meas. ranges upon request

### GMH 3111

device with 1 sensor connection, without sensor

### GMH 3111 - ex

device with 1 sensor connection, without sensor, ex

Specification:	GMH 3111	GMH3111-ex
max. display range:	-19999 ... +19999 digit	-19999 ... +19999 digit
Measuring range:	corresponding to used probe	corresponding to used probe
Overload:	corresponding to used probe	corresponding to used probe
Resolution:	corresponding to used probe	corresponding to used probe
Accuracy: (device)	±0,1 % FS ±1 digit (at nominal temperature = 25 °C)	
Pressure units: *	mbar, bar, Pa, kPa, MPa, mmHg, PSI, mH <sub>2</sub> O, can be selected.	
Probe connection:	1 sensor socket	1 sensor socket
	6-pin lockable Mini-DIN-socket(s) for GMSD/MSD-sensors. Automatic probe detection and setting of meas. range upon plugging in of probe.	
Display:	2 x 4½-digit LCD	2 x 4½-digit LCD
Output:	interface	interface
- serial interface:	direct connection to RS232 or USB interface of a PC via electrically isolated interface converter GRS 3100, GRS 3105 or USB 3100 N.	
- analog output:	-	-
Power supply:	9 V-battery, d.c. connector	9 V-battery, d.c. connector
	suitable 9 V-battery (type IEC 6F22) in scope of supply, d.c. connector for external 10.5-12 V direct voltage supply. (suitable power supply: GNG10/3000)	
Sensor adjustment:	digital offset and scale input	digital offset and scale input
Tara, hold, min/max value:	x	x
Peak value memory:	-	-
Measuring cycle:	4 measurements / s	4 measurements / s
Logger functions:	-	-
Averaging function:	-	-
Min-/Max-alarm:	-	-
Power consumption:	approx. 1.6 mA	max. 1.6 mA
Working condition:	-25 ... 50 °C, 0 ... 95 % RH	-10 ... 50 °C, 0 ... 95 % RH
Power-Off-function:	1 ... 120 min (can also be deactivated).	
Housing:	impact-resistant ABS plastic housing, Front side IP65	
	integrated pop-up clip for table top or suspended use.	-
Weight:	approx. 150 g	approx. 190 g (incl. leather case)

\* Note to the pressure unit selection: (information for all GMH 31xx)

The choice of a specific pressure unit is possible, if its whole measuring range is displayable within the display of the device and the sensor is supporting these resolution.

#### Note to Ex- design types:

Technical changes compared to standard instrument (valid for all GMH31xx - ex)

Ex qualification:  II 2 G Ex ib IIC T4

Ref. document: EPS 09 ATEX 1 227 X

#### Standards:

The device meets the standards for electric resources in explosion endangered areas according to EN 60079-0 : 2006, EN 60079-11: 2007

#### Probe:

(GMH 3111 - ex, GMH 3151 - ex, GMH 3156 - ex) All GMSD sensors with option 'Ex type' can be used.

#### Interface:

suitable interface adapter are USB 3100 N, GRS 3100 and GRS 3105

#### Please note:

The operation of the interface is not allowed within the Ex area!

**Working temperature:** -10 ... +50 °C

**Power supply:** 9 V-battery, d.c. connector

#### Please note:

the use of d.c. connector is not allowed within the Ex area! Just d.c. connectors of type GNG10/3000 can be used.

#### Alarm function:

(GMH 3151 - ex, GMH 3156 - ex, GMH 3181 - ex) The device is without a horn, in the alarm settings are only the parameter „no.so“ and „off“ adjustable.

#### Scope of supply:

device with associated leather case.



## Pressure measuring device with logger



- 4½-digit display  
probes with higher resolution up on request
- peak value memory
- analog output 0-1 V
- 1000 measurements / s
- digital sensor adjustment possible
- min- / max-alarm
- integrated horn

LOGGER FUNCTIONS

Suitable pressure probes  
page 54/55

### GMH 3151

Device with 1 sensor connection, analog output and data logger, without sensor

### GMH 3156

Device with 2 sensor connections, analog output and data logger, without sensor

### GMH 3151 - ex

Device with 1 sensor connection, analog output and data logger, without sensor

### GMH 3156 - ex

Device with 2 sensor connections, analog output and data logger, without sensor

Specification:	GMH 3151	GMH 3156	GMH 3151-ex	GMH3156-ex
<b>max. display range:</b>	-19999 ... +19999 digit		-19999 ... +19999 digit	
<b>Measuring range:</b>	corresponding to used probe		corresponding to used probe	
<b>Overload:</b>	corresponding to used probe		corresponding to used probe	
<b>Resolution:</b>	corresponding to used probe		corresponding to used probe	
<b>Accuracy: (device)</b>	±0,1 % FS ±1 digit (at nominal temperature = 25 °C)			
<b>Pressure units:</b>	mbar, bar, Pa, kPa, MPa, mmHg, PSI, mH <sub>2</sub> O, can be selected.			
<b>Probe connection:</b>	1	2	1	2
<b>Display:</b>	2 x 4½-digit LCD		2 x 4½-digit LCD	
<b>Output:</b>	serial interface or AAG		serial interface or AAG*	
<b>- serial interface:</b>	direct connection to RS232 or USB interface of a PC via electrically isolated interface converter GRS 3100, GRS 3105 or USB 3100 N.			
<b>- analog output:</b>	0-1 V, freely adjustable (res. 12 bit)		0-1 V, freely adjustable (res. 12 bit)	
<b>Power supply:</b>	9 V-battery, d.c. connector		9 V-battery, d.c. connector*	
	suitable 9V-battery (type IEC 6F22) in scope of supply, d.c. connector for external 10.5-12 V direct voltage supply. (i. e. GNG10/3000)			
<b>Sensor adjustment:</b>	digital offset and scale input		digital offset and scale input	
<b>Tara, Hold, min/max value:</b>	x		x	
<b>Peak value memory:</b>	≥1 ms		≥1 ms	
<b>Measuring cycle:</b>	„slow“ 4 measurements / s		4 measurements / s	
	„fast“ (with filter) ≥ 1000 measurements / s		≥1000 measurements / s	
	„peak-detect“ ≥ 1000 measurements / s		≥1000 measurements / s	
<b>Logger functions:</b>				
<b>- manually data sets:</b>	99 data sets		99 data sets	
<b>- cycle data sets:</b>	10000	4000	10000	4000
	(max. 64 recording sequences)		(max. 64 recording sequences)	
<b>- adjustable cycle time:</b>	1 ... 3600 s		1 ... 3600 s	
<b>Averaging function:</b>	x	x	x	x
<b>Min-/max- alarm:</b>	x	x	x*	x*
<b>Real-time clock:</b>	x	x	x	x
<b>Power consumption:</b>	max. 1.6 mA (4 measurements/s) max. 7 mA (1000 measurements/s)		max. 1.6 mA (4 measurements/s) max. 7 mA (1000 measurements/s)	
<b>Working conditions:</b>	-25 ... +50 °C, 0 ... +95 % RH (non-condensing)		-10 ... 50 °C, 0 ... 95 % RH (non-condensing)	
<b>Power-Off-function:</b>	1 ... 120 min (can also be deactivated)			
<b>Housing:</b>	142 x 71 x 26 mm, impact-resistant ABS plastic housing. Front side IP65 pop-up clip for table top or suspended use. -			
<b>Weight:</b>	approx. 150 g		approx. 190 g (incl. case)	

\* refer to note to EX-design types at page before

Additional functions of GMH3156:

- 2 GMSD/MSD-probes connectable.
- difference measurement of two probes

#### Functions:

**Tare function:** display value and the min./max values memorized can be set to zero.

**Hold function:** by pressing a button the current meas. value will be memorized.

**Min./Max. value memory:** memorizing of max. and min. values.

#### Peak value memory (peak-detect):

Not filtered pressure peaks >1 ms will be detected in the min-/max-value memory.

**Averaging function:** integrates the meas. values during a selectable period of time and then calculates the average display value.

**Logger operation:** Logger start and stop via the keyboard or interface. Comfortable read-out and display software GSOFT3050 (see accessories) available as additional equipment.

**Low power logger mode:** (only in measuring cycle „slow“) Only one measurement carried out at the end of the respective logger cycle. The battery life is considerably prolonged. For long-term recordings (eg. leaktest).

**Min-/Max-alarm:** the measuring value is constantly monitored if it remains within the min./max. limits set (deactivatable)

**- Alarm:** 3 different alarm settings

„off“ - alarm function deactivated

„on“ - visual alarm via display, interface alarm, alarm sounded via integrated horn.

„no.So.“ - visual alarm via display and interface alarm

**- Controlling function:** with the help of the switching module GAM3000 (optionally) electric equipment can be switched on/off or alarm memorized (see accessories)

**Sea-Level-correction:** when connecting an abs. pressure probe the barom. air pressure can also be displayed corrected to sea level „zero“. (Air pressure compensation achieved by entering the meters above sea level „zero“)

## Pressure sensors



### General:

for use with  
**GMH31xx, GDUSB:** Type GMSD ... -K31,  
**GMH 51xx:** Type: GMSD ... - K51

### Application:

air and non aggressive gases  
*not suitable for water / liquids*

Relative pressure sensors: for measuring of over / under pressure and pressure difference

	GMSD 2,5 MR ..	GMSD 25 MR ..	GMSD 350 MR ..	GMSD 2 BR ..	GMSD 10 BR ..
<b>Measuring range</b>	-1.999 ... +2.500 mbar	-19.99 ... +25.00 mbar	-199.9 ... +350.0 mbar	-1000 ... +2000 mbar	-1.00 ... 10.00 bar
<b>Overload</b>	max. 200 mbar	max. 300 mbar	max. 1 bar	max. 4 bar	max. 10.34 bar
<b>Resolution</b>	0.001 mbar (0.1 Pa)	0.01 mbar (1 Pa)	0.1 mbar	1 mbar	10 mbar
<b>Accuracy (typ.)</b>					
<b>hysteresis / linearity</b>	± 0.2 % FS	± 0.2 % FS	± 0.2 % FS	± 0.2 % FS	± 0.2 % FS
<b>temperature influence (from 0-50 °C)</b>	± 1.0 % FS	± 0.5 % FS	± 0.4 % FS	± 0.4 % FS	± 0.4 % FS

Absolute pressure sensors:

	GMSD 1,3 BA ..	GMSD 2 BA ..	GMSD 7 BA ..
<b>Measuring range</b>	0 ... 1300 mbar abs.	0 ... 2000 mbar abs.	0.00 ... 7.00 bar abs.
<b>Overload</b>	max. 4 bar abs.	max. 4 bar abs.	max. 10.34 bar abs.
<b>Resolution</b>	1 mbar	1 mbar	10 mbar
<b>Accuracy (typ.)</b>			
<b>hysteresis / linearity</b>	± 0.2 % FS	± 0.2 % FS	± 0.2 % FS
<b>temperature influence (from 0-50 °C)</b>	± 0.4 % FS	± 0.4 % FS	± 0.4 % FS

### Specification:

<b>Sensor:</b>	piezoresistive pressure sensor
<b>Pressure connection:</b>	2 connection pins for tubes 6 x 1 mm (6 mm inside-Ø and 4 mm outside-Ø)
<b>Electronics:</b>	PC board with amplifier and data memory for sensor data (measuring range / calibration etc.) integrated in sensor housing
<b>Working temperature:</b>	0 ... +50 °C
<b>Relative humidity:</b>	0 ... +95 % RH (non condensing)
<b>Storage temperature:</b>	-25 ... +70 °C
<b>Housing:</b>	ABS plastic with suspension eye, dimensions do not incl. conn. pin: 68 x 32,5 x 15 mm, dimensions with connection pin: 68 x 32,5 x 27,5 mm.
<b>Weight:</b>	approx. 75 g (...-K51: approx. 82 g)
<b>Device connection:</b>	
<b>GMSD ... - K31:</b>	1 m PVC connection cable, screened with integral 6-pin Mini-DIN-plug, lockable
<b>GMSD ... - ex:</b>	
<b>GMSD ... - K51:</b>	1 m PVC connection cable, screened with 7-pin bayonet plug

### Options:

#### Ex-protection



#### Higher probe accuracy

by multi point calibration  
 Additional individual linearisation points are stored in sensor memory. (not possible for GMSD 2,5 MR and GMSD 25 MR!)

#### Certificate of calibration WPD5

## Tube, Tube clips, adapter, couplings, etc.

for GMH31xx, GMSD, MSD, GDHs and pressure measuring transducers.



#### GDZ-01

PVC-tube 6/4 (6 mm outside-Ø, 4 mm inside-Ø) (5 bar @ 23 °C)

#### GDZ-02

PE (polyethylene) 6/4 (6 mm outside-Ø, 4 mm inside-Ø) (10 bar @ 23 °C))

#### GDZ-03

PUR (polyurethane) 6/4 (6 mm outside-Ø, 4 mm inside-Ø) (9 bar @ 23 °C)

#### GDZ-04

PA (polyamide) 6/4 (6 mm outside-Ø, 4 mm inside-Ø) (25 bar @ 23 °C)

#### GDZ-05

Screw-type glanding for 6/4 tube with outside thread G1/8"

#### GDZ-06

Increaser glanding for 6/4 tube with inside thread G1/8"

#### GDZ-08

Double adapter for 6/4 tube to 6/4 tube

#### GDZ-09

Coupling adapter (NW5) made of brass with inside thread G1/4" (suitable for GDZ-12)

#### GDZ-10

Coupling adapter (NW5) made of brass for tube with 6 mm inside-Ø (suitable for GDZ-12)

#### GDZ-11

Coupling adapter (NW5) made of brass with outside thread G1/4" (suitable for GDZ-12)

#### GDZ-12

Coupler socket (NW5) made of brass (single-hand use) with inside thread G1/4"

#### GDZ-17

Screw-in connection for 6/4 tube with outside thread G1/4"

#### GDZ-18

Tube clamp for 6/4 tube

#### GDZ-19

Tube clamp for 8/6 tube (8 mm outside-Ø and 6 mm inside-Ø)

#### GDZ-21

T-piece for 6/4 tubes

#### GDZ-25

Luer-Lock male to 6/4 tube

#### GDZ-26

Luer-Lock female to 6/4 tube

#### GDZ-29

Filter-Membrane incl. Luer-Locks (GDZ-25 and GDZ-26)

#### GDZ-31

Silicone tube 8/5 (8 mm outer / 5 mm inner) (2 bar at 23 °C) temperature-resistant up to 200 °C, very flexible (figure similar to GDZ-04)

#### GOG-N

needle, Ø 0.9 mm - suitable to Luer-Lock male (5 pieces) (without picture)

for additional accessories refer to page 55

## Stainless steel pressure sensors



Follow-on type für GMSD-stainless-steel-sensors

**MSD ...**

Stainless steel pressure sensors without cable  
Connection cable MSD-K31 or MSD-K51 has to be ordered separately (Accessories)

**General:**

for use with GMH31xx, GMH 51xx and GDUSB 1000 (p. 57)

**Application:**

air, aggressive gases, aggressive liquids / water, etc.

Absolute pressure	Measuring range	Overload	Resolution
MSD 1 BAE	0 ... 1000 mbar abs.	max. 5 bar abs.	1 mbar
MSD 2,5 BAE	0 ... 2500 mbar abs.	max. 10 bar abs.	1 mbar
MSD 4 BAE	0 ... 4000 mbar abs.	max. 17 bar abs.	1 mbar
MSD 6 BAE	0 ... 6000 mbar abs.	max. 35 bar abs.	1 mbar
MSD 10 BAE	0 ... 10.00 bar abs.	max. 35 bar abs.	10 mbar
MSD 16 BAE	0 ... 16.00 bar abs.	max. 80 bar abs.	10 mbar
MSD 25 BAE	0 ... 25.00 bar abs.	max. 50 bar abs.	10 mbar

Relative pressure	Measuring range	Overload	Resolution
MSD 100 MRE	0.0 ... 100.0 mbar rel.	max. 1 bar rel.	0.1 mbar
MSD 250 MRE	0.0 ... 250.0 mbar rel.	max. 2 bar rel.	0.1 mbar
MSD 400 MRE	0.0 ... 400.0 mbar rel.	max. 2 bar rel.	0.1 mbar
MSD -1/1.5 BRE	-1000 ... +1500 mbar rel.	max. 10 bar rel.	1 mbar
MSD -1/3 BRE	-1000 ... +3000 mbar rel.	max. 17 bar rel.	1 mbar
MSD 1 BRE	0 ... 1000 mbar rel.	max. 5 bar rel.	1 mbar
MSD 2,5 BRE	0 ... 2500 mbar rel.	max. 10 bar rel.	1 mbar
MSD 4 BRE	0 ... 4000 mbar rel.	max. 17 bar rel.	1 mbar
MSD 6 BRE	0 ... 6000 mbar rel.	max. 35 bar rel.	1 mbar
MSD 10 BRE	0.00 ... 10.00 bar rel.	max. 35 bar rel.	10 mbar
MSD 25 BRE	0.00 ... 25.00 bar rel.	max. 50 bar rel.	10 mbar
MSD 40 BRE	0.00 ... 40.00 bar rel.	max. 80 bar rel.	10 mbar
MSD 60 BRE	0.00 ... 60.00 bar rel.	max. 120 bar rel.	10 mbar
MSD 100 BRE	0.0 ... 100.0 bar rel.	max. 200 bar rel.	0.1 bar
MSD 160 BRE	0.0 ... 160.0 bar rel.	max. 320 bar rel.	0.1 bar
MSD 250 BRE	0.0 ... 250.0 bar rel.	max. 500 bar rel.	0.1 bar
MSD 400 BRE	0.0 ... 400.0 bar rel.	max. 800 bar rel.	0.1 bar
MSD 600 BRE	0.0 ... 600.0 bar rel.	max. 1200 bar rel.	0.1 bar
MSD 1000 BRE	0 ... 1000 bar rel.	max. 1500 bar rel.	1 bar

**MSD 25 MRE  
MSD -20/60 MRE**

not suited for aggressive media, water, etc.,  
no Ex design and no option „higher accuracy“ available

**NEW**

Relative pressure	Measuring range	Overload	Resolution
MSD 25 MRE	0,00 ... 25,00 mbar	max. 500 mbar	0.01 mbar
MSD -20/60 MRE	-20,00 ... 60,00 mbar	max. 500 mbar	0.01 mbar

**Specification:**

<b>Sensor:</b>	stainless steel pressure sensor (parts coming into contact with media). Suitable for aggressive media, water, etc.. <i>(does not apply to MSD 25 MRE and MSD -20/60 MRE)</i>
<b>Accuracy: (typ. values)</b>	± 0.2 % FS (hysteresis and linearity) ± 0.02 % FS / K (TC for zero or slope)
<b>Electronics:</b>	PC board with amplifier and data memory for sensor data (meas. range, etc.) integrated in sensor housing, sealed sensor electronic
<b>Reaction time:</b>	1 ms
<b>Medium temperature:</b>	-25 ... +100 °C (compensated range: 0 ... 70 °C); -25 ... +80 °C at MSD 25 MRE and MSD -20/60 MRE
<b>Working conditions:</b>	-20 ... +80 °C
<b>Storage temperature:</b>	-40 ... +80 °C
<b>Pressure connection:</b>	connection thread G1/2B (other on request).
<b>Cable connection:</b>	M16 built-in plug
<b>Housing:</b>	CrNi-steel (parts coming into contact with media) length: 88,5 mm, Ø 27 mm, approx. 220 g
<b>Protection class:</b>	IP 67 (Sensor)

**Options:****Higher probe accuracy**

by multi point calibration. Additional individual linearisation points are stored in sensor memory.  
*(not available for MSD 25 MRE and MSD -20/60 MRE)*

**Certificate of calibration WPD5****Accessories and spare parts:****MSD-K31**

Connection cable for use with GMH 31xx / GDUSB 1000  
1 m PVC connection cable, screened with integral 6-pin Mini-DIN-plug and M16-socket (IP 54)

**MSD-K51**

Connection cable for use with GMH 51xx  
1 m PVC connection cable, screened with 7-pin bayonet plug cable and plug connection water proof acc. to IP 67 and M16-socket

**MSD-K31-xx**

Longer connection cable (as MSD-K31); Length 2 ... 10 m please specify

**MSD-K51-xx**

Longer connection cable (as MSD-K51); Length 2 ... 10 m please specify

**Ex-Protection:**

**MSD ... - ex**   
Stainless steel pressure sensor (without cable) with Ex-protection

**MSD-K31 - ex**

Connection cable with Ex-protection  
Connection to GMH 31xx, 1 m PVC connection cable, screened with integral 6-pin Mini-DIN-plug and M12-socket

## Tube, Tube clips, adapter, couplings, etc.



for additional accessories refer to page 54

**GDZ-13**

Increaser/reducer made of brass with G1/2" outside thread and G1/8" inside thread

**GDZ-14**

Screw-in nozzle for 6/4 tube with outside thread G1/8"

**GDZ-15**

Screw-in nozzle for tube with 6 mm inside-Ø with outside thread G1/4"

**GDZ-16**

Screw-in nozzle for 6/4 tube with outside thread G1/4"

**GDZ-20**

Screw-on connection made of brass for 6/4 tube with inside thread G1/4"

**GDZ-22**

Coupling adapter (NW5) made of brass with tube connection 6/4 (suitable for GDZ-12)

**GDZ-23**

Adapter G1/2" inside thread to G1/4" outside thread, made of brass

**GDZ-27**

Manometer profile gasket (thickness 3 mm, Cu) for thread G1/4"

**GDZ-28**

Flat gasket (thickness 5 mm, Cu) for thread G1/2"

**GDZ-30**

Adapter G1/2" inside thread to tube 6/4 (without picture)

**GWA 1214**

Adapter G1/2" inside thread to G1/4" outside thread (without picture)

## A series of hand-held measuring devices with integrated sensor



- integrated pressure sensor
- sturdy metal connection pin
- tare function / zero point offset
- model with  protection available

**NEW**

Additional features for GMH 3181:

- peak value memory (>1 ms)
- 2 logger functions
- analog output 0 - 1 V
- min-/max- alarm
- integrated horn

Type specific data:	GMH 3161 - ...	GMH 3181 - ...	GMH 3161 - ... - ex	GMH 3181 - ... - ex
Display:	2 x 4½-digit LCD	2 x 4½-digit LCD	2 x 4½-digit LCD	2 x 4½-digit LCD
Output:	interface	interface or analog output	interface*	interface or analog output*
- serial interface:	x	x	x	x
- analog output:	--	0 - 1 V, freely adjustable (resolution 12 bit)	--	0 - 1 V, freely adjustable (resolution 12 bit)
Stromversorgung:	9 V-battery, d.c. connector	9 V-battery, d.c. connector	9 V-battery, d.c. connector *	9 V-battery, d.c. connector *
	suitable 9V-battery (type IEC 6F22) in scope of supply, d.c. connector for external 10.5-12 V direct voltage supply. (suitable power supply: GNG10/3000)			
Sensor adjustment:	digital offset and scale input	digital offset and scale input	digital offset and scale input	digital offset and scale input
Tare, hold, min/max value:	x	x	x	x
Peak value memory:	--	≥1 ms	--	≥1 ms
Measuring cycle: „slow“	4 measurements /	4 measurements / s	4 measurements / s	4 measurements / s
„fast“ (with filter)	--	≥ 1000 measurements / s	--	≥ 1000 measurements / s
„peak-detect“	--	≥ 1000 measurements / s	--	≥ 1000 measurements / s
Logger functions:	--	x	--	x
- manually:		99 data sets		99 data sets
- cycle:		10000 data sets (max. 64 recording sequences)		10000 data sets (max. 64 recording sequences)
-adjustable cycle time		1 ... 3600 s		1 ... 3600 s
Averaging function:	--	x	--	x
Min-/max-alarm:	--	x	--	x*
Real-time clock:	--	x	--	x
Power consumption:	approx. 0.6 mA	approx. 0.6 mA (slow mode) max. 2.5 mA (fast = 1000Hz)	approx. 0.6 mA	approx. 0.6 mA (slow mode) max. 2.5 mA (fast = 1000 Hz)
Working condition:	-25 ... +50 °C, 0 ... +95 % RH (non-condensing)		-10 ... 50 °C, 0 ... 95 % RH (non-condensing)	
Housing:	142 x 71 x 26 mm (without pressure connection pin - pin approx. 11 mm protruding at front side of device), impact-resistant ABS plastic housing. Front side IP65 integrated pop-up clip for table top or suspended use.			
Weight:	approx. 165 g	approx. 170 g	approx. 205 g (incl. leather case)	approx. 210 g (incl. leather case)

\* Please refer to note to Ex-design types

### General function description:

**Tare function:** display value and the min./max values memorized can be set to zero.

**Hold function:** by pressing a button the current meas. value will be memorized.

**Min./Max. value memory:** memorizing of max. and min. values.

**Serial interface:** direct connection to RS232 or USB interface of a PC via electrically isolated interface adapter GRS 3100, GRS 3105 or USB 3100 N.

**Power-Off-function:** device will be automatically switched off if no operating takes place for the time of the power-off delay.

**Selectable values:** off, 1 ... 120 min.

### GMH 3181:

#### Peak value memory (peak-detect):

Not filtered pressure peaks >1 ms will be detected in the min-/max-value memory.

**Logger operation:** Logger start and stop via the keyboard or interface. Comfortable read-out and display software (GSOFT3050) available as additional equipment.

**Low power logger mode:** (only in measuring cycle „slow“) Only one measurement carried out at the end of the respective logger cycle. The battery life is considerably prolonged.

For long-term recordings (eg. leaktest).

**Averaging function:** integrates the meas. values during a selectable period of time and then calculates the average display value.

**Min-/Max-alarm:** the measuring value is constantly monitored if it remains within the min./max. limits set (deactivateable)

- Alarm: 3 different alarm settings

„off“ - alarm function deactivated

„on“ - visual alarm via display, interface alarm, alarm

sounded via integrated horn.

„no.So.“ - visual alarm via display and interface alarm

**Controlling function:** with the help of the switching module GAM3000 (optionally) electric equipment can be switched on/off or alarm monitored (see accessories)

## FINEST MANOMETER / MANOMETER for over/under pressure and pressure difference.



NEW

MEASURING RANGE: -500.0 ... +500.0 Pa

**GMH 3161-002**Device -500.0 ... +500.0 Pa ( $\pm 500.0$  Pa <sup>1</sup>)**GMH 3181-002**Device -500.0 ... +500.0 Pa ( $\pm 500.0$  Pa <sup>1</sup>), Logger

Specification:	
Measuring range:	-5000 ... +500,0 Pa (-5.000 ... +5.000 mbar)
Overload:	max. 250 hPa (mbar)
Resolution:	0.1 Pa (0,001 mbar)
additional Pressure units:	kPa, PSI, mmHg, mH <sub>2</sub> O
Accuracy: (typ. values)	
hysteresis and linearity	0,3 %
temperature-influence from 0-50 °C	0,4 %
Option higher accuracy available	no
Sensor:	integrated piezo-resistive absolute pressure sensor. Suitable for air and non aggressive gas. (Note: sensor is not suitable for water!)
Pressure connection:	2 metal connection pins, made of brass, nickel plated, pressure tubes 6 x 1 mm (4 mm inside-Ø) can be connected

For type specific data please refer to page 56.

\*1 measuring range possible by changing the pressure connection ports

MEASURING RANGE: ...-01: -100 ... 2500 Pa  
...-07H: -1.00 ... +70.00 MBAR**GMH 3161-01**Device -100 ... 2500 Pa ( $\pm 2500$  Pa <sup>1</sup>)**GMH 3181-01**Device -100 ... 2500 Pa ( $\pm 2500$  Pa <sup>1</sup>), Logger**GMH 3161-07H**Device -1.00 ... 70.00 mbar ( $\pm 70.00$  mbar <sup>1</sup>)**GMH 3181-07H**Device -1.00 ... 70.00 mbar ( $\pm 70.00$  mbar <sup>1</sup>), Logger

Specification:		... - 01	... - 07H
Measuring range:		-100 ... 2500 Pa (-1.00 ... 25.00 mbar)	-1.00 ... +70.00 mbar
Overload:		max. 100 mbar	max. 1000 mbar
Resolution:		1 Pa (0.01 mbar)	0.01 mbar
additional Pressure units:		bar, kPa, PSI, mmHg, mH <sub>2</sub> O	bar, Pa, kPa, PSI, mmHg, mH <sub>2</sub> O
Accuracy: (typ. values)			
hysteresis and linearity		$\pm 0.3$ % FS	$\pm 0.1$ % FS
temperature-influence from 0-50 °C		$\pm 0.4$ % FS	$\pm 0.4$ % FS
Option higher accuracy available		no	already integrated
Sensor:		integrated piezo-resistive absolute pressure sensor. Suitable for air and non aggressive gas. (Note: sensor is not suitable for water!)	
Pressure connection:		2 metal connection pins, made of brass, nickel plated, pressure tubes 6 x 1 mm (4 mm inside-Ø) can be connected	

For type specific data please refer to page 56.

\*1 measuring range possible by changing the pressure connection ports

MEASURING RANGE:  
...-07: -10.0 ... +350.0 MBAR  
...-07B: -10.0 ... +420.0 MBAR**GMH 3161-07**Device -10.0 ... +350.0 mbar ( $\pm 350.0$  mbar <sup>1</sup>)**GMH 3181-07**Device -10.0 ... +350.0 mbar ( $\pm 350.0$  mbar <sup>1</sup>), Logger**GMH 3161-07B**

Device -10.0 ... 420.0 mbar (-7.5 ... 315.0 mmHg)

**GMH 3181-07B**

Device -10.0 ... 420.0 mbar (-7.5 ... 315.0 mmHg), Logger

Specification:		... - 07	... - 07B
Measuring range:		-10.0 ... +350.0 mbar	-10.0 ... +420.0 mbar (-7.5 ... 315.0 mmHg)
Overload:		max. 1 bar	max. 1 bar
Resolution:		0.1 mbar	0.1 mbar (0.1 mmHg)
additional Pressure units:		bar, kPa, MPa, PSI, mmHg, mH <sub>2</sub> O	bar, kPa, MPa, PSI, mH <sub>2</sub> O
Accuracy: (typ. values)			
hysteresis and linearity		$\pm 0.2$ % FS	$\pm 0.1$ % FS
temperature-influence from 0-50 °C		$\pm 0.4$ % FS	$\pm 0.4$ % FS
Option higher accuracy available		yes	already integrated
Sensor:		integrated piezo-resistive absolute pressure sensor. Suitable for air and non aggressive gas. (Note: sensor is not suitable for water!)	
Pressure connection:		2 metal connection pins, made of brass, nickel plated, pressure tubes 6 x 1 mm (4 mm inside-Ø) can be connected	

For type specific data please refer to page 56.

\*1 measuring range possible by changing the pressure connection ports

\*2 without changing the pressure connection ports

**Note to the pressure unit selection:**

(information for all GMH31xx)  
The choice of a specific pressure unit is possible, if its whole measuring range is displayable within the display of the device and the sensor is supporting these resolution.

Special design type:   
Ex-protection (Ex II 2 G Ex ib IIC T4)  
device type with Ex-protection

## MANOMETER for over/under pressure and pressure difference.



**MEASURING RANGE**  
...-13: -100 ... 2000 MBAR

### GMH 3161-13

Device -100 ... 2000 mbar ( $\pm 2000$  mbar <sup>1)</sup>)

### GMH 3181-13

Device -100 ... 2000 mbar ( $\pm 2000$  mbar <sup>1)</sup>), with data logger

#### Option:

##### MB -1...2 BAR

measuring range: -1000 ... 2000 mbar <sup>2</sup>

#### Specification:

**Measuring range:** -100 ... 2000 mbar (optional: -1000 ... 2000 mbar)

**Overload:** max. 4 bar

**Resolution:** 1 mbar

**additional Pressure units:** bar, kPa, MPa, PSI, mmHg, mH<sub>2</sub>O

#### Accuracy: (typ. values)

**hysteresis and linearity:**  $\pm 0.2$  % FS

**temperature-influence from 0-50 °C:**  $\pm 0.4$  % FS

**Option higher accuracy yes available:**

**Sensor:** integrated piezo-resistive absolute pressure sensor. Suitable for air and non aggressive. (Note: sensor is not suitable for water!)

**Pressure connection:** 2 metal connection pins, made of brass, nickel plated, pressure tubes 6 x 1 mm (4 mm inside-Ø) can be connected

For type specific data please refer to page 56.

<sup>\*1</sup> measuring range possible by changing the pressure connection ports

<sup>\*2</sup> without changing the pressure connection ports

#### Options:

##### Higher sensor accuracy

by multi point calibration  
Note: not possible for all device types!

##### Certificate of calibration WPD5

(f. ISO9000 ff.) incl. several calibration points of sensor (stored in device memory), Certificate of calibration: 5 points increase, 5 points decrease.

##### Certificate of calibration WPD10

(f. ISO9000 ff.) incl. several calibration points of sensor (stored in device memory), Certificate of calibration: 10 points increase, 10 points decrease.

#### Special design type:



**Ex-protection** (Ex II 2 G Ex ib IIC T4) device type with Ex-protection

## VAKUUM- or BAROMETER



**FOR MEASURING OF ABSOLUTE PRESSURE**  
**MEASURING RANGE: 0 ... 1300 MBAR ABS.**

### GMH 3161-12

Device 0 ... 1300 mbar abs.

### GMH 3181-12

Device 0 ... 1300 mbar abs., with data logger

#### Specification:

**Measuring range:** 0 ... 1300 mbar absolute

**Overload:** max. 4 bar abs.

**Resolution:** 1 mbar

**Pressure units:** mbar, bar, kPa, MPa, PSI, mmHg, mH<sub>2</sub>O - freely select able

#### Accuracy: (typ. values)

**hysteresis and linearity:**  $\pm 0.2$  % FS

**temperature-influence from 0-50 °C:**  $\pm 0.4$  % FS

**Option higher accuracy yes available:**

**Sensor:** integrated piezo-resistive absolute pressure sensor. Suitable for air and non aggressive gases. (Note: sensor is not suitable for water!)

**Pressure connection:** 1 metal connection pin, made of brass, nickel plated, pressure tubes 6 x 1 mm (4 mm inside-Ø) can be connected

For type specific data please refer to page 56.

#### Special function:

##### SeaLevel-correction:

The barometric air pressure can also be related to sea level „zero“. (Correction of air pressure is achieved by entering m above „zero“)

#### Accessories and spare parts:

##### GNG 10/3000

plug-in power supply

##### GKK 3000

case (275 x 229 x 83 mm) with cut-outs for GMH3xxx

##### GRS 3100

interface converter, RS232, electrically isolated

##### USB 3100 N

interface converter, USB, electrically isolated

##### GDZ-01

PVC-tube (5 bar) 6/4 (6 mm outside-Ø, 4 mm inside-Ø)

##### GDZ-08

Double adapter for 6/4 tube to 6/4 tube

##### GDZ-18

tube clamp for 6/4 tube

##### GDZ-21

T-piece for 6/4 tubes

for miscellaneous accessories p.r.t. pages 54 - 55

## FINE MANOMETER



FOR OVER/UNDER PRESSURE  
OR PRESSURE DIFFERENCE

## GDH 200 - 07

0.00 to 19.99 / 199.9 mbar ( $\pm 199.9$  mbar)

<b>Functions:</b>	<ul style="list-style-type: none"> <li>Differential and relative pressure measurement</li> <li>Autorange</li> <li>Excellent zero point stabilisation</li> <li>Manual slope adjustment</li> <li>4 selectable measuring units: Pa, mbar, mmHg, PSI</li> <li>automatic off-function: 1 ... 120 min</li> </ul>
<b>Specification:</b>	
<b>Measuring range:</b>	0.00 ... 19.99 resp. 20.0 ... 199.9 mbar (hPa) 0.00 ... 19.99 resp. 20.0 ... 150.0 mmHg 0.000 ... 1.999 PSI / 0 ... 1999 Pa
<b>Resolution:</b>	automatic change 0.1 / 0.01
<b>Overload:</b>	max. 500 mbar
<b>Accuracy:</b>	(at nominal temperature = 25 °C and automatic Zero point-adjustment)
<b>Measuring range:</b>	$\pm 0.2$ % f.s. hysteresis and linearity up to 200 mbar $\pm 0.4$ % f.s. temperature drift from 0 ... 50 °C
<b>Measuring range:</b>	$\pm 1$ % f.s. hysteresis and linearity up to 20 mbar $\pm 2$ % f.s. temperature drift from 0 ... 50 °C
<b>Sensor:</b>	piezoresistive relative pressure sensor
<b>Pressure connection:</b>	2 pressure port sockets made of nickel-plated brass, for flexible pressure tubings 6 x 1 mm (4 mm inner-diameter).
<b>Working temperature:</b>	-25 ... 50 °C, 0 ... 95 % RH (non-condensing)
<b>Display:</b>	3½ digit LCD display, approx. 13 mm high
<b>Pushbuttons:</b>	3 membrane keys
<b>Power supply:</b>	9 V battery type JEC 6 F 22 (included)
<b>Power consumption:</b>	approx. 250 $\mu$ A (= 1200 operating hours)
<b>Low battery warning:</b>	„BAT“, automatic
<b>Housing:</b>	impact resistant ABS plastic housing approx. 106 x 67 x 30 mm (H x W x D) +11 mm pressure port sockets
<b>Weight:</b>	approx. 135 g (incl. battery)
<b>Auto-Off-Function:</b>	1 ... 120 min (can be deactivated either)
<b>Min./Max. value memory:</b>	Memorizing of max. and min. values.
<b>Zero point-adjustment:</b>	automatically
<b>Slope-adjustment:</b>	manually
<b>Zero function:</b>	Display value and min-/max value are set to zero.

Tubes, clamps, adapters, accessories, etc. p.r.t. pages 54/55

## MANOMETER



FOR OVER/UNDER PRESSURE  
OR PRESSURE DIFFERENCE

## GDH 200 - 13

0.0 to 199.9 / 1999 mbar ( $\pm 1999$  mbar)

<b>Functions:</b>	<ul style="list-style-type: none"> <li>Differential and relative pressure measurement</li> <li>Autorange</li> <li>Excellent zero point stabilisation</li> <li>Manual slope adjustment</li> <li>3 selectable measuring units: mbar, mmHg, PSI</li> <li>automatic off-function: 1 ... 120 min</li> </ul>
<b>Specification:</b>	
<b>Measuring range:</b>	0.0 ... 199.9 resp. 200 ... 1999 mbar (hPa) 0.0 ... 199.9 resp. 200 ... 1500 mmHg 0.00 ... 19.99 PSI
<b>Resolution:</b>	automatic change 1 / 0.1
<b>Overload:</b>	max. 4000 mbar
<b>Accuracy:</b>	(at nominal temperature = 25 °C and automatic Zero point-adjustment)
<b>Measuring range:</b>	$\pm 0.2$ % f.s. hysteresis and linearity up to 2000 mbar $\pm 0.4$ % f.s. temperature drift from 0 ... 50 °C
<b>Measuring range:</b>	$\pm 1$ % f.s. hysteresis and linearity up to 200 mbar $\pm 2$ % f.s. temperature drift from 0 ... 50 °C
<b>Sensor:</b>	piezoresistive relative pressure sensor
<b>Pressure connection:</b>	2 pressure port sockets made of nickel-plated brass, for flexible pressure tubings 6 x 1 mm (4 mm inner-diameter).
<b>Working temperature:</b>	-25 ... 50 °C, 0 ... 95 % RH (non-condensing)
<b>Display:</b>	3½ digit LCD display, approx. 13 mm high
<b>Pushbuttons:</b>	3 membrane keys
<b>Power supply:</b>	9 V battery type JEC 6 F 22 (included)
<b>Power consumption:</b>	approx. 250 $\mu$ A (= 1200 operating hours)
<b>Low battery warning:</b>	„BAT“, automatic
<b>Housing:</b>	impact resistant ABS plastic housing approx. 106 x 67 x 30 mm (H x W x D) +11 mm pressure port sockets
<b>Weight:</b>	approx. 135 g (incl. battery)
<b>Auto-Off-Function:</b>	1 ... 120 min (can be deactivated either)
<b>Min./Max. value memory:</b>	Memorizing of max. and min. values.
<b>Zero point-adjustment:</b>	automatically
<b>Slope-adjustment:</b>	manually
<b>Zero function:</b>	Display value and min-/max value are set to null.

Tubes, clamps, adapters, accessories, etc. p.r.t. pages 54/55

## VAKUUM-/BAROMETER and MANOMETER



FOR ABSOLUTE  
PRESSURE  
UP TO 11 BAR!

## GDH 200 - 14

0 to 11000 mbar abs.

<b>Functions:</b>	<ul style="list-style-type: none"> <li>Sea level-adjustment possible</li> <li>suitable for relative pressure measurement (-1...10 bar) by use the zero function</li> <li>Manual slope and offset adjustment</li> <li>4 selectable measuring units: mbar, mmHg, bar, PSI</li> <li>automatic off-function: 1 ... 120 min</li> </ul>
<b>Specification:</b>	
<b>Measuring range:</b>	0 ... 11000 mbar (hPa) abs. 0 ... 8250 mmHg abs. 0.000 ... 11.000 bar abs. 0.00 ... 160.00 PSI abs.
<b>Resolution:</b>	1 mbar, 1 mmHg, 0.001 bar, 0.02 PSI
<b>Overload:</b>	max. 13 bar abs.
<b>Accuracy:</b>	$\pm 3$ mbar or 0.1 % of m.v. (whichever is higher) (at nominal temperature = 25 °C) $\pm 0.3$ % f.s. temperature drift from 0 ... 50 °C
<b>Sensor:</b>	piezoresistive absolute pressure sensor
<b>Pressure connection:</b>	pressure port socket made of nickel-plated brass, for flexible pressure tubings 6 x 1 mm (4 mm inner-diameter).
<b>Working temperature:</b>	-25 ... 50 °C, 0 ... 95 % RH (non-condensing)
<b>Display:</b>	4½ digit LCD display, approx. 12 mm high
<b>Pushbuttons:</b>	3 membrane keys
<b>Power supply:</b>	9 V battery type JEC 6 F 22 (included)
<b>Power consumption:</b>	approx. 40 $\mu$ A (= 7500 operating hours)
<b>Low battery warning:</b>	„BAT“, automatic
<b>Housing:</b>	impact resistant ABS plastic housing approx. 106 x 67 x 30 mm (H x W x D) +11 mm pressure port sockets
<b>Weight:</b>	approx. 135 g (incl. battery)
<b>Sea level-adjustment:</b>	barometric air pressure can be displayed null based even at sea level. (the pressure-adjustment is entered in metres above „null“)
<b>Auto-Off-Function:</b>	1 ... 120 min (can be deactivated either).
<b>Min./Max. value memory:</b>	Memorizing of max. and min. values.
<b>Zero point-adjustment:</b>	manually
<b>Slope-adjustment:</b>	manually
<b>Zero function:</b>	Display value and min-/max value are set to null.

Tubes, clamps, adapters, accessories, etc. p.r.t. pages 54/55

## BAROMETER



## Altimeter / Barometer / Thermometer Precision barometer



FOR PROFESSIONAL USAGE IN MEASUREMENT  
TECHNOLOGY AS WELL  
AS IN SPARE TIME SPORTS



- resolution 0.1 mbar
- for simple determination of a building size (steeples, skyscrapers, bridges, etc.)
- further application areas: hiking, hang gliding, cycling, motorsports, etc.

### GPB 3300

300.0 ... 1100.0 mbar abs.

#### Functions:

- manual offset and slope adjustment
- sea level-adjustment possible
- 2 measuring units selectable: mbar, mmHg
- Auto-off-function: 1 ... 120 min

#### Specification:

<b>Measuring ranges:</b>	300.0 ... 1100.0 mbar (hPa) abs. 225.0 ... 825.0 mmHg abs.
<b>Max. Overload:</b>	4000 mbar resp. 3000 mmHg
<b>Accuracy: (at nominal temperature)</b>	± 2,0 mbar (typ. at 0 - 50 °C)
<b>Sensor:</b>	piezoresistive abs. pressure sensor integrated in housing.
<b>Nominal temperature:</b>	25 °C
<b>Operating temperature:</b>	-25 ... 50 °C, 0 ... 95 % RH (non-condensing)
<b>Display:</b>	4½-digit, 12 mm high LCD-display
<b>Pushbuttons:</b>	3 membrane key for ON/OFF, min-/max-value memory, tara, etc.
<b>Power supply:</b>	9 V battery type IEC 6F22
<b>Power consumption:</b>	approx. 60 µA (= 5000 operating hours)
<b>Low battery warning:</b>	„BAT“, automatic
<b>Housing:</b>	impact resistant ABS housing approx. 106 x 67 x 30 mm (H x W x D)
<b>Weight:</b>	approx. 135 g (incl. battery)
<b>Sea level-adjustment:</b>	barometric air pressure can be displayed null based even at sea level. (the pressure-adjustment is entered in metres above „null“)
<b>Auto-Off-Function:</b>	1 ... 120 min (can be deactivated either)
<b>Min./Max. value memory:</b>	Memorizing of max. and min. values.
<b>Zero point-adjustment:</b>	manually
<b>Slope-adjustment:</b>	manually
<b>Zero function:</b>	Display value and min-/max value are set to null.

#### Accessories and spare parts:

**GKK 252**  
small case (235 x 185 x 48 mm) with foam lining  
**GB 9 V**  
spare battery

### GTD 1100

300.0 ... 1100.0 mbar abs. + Altimeter

#### Functions:

- manual offset and slope-adjustment
- sea level-adjustment possible
- tendency-meter, summing-function (ascendency, descendency, overall)
- over 6.000 operating hours

#### Specification:

<b>Measuring ranges:</b>	
<b>Temperature:</b>	-10.0 ... +50.0 °C, or 14.0 ... +122.0 °F,
<b>Pressure:</b>	300.0 ... 1100.0 mbar abs. or 225.0 ... 825.0 mmHg abs.
<b>High:</b>	-500 ... -200 m, res. 1 m or -1640 ... -655 ft, res. ~5 ft -200 ... 2000 m, res. 0,5 m or -654 ... 1999 ft, res. ~2 ft 2000 ... 9000 m, res. 1 m or 2000 ... 19999 ft, res. ~5 ft
<b>Measuring units:</b>	hPa / mbar, mmHg, °C, °F, m, ft
<b>Max. Overload:</b>	pressure: 4000 mbar or 3000 mmHg
<b>Accuracy: (at nominal temperature = 25 °C)</b>	
<b>Temperature:</b>	±1% FS ± 1 digit
<b>Absolute pressure:</b>	±1,5 mbar ±1 digit (750 ... 1100 mbar), with certificate of calibration: ±0,5 mbar ± 1 digit
<b>Sensor:</b>	absolute pressure sensor, integrated in housing.
<b>Operating conditions:</b>	-10 ... 50 °C; 0 ... 80 % RH (non condensing)
<b>Storage temperature:</b>	-20 ... 70 °C
<b>measuring-frequency:</b>	1 measuring / s
<b>Display:</b>	approx. 12 mm high, 4½-digit LCD-display
<b>Pushbuttons:</b>	keypad (3 push-buttons) for On/off, min/max-value, tara-function, zero-, slope-, and sea level-adjustment slide switch for unit selection.
<b>Power supply:</b>	9 V battery type IEC 6F22 (included)
<b>Power consumption:</b>	approx. 50 µA (= over 6.000 operating hours with standard zinc carbon batteries)
<b>Low battery warning:</b>	„BAT“, automatic in case of low voltage
<b>Housing:</b>	impact resistant ABS housing, approx. 106 x 67 x 30 mm (H x W x D)
<b>Weight:</b>	approx. 135 g (incl. battery)

<b>Sea level-adjustment:</b>	barometric air pressure can be displayed null based even at sea level. (the pressure-adjustment is entered in metres above „null“)
<b>Tendency-meter:</b>	for falling / rising air pressure
<b>Sum-function:</b>	Displaying the elevation (in metres for ascendency, descendency, overall)
<b>Min./Max. value memory</b>	Memorizing of max. and min. values.
<b>Zero function:</b>	Display-value, min-/max-value are set to null (altitude and air pressure)
<b>Auto-Off-Function:</b>	1 ... 120 min (can be deactivated either).
<b>Zero point-and slope-adjustment:</b>	manual adjustment (for temperature and air pressure)
<b>Zero function:</b>	Display- and min-/max-value are set to „null“.
<b>System Notifications:</b>	permanent self-diagnosis and error indication.

#### Accessories and spare parts:

**GKK 252**  
small case (235 x 185 x 48 mm) with foam lining  
**GB 9 V**  
spare battery  
**Certificate of calibration, WPD 5**  
5 points rising, 5 points falling  
calibration certificate, p.r.t. page 8

## Universal pressure measurement system with fast recording time



- suitable for all GMSD and MSD pressure sensors
- 1000 measurements per second
- complete package incl. software for up-to-date Windows systems
- live display before and live diagram display
- simultaneous support of several GDUSB 1000
- 4 measuring channels (display value, min-, max- value and average)

**INNOVATION FOR  
PRESSURE MEASUREMENTS**

### GDUSB 1000

Full set incl. software for high-speed live measurement data logging GDUSB FastView

#### Applications:

- Test rigs and laboratory experiments
- Detection of pressure peaks
- Monitoring system pressure curves e.g. for process technology, engineering, etc.
- Live and offline displaying of measuring data of several GDUSB 1000 e.g. for data evaluation and logging, for optimization of processes and other statistics
- Multi-channel measurements with high recording rate
- Test setups or on-site recordings with GDUSB 1000

#### Functions:

The GDUSB 1000 adapter allows to connect a standard pressure sensor of type GMSD / MSD directly to the USB interface of a PC. It provides 4 channels, i.e. currently measured value, average value, max and min value. There are two operation modes:

#### Fast mode:

A GDUSB 1000 in fast mode can output up to 1000 measured values per second. The provided software displays the data and records for later usage. The software can be configured to start or stop the recording with several selectable trigger conditions

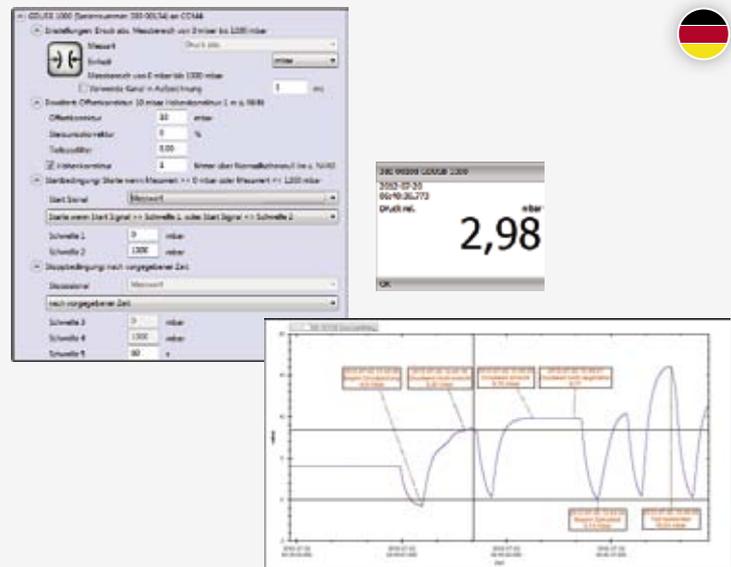
#### Standard mode:

A GDUSB 1000 in standard mode can be responded similarly to GMH handheld devices or EASYBus modules (up to 32 measurements per second). Then a long term recordings can be archived with the software EBS 20M / EBS 60M (2 measurements per second).

#### Specification:

<b>Measuring ranges:</b>	depends on connected sensor
<b>Max. range:</b>	-19999 ... +19999 digit
<b>Pressure units:</b>	mbar, bar, Pa, kPa, MPa, mmHg, PSI, mH <sub>2</sub> O, selectable, depending on connected sensor
<b>Measuring rate:</b>	measurements / s (= 1 ms)
<b>Accuracy:</b>	±0.2 % FS (at nominal temperature = 25 °C)
<b>Recording interval:</b>	1 ms (FAST mode) to 10 s, adjustable via software
<b>Connections:</b>	
<b>PC:</b>	standard USB plug (type A)
<b>GMSD/MSD:</b>	6-pole screened mini-DIN socket with locking
<b>Power supply:</b>	supplied by USB interface
<b>Dimensions:</b>	56 x 31 x 24 mm
<b>Cable length (USB):</b>	approx. 20 cm

Suitable GMSD/MSD sensors for GDUSB 1000 are at page 54/55.



### GDUSB FastView

Software for high-speed live measurement data logging of fast pressure measurements

#### General:

- Several GDUSB 1000 usable at one PC at the same time
- Measuring rates up to 1000 measurements per second
- Live display with current value and measurement diagram, even for highest measuring rates
- Different measuring rates for each sensor selectable
- Safe storage of measurement and sensor data in a SQL based data base
- Fast diagram display
- Comment function for measured values
- Data export as CSV file and as picture
- Multi-language software (German, English, French, Italian, Czech)
- 32-bit or 64-bit application

#### System requirements:

1GHz CPU, 1GB RAM, 100 MB HDD, 1 available USB Port  
 Microsoft .NET 4.0 Framework  
 Microsoft Visual Studio 2010 Runtime  
 SQLite  
 SiLabs USB VCP driver  
 Microsoft Windows XP SP3 (32 or 64 Bit)  
 Microsoft Windows Vista SP2 (32 or 64 Bit)  
 Microsoft Windows 7 SP1 (32 or 64 Bit)  
 Microsoft Windows 8 (32 or 64 Bit)  
 (not executable with Windows RT, ARM or Intel Itanium based Windows systems)

*This software uses open-source components under LGPL conditions. The license terms of this software provide further information.*

## Volumetric flow anemometer



### GVA 0430

Volumetric flow anemometer, cpl. in case, incl. RS232 interface cable and software

<b>General:</b>	
<ul style="list-style-type: none"> <li>• flow rate</li> <li>• volumetric flow</li> <li>• temperature</li> </ul>	
<b>Application:</b>	
Ventilation and air conditioning technology, meteorology, water sport, air gliding, etc.	
<b>Specification:</b>	
<b>Meas. ranges:</b>	
<b>Flow rate:</b>	0.40 m/s ... 30.00 m/s
<b>Temperature:</b>	-10.0 ... +50.0 °C
<b>Resolution:</b>	0.01 m/s resp. 0.1 °C
<b>Accuracy: (at nominal temperature = 25 °C)</b>	
<b>Flow rate:</b>	±2 % FS
<b>Temperature:</b>	±0.6 °C
<b>Meas. probes:</b>	vane probe, 70 mm rotor-Ø and precision-NTC
<b>Meas. interval:</b>	1 meas. / s
<b>Display:</b>	2-line LCD display, 37 x 42 mm
<b>Working temperature:</b>	-10 ... +50 °C
<b>Relative humidity:</b>	0 ... +95 % RH (non-condensing)
<b>Storage temperature:</b>	-10 ... +50 °C
<b>Interface:</b>	serial interface RS232
<b>Special function:</b>	averaging of 8 meas. points, averaging throughout meas. time, volumetric flow calculation, hold function, min./max. value memory
<b>Power supply:</b>	9 V-batteries, type IEC 6F22 (included) or via external power supply
<b>Operating time:</b>	100 hours (with alkaline)
<b>Low battery warning:</b>	display blinking
<b>Automatic-Off-function:</b>	device switches off automatically after 20 minutes. Permanent mode possible.
<b>Housing dimensions:</b>	device: 183 x 76 x 45 mm (W x H x D), probe: 155 x 75 x 42 mm (W x H x D)
<b>Weight:</b>	approx. 350 g (meas. device and probe) approx. 1.05 kg (cpl. in case)
<b>Accessories and spare parts:</b>	
<b>GN 8901</b> power supply	

## Flow speed measuring device



### TA 888 N

Thermal anemometer complete set in case, incl. software

<b>General:</b>	
<ul style="list-style-type: none"> <li>• high accuracy</li> <li>• smallest and slow air flows measurable</li> <li>• slimline telescopic probe</li> </ul>	
<b>Application:</b>	
Classic application of the TA 888 N is flow measurement in ventilation ducts. Due to its high resolution of 0.01 m/s even smallest changes of the flow velocity can be easily and fast detected. The sensor's small dimensions ensure measurements yet in thin tubes and confined spaces. Further applications are function and dirt checks of filters and exhaust ducts as well as measurements of room air velocity, e.g. for workspace checks.	
<b>Specification:</b>	
<b>Measuring range:</b>	
<b>Flow:</b>	0.10 m/s ... 15.00 m/s
<b>Temperature:</b>	0.0 ... +50.0 °C
<b>Resolution:</b>	
<b>Flow:</b>	0.01 m/s
<b>Temperature:</b>	0.1 °C
<b>Accuracy:</b>	
<b>Flow:</b>	0 ... 1 m/s ±0.25 m/s 1 ... 5 m/s ±0.5 m/s 5 ... 10 m/s ±1.0 m/s 10 ... 15 m/s ±2.0 m/s
<b>Temperature:</b>	±1 °C
<b>Display:</b>	LCD display
<b>Meas. interval:</b>	approx. 0.8 s
<b>Working temperature:</b>	0 ... 50 °C
<b>Relative humidity:</b>	0 ... 80 % RH
<b>Dimensions:</b>	- Housing: 210 x 75 x 50 mm (H x W x D) - Telescopic probe: extendable up to 1150 mm (incl. handle), Ø 10 mm - Cable: 2 m
<b>Weight:</b>	approx. 275 g (only measuring device) approx. 1800 g (complete set in case)
<b>Scope of supply:</b> measuring device, battery, probe, case, power supply, USB cable, software	
<b>Accessories and spare parts:</b>	
<b>Calibration certificate (10 points)</b> (without device)	
<b>DKD-certificate (10 points)</b> (without device)	

## Phonometer



### GSH 8922

Phonometer with analog output, backlight display, cpl. in case

<b>General:</b>	
Compensation of the background-noise for measuring sound-sources in the fore-ground. Weighting of the sound level via two weighting-filters according to the IEC standard. Assignment of the max/min value during one measuring period.	
<b>Specification:</b>	
<b>Measuring ranges:</b>	30 - 130 dB (6 ranges) 30 - 80, 40 - 90, 50 - 100, 60 - 110, 70 - 120, 80 - 130 dB manual or automatic selection of range
<b>Resolution:</b>	0.1 dB
<b>Accuracy:</b>	±1.5 dB
<b>Norms:</b>	ANSI S1.4 and IEC 651 Typ 2
<b>Frequency rate weighted:</b>	31.5 Hz - 8 kHz
<b>Evaluation weight filter:</b>	2, selectable
<b>Type A:</b>	evaluation of the spectrum in accordance with the perceptive faculties of the human ear. (Sound insulation establishment, environmental analysis)
<b>Type C:</b>	linear evaluation of spectrum (sonic-analysis of engines or machines)
<b>Weight of time factor:</b>	fast or slow
<b>Microphone:</b>	6 mm Electret condensator microphone
<b>Display:</b>	3½-digit LCD-backlight display, additionally quasi-analog bar graph
<b>Analog output:</b>	AC: 0.707 Vrms, DC: 10 mV DC / dB
<b>Working temperature:</b>	4 ... +50 °C
<b>Relative humidity:</b>	10 ... +90 % RH
<b>Storage temperature:</b>	-20 ... +60 °C
<b>Interface:</b>	RS232, (2400BD8N1)
<b>Power supply:</b>	9 V-batteries, type IEC 6F22 (included) or via external 9 V power supply
<b>Operating time:</b>	20 hours (with alkaline)
<b>Housing:</b>	256 x 80 x 38 mm (H x W x D)
<b>Weight:</b>	approx. 240 g (device)

## Rotation speed measuring device via light and reflecting label or measuring tip



### rotaro 3

Rotation speed measuring device via light and reflecting label or measuring tip

#### General:

Rotation speed measuring device incl. reflecting labels, measuring tip, hollow tip, measuring wheels ( $\varnothing$  0.1 m and  $\varnothing$  6"), extension shaft, calibration certificate, case, battery

#### Application:

The handheld tachometer rotaro 3 is useful at the installation and setup of plants and machinery as well as for service application, monitoring production processes or use at development laboratory. The rotaro 3 can measure rotary speed of for example motors, turbines, pumps as well as stirring devices, centrifuges and haulage installations, foil or textile manufacturing units, coil and transformer winding machines, machine tools, etc. Furthermore it can measure running speed and length of foils and band of all kind.

#### Specification:

<b>Measuring range:</b>	
<b>rpm:</b>	1.00 ... 99.999 min <sup>-1</sup> (optical measurement) 1 ... 19.999 min <sup>-1</sup> (mechanical measurement)
<b>Velocity:</b>	$\varnothing$ 0.1 m: 0.10 ... 1999 m/min $\varnothing$ 6": 0.10 ... 1524 m/min (other units possible: m/sec, ft/min, in/min ...)
<b>Length:</b>	0 ... 99999 m / ft / in
<b>Accuracy:</b>	
<b>rpm:</b>	$\pm$ 0.02 % of m.v. ( $\pm$ 1 digit)
<b>Measuring distance:</b>	max. 600 mm
<b>Measuring principle:</b>	optical / mechanical
<b>Memory function:</b>	min- / max- value memory, average and last value
<b>Power-off:</b>	automatically after 30 s
<b>Display:</b>	5-digit LCD display with 10 mm height of digits and floating point at range change
<b>Power supply:</b>	2 x AA battery or accumulator
<b>Working temperature:</b>	0 ... 50 °C
<b>Storage temperature:</b>	-20 ... 70 °C
<b>Housing:</b>	plastic ABS
<b>Approval:</b>	CE
<b>Dimensions:</b>	175 x 60 x 28 mm (H x W x D)
<b>Weight:</b>	250 g

## Rotation speed measuring device via light and reflecting label



### ecotach

Rotation speed measuring device via light and reflecting label

#### General:

Rotation speed measuring device incl. reflecting labels, transportation slip case, battery

#### Application:

The handheld tachometer ecotach is useful at the installation and setup of plants and machinery as well as for service application, monitoring production processes or use at development laboratory. The rotaro 3 can measure rotary speed of for example motors, turbines, pumps as well as stirring devices, centrifuges and haulage installations.

#### Specification:

<b>Measuring range:</b>	1 ... 60.000 rpm
<b>Accuracy:</b>	$\pm$ 0.02 % of m.w. ( $\pm$ 1 digit)
<b>Measuring distance:</b>	max. 450 mm
<b>Measuring principle:</b>	optical
<b>Power-off:</b>	automatically after 30 s
<b>Display:</b>	5-digit LCD display for measuring value with floating point, measuring unit, trigger signal, low-battery warning
<b>Power Supply:</b>	2 x AA battery or accumulator
<b>Working temperature:</b>	0 ... 50 °C
<b>Housing:</b>	plastic ABS
<b>Approval:</b>	CE
<b>Dimensions:</b>	145 x 60 x 28 mm (H x W x D)
<b>Weight:</b>	147 g

## Handheld instruments - Accessories



GKK 1420



Insert of  
GKK 3000



Insert of  
GKK 3500

### Device case:

#### GKK 3000

with punched lining for 1 device of the GMH 3xxx-series  
(275 x 229 x 83 mm)

#### GKK 1105

with punched lining for 1 device of the GMH 3xxx- or 5xxx-series  
(340 x 275 x 83 mm)

#### GKK 3500

with punched lining for 1 device of the GMH 3xxx-series  
(394 x 294 x 106 mm)

#### GKK 1420

with punched lining for 2 devices of the GMH 3xxx-series  
(450 x 360 x 123 mm)



### Universal case::

#### ① GKK 252

with foam lining for universal use (235 x 185 x 48 mm)

#### ② GKK 3100

with foam lining for universal use (275 x 229 x 83 mm)

#### ③ GKK 1100

with foam lining for universal use (340 x 275 x 83 mm)

#### ④ GKK 3600

with foam lining for universal use (394 x 294 x 106 mm)

#### ⑤ GKK 3700

with foam lining for universal use (450 x 360 x 123 mm)



GKK 4400



GKK 5240 with foam lining for  
individual adaption

#### GKK 4400

robust case for up to 10 devices or accessories, foam for water analysis  
(closed cell structure), with bottle and electrode retainer.  
Dimensions: 500 x 405 x 140 mm

#### GKK 5240

robust case, suitable for universal applications due to possibility of individual  
adaption of its foam lining, pressure balance possible.  
Dimensions: 530 x 415 x 200 mm



### Protection bag:

#### ST-R1

Nappa leathern device protection bag with 1 round cut-out for sensor  
connection  
suitable for: GMH 3111, GMH 3151, GMH 3161-12, GMH 3181-12,  
GMH 3431, GMH 3451, GMH 3610, GMH 3630, GMH 3691, GMH 3710,  
GMH 3750, GMH 175

#### ST-R2

Nappa leathern device protection bag with 2 round cut-outs for sensor  
connection  
suitable for: GMH 3156, GMH 3161-002, GMH 3161-01, GMH 3161-07, GMH  
3161-13, GMH 3181-002, GMH 3181-01, GMH 3181-07, GMH 3181-13, GMH  
3531, GMH 3551

#### ST-N1

Nappa leathern device protection bag with 1 rectangular cut-out for sensor  
connection  
suitable for: GMH 3210, GMH 1150, GMH 1170

#### ST-N2

Nappa leathern device protection bag with 2 rectangular cut-outs for sensor  
connection  
suitable for: GMH 3230, GMH 3250

#### ST-RN

Nappa leathern device protection bag with 2 round cut-outs for sensor  
connection (1 x round, 1 x rectangular)  
suitable for: GMH 3330, GMH 3350, GMH 3830, GMH 3850

#### ST-KO

device protection bag  
suitable for: GTD 1100, GPB 3300

#### ST-KN

device protection bag with rectangular cut-out for sensor connection  
suitable for: GTH 1150, GTH 1170

#### ST-KR

device protection bag with round cut-out (central)  
suitable for: GTH 175, GOX 20, GOX 100, GLF 100, GLF 100 RW

#### ST-KF

device protection bag with punched-out slot for a sensor head  
suitable for: GFTH 95, GFTH 200, GFTB 200, GTH 200 air

#### ST-KD

device protection bag with 2 round cut-outs  
suitable for: GDH 200 - 07, GDH 200 - 13, GDH 200 - 14, GMR 110



GMH 1300 with  
mounted device



GMH 1300



GEH 1  
with probe

### Mount:

#### GMH 1300

Magnetic mount for hanging up devices with integrated suspension clip

#### GEH 1

Electrode retainer for measuring electrodes and probes suitable for our electrodes  
(pH/redox, conductivity, oxygen, ...) and temperature probes with plastic handle

## Handheld instruments - Accessories



## Interface:

**USB 3100 N**

Interface converter GMH 3xxx <=> PC, for electrically isolated connection of a GMH 3xxx to the USB-interface of your PC.  
(Converter supplying from PC interface)

**USB 5100**

Interface converter GMH 5xxx <=> PC, for electrically isolated connection of a GMH 5xxx to the USB-interface of your PCs.  
(Converter supplying from PC interface)

**GRS 3100**

Interface converter GMH 3xxx <=> PC for electrically isolated connection of a GMH 3xxx to the RS232-interface.

**GRS 3105**

5-point interface converter GMH 3xxx <=> PC, connection of 5 GMH 3xxx to the RS232-interface of your PC. (Converter supply achieved via permanently connected power supply) Device delivered with 9-pin DSub extension cable and 5 connection cables VEKA3105.

**VEKA 3105**

Spare connection cable GMH 3xxx <=> GRS 3105

**GSA 25S-9B**

Connection adapter (25-pin Dsub-adapter <=> 9-pin Dsub-socket)

**GSA 9S-25B**

Connection adapter (9-pin Dsub-adapter <=> 25-pin Dsub-socket)

**USB-Adapter**

for connection of a RS232-interface converter to the USB-interface

## Plug and Cable:

**MINIDIN 4S**

Mini-DIN plug, 4-pin, with lock and for self installation

**AAG2M**

2 m analog output cable for GMH3xxx-series, 2 x banana plug and 3.5 mm jack connector

**AAG 5000**

Cable for analog output, with cable length 1 m, connectors: 1 x bayonet socket LTW 4-pole, 1 x loose ends, with ferrules, application: GMH 5xxx.



## Power supply:

**GB 9 V**

Spare battery 9 V, type IEC 6F22

**GLI 9 V**

Lithium battery 9 V, approx. 1200 mAh

**GAK 9 V**

NiMH accu 9 V

**AAA-AKKU**

AAA akku, 1.2 V, 2 pieces, NiMH akku

**GLG 1300**

Rechargeable battery charger for two 9 V accu, AA- or AAA-batteries at the same time

**GNG 09**

Plug-in power supply (220 / 240 V, 50 / 60 Hz), output voltage: 12 V / 300 mA, suitable for devices with 2.5 mm jack connector

**GNG 10**

Plug-in power supply (220 / 240 V, 50 / 60 Hz), output voltage: 10.5 V / 10 mA, suitable for devices with 2.5 mm jack connector (e.g. for devices of the series GDH ... )

**GNG 8901**

Plug-in power supply (220 / 240V, 50 / 60 Hz), output voltage: 9 V / 500 mA, suitable for devices with DC device socket 5.4 / 2.1 (suitable for GVA 0430)

**GNG 5 / 5000**

Plug-in power supply (220 / 240 V, 50 / 60 Hz), output voltage: 5 VDC, suitable for devices with BNC (e.g. for devices of the series GMH5xxx)

**GNG 10 / 3000**

Plug-in power supply (220 / 240 V, 50 / 60 Hz), output voltage: 10.5 V / 10 mA, suitable for devices with power supply socket (e.g. for devices of the series GMH3xxx)



## Switching modules:

**GAM 3000**

Switching module for the GMH 3xxx-series

The GAM 3000 is an alarm or control output for the devices of the GMH 3xxx-series with alarm output function. The GAM 3000 is controlled via the serial interface of the GMH 3xxx. The setting of the alarm/switching limits are carried out the GMH 3xxx as usual.

You can choose between 2 different switching modes:

- **Alarm output:** Relay switches when the measuring value is no longer within the min./max. alarm limit values or an error state occurs at the set channel.
- **Control output:** In this case the min./max. values are not used as alarm points but as on/off switching points. In case of an error state the relay switches in its preferred state "off".

The desired switching function can be selected via an externally accessible miniature switch.

**Power supply:** 220 / 240 V, 50 / 60 Hz

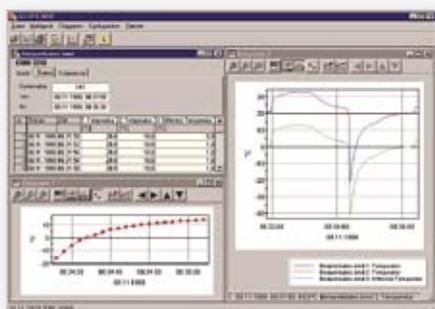
**Switching output:** controlled power socket, selector switch to choose switching state normally-open or normally-closed

**Switching power:** 10 A (ohmic load)

**GMH-connection:** GMH 3xxx interface and supply (integrated power supply 10.5 V / 10 mA) via 1 m cable each, permanently connected to GAM 3000.

**Dimensions:** (controller) 112 x 71 x 48 mm (H x W x D)

Operation for GMH 3xxx / GMH 5xxx - logger device



Long-time monitoring - Recording - Monitoring



**GSOFT 3050**

Windows-software for the setting, data read-out and printing of all data stored by devices of the GMH3xxx- and GMH5xxx-series with logger.

**General:**

With GSOFT3050 you are able to operate the logger function of the GMH 3000- and GMH 5000 hand-held series. The logger recordings can be started, stopped, read in and displayed. It is also possible to operate several instruments simultaneously and to display their data in mutual diagrams. Data will be read via the serial interfaces 'COM 1' - 'COM 255' of your PC and an interface adapter (GRS 3100, GRS 3105, USB 3100 N ...). Software is multilingual, the language can be selected simply in the programme. Executable with Windows 98, Me, NT, 2000, XP, Vista, 7 and 8.

**The GSOFT3050 offers, among others, the following functions:**

- **Display of the GMH-information**
- **Setting of the alarm function** for GMH3xxx and GMH5xxx devices.
- **Operation of the logger function**  
simple selection of the logger function (cyclic or manual), setting of cycle time, logger recording start and stop, read-out of logger data.
- **Diagram display of logger data**  
The logger data can be displayed in form of a diagram.  
It is possible to display various measuring sequences in one diagram.  
The diagram offers the following functions:  
- display including real-time axis, zooming of display view  
- display of legend and marking of measuring points can be switched on/off  
- a new/existing measuring sequence can be added/deleted at any time
- **Logger data print-out**  
Data can be printed as tables (complete measuring sequence or limited area) or as diagram (in accordance with the current diagram window).
- **Memorizing of logger data**  
The logger data can be saved in files and, therefore, called up again at any given time without a connected device.
- **Export of logger data to ASCII (text) file format**
- **Memorizing of windows**  
Data and diagram windows can be placed at any desired position. The setup of the windows can be stored as ,view'.

**EBS 20M**

20-Channel Measurement Data Logging

**EBS 60M**

60-Channel Measurement Data Logging

**General:**

This software makes up a low-price and comfortable multi-channel acquisition program for measuring data. The program is suitable for recording, monitoring, visualization and documentation. Simultaneous use of different serial Bus-Systems: EASYBus, GMH handheld devices, GDUSB 1000

**Application:**

- On-site recording
- Process and system control, monitoring of climate and buildings
- Real time monitoring of measuring data i.e for data evaluation and logging for cost listings, overview of consumption, optimisation of processes, and other statistics

**Highlight:**

- Simultaneous use of several serial interfaces
- Simultaneous use of different serial converters
- Quick and easy installation and handling
- Freely scaleable diagrams and alarm limits
- Visualization of actual measurements values
- Trusted data storage via SQL database
- Data export

**Measuring Cycle:**

smallest possible measuring cycle: 500 ms

**System Requirements:**

One of the following 32- or 64-bit Microsoft Windows operating system is required: Windows XP, Windows Vista, Windows 7, Windows 8 (not working under Windows RT and at ARM or Intel Itanium based Windows systems)

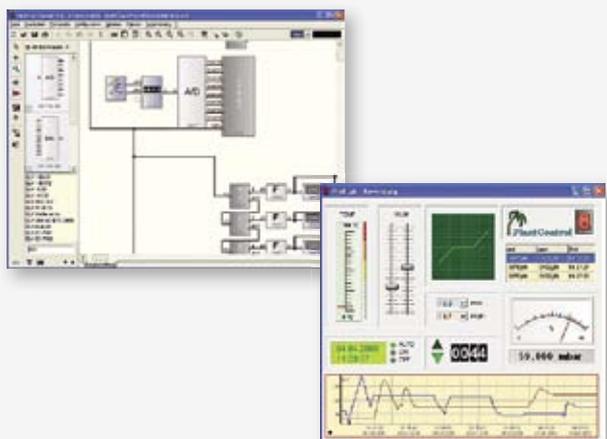
**GMH 3000.DLL**

Windows-functional library for interface communication. To integrate all GMH 3xxx/5xxx device functions in own Windows programm, i.e. LabView.

**ProfiLab-Expert 4.0**

**General:**

The software ProfiLab-Expert allows you to develop your own digital or analog measuring technology requirement. It doesn't matter if you want to create analog measurements or digital controls - you can realize it all. And for all this you don't have to write a single program-line! ProfiLab-Expert supports our devices of the GMH3xxx-Serie with serial interface, GCO100, GFTB100/GRS, as well as all EASYBus-devices. Every device will be displayed in your project like a normal component. You only have to connect his inputs and outputs. Compiler inclusive ! ProfiLab-Expert is equipped with an integrated compiler. The compiler can create executable files for stand-alone applications that run on systems without ProfiLab-Expert. The distribution of these compiled applications is unlimited, so ProfiLab-Expert become a complete and professional developers system. Software executable with: Windows 98, Me, NT, 2000 and XP.



Handheld instrument  
Display / Controller  
Logger / EASYBus  
Transmitter  
Temperature probe  
Alarm / Protection

### Display



**Application:**

Device	GIA ... N	GIA ... N - ex	GIA 2448	GTH2448/1	GTH2448/2 ../3	GTH2428/4 ../5	GIA 2000	GIA 0420 VO(T) GIA 010 VO(T)	GIA 0420 VOT - ex GIA 010 VOT - ex	GIA 0420 WKT GIA 010 WKT	GIA 0420 WKT - ex GIA 010 WKT - ex
Dimensions	24 x 48	24 x 48	24 x 48	24 x 48	24 x 48	24 x 48	48 x 96	Special size	Special size	Special size	Special size
Measuring input normalized signal	✓	✓	✓				✓	✓	✓	✓	✓
Measuring input temperature (Pt100 / Pt1000)					✓	✓	✓				
Measuring input temperature (Thermocouples)				✓			✓				
Measuring input Frequency							✓				
Universal input							✓				
- Protection		✓							✓		✓
Catalog page:	68	68	69	69	69	69	73	79	79	79	79

### Controller



**Application:**

Device	GIA 20 EB	GIR 230 ...	GIR 230 ... DIF	GIR 2002	GIR 2002 PID	GIR 2002 ... SW	GIR 2002 NS / DIF ...	GIR 2000 Pt ...	GIR 300	K 31 / K 32	TLK 43	GRA ... VO	GRA ... WK
Dimensions	24 x 48	24 x 48	24 x 48	48 x 96	48 x 96	48 x 96	48 x 96	48 x 96	36 x 72	33 x 75	48 x 48	Special size	Special size
Measuring input normalized signal		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Measuring input temperature (Pt100 / Pt1000)		✓	✓	✓	✓	✓		✓	✓	✓	✓		
Measuring input temperature (Thermocouples)		✓		✓	✓	✓			✓	✓	✓		
Temperature (NTC, PTC)		✓	✓								✓	✓	
Measuring input Frequency		✓		✓	✓	✓			✓				
Universal input	✓			✓	✓	✓			✓		✓		
Catalog page:	70	71	71	74	74	76	76	77	72	78	78	80	80

## µP-display with freely adjustable scale



MOISTURE | PH | REDOX | OXYGEN | CONDUCTIVITY | GAS |  
 TEMPERATURE | PRESSURE | DISTANCE |  
 REVOLUTIONAL SPEED | FLOW RATE | FLOW |  
 FILL LEVEL | POWER |

### GIA 0420 N

Display without auxiliary energy, input 4-20 mA

### GIA 010 N

Display, input 0-10 V

### GIA 0420 N - ex



Display, input 4-20 mA,  
 with EX-protection for all potentially explosive atmospheres  
 Ex qualification:  $\text{Ex II 2G Ex ia/ib IIC/IIB T4}$   
 (Further Information please refer to our homepage [www.greisinger.de](http://www.greisinger.de))

### GIA 010 N - ex



Display, input 0-10 V,  
 with EX-protection for all potentially explosive atmospheres  
 Ex qualification:  $\text{Ex II 2G Ex ia/ib IIC/IIB T4}$   
 (Further Information please refer to our homepage [www.greisinger.de](http://www.greisinger.de))

#### General:

- time-saving on-site scaling without any additional auxiliary modules
- simple device identification by means of integrated membrane.
- optimum operational reliability due to integrated self-diagnosis function and watchdog system.
- large display range from -1999 to +9999 digits
- high accuracy combined with minimum temperature drift due to integrated self-calibration
- smallest housing dimensions possible
- monitoring of probe damage, probe short-circuit, values no longer within measuring range.
- software filter for clear display even in case of encoder signal interference (can be switched on and off)

#### Ex protection:

$\text{Ex II 2G Ex ia IIC T4}$

EC type examination: BVS 11 ATEX 1 333 X



Connection data: Umax: 28 V  
 I<sub>max</sub>: 100 mA  
 P<sub>max</sub>: 1.2 W (for GIA 0420 N -ex)  
 or 0.95 W (for GIA 010 N - ex)

max. effective internal capacitance: C<sub>i</sub> = 13 nF (for GIA 0420 ...)  
 or 26 nF (for GIA 010 ...)

additionally for the switching output: C<sub>i</sub> = 4.5 nF

max. effective internal inductance: negligible small

**Please keep in mind for the circuit of the optionally available switching output that the wiring has to be done from the same intrinsically safe circuit as the measuring signal!**

Specification:	GIA 0420 N ..	GIA 010 N ..
<b>Input signal:</b>	4 ... 20 mA 2-wire	0 ... 10 V 3-wire
<b>Voltage load:</b>	approx. 3.5 V	-
<b>Input resistance:</b>	-	approx. 100 kOhm
<b>Max. input:</b>	25 mA	15 V
<b>Power supply:</b>	-	12 - 28 V DC
<b>Power consumption:</b>	from current loop	< 10 mA
<b>Display:</b>	LCD display, approx. 10 mm high	
<b>Display range:</b>	-1999 ... +9999	
<b>Decimal point:</b>	any position selectable	
<b>Scaling:</b>	scale freely adjustable via 3 keys at the back side of the unit	
<b>Accuracy:</b>	< 0.2% FS ±1 digit (at 25 °C)	
<b>Temperature drift:</b>	< 100 ppm / K	
<b>Measuring rate:</b>	approx. 5 measurements / s	
<b>Filter:</b>	adjustable: 0.1 ... 2.0; off	
<b>Storage:</b>	min- / max-value memory	
<b>Switching output:</b>	electrically isolated open collector	
<b>Switching capacity:</b>	28V DC / 50 mA	
<b>Working temperature:</b>	-20 ... 50 °C	
<b>Storage temperature:</b>	-20 ... 70 °C	
<b>Electric connection:</b>		
<b>GIA 0420 N ..</b>	2 x 2-pin screw-type/plug-in terminal max. terminal range up to 1.5 mm <sup>2</sup>	
<b>GIA 010 N ..</b>	1 x 2-pin., 1 x 3-pin. screw-type/plug-in terminal, max. terminal range up to 1.5 mm <sup>2</sup>	
<b>Housing:</b>	fibre-reinforced Noryl	
<b>Front screen:</b>	polycarbonate	
<b>Dimensions:</b>	24 x 48 mm (H x W, front dimensions)	
<b>panel cutout:</b>	21.7 <sup>+0.5</sup> x 45 <sup>+0.5</sup> mm (H x W)	
<b>mounting depth:</b>	approx. 65 mm incl. terminal	
<b>Protection rating:</b>	IP 20, with front flush installation IP 54	

#### Accessories and spare parts:

##### GGD2448SET

frontal IP65 by means of additional optional silicone O-rings

## Universal LowCost-LED-Display for Standard Signals and Temperature



DIGITAL DISPLAY FOR STANDARD SIGNALS

**GIA 2448**

(for self-adjustment)

**GIA 2448 WE 1)**

(settings and calibrations by our works)

1) Please specify as follows upon order: Input signal, scaling (lower and upper limits), decimal point and supply voltage.

(Order to read e.g. GIA2448WE: 4-20 mA, 4 mA=-50.0, 20 mA = 100.0, 12 VDC)

Specification:	
<b>Measuring ranges:</b>	0-20 V, 0-10 V, 0-2 V, 0-1 V, 0-200 mV, 0-20 mA and 4-20 mA. (select via soldering jumpers)
<b>Display range:</b>	-1999 ... +1999 digit (adjustable via soldering jumpers and potentiometer)
<b>Decimal point:</b>	any position by means of soldering jumpers (soldering jumpers accessible after removal of front panel)
<b>Accuracy:</b>	±0.2% ±1 digit (at nominal temperature = 25 °C)
<b>Scan rate:</b>	approx. 3 measurements / s
<b>Display:</b>	3½-digit, red 10 mm high LED display
<b>Working temperature:</b>	0 ... 50 °C (permissible ambient temperature)
<b>Relative humidity:</b>	5 ... 95 % RH (non-condensing)
<b>Storage temperature:</b>	-20 ... 70 °C
<b>Voltage supply:</b>	8 - 20 V DC or 18 - 29 V DC (standard) (set via soldering jumper)
<b>Current supply:</b>	max. 20 mA
<b>Housing:</b>	glass fibre reinforced Noryl, front panel PC
<b>Dimensions:</b>	24 x 48 mm (H x W) (front frame)
<b>Mounting depth:</b>	approx. 65 mm (incl. screw-type/plug-in terminal)
<b>Panel mounting:</b>	with VA-spring clamp. allowed panel thicknesses from 1 to approx. 10 mm
<b>Panel cut-out:</b>	21,7 <sup>+0.5</sup> x 45 <sup>+0.5</sup> mm (H x W).
<b>Connection terminal:</b>	4-pin screw-type/plug-in terminal for wire cross sections from 0.14 to 1.5 mm <sup>2</sup>
<b>Noise immunity (EMV):</b>	meets EN50081-1 and EN50082-2 requirements, additional fault: <1 %
<b>Protection rating:</b>	front side IP54 (with optional O-rings IP65).

**Option:****- VAC**

voltage supply 8-20 V AC or 18 - 29 V AC set via soldering jumper

**Accessories and spare parts:****GGD 2448 SET**

optional O-rings for IP65 (2 pieces)

**GNG 220/2-12V**

power supply for GIA 2448 and GTH 2448

(Input: 230 VAC; output: 2 x 12 VDC regulated, 30 mA each)

**GNG 12/24**

power supply

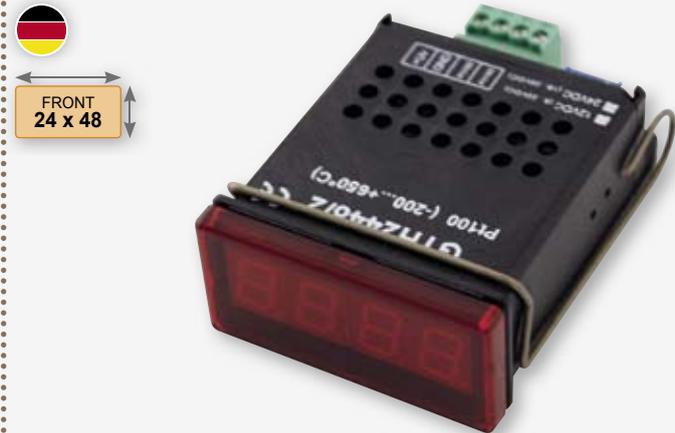
(Input: 12 VDC; output: 24 VDC electrically isolated)

**GNG 24/24**

power supply

(Input: 24 VDC; output: 24 VDC electrically isolated)

for additional accessories, transmitter, probes p.r.t.p. 102-124, 125-140



DIGITAL THERMOMETER FOR NiCr-Ni, Pt100 OR Pt1000

**GTH 2448/1**

(NiCr-Ni)

**GTH 2448/2**

(Pt100, 1 °C)

**GTH 2448/3**

(Pt100, 0.1 °C)

**GTH 2448/4**

(Pt1000, 1 °C)

**GTH 2448/5**

(Pt1000, 0.1 °C)

Specification:	
<b>Measuring ranges, Resolution:</b>	
<b>GTH 2448/1:</b>	-50 ... +1150 °C (NiCr-Ni)
<b>GTH 2448/2:</b>	-200 ... + 650 °C (Pt100, 2-wire)
<b>GTH 2448/3:</b>	-60.0 ... +199.9 °C (Pt100, 2-wire)
<b>GTH 2448/4:</b>	-200 ... + 650 °C (Pt1000, 2-wire)
<b>GTH 2448/5:</b>	-60.0 ... +199.9 °C (Pt1000, 2-wire)
<b>Accuracy: (at nominal temperature = 25 °C)</b>	
<b>NiCr-Ni:</b>	±1 % ±1 digit (from -20 ... +550 °C and 920 ... 1150 °C) ±1.5 % ±1 digit (from 550 ... 920 °C)
<b>Pt100, Pt1000:</b>	±0.5 °C ±1 digit or ±1 °C ±1 digit
<b>Offset compensation:</b>	The zero point offset of the sensor (e.g. due to long cables) can be compensated for by means of the spindle trimmer on the backside of the device.
<b>Display:</b>	3½-digit, red 10 mm high LED display
<b>Scan rate:</b>	approx. 3 measurements / s
<b>Working temperature:</b>	0 ... 50 °C (permissible ambient temperature)
<b>Relative humidity:</b>	5 ... 95 % RH (non-condensing)
<b>Storage temperature:</b>	-20 ... 70 °C
<b>Voltage supply:</b>	8 - 20 V DC or 18 - 29 V DC (standard) (set via soldering jumper)
<b>Current supply:</b>	max. 20 mA
<b>Housing:</b>	glass fibre reinforced Noryl, front panel PC
<b>Dimensions:</b>	24 x 48 mm (H x W) (front frame)
<b>Mounting depth:</b>	approx. 65 mm (incl. screw-type/plug-in terminal)
<b>Panel mounting:</b>	with VA-spring clamp. allowed panel thicknesses from 1 to approx. 10 mm
<b>Panel cut-out:</b>	21,7 <sup>+0.5</sup> x 45 <sup>+0.5</sup> mm (H x W).
<b>Connection terminal:</b>	4-pin screw-type/plug-in terminal for wire cross sections from 0.14 to 1.5 mm
<b>Protection rating:</b>	front side IP54 (with optional O-rings IP65).

**System solution - complete packages:****KFZ 2000**

Exhaust gas temperature set for measurement of exhaust gas temperatures up to 1000 °C in motor vehicles (e.g. motorsports). The set consists of:

• **GTH 2448/1**

NiCr-Ni thermometer with additional over-voltage protection.

• **GTF 101-5/30150 / NIMONIC**

temperature probe with jacket material: Nimonic 75 (view p.r.t. page 132)

Cable length = 3 m (extended cable against upcharge available)

• **GKV 4**

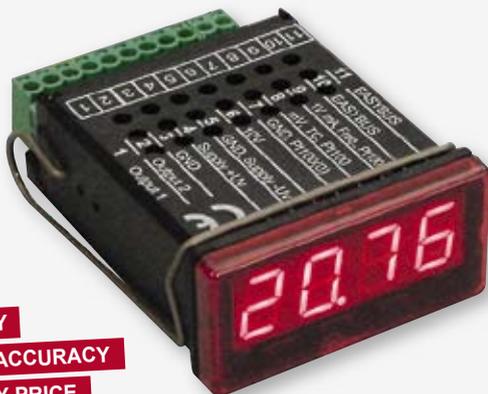
clamping ring screw connection (p.r.t. p. 139)

# Universal Display and Regulating Device



FRONT  
24 x 48

E.A.S.Y.Bus - Modul



EASY OPERABILITY

HIGH ACCURACY

ECONOMY-PRICE

Option: Frontpanel with push buttons  
(frontpanel without buttons included in delivery)

- Universal inputs for normalized signals, frequency, Pt100, Pt1000 and thermocouples
- Configurable as display or controller (5 switching functions)
- extensive self-monitoring and diagnostic system
- Limit functions, digital filter, min-/max value memory
- Alarm delay selectable

## GIA 20 EB

Universal Display and Regulating Device

Specification:	
<b>Measuring input:</b>	universal input for
- <b>Normalized signal:</b>	4-20 mA, 0-20 mA, 0-1 V, 0-2 V, 0-10 V, 0-50 mV
- <b>Resistance thermometer:</b>	Pt100 (3-wire), Pt1000 (2-wire)
- <b>Thermocouples:</b>	types J, K, N, S, T
- <b>Frequency, Rotational speed:</b>	TTL-signal, switching contact
- <b>Counter up / down:</b>	TTL-signal, switching contact
- <b>Serial interface</b>	
<b>Measuring rate:</b>	approx. 100 measurings / s (for normalized signal) resp. approx. 4 measurings / s (for temperature and frequency)
<b>Measuring resp. display ranges, resolution:</b>	
<b>Temperature: (display unit selectable: °C or °F)</b>	
<b>Pt100:</b>	-200 ... +850 °C or -50.0 ... +200.0 °C
<b>Pt1000:</b>	-200 ... +850 °C
<b>Typ J:</b>	-170 ... +950 °C
<b>Typ K:</b>	-270 ... +1350 °C
<b>Typ N:</b>	-270 ... +1300 °C
<b>Typ S:</b>	-50 ... +1750 °C
<b>Typ T:</b>	-270 ... +400 °C
<b>Normalized signals:</b>	-1999 ... 9999 digit, initial-, final value and DP freely scaleable
- <b>recommended range:</b>	≤ 2000 digit
<b>Frequency:</b>	0.000 Hz ... 10 kHz, display freely scaleable
<b>Rotational speed:</b>	0.000 U/min ... 9999 U/min, selectable prescaler: 1-1000
<b>Counter up/down:</b>	countervalue remains on power loss 0 ... 9999 (10 Mio. with prescaler), pulse frequency: < 10kHz, selectable prescaler: 1-1000
<b>Serial interface:</b>	Displaying and controlling from values coming via the serial interface.
<b>Accuracy: (at nominal temperature = 25 °C)</b>	
- <b>Normalized signal:</b>	< 0.2 % FS ±1 digit (at 0-50 mV: < 0.3 % FS ±1 digit)
- <b>Resistance thermometer:</b>	< 0.5 % FS ±1 digit
- <b>Thermocouples:</b>	< 0.3 % FS ±1 digit (at type S: < 0.5 % FS ±1 digit)
<b>Point of comparison:</b>	± 1 °C
- <b>Frequency, rotational speed, counter:</b>	< 0.1 % FS ±1 digit
<b>Outputs:</b>	2 switching outputs, not electrically isolated
<b>Switching behavior:</b>	Low-Side, High-Side or Push-Pull (selectable)
<b>Connection data:</b>	Low-Side: 28V/1A; High-Side: Ub/200 mA
<b>Controller state:</b>	2-point, 3-point, 2-point with alarm, min/max alarm to 1 output, min/max alarm to 2 outputs
<b>Switching point, hysteresis:</b>	freely adjustable
<b>Response time:</b>	≤ 20 ms at normalized signals ≤ 0.5 s at temperature and frequency
<b>Display:</b>	approx. 10 mm high, 4-digit red LED-display
<b>Service:</b>	with 3 push-buttons (after disassembly of the frontpanel).
<b>Option:</b>	FS3T, frontpanel with 3 push-buttons for comfortable configuration. Trouble-free replacement is possible (refer accessories)
<b>Min-/max-value memory:</b>	the max- and min value will be stored.

<b>Interface:</b>	serial interface, electrical isolated, EASYBus compatible
<b>Miscellaneous:</b>	permanent self-monitoring, digital filter function, measuring range boundary (limit)
<b>Voltage supply:</b>	9 ... 28 V DC (Standard)
<b>Option:</b>	electrical isolated voltage supply 11-14 V or 22-27 V
<b>Power consumption:</b>	max. 30 mA (without outputs)
<b>Nominal temperature:</b>	25 °C
<b>Operating temperature:</b>	-20 ... +50 °C
<b>Relative humidity:</b>	0 ... 80 % RH (non condensing)
<b>Storage temperature:</b>	-30 ... +70 °C
<b>Housing:</b>	glass fibre reinforced Noryl, front panel PC
- <b>Dimensions:</b>	24 x 48 mm (front frame)
- <b>Mounting depth:</b>	approx. 65 mm (incl. screw-type/plug-in terminal)
<b>Panel mounting:</b>	with VA-spring clamp
- <b>Allowed panel thicknesses:</b>	from 1 to approx. 10 mm.
- <b>Panel cut-out:</b>	21,7 <sup>+0.5</sup> x 45 <sup>+0.5</sup> mm (H x W)
<b>Connection terminal:</b>	screw-type/plug-in terminal: 2-pin for interface and 9-pin for other connections. For wire cross sections from 0.14 to 1.5 mm <sup>2</sup>
<b>Protection rating:</b>	front side IP54, with optional O-rings IP65
<b>Noise immunity (EMC):</b>	EN61326 (appendix A, class B)

### Option:

#### IS12

type with insulated power supply: 11-14 V

#### IS24

type with insulated power supply: 22-27 V

### Special design types:

## GIA 20 EB / PK

Universal display and regulating device with individual programmable linearization characteristic.

Even heavily bent sensor characteristics/value curves can be approximated by a straightened curve with 30 freely programmable linearization points. The adjustment to the measurement is done via the integrated interface with the (gratis) configuration software. For the connection with a PC, an additional serial converter EBW 1 or EBW 3 will be needed. Therefore only the input values (in mA, V, Ω or Hz) and the corresponding displayed values have to be entered.

For detailed information please refer to our homepage [www.greisinger.de](http://www.greisinger.de)

### Accessories and spare parts:

#### GGD2448SET

O-rings for device mounting IP65 (2 pieces)

#### FS3T

Frontpanel with 3 push-buttons for comfortable configuration, for adjustments at variable switching points, calling of min- and max-values etc.

#### GNR 10

Power supply and relay module for one GIA20EB (p.r.t. page 82)  
(Input: 230VAC, Power supply for device + transducer, 2 relay outputs)

#### Temperature probes

p.r.t. page 125 - 139

#### Transducer

p.r.t. page 101 - 123

for other accessories p.r.t. page 99/100

## The Displaying and Regulating Device for 230 V

FRONT  
24 x 48CONFIGURABLE AS DISPLAY  
OR CONTROLLER (5 SWITCHING FUNCTIONS)**GIR 230 NS**

(normalized signal input)

Controller with meas. input for normalized signal (4-20 mA, 0-20 mA, 0-10 V)

**GIR 230 Pt**

(resistance input)

Controller with measuring input for Pt100 and Pt1000

**GIR 230 TC**

(thermo couple input)

Controller with meas. input for thermo couple and 0-50 mV

**GIR 230 FR**

(frequency input)

Controller with measuring input for frequency

**GIR 230 NTC**

Controller with measuring input for NTC and only 1 relay output

**Version GIR 230 NS:**

<b>Measuring input:</b>	4-20 mA, 0-20 mA, 0-10 V
<b>Display range:</b>	-1999 ... 9999 digit, scale freely adjustable
<b>Recommended range:</b>	≤ 2000 digit
<b>Accuracy:</b>	< 0.2 % FS ±1 digit (at nominal temperature = 25 °C)
<b>Measuring rate:</b>	approx. 100 measurings / s

**Version GIR 230 Pt:**

<b>Measuring input:</b>	Pt100 (3-wire), Pt1000 (2-wire)
<b>Measuring ranges, resolution:</b>	
<b>Pt100:</b>	-200 ... +850 °C resp. -50.0 ... +200.0 °C
<b>Pt1000:</b>	-200 ... +850 °C
<b>Accuracy:</b>	< 0.5 % FS ±1 digit (at nominal temperature = 25 °C)
<b>Measuring rate:</b>	approx. 4 measurings / s

**Version GIR 230 TC:**

<b>Measuring input:</b>	types J, K, N, S, T and 0-50 mV
<b>Measuring ranges, resolution:</b>	
<b>Typ J:</b>	-170 ... +950 °C
<b>Typ K:</b>	-270 ... +1350 °C
<b>Typ N:</b>	-270 ... +1300 °C
<b>Typ S:</b>	-50 ... +1750 °C
<b>Typ T:</b>	-270 ... +400 °C
<b>Accuracy:</b>	< 0.3 % FS ±1 digit (type S: < 0.5 % FS ±1 digit) (at 25 °C)
<b>Point of comparison:</b>	± 1 °C
<b>Measuring rate:</b>	approx. 4 measurings / s

**Version GIR 230 FR:**

<b>Measuring input:</b>	frequency
<b>Display range:</b>	-1999 ... 9999 digit, freely scaleable
<b>Accuracy:</b>	< 0.2 % FS ±1 digit (at nominal temperature = 25 °C)
<b>Frequency measuring:</b>	0.000 Hz ... 10 kHz
<b>Rotational speed:</b>	0.000 U/min ... 9999 U/min, selectable prescaler (1-1000)
<b>Counter up/down:</b>	0 ... 9999 (10 mio with prescaler)

**Version GIR 230 NTC:**

<b>Measuring input:</b>	NTC (2-wire)
<b>Measuring ranges:</b>	-40.0 ... +120.0 °C
<b>Accuracy:</b>	< 0.5 % FS ±1 digit (at nominal temperature = 25 °C)
<b>Measuring rate:</b>	approx. 4 measurings / s

**5 INPUT EXECUTIONS FOR CHOICE:**

- NORMALIZED SIGNAL: 4-20 MA, 0-20 MA, 0-10 V
- RESISTOR: PT100 (3-WIRE), PT1000 (2-WIRE)
- THERMO COUPLE: TYPE J, K, N, S, T AND 0-50 MV
- FREQUENCY
- NTC

**GIR 230 Pt1000 / DIF**

Difference controller with 2 measuring inputs for Pt1000

**GIR 230 NTC / DIF**

Difference controller with 2 measuring inputs for NTC

**GIR 230 NS / DIF - ...**

Difference controller with 2 measuring inputs for 4-20 mA, 0-20 mA or 0-10 V

**Version GIR 230 Pt1000 / DIF, GIR 230 NTC / DIF:**

<b>Measuring inputs:</b>	2 x Pt1000 (2-wire) resp. 2 x NTC
<b>Measuring ranges,</b>	Pt1000: -200 ... +850 °C, 1 °C
<b>resolution:</b>	NTC: -40.0 ... +120.0 °C, 0.1 °C
<b>Display:</b>	difference temperature sensor 1 - sensor 2
<b>Accuracy:</b>	< 0,5 % FS ±1 digit (at nominal temperature = 25 °C)
<b>Measuring rate:</b>	approx. 4 measurings / s

**Version GIR 230 NS / DIF - 420 mA, ... - 020 mA, ... - 010 V:**

<b>Measuring inputs:</b>	(2 x) 4-20 mA, (2 x) 0-20 mA or (2 x) 0-10 V specify required input signals by order!
<b>Display range:</b>	-1999 ... 9999 digit, scale freely adjustable
<b>Recommended range:</b>	≤ 2000 digit
<b>Accuracy:</b>	< 0.2 % FS ±1 digit (at nominal temperature = 25 °C)
<b>Measuring rate:</b>	approx. 100 measurings / s

**Specification:**

<b>Relay output:</b>	2 (1) closing contacts (GIR 230 NTC: 1 relay output), 230 V~ switching, switching power: 5 A, 230 VAC
<b>Alarm output:</b>	NPN, open collector, switching power: 30 mA, max. 28 V
<b>Controller states:</b>	2-point, 3-point*, 2-point with alarm, min/max alarm to 1 output, min/max alarm to 2 outputs* (* = not available at GIR230NTC)
<b>Switching points, hysteresis, alarm points:</b>	freely selectable
<b>Display:</b>	approx. 10 mm high, 4-digit red LED-display
<b>Operating conditions:</b>	-20 ... +50 °C, 0 ... 80 % RH (non condensing)
<b>Power supply:</b>	230 V, 50/60 Hz, approx. 2 VA
<b>Housing:</b>	glass fibre reinforced Noryl, front panel PC
<b>Dimensions:</b>	24 x 48 mm (front frame).
<b>Mounting depth:</b>	approx. 65 mm (incl. screw-type/plug-in terminal)
<b>Panel mounting:</b>	with VA-spring clamp.
<b>Allowed panel thicknesses:</b>	from 1 to approx. 10 mm
<b>Panel cut-out:</b>	21,7 <sup>+0.5</sup> x 45 <sup>+0.5</sup> mm (H x W)
<b>Connection terminal via screw-type/plug-in terminal:</b>	
<b>4-pin (...NTC: 3-pin)</b>	for power supply and relay outputs
<b>4-pin (...NTC: 3-pin)</b>	for measuring input and alarm output
<b>For wire cross selections:</b>	from 0.14 ... 1.5 mm <sup>2</sup> .
<b>Protection rating:</b>	front side IP54 (IP65 upon request)
<b>Noise immunity (EMC):</b>	EN61326 (appendix A, class B)

**Option:**

- 24V  
GIR with power supply 12 - 28 V DC  
Outputs: 2 (1) relay outputs, +Ub switching

**Accessories and spare parts:****GGD2448SET**

O-rings for device mounting IP65 (2 pieces)

**Transducer**

p.r.t. page 101-123

**Temperature probes (Pt100/1000)**

p.r.t. page 126/127, 134-138

**Temperature probes (type K, S, N)**

p.r.t. page 128-132, 134-138

**GTF230S**

NTC-temperature probe, -40 ... +120 °C, sensor sleeve made of stainless steel, Ø 5 x 50 mm, approx. 1 m silicone-cable

**Option:** longer probe cable (silicone)



FRONT  
36 x 72

E.A.S.Y.Bus - Modul

# ANNOUNCEMENT

AVAILABLE FROM SUMMER 2014

NEW DESIGN!

NEW



EASY HANDLING

HIGH PRECISION

LOW PRICE

- Universal input for standard signals, frequency, Pt100, Pt1000 and thermocouples
- 2 integrated switching outputs (electrically isolated)
- Configurable as display or controller (5 switching functions)
- Fast controlling and monitoring
- Comprehensive self-test and diagnostic system
- Serial EASYBus interface (max. 240 devices)
- Limit functions, digital filter, min- / max- value memory
- Adjustable alarm delay

## GIR 300

Universal displaying and controlling device

Specifications (preliminary):	
Measuring input:	universal input for
- Standard signals:	4-20 mA, 0-20 mA, 0-1 V, 0-2 V, 0-10 V, 0-50 mV
- Resistance thermometer:	Pt100 (3-wire), Pt1000 (2-wire)
- Thermocouples::	types J, K, N, S, T
- Frequency, rotational speed:	TTL signal, switching contact
- Up- / down- counter:	TTL signal, switching contact
- Serial interface	
Measuring rate:	approx. 100 measurements / s (standard signal) approx. 4 measurements / s (temperature and frequency)
Measuring and display range, resolution:	
Temperature: (unit switchable between °C and °F)	
Pt100:	-200 ... +850 °C or -50.0 ... +200.0 °C
Pt1000:	-200 ... +850 °C
Type J:	-170 ... +950 °C
Type K:	-270 ... +1350 °C
Type N:	-270 ... +1300 °C
Type S:	-50 ... +1750 °C
Type T:	-270 ... +400 °C
Standard signals:	-1999 ... 9999 digit, decimal point, start and end value freely selectable
- recommended range:	≤ 2000 digit
Frequency::	0.000 Hz ... 10 kHz, display freely scalable
Rotational speed:	0.000 rpm ... 9999 rpm, selectable prescaler: 1-1000
Up- / down- counter:	The counter reading is stored also in power-down state. 0 ... 9999 (10 million with prescaler), pulse frequency: ≤ 10 kHz, selectable prescaler: 1-1000
Serial interface:	Display and control functions with values obtained via serial interface
Accuracy: (at nominal temperature = 25 °C)	
- Standard signals:	< 0.2 % FS ±1 digit (in range 0 ... 50 mV: < 0.3 % FS ±1 digit)
- Resistance thermometer:	< 0.5 % FS ±1 digit
- Thermocouples:	< 0.3 % FS ±1 digit (for type S: < 0.5 % FS ±1 digit)
Point of comparison accuracy:	± 1 °C

- Frequency, rotational speed, counter:	< 0.1 % FS ±1 digit
Outputs:	2 volt-free relay switching outputs relay 1: normally-open contact relay 2: normally-closed contact
Switching functions:	2-point, 3-point, 2-point with alarm, combined min-/max- alarm with 1 output, separate min-/max- alarm with 2 outputs
Switching points, switching hysteresis:	freely selectable
Response time:	≤ 20 ms for standard signals ≤ 0.5 s for temperature and frequency
Display:	approx. 13 mm high, 4-digit red LED display
Min-/max- value memory:	Maximal and minimal values are stored.
Interface:	serial interface, electrically isolated, compatible to EASYBus
Miscellaneous:	continuous self-diagnostics, digital filter function, measuring range limitation
Supply voltage:	9 ... 28 V DC (standard)
Option:	electrically isolated supply
Current consumption:	max. 70 mA
Nominal temperature:	25 °C
Working temperature:	-20 ... +50 °C
Relative humidity:	0 ... 80 % RH (non condensing)
Storage temperature:	-30 ... +70 °C
Housing:	
Dimensions:	36 x 72 mm (front frame)
Installation depth:	approx. 75 mm (incl. screw-type/plug-in terminals)
Panel mounting:	with fixing clamps panel cutout: 32,0 <sup>+0.5</sup> x 68,5 <sup>+0.5</sup> mm (H x W)
Electric connection:	via screw-type/plug-in terminals cable cross section: 0.14 ... 1.5 mm <sup>2</sup> .

## Universal Displaying Device



TEMPERATURE DISPLAY

PRESSURE CONTROL

TACHOMETER, FLOW METER, ETC.

## GIA 2000

Universal Displaying Device

Specification:	
<b>Measuring input: universal input (freely adjustable) for</b>	
- Normalized signal:	4-20 mA, 0-20 mA, 0-1 V, 0-2 V, 0-10 V, 0-50 mV
- Resistance thermometer:	Pt100 (3-wire), Pt1000 (2-wire)
- Thermocouples:	types J, K, N, S, T
- Frequency:	TTL-signal, switching contact
- Flow, Rotational speed:	TTL-signal, switching contact
- Counter up / down:	TTL-signal, switching contact
- Serial interface	
Measuring rate:	approx. 100 measurings / s (for normalized signal and frequency) resp. approx. 4 measurings / s (for temperature)
<b>Measuring resp. display ranges, resolution:</b>	
<b>Temperature: (display unit selectable: °C or °F)</b>	
Pt100:	-200 ... + 850 °C or - 50.0 ... +200.0 °C
Pt1000:	-200 ... + 850 °C
Type J:	-170 ... + 950 °C or - 70.0 ... +300.0 °C
Type K:	-270 ... +1372 °C or - 70.0 ... +250.0 °C
Type N:	-270 ... +1350 °C or -100.0 ... +300.0 °C
Type S:	-50 ... +1750 °C
Type T:	-270 ... + 400 °C or - 70.0 ... +200.0 °C
Normalized signals:	-1999 ... 9999 digit, scale freely adjustable
- recommended range:	≤ 2000 digit
Frequency:	0.000 Hz ... 10 kHz, display freely scalable
Rotational speed:	0.000 U/min ... 9999 U/min, selectable prescaler: 1-1000
Flow:	0 ... 9999 l/s, 0 ... 9999 l/min, 0 ... 9999 l/h
Counter up/down:	counter value remains on power loss 0 ... 9999 (10 mio. with prescaler), pulse frequency: ≤ 10 kHz
Serial interface:	Displaying and controlling from values coming via the serial interface.
<b>Accuracy: (at nominal temperature = 25 °C)</b>	
- Norm. signal:	< 0.2 % FS ±1 digit (at 0-50 mV: < 0.3 % FS ±1 digit)
- Resistance thermometer:	< 0.3 % FS ±1 digit
- Thermocouples:	< 0.3 % FS ±1 digit (at type S: < 0.5 % FS ±1 digit)
- Point of comparison:	± 1 °C
- Frequency, rotational speed, counter:	< 0.1 % FS ±1 digit
Analog output: (option)	freely scalable analogue output 0-20 mA / 4-20 mA or 0-10 V
Display:	approx. 13 mm high, 4-digit red LED-display
Min-/max-value memory:	the max- and min value will be stored.
Interface:	serial interface, electrical isolated, EASYBus compatible
Power supply for sensor:	integrated isolated power supply for measuring transducer: 24 V DC ±5 %, 22 mA (for DC-supply 18 V DC)

- Universal inputs for normalized signals, frequency, Pt100, Pt1000 and thermocouples, freely adjustable
- integrated isolated power supply for measuring transducer (24V / 22 mA)
- extensive self-monitoring and diagnostic system
- Serial interface - EASYBus (max. 240 devices can be combined)
- Limit functions, digital filter, min-/max value memory

Miscellaneous:	permanent self-monitoring, digital filter function, measuring range boundary (limit)
Voltage supply:	230 V AC, 50/60 Hz (standard) optionally other supply voltages are possible
Power consumption:	approx. 5 VA
Operating temperature:	-20 ... +50 °C
Relative humidity:	0 ... 80 % RH (non condensing)
Storage temperature:	-30 ... +70 °C
Housing:	standard rack type housing 48 x 96 mm (front frame) installation depth: approx. 115 mm (incl. screw-type/plug-in terminals)
Panel mounting:	with fixing clamps panel cutout: 43,0 <sup>+0.5</sup> x 90,5 <sup>+0.5</sup> mm (H x W)
Electrical connection:	via screw-type/plug-in terminals cable diameters from 0.14 ... 1.5 mm <sup>2</sup> .
Protection class:	front side IP54, with optional sealing IP65
Electromagnetic immunity (EMC):	EN61326 (appendix A, class B)

## Option:

- 12VDC  
voltage supply: 12 VDC (11-14 V) <sup>1)</sup>
  - 24VDC  
voltage supply: 24 VDC (22-27 V) <sup>1)</sup>
  - 24VAC  
voltage supply: 24 VAC ±5 %
  - 115VAC  
voltage supply: 115 VAC ±5 %
  - AAG020  
analog output 0 - 20 mA, 4 - 20 mA (reversible) <sup>1)</sup>
  - AAG010  
analog output 0 - 10 V <sup>1)</sup>
- <sup>1)</sup> For analog output with option 12VDC or 24VDC

## Accessories and spare parts:

## GGD 4896

additional sealing for panel mounting IP65

## EAK 36

Unit stickers (black with white text)  
for 36 different units for lettering  
of display devices.

## EBW 1

interface converter EASYBus =&gt; RS232 (p.r.t. page 98)

## EBS 20M

software for recording and archiving of the measuring values (p.r.t. page 66).

## Temperature probes

p.r.t. page 125 - 139

for other accessories p.r.t. page 99/100

# Universal Displaying and Regulating Device



**UNIVERSAL INPUT FOR  
NORMALIZED SIGNALS, FREQUENCY, PT100,  
PT1000, THERMOCOUPLE**

## GIR 2002

Universal Displaying and Regulating Device with On/Off - control mode

## GIR 2002 PID

Universal Displaying and Regulating Device with PID - control mode

### Application:

- process regulating
- temperature controller
- Pressure monitoring
- rotation speed display
- flow counter, etc.

### Allgemeines:

The universal controller GIR 2002 is the ideal device for simple control systems (on/off switching, relay outputs, ...), because of its compact construction and its high ease of use.

The GIR 2002 PID (basic version) supplies one control output for a 2-point-control the types of control P, I, PI, PD or PID and a second control output for on/off switching. The device can also be configured as a 3-point motorized valve controller or as controller with continuous output (optionally).

Due to the universal input and the various switching functions the controller can be optimally adapted to the requirements of the system. The structured menu navigation allows a straightforward handling and a fast adjustment of the parameters.

A LED switching position display gives information to the user about the current status of the switching outputs. The automatic self-test and diagnostic system ensures maximum operational safety and reports systems errors by conclusive error codes. The parameters are automatically saved, so that all data will be maintained even in case of a power blackout.

Among others most of the GREISINGER transmitters, rpm sensors and flow rate sensors can be connected directly to the integrated transmitter power supply (24 VDC/22 mA) of the controller.

If the device is used as a thermocouple or resistance thermometer, the measuring value can be alternatively displayed in °C or °F. By means of an offset correction the measured value can be scaled i.e. to the resistivity of the wires. The current and voltage inputs can be arbitrarily scaled in the range of -1999 to +9999.

The GIR 2002 has a serial, bus-compatible interface by default, by which a comfortable adjustment of the parameters as well as recording of measured values is possible. With the optionally available Windows library EASYBUS.dll up to 240 devices can be integrated into own programs (i.e. LabView).

### Optionen:

- **12VDC**  
voltage supply: 12 VDC (11-14 V) <sup>1)</sup>
- **24VDC**  
voltage supply: 24 VDC (22-27 V) <sup>1)</sup>
- **24VAC**  
voltage supply: 24 VAC ±5 %
- **115VAC**  
voltage supply: 115 VAC ±5 %

- 2 relay switching outputs
- 1 analog output (0(4)-20 mA or 0-10 V) (optional)
- 5 programmable switching modes
- electrical isolated power supply for a transmitter (24 V / 22 mA)
- serial interface, bus operation

Additional functions at GIR 2002 PID:

- P, I, PI, PD or PID control mode
- 3-point motorized valve control
- continuous regulating output (optional)

### Specification:

**Outputs:**  
Please note: Not all options are available for both device types and not all options can be combined with each other. Please see therefore the output options diagram.

**Output 1:** voltage free relay output (standard) normally-open contact, switching power: 5 A (ohmic load), 250 VAC

- **Optional:** HLR1: control output for semiconductor relay (6 VDC/ 15 mA)  
AAG..1: freely scalable analog output 0(4)-20 mA or 0-10 V  
ST..1: continuous output 0(4)-20 mA or 0-10 V

**Output 2:** voltage free relay output (standard) change-over contact, switching power: 10 A (ohmic load), 250 VAC

- **Optional:** HLR2: control output for semiconductor relay (6 VDC/ 15 mA)

**Output 3:** (not available at standard device type)

- **Optional:** REL3: voltage free relay output (chance-over contact) switching power: 1 A / 40 VAC or 30 VDC  
HLR3: control output for semiconductor relay (14 VDC / 15 mA)  
NPN3: electrical isolated NPN-switching contact (max. 1 A / 30 VDC)  
AAG..3: freely scalable analog output 0(4)-20 mA or 0-10 V  
ST..3: continuous output 0(4)-20 mA or 0-10 V

**Controller states:** 5 or 6, selectable (e.g. 2-point regulator, 3-point regulator, ...)

**Switching point, hysteresis:** freely adjustable

**Response time:** ≤ 25 ms at normalized signals  
≤ 0.5 s at temperature and frequency

**Display:** approx. 13 mm high, 4-digit red LED-display

**Min-/Max-value memory:** the max- and min value will be stored.

**Interface:** serial interface, electrical isolated, EASYBus compatible

**Power supply for sensor:** 24 V DC ±5 %, 22 mA (for DC-supply 18 V DC)

**Miscellaneous:** permanent self-monitoring, digital filter function, measuring range boundary (limit)

**Voltage supply:** 230 V AC, 50/60 Hz (standard)  
optionally other supply voltages are possible

**Power consumption:** approx. 6 VA

**Operating conditions:** -20 ... +50 °C, 0 ... 80 % RH (non condensing)

**Housing:** standard rack type housing 48 x 96 mm (front frame)  
installation depth: approx. 115 mm (incl. screw-type/plug-in terminals)

**Panel mounting:** with fixing clamps  
panel cutout: 43,0<sup>+0.5</sup> x 90,5<sup>+0.5</sup> mm (H x W)

**Electrical connection:** via screw-type/plug-in terminals  
cable diameters from 0.14 ... 1.5 mm<sup>2</sup>.

**Protection class:** front side IP54, with optional sealing IP65

**Electromagnetic immunity (EMC):** EN61326 (appendix A, class B)

### Accessories and spare parts:

**GGD4896**  
additional sealing for panel mounting IP65

**EAK 36**  
Unit stickers (black with white text) for 36 different units for lettering of display devices (p.r.t. page 73)

**Temperature probes** p.r.t. page 125 - 139  
for other accessories p.r.t. page 66, 99/100

**Specification:**

Measuring input	Measuring / display ranges	Accuracy (at nominal temperature)	Measuring rate
<b>Thermocouples</b>			
FeCu-Ni type J IEC 584	-70.0 ... +300.0 °C or -170 ... 950 °C	< 0.3 % FS ±1 digit *	approx. 4 measurings / s
NiCr-Ni type K IEC 584	-70.0 ... +250.0 °C or -270 ... 1372 °C	< 0.3 % FS ±1 digit *	
NiCrSi-NiSi type N IEC 584	-100.0 ... +300.0 °C or -270 ... 1350 °C	< 0.3 % FS ±1 digit *	
Pt10Rh-Pt type S IEC 584	-50 ... 1750 °C	< 0.5 % FS ±1 digit *	
Cu-CuNi type T IEC 584	-70.0 ... +200.0 °C or -270 ... 400 °C	< 0.3 % FS ±1 digit *	
<b>Resistance thermometer</b>			
Pt 100 3-wire DIN EN 60751	-50.0 ... +200.0 °C or -200 ... 850 °C	< 0.3 % FS ±1 digit	approx. 4 measurings / s
Pt1000 2-wire DIN EN 60751	-200 ... 850 °C	< 0.3 % FS ±1 digit	
<b>Action signals / normalized signal</b>			
0 ... 1 V, 0 ... 2 V, 0 ... 10 V	-1999 ... +9999 digit, scale freely adjustable	< 0.2 % FS ±1 digit	approx. 100 measurings / s
0 ... 20 mA, 4 ... 20 mA		< 0.2 % FS ±1 digit	
0 ... 50 mV		< 0.3 % FS ±1 digit	
<b>Frequency</b>			
TTL-signal	0.000 Hz ... 10 kHz, scale freely adjustable	< 0,1 % FS ±1 digit	approx. 100 measurings / s
Switching contact NPN	0.000 Hz ... 3 kHz, scale freely adjustable		
Switching contact PNP	0.000 Hz ... 1 kHz, scale freely adjustable		
Rotational speed	0.000 ... 9999 U/min.	selectable prescaler: 1-1000, pulse frequency: max. 600 000 Imp./min. at TTL	
Flow	0 ... 9999 l/s, 0 ... 9999 l/min. or 0 ... 9999 l/h		
<b>Counter up / down</b>			
TTL-signal, switching contact (NPN, PNP)	0 ... 9999 or 0 ... 999 000 (with prescaler) selectable prescaler: 1-1000, pulse frequency: max. 10 000 Imp./s at TTL	< 0,1 % FS ±1 digit	approx. 100 measurings / s

Serial interface: displaying and controlling from values coming via the serial interface

\* = Point of comparison: ± 1 °C

**Options:**

Output schema	GIR 2002			GIR 2002 PID		
	out 1	out 2	out 3	out 1	out 2	out 3
Standard type:	normally-open contact	chance-over contact	--	normally-open contact	chance-over contact	--
<b>available output options</b>						
HLR1: output 1 = control output for external SSR						
HLR2: output 2 = control output for external SSR						
REL3: output 3 = relay (chance-over contact)						
HLR3: output 3 = control output for external SSR						
NPN3: output 3 = NPN-switching output						
AAG020/1: output 1 = analog output 0(4) - 20 mA			no out3 possible			
AAG010/1: output 1 = analog output 0 - 10 V						
AAG020/3: output 3 = analog output 0(4) - 20 mA						
AAG010/3: output 3 = analog output 0 - 10 V						
STA1: output 1 = continuous output 0(4) - 20 mA						no out3 possible
STV1: output 1 = continuous output 0 - 10 V						
STA3: output 3 = continuous output 0(4) - 20 mA						
STV3: output 3 = continuous output 0 - 10 V						

<sup>1)</sup> At continuous or analog output or NPN-switching output with option voltage supply = 12 VDC or 24 VDC

<sup>2)</sup> At output type REL3 or HLR3 with option voltage supply = 12 VDC

## Controller with external predetermined set point (0-10 V)



### GIR 2002 / SW

Controller with external predetermined set point (0-10 V)

### GIR 2002 PID / SW

Controller with external predetermined set point (0-10 V)

<b>Application:</b>	
<ul style="list-style-type: none"> <li>• predetermined control</li> <li>• program control with external set point</li> <li>• temperature regulation depending on ambient temperature</li> <li>• flow rate regulation with set point input via rotary potentiometer, etc.</li> </ul>	
<b>General:</b>	
The technical data of the set-point-regulators are largely identical to that ones of the GIR 2002 and GIR 2002 PID. The difference is that the input for 0 ... 10 V normalized signals is used as set-point input.	
<b>Specification:</b>	
<b>Measuring input:</b> universal input for	
- <b>normalized signals:</b>	4-20 mA, 0-20 mA, 0-1 V, 0-2 V, 0-50 mV
- <b>resistance thermometer:</b>	Pt100 (3-wire), Pt1000 (2-wire)
- <b>thermocouples:</b>	types J, K, N, S, T
- <b>frequency:</b>	TTL-signal, switching contact
- <b>flow, rotational speed:</b>	TTL-signal, switching contact
- <b>counter up/down:</b>	TTL-signal, switching contact
<b>Display range:</b>	-1999 ... 9999 digit, decimal point, initial and final values freely selectable
<b>Recommended range:</b>	≤ 2000 digit
<b>Set-point input:</b>	0 ... 10 V, freely scalable (for switching point 1)
<b>Outputs:</b>	1 normally open contact, 1 change-over contact; output options like HLR-control output, analog output or continuous output available - p.r.t. page 75
<b>Controller states:</b>	5 or 6, selectable (e.g. 2-point-regulator, 3-point-regulator, ...)
<b>Limit values:</b>	freely selectable
<b>Display:</b>	approx. 13 mm high, 4-digit red LED-display
<b>Operating conditions:</b>	-20 ... +50 °C, 0 ... 80 % RH (non condensing)
<b>Voltage supply:</b>	230 V AC, 50/60 Hz, approx. 6 VA
<b>Housing:</b>	standard rack type housing 48 x 96 mm (front frame) installation depth: approx. 115 mm (incl. screw-type/ plug-in terminals)
<b>Electrical connection:</b>	via screw-type/ plug-in terminals: cable diameters from 0.14 ... 1.5 mm <sup>2</sup> .
<b>Protection class:</b>	front side IP54 (IP65 on request)
<b>Electromagnetic immunity (EMC):</b>	EN61326 (appendix A, class B)

for further technical data refer to GIR 2002 (page 74/75)

<b>Option:</b>	
- <b>output options</b> (e.g. HLR..., AAG..., ST...)	see page 75
- <b>other voltage supply</b>	see page 75

## 2-channel difference controller



### GIR 2002 NS / DIF - ... \*1

2-channel difference controller

\*1 = Please state your desired input signal at order transaction!  
020 = (2x) 0-20 mA, 420 = (2x) 4-20 mA, 010 = (2x) 0-10 V

<b>Application:</b>	
<ul style="list-style-type: none"> <li>• difference controller for 2 channels</li> <li>• detection of leaks</li> <li>• control of delivery and exit air</li> <li>• pressure compensation, etc.</li> </ul>	
<b>General:</b>	
The <b>GIR 2002 NS / DIF</b> is a display, control and regulating device for difference measurements. The measuring inputs are designed for standard signals. Please state your desired input signal at order transaction.	
<b>Specification:</b>	
<b>Measuring inputs:</b>	(2x) 4-20 mA, (2 x) 0-20 mA or (2 x) 0-10 V Please state your desired input signal at order transaction!
<b>Display range:</b>	-1999 ... 9999 digit, decimal point, initial and final values freely selectable
<b>Recommended range:</b>	≤ 2000 digit
<b>Accuracy:</b>	< 0.2 % FS ±1 digit (at nominal temperature = 25 °C)
<b>Measuring rate:</b>	approx. 100 measurements / s
<b>Display/regulation:</b>	difference: input 1 - input 2
<b>Outputs:</b>	1 normally open contact, 1 change-over contact output options like HLR-control output, analog output or continuous output available - p.r.t. page 75
<b>Controller states:</b>	5 or 6, selectable (e.g. 2-point-regulator, 3-point-regulator, ...)
<b>Limit values:</b>	freely selectable
<b>Display:</b>	approx. 13 mm high, 4-digit red LED-display
<b>Operating conditions:</b>	-20 ... +50 °C, 0 ... 80 % RH (non condensing)
<b>Voltage supply:</b>	230 V AC, 50/60 Hz, approx. 6 VA
<b>Housing:</b>	standard rack type housing 48 x 96 mm (front frame) installation depth: approx. 115 mm (incl. screw-type/ plug-in terminals)
<b>Panel mounting:</b>	with fixing clamps panel cutout: 43,0 <sup>+0.5</sup> x 90,5 <sup>+0.5</sup> mm (H x W)
<b>Electrical connection:</b>	via screw-type/ plug-in terminals: cable diameters from 0.14 to 1.5 mm <sup>2</sup> .
<b>Protection class:</b>	front side IP54 (IP65 on request)
<b>Electromagnetic immunity (EMC):</b>	EN61326 (appendix A, class B)

for further technical data refer to GIR 2002 (page 75)

<b>Option:</b>	
- <b>output for HLR-connection</b> (HLR1, HLR2)	see page 75
- <b>analog output</b> (AAG.../...)	see page 75
- <b>other voltage supply</b>	see page 75

## Temperature regulator



FRONT  
48 x 96



- integrated switching output
- extensive self-monitoring and diagnostic system
- min-/max value memory

MEASURING INPUT FOR PT100 (3-WIRE)

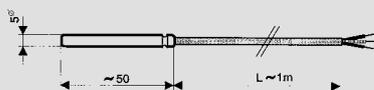
### GIR 2000 Pt

Temperature regulator complete with probe

### GIR 2000 Pt OF

Temperature regulator without probe

Specification:	
Measuring input:	Pt100 (3-wire)
Measuring range:	-50,0 ... +200,0 °C
Resolution:	0,1 °C
Measuring rate:	approx. 4 measurings / s
Accuracy:	< 0.3 % FS ±1 digit (at nominal temperature = 25 °C)
Temperature probe:	GTF200 Pt100 / 3-wire Pt100-probe, DIN class B (±0.3 °C at 0 °C), V4A-tube Ø 5 mm 50 mm length, approx. 1 m silicone cable. (in scope of supply at GIR2000Pt)
Output:	voltage free relays output, change-over-contact, switching power: 10 A (ohmic load), 250 VAC
Controller state:	2-point, min-/max-alarm
Switching point:	freely adjustable
Response time:	≤ 0.5 s
Display:	approx. 13 mm high, 4-digit red LED-display
Min-/max-value memory:	the max- and min value will be stored.
Miscellaneous:	permanent self-monitoring, digital zero point and scale adjustment
Voltage supply:	230 V AC, 50/60 Hz (standard) optionally other supply voltages are possible
Power consumption:	approx. 5 VA
Operating temperature:	-20 ... +50 °C
Relative humidity:	0 ... 80 % RH (non condensing)
Storage temperature:	-30 ... +70 °C
Housing:	standard rack type housing 48 x 96 mm (front frame) installation depth: approx. 115 mm (incl. screw-type/plug-in terminals)
Panel mounting:	by fixing clamps Panel cutout: 43,0 <sup>+0.5</sup> x 90,5 <sup>+0.5</sup> mm (H x W)
Electrical connection:	via screw-type/plug-in terminals cable diameters from 0.14 ... 1.5 mm <sup>2</sup> .
Protection class:	front side IP54, with optional sealing IP65
Electromagnetic immunity (EMC):	EN61326 (appendix A, class B)



#### Option:

- **12VDC**  
voltage supply: 12 VDC (11-14 V)
- **24VDC**  
voltage supply: 24 VDC (22-27 V)
- **24VAC**  
voltage supply: 24 VAC ±5 %
- **115VAC**  
voltage supply: 115 VAC ±5 %

#### Accessories and spare parts:

##### GGD4896

additional sealing for panel mounting IP65

##### APG-4

Housing for surface mounting  
(incl. seal GGD4896)

device assembled in housing

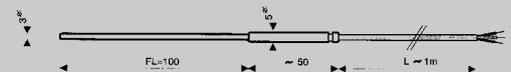
**Dimensions:** 75 x 125 x 127 mm (H x W x D)  
(without screw connections)

**Cable insert:** screw connections M12 x 1.5  
and M16 x 1.5



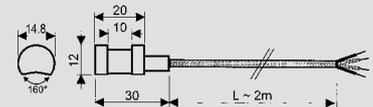
##### GTF 199

Pt100-probe, 3-wire, -50 ... +400 °C DIN class B, V4A-tube Ø 3 x 100 mm,  
approx. 1 m silicone cable



##### GRO 200 Pt100

tube surface probe, -50 ... +200 °C, DIN class B, sensor body made of  
aluminium,  
approx. 2 m silicone cable



additional suitable temperature probes

p.r.t. page 135

## Digital controller for temperature and process values

## digital controller for temperature and process values



**K 31** (33 x 75 mm)

**K 32** (33 x 75 mm)

Autotuned, microprocessor based digital controller with 2-, 3-point or PID control and adjustable set point gradient (ramp function)

### Specification:

#### Measuring input:

- Pt100 (3-wire) and thermocouples: J, K, S, R and T
- solid state: PTC KTY 81-121, NTC 103AT-2
- normalized signals: 0(4) ... 20 mA
- Normalized signal voltage: 0(1) ... 5 Volt and 0(2) ... 10 Volt

#### Measuring ranges:

**Pt100:** -200 ... 850 °C; **PTC:** -55 ... +150 °C; **NTC:** -50 ... +110 °C  
**Type J:** -0 ... 1000 °C, **Type K:** 0 ... 1370 °C, **Type S:** 0 ... 1760 °C

**Resolution:** temperature: 0.1 or 1 (°C or °F)

**Normalized signals:** scale freely adjustable, -1999 ... 9999 digit, DP settable to any place

**Accuracy:** ± 0.5 % FS ± 1 digit

**Display:** 4-digit, 12 mm high LED-display (K31) resp. two lines, each 4-digit, 7 mm high LED-display (K32)

**Outputs:** till 4 switching outputs

- **relay output (R1/R2)** (change over, switching power: 8 A/3 A, 250 VAC)
- **relay output (R3/R4)** (change over, switching power: 5 A/1 A, 250 VAC)
- **solid state relay (SSR drive):** 8V DC / 8 mA

**Controller state:** 2-point, 3-point or PID control

**Autotuning:** integrated autotuning function

**Timer / Programm Controller (optionally):** timer realisation / Programm controller function with 8 segments / 4 groups with time and gradient.

**Housing:** 75 x 33 x 64 mm, panel cutout: 71 x 29 mm

**Protection class:** front IP65

**Electric connection:** screw-type terminals

**Operating conditions:** Standard: 12 VAC ± 10 %, 50/60 Hz and 12 VDC ± 10 %  
 Option: 24 VAC/DC ± 10 % or 90 ... 240 VAC ± 10 %, 50/60 Hz

**Power consumption:** approx. 4 VA

### Option:

#### 1. Functions:

- : controller
- T: controller + Timer
- P: controller + programm controller

#### 2. Power supply:

- F: Power supply: 12 V AC/DC
- L: Power supply: 24 V AC/DC
- H: Power supply: 90 ... 240 V AC

#### 3. Measuring input:

- C: measuring input: Pt100 and Thermoelement
- E: measuring input: PTC, NTC
- I: measuring input: current (0-20 mA, 4-20 mA)
- V: measuring input: voltage (0-5 V, 0-10 V, 1-5 V, 2-10 V)

**4. Outputs:** 1Rel. 2Rel. 3Rel. 4Rel.

R: relay-output standard

O: SSR drive

- : without additional output standard standard standard standard
- where R1 and R2: change-over contact / R3 and R4: normally-open contact

#### 5. Serial Interface:

- S: with serial interface (RS485)
- : without serial interface

#### Ordering Information:

(Attention: measuring input has to be stated!)

K 3x - 

1.	2.	3.	4.	5.
----	----	----	----	----

K 31 - - H E R O - - -: K 31 with measuring input Pt100, 230 VAC power supply and 2 outputs (1x relay, 1x SSR drive)

**TLK 43** (48 x 48 mm)

Autotuned, microprocessor based digital controller with 2-, 3-point or PID control, 3-point motor valve control and adjustable set point gradient (ramp function)

### Specification:

**Measuring inputs:** universal input for

- resistance thermometer: Pt100 (3-wire)
- solid state: PTC KTY 81-121, NTC 103AT-2 (2-wire)
- Thermocouples: B, C, E, J, K, L, N, R, S, T
- Normalized signals: 0 ... 20 mA, 4 ... 20 mA, 0 ... 5 V, 0 ... 10 V, 1 ... 5 V, 2 ... 10 V
- mV-signals: 0 ... 50 mV, 0 ... 60 mV, 12 ... 60 mV

#### Measuring ranges:

**Pt100:** -200 ... 850 °C; **PTC:** -55 ... +150 °C; **NTC:** -50 ... +110 °C

**Type J:** -160 ... 1000 °C, **Type K:** -270 ... 1370 °C, **Type S:** -50 ... 1760 °C

**Resolution:** temperature: 0.1, 1 °C or 0.1, 1 °F

**Normalized signals:** scale freely adjustable, -1999 ... 9999 digit, DP settable to any place

**Accuracy:** ± 0.15 % FS ± 1 digit

**Display:** two lines, each 4-digit, 7 mm high LED-display

**Outputs:** up to max. 4 outputs available output versions (standard = relay-output)

- **relay output** (close contact, switching power: 5 A/2 A, 250 VAC)
- **solid state relay (SSR drive):** 14V DC / 7mA
- **normalized signal** 0(4) ... 20 mA
- **normalized signal** 0(2) ... 10 Volt

**Controller state:** 2-point, 3-point or PID (single or double action) control, continuous, 3-point motor valve control

**Autotuning:** integrated autotuning function

**Alarm outputs:** max. 3 (depending from output configuration)

**Analog output:** scalable (normalized signal output necessary)

**Interface (option):** RS485, optoisolated

**Control input (option):** digital input that permits the remote commutation of the set point.

**Heater break function (option):** the controller is available with a current transformer input for the heater break monitoring

**Housing:** 48 x 48 x 98 mm, panel cutout: 45.5 x 45.5 mm, Mounting by means of clamping frame

**Protection class:** front IP54 (mounted in panel with gasket)

**Electric connection:** screw-type terminals

**Operating conditions:** 0 ... +55 °C, 30 ... 95 % RH (non condensing)

**Power supply:** standard: 90 ... 240 VAC ± 10 %, 50/60Hz, approx. 10 VA  
 option: 24 VAC ± 10 %, 50/60 Hz and 24 VDC ± 10 %

### Option:

#### 1. Power supply:

- L: power supply: 24 V AC/DC
- H: power supply: 90 ... 240 V AC

**2. Outputs:** 1Rel. 2Rel. 3Rel. 4Rel.

R: relay-output Standard

O: SSR drive

C: Normalized signals 0(4) ... 20 mA

V: Normalized signals 0(2) ... 10 V

- : without additional output - standard standard standard

*Limitations: If RS485 is chosen, OUT4 is not possible, OUT3 and OUT4 have to have the same output option. OUT4 only possible if OUT3 also chosen*

#### 3. Digital control input and serial interface:

I: with control input and serial interface (RS485)

-: without interface

#### 4. Heater break function:

H: input for current transformer

-: no monitoring

#### Ordering Information:

TLK 43 

1.	2.	3.	4.
----	----	----	----

**TLK 43 L RROO I -:**  
 TLK 43 with serial interface and 4 outputs (2x relay and 2x SSR).

Self-supplying plug-in display for measuring transducer without auxiliary energy source



DEVICE WILL TAP FROM  
4 TO 20 mA LOOP CURRENT



CAN BE TURNED TO ANY POSITION

- scale freely adjustable ,on site' within seconds, no auxiliary devices required (GIA 0420 ...)
- Also available for 0-10 V (auxiliary energy needed) (GIA 010 ...)
- large display range from -1999 to 9999 digit.
- maximum accuracy and minimum temperature drift
- large, 10 mm high LCD
- monitoring for probe damage, probe short circuit, values above/below permissible limit
- steady display even if transmitter signal is disturbed: due to software filters (can be switched on/off)

**GIA 0420 VO**

plug-in display without buttons, 4-20 mA

**GIA 0420 VOT**

plug-in display with buttons, 4-20 mA

**GIA 010 VOT**

plug-in display with buttons, 0-10 V

Specification:	GIA 0420	GIA 010
Input signal:	4 - 20 mA (2-wire)	0 - 10 V (3-wire)
Spannungslast:	approx. 2 V (approx. 3.5 V at ...-ex)	-
Input resistance:	-	approx. 100 kOhm
Supply voltage:	-	12 - 28 V DC
Supply current:	from current loop	< 10 mA
Accuracy:	± 0.2 % FS ±1 digit (at nominal temperature = 25 °C)	
Display:	10 mm high LCD	
Display range:	-1999 ... +9999	
Decimal point:	any position	
Scale:	freely adjustable via 3 buttons (for „VO“: accessible after cover has been removed)	
Measuring rate:	approx. 5 measurements / s	
Filter:	adjustable	
Limit:	3 limit functions selectable:	
LI 0:	Values above/below range permissible	
LI 1:	Values above/below range not permissible	
LI 2:	When range is exceeded, the referring rail will be displayed	
<b>Switching outputs: (only devices with option S1 or S2)</b>		
- S1:	1 electrically isolated open collector outputs	
- S2:	2 electrically isolated open collector outputs, connection via separate M8 jack	
Switching point, switching hysteresis:	freely adjustable	
max. switching voltage:	28 V	
max. switching current:	1 A (option S1: 20 mA)	
Reaction time:	≤ 250 ms	
Min./Max. value memory:	memorizing of max. and min. values.	
Operation, Configuration:	via 3 keys	
Working conditions:	-25 ... +50 °C / 0 ... 80 % RH (non-condensing)	
Electric connection:	special-adaptor design for cubic plug EN 175301-803/A for simple plug-in wherever required. 2 screws (68 and 75 mm) included in scope of supply.	
Housing:	ABS, keypad (resp. transparent panel made of polycarbonate) approx. 48.5 x 48.5 x 35.5 mm (H x W x D) without special adapter, approx. 50.5 x 90 x 39.5 mm (H x W x D) with special adapter	
Protection rating:	IP65 (when mounted appropriately)	

**GIA 0420 VOT - ex**

plug-in display 0-10 V with Ex-protection for all potentially explosive atmospheres  
Ex qualification: Ex II 2G Ex ia/ib IIC/IIB T4



**GIA 010 VOT - ex**

plug-in display 0-10 V with Ex-protection for all potentially explosive atmospheres  
Ex qualification: Ex II 2G Ex ia/ib IIC/IIB T4



(Further Information please refer to our Homepage [www.greisinger.de](http://www.greisinger.de) or p.r.t. page 68)

**Option:**

- S1  
with 1 electrically isolated switching output  
Delivery incl. 1 m connecting cable for connection of switching output  
(Option S1 just in combination with Ex-device available)
- S2  
with 2 electrically isolated switching outputs  
Delivery incl. 1 m connecting cable for connection of both switching outputs  
(Option S2 not in combination with Ex-device available)

**GIA 0420 WKT**

plug-in display with buttons, 4-20 mA

**GIA 0420 WKT - ex**

plug-in display with Ex-protection for all potentially explosive atmospheres, 4-20 mA



**GIA 010 WKT**

plug-in display with buttons, 0-10 V

**GIA 010 WKT - ex**

plug-in display with Ex-protection for all potentially explosive atmospheres, 0-10 V



**Specification:**

as GIA ... VOT but	
<b>Electric connection:</b>	Connection to any standard signal source (4-20 mA) via 2 m connection cable.
<b>Housing:</b>	with mounting holes can be mounted to any surface.



## Plug on controller/display needs no auxiliary energy



LED-DISPLAY

WITH 1 OPEN COLLECTOR OUTPUT

FREELY SCALABLE

VIA 3 KEYS

- optional with 2 electrically isolated high current open collector switching outputs (28 V / 1 A)
- 4 switching functions
- fast controlling and supervision (reacting time <20 ms)
- alternatively available version: 0-10 V (auxiliary energy required)
- Min./Max. value memory
- 3 limit functions, 3 filter stages
- alarm delay adjustable
- extensive self check and diagnosis system

### GRA 0420 VO

Plug on controller/display without auxiliary energy, output 4-20 mA, 1 electrically isolated switching output.

### GRA 010 VO

Plug on controller/display, output 0-10 V, 1 +Ub-switching output.

Specification:	GRA 0420 ...	GRA 010 ...
Input signal:	4 ... 20 mA (2-wire)	0 ... 10 Volt (3-wire)
Voltage load:	< 5.5 V	--
Input resistance:	--	approx. 30 kOhm
Supply voltage:	--	12 - 28 V
Supply current:	from current loop	< 10 mA
Display:	4 digit LED, approx. 7 mm high	
Display range:	-1999 ... 9999 digit, first and last value freely adjustable	
Recommended range:	≤ 2000 digit	
Decimal point:	any position	
Accuracy:	≤ 0.2 % FS ±1 digit (at nominal temperature = 25 °C)	
Measuring rate:	> 50 measurements / s	
Filter:	selectable in 3 stages	
Limit:	3 limit functions selectable:	
LI 0:	Values above/below range permissible	
LI 1:	Values above/below range not permissible	
LI 2:	When range is exceeded, the referring rail will be displayed	
Switching outputs:		
GRA0420VO:	1 electrically isolated open collector output, connection via cubic plug	
GRA010VO:	1 +Ub-switching open collector output, connection via cubic plug	
Option ... - S2:	2 electrically isolated open collector outputs, connection via separate M8 jack	
Switching point, switching hysteresis:	freely adjustable	
max. switching voltage:	28 V	
max. switching current:	20 mA (at option ... - S2: 1 A)	
Reaction time:	≤ 20 ms	
Switching functions:	2 or 3 point controller, 2 point controller with alarm, min-/max-alarm	
Min./Max. value memory:	memorizing of max. and min. values.	
Operation:	via 3 keys	
Working temperature:	-25 ... +50 °C	
Relative humidity:	0 ... 80 % RH (non-condensing)	
Electric connection:	special-adaptor design for cubic plug EN 175301-803/A for simple plug-in wherever required. 2 screws (68 and 75 mm) included in scope of supply.	
Housing:	ABS, keypad (resp. transparent panel made of polycarbonate) approx. 48.5 x 48.5 x 35.5 mm (H x W x D) without special adapter, approx. 50.5 x 90 x 39.5 mm (H x W x D) with special adapter	
Protection rating:	IP65 (when mounted appropriately)	

#### Option:

- S2 design type with 2 electrically isolated switching outputs. Outputs with increased switching current (28 V / 1 A), connection via separate M8 jack (Delivery incl. 1 m connecting cable for connection of both switching outputs)
- OT design type without pushbuttons in the cover (e.g. if the adjustment of the device shouldn't be directly accessible for the user)

### GRA 0420 WK

Without auxiliary energy, output 4-20 mA, 1 electrically isolated switching output.

### GRA 010 WK

Output 0-10 V, 1 electrically isolated switching output.

#### Specification:

same as GRA ... VO, but	
Electric connection:	connection to any standard signal source and switching output via 2 m connection cable.
Housing:	with mounting holes can be mounted to any surface whatsoever.



Housings for surface mounting for build in of devices with the format 24 x 48 or 48 x 96 mm



	<b>APG-1*</b>	<b>APG-2*</b>	<b>APG-3*</b>	<b>APG-4*</b>	<b>APG-6*</b>
	Housing for surface mounting incl. seal GGD2448	Housing for surface mounting incl. seal GGD2448	Housing for surface mounting incl. seal GGD2448	Housing for surface mounting incl. seal GGD2448	Housing for surface mounting incl. seal GGD2448
<b>Dimensions:</b>	80 x 82 x 95 mm (H x W x D), without elbow-plug	80 x 82 x 95 mm (H x W x D), without screw connections	80 x 82 x 95 mm (H x W x D), without screw connections	75 x 125 x 126 mm (H x W x D), without screw connections	175 x 125 x 126 mm (H x W x D), without screw connections
<b>Panel cutout:</b>	for 1 display at the format 24 x 48	for 1 display at the format 24 x 48	for 2 displays at the format 24 x 48	for 1 display at the format 48 x 96	for 2 displays at the format 48 x 96
<b>Connection:</b>	elbow-plug in according EN 175301-803/A, 4-pin	2 x screw connections M12 x 1.5	2 x screw connections M12 x 1.5	screw connections M12 x 1.5 and M16 x 1.5	screw connections 2 x M12 x 1.5 and 2 x M16 x 1.5
<b>Protection class:</b>	IP65	IP65	IP65	IP65	IP65
<b>Suitable for:</b>	GIA 20 EB / GIR 230 ... / GIA 0420 / GIA 0420 SP / GIA 2448 / WE / GTH2448/1,2,3			GIA 2000 / GIR 2000 Pt / GIR 2002 ..., / GTH 83 EG, / GTH 1150 EG	

\* Note: All housings without installation device and without unit sticker! These (see page 69) have to be ordered separately! The installation device will be assembled for free in the housing (on common order) if desired.

**Alarm light with buzzer**



**GIVES OPTICAL AND ACCOUSTIC ALARM**

**ALARM 230V**

Alarm light with buzzer

**Description:**

Universal alarm device with flashlight and buzzer, which is connected easily to relay outputs and the 230 V grid.

<b>Specification:</b>	
<b>Color:</b>	red
<b>Sound level:</b>	92 dB
<b>Power supply:</b>	230 V AC / 50 Hz
<b>Working temperature:</b>	-20 ... +50 °C
<b>Protection class:</b>	IP 65
<b>Suitable for:</b>	e.g. GIR 2002, GIR 230, GIR 300



Application

**Pre-assembled mounting plate**



**FOR EVEN EASIER MOUNTING OF THE TRANSMITTERS AND DEVICES**

**MP 8082**

mounting plate for 80 x 82 housings

**Description:**

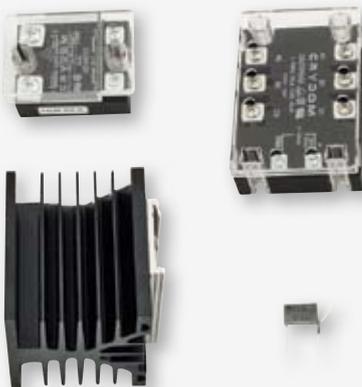
The mounting plate (of plastic, black) will be assembled to the ordered device ex works. The mounting flaps allow direct mounting to the wall without opening the housing.

**Specification:**

<b>Dimensions:</b>	80 x 114 x 6 mm (H x W x D)
<b>Housing:</b>	all devices at 80 x82-housing: e.g. GTMU, GRHU, GHTU, GMUD, GPHU 014 MP, OXY 3610 MP, APG-1

Other design types upon request

**Semiconductor Relais**



**HLR 50A**

semiconductor relay incl. suitable touch-guard protection cap

<b>Specification:</b>	
<b>Switching voltage:</b>	48 ... 530 V AC
<b>Switching current:</b>	max. 50 A
<b>Control voltage:</b>	3 - 32 V DC
<b>Isolation voltage:</b>	4000 V
<b>Operating temperature:</b>	-40 ... +80 °C
<b>Dimensions:</b>	approx. 59 x 46 x 35 mm

**RC-element**

230 VAC for inductive switching loads (solenoids, relay, motors, etc.)

**D53 TP50D**

3 phase semiconductor relay incl. suitable touch-guard protection cap

<b>Specification:</b>	
<b>Switching voltage:</b>	48 ... 530 V AC
<b>Switching current:</b>	max. 50 A
<b>Control voltage:</b>	3 - 32 V DC
<b>Isolation voltage:</b>	4000 V
<b>Operating temperature:</b>	-40 ... +80 °C
<b>Dimensions:</b>	approx. 100 x 75 x 35 mm

**D53-3P**

Suitable heat sink for D53TP50D snap-on mounting on hat rail

## Power supply



### GNG 220 / 2

Power supply integrated in snap-on housing for top hat rail - for 2 transmitters

Specification:	
<b>Input voltage:</b>	230 V, 50/60 Hz
<b>Output voltage:</b>	2 x 18 V DC $\pm 5\%$ , 25 mA each
<b>Dimensions:</b>	48 x 96 x 52 mm (W x H x D)
<b>Mounting:</b>	snap-on to top hat rail

### GNG 220 / 2 - 12V

identical to GNG220/2, but with output voltage 2 x 12 V DC, 30 mA each

### GNG 220

identical to GNG220/2, but with output voltage 1 x 12 V DC, 100 mA, unregulated

### GNG 12 / 300

Power supply integrated in snap-on housing for top hat rail

Specification:	
<b>Input voltage:</b>	230 V, 50/60 Hz
<b>Output voltage:</b>	12 V DC $\pm 5\%$ , 300 mA
<b>Dimensions:</b>	70.4 x 96 x 62 mm (W x H x D)
<b>Mounting:</b>	snap-on to top hat rail

### GNG 24 / 150

identical to GNG12/300, but with output voltage: 24 V DC  $\pm 5\%$ , 150 mA

other voltage upon request

## DC/DC-converter



### GNG 12 / 24

### GNG 24 / 24

DC/DC-converter to electrically isolate 12 V or 24 V DC-supply voltages

Specification:	
<b>Input voltage:</b>	GNG12/24: 10 - 18 V DC GNG24/24: 19 - 30 V DC
<b>Output voltage:</b>	24 V DC $\pm 5\%$ , max. 80 mA, electrically isolated
<b>Insulating voltage:</b>	500 V
<b>Operating temperature:</b>	-20 ... +70 °C
<b>Mounting:</b>	snap on to top hat rail.
<b>Dimensions:</b>	minimum space requirements due to narrow rack housing (module fully encapsulated). Installation width only 22.5 mm.

### GNG 12 / 2 x 24

### GNG 24 / 2 x 24

DC/DC-converter

Specification:	
<b>Input voltage:</b>	GNG 12 / 2 x 24: 10 - 18 V DC GNG 24 / 2 x 24: 19 - 30 V DC
<b>Output voltage:</b>	2 x 24 V DC $\pm 5\%$ , max. 80 mA each, electrically isolated
other data identical to GNG12/24 resp. GNG24/24	

## Power supply and relay module (e.g. for GIA20EB)



### GNR10

Power supply and relay module for top-hat rail, power supply for one GIA20EB and one transducer.

Specification:	
<b>Input voltage:</b>	230V, 50/60 Hz (others upon request)
<b>Output voltage:</b>	approx. 11 V DC (unregulated) for the supply of a GIA20EB 18 V DC $\pm 5\%$ (regulated), 25 mA for measuring transducer
<b>Relay outputs:</b>	2 volt-free changeover contacts, switching current: max. 10 A ohmic load.
<b>Connection:</b>	screw-type terminal
<b>Dimensions:</b>	48 x 96 x 60 mm (W x H x D)
<b>Mounting:</b>	snap on to top hat rail

### GR10

Relay module for top-hat rail for one GIA20EB to mounting to a top-hat rail

Specification:	
<b>Input voltage:</b>	12 V DC (others e.g. 24 VDC upon request)
<b>Relay outputs:</b>	2 volt-free changeover contacts, switching current: max. 10 A ohmic load.
<b>Connection:</b>	screw-type terminal
<b>Dimensions:</b>	48 x 96 x 60 mm (W x H x D)
<b>Mounting:</b>	snap on to top hat rail

Data logger / EASYBus



Data logger

Application:	Device	EL-USB-2-LCD	EL-USB-TC-LCD	T-Logg 100 ..	T-Logg 120 ..	T-Logg 160	EASYLog 40 K ..	EASYLog 40IMP/ ..	EASYLog 24 RFT ..	EASYLog 40NS ..	EASYLog 40 BIN	EASYLog 80 CL
Standard signal					✓					✓		
Temperature		✓	✓	✓		✓	✓		✓			✓
Humidity		✓				✓			✓			✓
Pressure (abs.)												✓
Pulse								✓				
State											✓	
EASYBus-load		-	-	-	-	-	2	2	2	2	2	2
Description		USB data logger	USB data logger	Stand-Alone logger	Stand-Alone logger	Stand-Alone logger	EASYBus data logger					
Catalog page:		84	84	84	85	85	86	86	87	87	88	88



EASYBus MODULES

Application:	Device	EASYBus MODULES							EASYBus CONTROLLER				EASYBus INTERFACE CONVERTER				
		EBHT ..	EBT - 2R ..	EBT - AP ..	EBT - IF ..	EBN / ..	EBG - CO - 1R	EBG - CO2 - 1R	GIA 20 EB	GIA 2000	GIR 2002	EB 2000 MC	EB 3000	EBW 1	EBW 3	EBW 64	EBW 240
Standard signal						✓											
Temperature		✓	✓	✓	✓												
Humidity		✓															
Carbon monoxide							✓										
Carbon dioxide								✓									
EASYBus-load		1.5	1.5	1.5	1.5	2	1	1	1	1		1					
max. permissible bus loads											14	30	14	2	64	240	
Description		EASYBus sensor modul	Universal display and controller	Universal display	Universal display and controller	Display- and monitoring device	Display-, controlling- and monitoring device	Connection to RS 232-interface	Connection to USB-interface	Connection to RS 232-interface	Connection to RS 232-interface						
Catalog page:		90	91	91	92	92	93	93	70	73	74	95	94	98	98	98	98

## USB Data Logger with Display



**FOR EXTERNAL THERMOCOUPLES (J, K AND T)  
OR HUMIDITY / TEMPERATURE AND DEW POINT**

### EL-USB-2-LCD

(device + software)  
USB Data Logger for Humidity / Temperature and Dew Point

### EL-USB-TC-LCD

(device + software)  
USB Data Logger for external Thermocouples (J, K and T)

#### Description:

- Direct connection to USB interface
- 2 programmable alarm limits
- LED for indication of low battery power
- Data logger with display
- red, green and orange LED for system status
- Protection class IP67
- incl. software

#### Specification EL-USB-2-LCD:

##### Measuring Range:

**Temperature:** -35 ... +80 °C

**Humidity:** 0 ... 100 % RH

**Dew Point:** via software

**Resolution:** 0.5 °C / 0.5% RH

##### Accuracy:

**Temperature (typ):** ± 1 °C

**Humidity:** ± 3,5 % RH (in the range 20 ... 80 % RH)

**Dew Point:** ± 2 °C (in the range 40 ... 100 % RH/25 °C)

**Memory:** 16.382 recordings per humidity and temperature

**Logging Interval:** 10 s, 1 min, 5 min, 30 min, 1 h, 6 h, 12 h programmable via software

**Serial Interface:** USB

**Battery:** lithium battery, size 1/2 AA,

**Dimensions housing:** 103 x 26.4 mm (L X W), Ø 27 mm

**Scope of supply:** 1 device, 1 lithium battery 3,6 V, 1 software, 1 protection cap, 1 operating manual (on CD-ROM), 1 clip

#### Specification EL-USB-TC-LCD:

##### Measuring Range:

**Type J:** -130 ... +900 °C,

**Type K:** -200 ... +1300 °C

**Type T:** -200 ... +350 °C

**Resolution:** 0.5 °C

**Accuracy (typ.):** ± 1.0 °C (at nominal temperature 25 °C)

**Thermocouple Connectors:** Thermoelement socket in miniature size, suitable for flat-pin plugs

**Memory:** 32.000 data

**Logging Interval:** 1 s, 10 s, 1 min, 5 min, 30 min, 1 h, 6 h, 12 h, adjustable via software

**Operating Temperature:** -10 ... +40 °C

**Serial Interface:** USB

**Battery:** 3.6 V Lithium battery, size 1/2 AA

**Dimensions:** 118.2 x 26.8 mm (L X W), Ø 27 mm

**Scope of supply:** 1 device incl. 3.6 V lithium battery, 1 software, 1 protection cap, 1 operating manual (on CD-ROM), 1 clip, 1 wire temperature probe

#### Special Note:

EL-USB-2-LCD and EL-USB-TC-LCE are neither BUS- nor **E.A.S.Y.Bus** compatible.

## Temperature-Logger



### T-Logg

The logger series for stand-alone applications



T-Logg 100

T-Logg 100 E

**DIN EN 12830**

**FOR INDIVIDUAL PROGRAMMING  
OF RECORDING TIME**

### T-Logg 100

Temperature data logger (16.000 measurement values) for any application

### T-Logg 100 E

Temperature data logger (16.000 measurement values) for any application

#### Starter kit

### T-Logg 100 SET

Complete set: T-Logg 100 + USB 100 (incl. software)

#### Specification:

##### Measuring range:

**T-Logg 100:** -30.0 ... 60.0 °C

**T-Logg 100 E:** -30.0 ... 120.0 °C

**Resolution:** 0.1 °C

##### Accuracy (at nominal temperature = 25 °C)

**T-Logg 100:** ±0.5 °C

**T-Logg 100 E:** ±0.2 % of measuring value ±0,5 °C

##### Sensor:

**T-Logg 100:** integrated in device

**T-Logg 100 E:** sensor tube made of stain-less steel, Ø 5 mm, approx. 50 mm long, approx. 1 m silicone cable. Cable with anti-buckling glanding to housing.

**Display:** LCD-display, 10 mm high

**Recording interval:** from 2 s ... 5 h, free programmable via software

**Storage capacity:** 16.000 measuring values

**Recording time:** 166 days (if interval is 15 min.)

**Working temperature:** -30 ... +60 °C

**Storage temperature:** -40 ... +85 °C

**Battery:** CR2032, exchangeable

**Battery service life:** over 3 years (if recording interval is 15 min.)

**Approvals:** DIN EN 12830

**Interface:** serial interface, 3-pin miniature integral plug.

**Housing:** 48.5 x 48.5 x 35.5 mm (L x W x D) plugs, sensor connection, ... are not included, Housing made of shock resistant plastic, transparent front made of polycarbonate. splash water-proof: IP 65.

**Noise immunity (EMC):** the T-Logg 100 have been manufactured in accordance with the regulations concerning EMC (2004/108/EG). The device meets EN 61326-1 (table 2, class B), additional error: < 0,5 % (< 1 % at T-Logg 100 E)

#### Note:

The T-Logg 100 is not suitable for bus operation and is not **E.A.S.Y.Bus** compatibel.

## Standard signal-Logger



### T-Logg

The logger series for stand-alone applications



T-Logg 120 K



T-Logg 120 W

**FOR INDIVIDUAL PROGRAMMING  
OF RECORDING TIME**

### T-Logg 120 W - ...

Standard signal data logger (16.000 measuring values) for transducers etc. (with elbow type plug)

### T-Logg 120 K - ...

Standard signal data logger (16.000 measuring values) for transducers etc. (with PG glanding and cable)

**Note:** please specify standard signal desired when ordering (i.e.: T-Logg 120 K - 0-1V)

Specification:	
<b>Display range:</b>	-1999 ... 9999 digit, freely programmable
<b>Decimal point:</b>	any position
<b>Input signal:</b>	only one signal! 0 - 1 V, 0 - 2 V, 0 - 10 V, 0 - 20 mA or 4 - 20 mA other input signals upon request (input is not isolated from interface)
<b>Accuracy:</b>	±0,5 % FS (at nominal temperature)
<b>Display:</b>	10 mm high LCD-display
<b>Recording interval:</b>	from 2 s ... 5 h, freely programmable via software
<b>Storage capacity:</b>	16.000 measuring values
<b>Recording time:</b>	166 days (if interval is 15 min.)
<b>Working temperature:</b>	-25 ... +60 °C
<b>Storage temperature:</b>	-30 ... +85 °C
<b>Battery:</b>	CR2032, exchangeable
<b>Battery service life:</b>	over 3 years (if recording interval is 15 min.)
Electric connection: (for input signals)	
<b>... 120 W - ...</b>	elbow-plug in accordance with EN 175301-803/A for connection to an existing transmitter.
<b>... 120 K - ...</b>	approx. 0.5 m connection cable
<b>Interface:</b>	serial interface, 3-pin miniature integral plug
<b>Housing:</b>	48.5 x 48.5 x 35.5 mm (L x W x D) plugs, sensor connection, ... are not included, Housing made of shock resistant plastic, transparent front made of polycarbonate, splash water-proof: IP 65.
<b>Noise immunity (EMC):</b>	The T-Logg 100 have been manufactured in accordance with the regulations concerning EMC (2004/108/EG). The device meets EN 61326-1 (table 2, class B), additional error: < 0,5 % (< 1 % at T-Logg 100 E)

**Note:**  
The T-Logg 100 is not suitable for bus operation and is not **E.A.S.Y.Bus** compatibel.

Software:	
<b>MINISOFT</b>	<b>free</b>
Read-out software for the T-Logg. Software is contained at the USB 100 or free available via the internet ( <a href="http://www.greisinger.de">www.greisinger.de</a> ). We will be pleased to send you a separate CD against a small charge covering our expenses of € 16,00.	
<b>Note:</b> the T-Logg can also be controlled by the software GSOFT40K.	

## Humidity- / Temperature-Logger



### T-Logg

The logger series for stand-alone applications



**FOR INDIVIDUAL PROGRAMMING  
OF RECORDING TIME**

### T-Logg 160

Humidity- / Temperature- Data-Logger (16.000 meas. values) for any application

#### Starter kit

### T-Logg 160 SET

Complete set with T-Logg 100 and interface converter USB 100 (incl. MINISOFT)

Specification:	
<b>Measuring ranges, display ranges:</b>	
<b>Humidity:</b>	0.0 ... 100.0 % RH
<b>Temperature:</b>	-25.0 ... 60.0 °C
<b>Resolution:</b>	0.1 °C/0.1 % RH
<b>Accuracy (at nominal temperature = 25 °C):</b>	
<b>Humidity:</b>	±3 % in range 10 - 90 %
<b>Temperature:</b>	± 0.3 °C ± 0.017 * (T - 25 °C)
<b>Sensors:</b>	mounted in sensor tube
<b>Sensor tube:</b>	approx. Ø 15 mm made of polyamide with screw-type plastic protection cap
<b>Display:</b>	10 mm high LCD-display
<b>Recording interval:</b>	from 4 s ... 5 h, freely programmable via software
<b>Storage capacity:</b>	16.000 measuring values each
<b>Recording time:</b>	166 days (if interval is 15 min.)
<b>Nominal temperature:</b>	25 °C
<b>Working temperature:</b>	-25 ... +60 °C
<b>Storage temperature:</b>	-30 ... +85 °C
<b>Battery:</b>	CR2032, exchangeable
<b>Battery service life:</b>	over 3 years (if recording interval is 15 min.)
<b>Interface:</b>	serial interface, 3-pin miniature integral plug
<b>Housing:</b>	48.5 x 48.5 x 35.5 mm (L x W x D) plugs, sensor connection, ... are not included, Housing made of shock resistant plastic, transparent front made of polycarbonate, splash water-proof: IP 65. (except filter cap of T-Logg 160).
<b>Noise immunity (EMC):</b>	The T-Logg 100 have been manufactured in accordance with the regulations concerning EMC (2004/108/EG). The device meets EN 61326-1 (table 2, class B), additional error: < 0.5 % (< 1 % at T-Logg 100 E)

**Note:** The T-Logg 100 is not suitable for bus operation and is not **E.A.S.Y.Bus** compatibel.

#### Accessories and spare parts:

<b>USB 100</b>	interface converter, for direct connection of one T-Logg to the USB-interface of a PC.
<b>GWH 40K</b>	Wall suspension with lock against theft (picture: see page 99) suitable for e.g. T-Logg 100, T-Logg 120 K - ... and T-Logg 160.
<b>GWH 10</b>	Simple wall suspension, made of stainless steel (picture: see page 99) Mount wall suspension at the monitoring point, logger may now be easily put in.
<b>CR 2032</b>	spare battery for T-loggs

## Temperature Logger for watching production and server-rooms



### EASYLOG 40K

Temperature Data Logger (48.000 meas. values) for any application, sensor tube are attached on the device

### EASYLOG 40KH

Temperature Data Logger (48.000 meas. values) for any application, sensor tube are connected via 1 m cable

### EASYLOG 40KH-E300

Temperature Data Logger (48.000 meas. values) for any application, tube connected via cable, increased measuring range (0.1 °C)

### EASYLOG 40KH-E600

Temperature Data Logger (48.000 meas. values) for any application, tube connected via cable, increased measuring range (1 °C)

### EASYLOG 40KH-GOF

Temperature Data Logger (48.000 meas. values) for any application., with surface probe for pipe mounting

Specification:	
<b>Measuring ranges:</b>	
<b>EASYlog 40K:</b>	-30.0 ... 60.0 °C
<b>EASYlog 40KH:</b>	-50.0 ... 150.0 °C
<b>EASYlog 40KH-E300:</b>	-50.0 ... 300.0 °C
<b>EASYlog 40KH-E600:</b>	0 ... 600 °C
<b>EASYlog 40KH-GOF:</b>	-50.0 ... 150.0 °C
For special measuring ranges refer to options	
<b>Working range (electronic):</b>	-30 ... +60 °C
<b>Resolution display and memory:</b>	0.1 °C or 1 °C (corresponding type)
<b>Accuracy (at nominal temperature = 25 °C):</b>	
<b>EASYlog 40K:</b>	±0.5 °C
<b>EASYlog 40KH:</b>	±0.5 °C
<b>EASYlog 40KH-E300:</b>	±0.5 °C ±0.2 % of m.v.
<b>EASYlog 40KH-E600:</b>	±1 °C ±0.2 % of m.v.
<b>EASYlog 40KH-GOF:</b>	±0.5 °C ±0.2 % of m.v.
<b>Sensor:</b>	Pt1000 (2-wire)
<b>- Design 40K: (refer upper picture)</b>	sensor tube made of plastic, Ø 7 mm, approx. 30 mm long, attached on the device. (Note: at certificate: stainless steel tube, Ø 5 mm, approx. 60 mm long)
<b>- Design 40KH: (refer upper picture)</b>	sensor tube made of stainless steel, Ø 5 mm, approx. 50 mm long, approx. 1 m silicone cable. Cable with anti-buckling glanding to housing.
<b>- Design 40KH-E300: (without picture)</b>	sensor tube made of stainless steel, Ø 3 mm, approx. 100 mm long, sleeve Ø 5 x 50 mm, approx. 1 m glass silk cable. Cable with anti-buckling glanding to housing.
<b>- Design 40KH-E600: (without picture)</b>	sensor tube made of stainless steel, Ø 3 mm, approx. 100 mm long, sleeve Ø 5 x 50 mm, flexible coating-element, approx. 1 m silicone cable. Cable with anti-buckling glanding to housing.
<b>- Design 40KH-GOF: (without picture)</b>	self-adhesive surface temperature probe with moulded silicone design (type GOF 115 Pt1000 - please refer to page 138), approx. 2 m PFA-insulated cable. Cable with anti-buckling glanding to housing.
<b>Special design types upon request</b>	
<b>Display:</b>	10 mm high LCD-display
<b>Recording interval:</b>	2 s ... 5 h, free programmable via software GSOFT 40K

<b>Storage capacity:</b>	48.000 measuring values
<b>Recording time:</b>	500 days, (if recording interval is 15 min.)
<b>Battery service life:</b>	approx. 6 years (if recording interval is 15 min.)
<b>Working temperature (electronic):</b>	-30 ... +60 °C
<b>Storage temperature:</b>	-40 ... +70 °C
<b>Interface:</b>	EASYBus-interface, 3-pin mini-integral plug. Needed connection-cable EBSK01 not included in delivery (see accessories page 99) <b>Note:</b> With an according interface converter you can connect 120 logger without having any problems.
<b>Housing:</b>	48.5 x 48.5 x 35.5 mm (W x W x D) sensor and plug not included, IP65.
<b>Noise immunity (EMC):</b>	the <b>EASYlog</b> have been manufactured in accordance with the regulations concerning EMC (2004/108/EG). The device meets EN 61326-1 (table 2, class B) additional error: < 0.5 %
<b>Approvals:</b>	DIN EN 12830

#### Options:

- **DBK:** double battery capacity recommended for high measurerates
- **ALARM:** additional alarm-output open-collector output via 4-pole miniature mounting connector (IP65) including 1 m cable. Max. switching power: 28 V, 50 mA
- **AFK:** plugable probe-cable, 4-pole (IP65) miniature mounting connector including assembling of the temperature-probe to the corresponding connection socket
- **SMB:** extra measuring range, freely selectable between -200 ... +600 °C. The essential probe-adjustment is not included in this price.  
**Note:** at a measuring span <400 °C (e.g. ± 200 °C) a resolution of 0,1 °C is possible. Taller ranges have a resolution of 1 °C
- **WPT3** Certificate of calibration (not available at ...40KH-GOF) (measuring points: -20 °C / 0 °C / +60 °C (at ...40K) or -20 °C / 0 °C / +70 °C (at ...40KH))

## Pulse-Logger

FOR CONSUMPTION AND FLOW RATE MEASURING, PIECE COUNTING ETC.

E.A.S.Y.Bus - Modul



### EASYLOG 40IMP/S

Pulse Data Logger (48000 measuring values) for individual use (type switching contact - with PG-glanding and cable)

### EASYLOG 40IMP/T

Pulse Data Logger (48000 measuring values) for individual use (type TTL-signal - with PG-glanding and cable)

Specification:	
<b>Measuring range:</b>	0 ... 30000 pulses/cycle
<b>Resolution:</b>	1 pulse
<b>Cycle:</b>	2 s ... 5 h, free programmable via software GSOFT 40K
<b>Display range:</b>	-1999 ... 9999 digit free programmable
<b>Decimal point:</b>	any position
<b>Input signals:</b>	<b>EASYlog 40IMP/S:</b> passive volt-free switching contact <b>EASYlog 40IMP/T:</b> active TTL-signal
<b>(input is not isolated for EASYBus)</b>	
<b>Resolution display and memory:</b>	1 digit
<b>Accuracy:</b>	cycle time ±50 ms
<b>Display:</b>	10 mm high LCD-display
<b>Recording interval:</b>	equal to cycle
<b>Storage capacity:</b>	48.000 measuring values
<b>Recording time:</b>	500 days, (if recording interval is 15 min.)
<b>Battery service life:</b>	approx. 6 years (without switching current, at 15 min)
<b>Working temperature:</b>	-25 ... +60 °C
<b>Storage temperature:</b>	-30 ... +70 °C
<b>Interface:</b>	EASYBus-interface, 3-pin mini-integral plug. Needed connection-cable EBSK01 not included in delivery (see accessories page 99)
<b>Housing:</b>	48.5 x 48.5 x 35.5 mm (L x W x D) plug and cable not included, IP65
<b>Electric connection:</b>	(for input signals) approx. 0.5 m connection cable, flying leads
<b>Noise immunity (EMC):</b>	the <b>EASYlog</b> have been manufactured in accordance with the regulations concerning EMC (2004/108/EG). The device meets EN 61326-1 (table 2, class B) additional error: < 0.5 %

#### Options:

- **DBK:** double battery capacity recommended for high measure-rates
- **ALARM:** additional alarm-output, open-collector output via 4-pole miniature mounting connector (IP65) including 1 m cable. Max. switching power: 28 V, 50 mA

## Humidity-/Temperature-Logger



EASYLOG 24RFT

E.A.S.Y.Bus - Modul

FOR MUSEUMS, GREENHOUSES,  
MEDICINE TECHNOLOGY ETC.



EASYLOG 24RFT-E

E.A.S.Y.Bus - Modul

### EASYLOG 24RFT

Humidity-/Temperature-Data-Logger (48.000 measuring values each) for individual use.

### EASYLOG 24RFT-E

Humidity-/Temperature-Data-Logger (48.000 measuring values each) for individual use.

Specification:	
Measuring range, Display ranges:	
Humidity:	0.0 ... 100.0 % RH
Temperature:	-25.0 ... 60.0 °C
Resolution display and memory:	0.1 °C and 0.1 % RH
Accuracy (at nominal temperature = 25 °C):	
Humidity:	±3 % in range 11-90 %
Temperature:	±0.5 °C
Sensors:	high-quality capacitive polymer humidity sensor and Pt1000 temperature sensor
Sensor tube:	
EASYLog 24RFT:	approx. Ø 15 mm made of polyamide
EASYLog 24RFT-E:	approx. Ø 14 x 68 mm made of PVDF, connected to logger via 1 m teflon cable
Protection cap:	screw-type plastic protection cap for quick responses
Display:	LCD-display, 10 mm high
Recording interval:	4 s ... 5 h free programmable via software GSOFT 40K
Storage capacity:	48.000 measuring values each channel
Recording time:	500 days, (if recording interval is 15 min.)
Battery service life:	approx. 6 years (at 15 min) double battery capacity against upcharge available!
Working temperature:	-25 ... +60 °C
Storage temperature:	-30 ... +70 °C
Interface:	EASYBus-interface 3-pin mini-integral plug. Needed connection-cable EBSK01 not included in delivery (see accessories page 99) <b>Note:</b> With an according interface converter you can connect 120 logger without having any problems.

Housing:	48.5 x 48.5 x 35.5 mm (H x W x D) sensor and plug not included. Housing made of shock resistant plastic, transparent front made of polycarbonate, splash water-proof: IP 65 (excl. protection cap)
Noise immunity (EMC):	the <b>EASYLOG</b> have been manufactured in accordance with the regulations concerning EMC (2004/108/EG). The device meets EN 61326-1 (table 2, class B), additional error: < 0,5 %

Options:	
- <b>DBK:</b>	double battery capacity, recommended for high measure-rates
- <b>ALARM:</b>	additional alarm-output, open-collector output via 4-pole miniature mounting connector (IP65) including 1 m cable. Max. switching power: 28 V, 50 mA
- <b>WPF4</b>	Certificate of calibration humidity (measuring points: approx. 20 / 40 / 60 / 80 %)

Accessories and spare parts:	
<b>EBW 1</b>	Level converter for connection of up to 9 EASYBus data logger to the RS232-interface of a PC. (Power supply: 230 V/50 Hz)
<b>EBW 3</b>	Level converter for connection of one EASYBus data logger to the USB-interface of a PC. (Power supply: via USB)
<b>GSOFT 40K incl. EBSK01</b>	(connection cable in scope of supply) Windows software for setting of device, data readout and printing of the stored data. (for further description p.r.t. page 96)
<b>EBSK 01</b>	Special connector with approx. 1 m cable for the connection of one <b>EASYLog</b> . (note: cable is in scope of supply of the software GSOFT 40K)

## Standard Signal Logger



EASYLOG 40NS W

REPLACES FOR EXPENSIVE  
RECORDERS

E.A.S.Y.Bus - Modul

### EASYLOG 40NS W - ...

Standard Signal Data Logger (48.000 meas. values) for transducers etc. (with elbow type plug)

### EASYLOG 40NS K - ...

Standard Signal Data Logger (48.000 meas. values) for transducers etc. (with PG glanding and cable)

#### Note:

please specify standard signal desired when ordering

Specification:	
Display range:	-1999 ... 9999 digit free programmable
Decimal point:	any position
Input signals:	one signal only! 0 - 2 V, 0 - 10 V, 0 - 20 mA or 4 - 20 mA other input signals upon request (input is not isolated for EASYBus)
Accuracy:	±0.5 % (at nominal temperature)
Display:	10 mm high LCD-display
Recording interval:	2 s ... 5 h free programmable via software GSOFT 40K
Storage capacity:	48.000 measuring values
Recording time:	500 days, (if recording interval is 15 min.)
Battery service life:	approx. 6 years (at 15 min)
Working temperature:	-25 ... +60 °C
Storage temperature:	-30 ... +70 °C
Interface:	EASYBus-interface 3-pin mini-integral plug. Needed connection-cable EBSK01 not included in delivery (see accessories page 99)
Housing:	48.5 x 48.5 x 35.5 mm (L x W x D) (with elbow-plug: 48.5 x 48.5 x 35.5 mm), splash water-proof IP65
Electric connection: (for input signals)	
... 40NS W:	elbow-plug in accordance with EN 175301-803/A for connection to an existing transmitter.
... 40NS K:	approx. 0.5 m connection cable
Noise immunity (EMC):	the <b>EASYLOG</b> have been manufactured in accordance with the regulations concerning EMC (2004/108/EG). The device meets EN 61326-1 (table 2, class B), additional error: < 0,5 %

Option:	
- <b>DBK:</b>	double battery capacity recommended for high measure-rates
- <b>ALARM:</b>	additional alarm-output open-collector output via 4-pole miniature mounting connector (IP65) including 1 m cable. Max. switching power: 28 V, 50 mA

Attention: Our software GSOFT40K as well as a level converter (EBW1, EBW3, EBW64 or EB2000MC) are required for all EASYLOG devices for configuration and to read-out logger data. (p.r.t. p. 95 a. 98)

## State-Logger



FOR STATE MONITORING ETC.

E.A.S.Y.Bus - Modul

### EASYLOG 40BIN

State Data-Logger (48000 measuring values) for individual use

Specification:	
<b>Input signal:</b>	passive volt-free switching contact (input is not isolated for EASYBus)
<b>Measuring values:</b>	1 = contact is closed (R < 50 Ohm) 0 = contact is open (R > 20 kOhm)
<b>Cycle:</b>	2 s ... 5 h, free programmable via software GSOFT 40K
<b>Resolution display and memory:</b>	1 digit
<b>Display:</b>	10 mm high LCD-display
<b>Recording interval:</b>	equal to cycle
<b>Storage capacity:</b>	48.000 measuring values
<b>Recording time:</b>	500 days, (if recording interval is 15 min.)
<b>Battery service life:</b>	approx. 6 years (without switching current, at 15 min)
<b>Working temperature:</b>	-25 ... +60 °C
<b>Storage temperature:</b>	-30 ... +70 °C
<b>Interface:</b>	EASYBus-interface 3-pin mini-integral plug
Needed connection-cable EBSK01 not included in delivery (see accessories page 99)	
<b>Note:</b> With an according interface converter you can connect 120 logger without having any problems.	
<b>Housing:</b>	48.5 x 48.5 x 35.5 mm (L x W x D) plug and cable not included, IP65
<b>Electric connection:</b>	(for input signals) approx. 0.5 m connection cable, flying leads
<b>Noise immunity (EMC):</b>	the <b>EASYLOG</b> have been manufactured in accordance with the regulations concerning EMC (2004/108/EG). The device meets EN 61326-1 (table 2, class B) additional error: < 0.5 %

#### Options:

- **DBK:** double battery capacity recommended for high measure-rates
- **ALARM:** additional alarm-output open-collector output via 4-pole miniature mounting connector (IP65) including 1 m cable. Max. switching power: 28 V, 50 mA

## Humidity-/Temperature-/Air pressure Logger



E.A.S.Y.Bus - Modul

FOR CLIMATE MONITORING ETC.

### EASYLOG 80CL

Humidity-/Temperature-/Air pressure Data-Logger (each 250.000 measured values) for climatic applications.

Description:	
The <b>EASYlog 80CL</b> can be configured, started and stopped by its buttons. It is possible to record max. 64 recording sequences (=start/stop processes) with max. 250.000 data sets (humidity/temperature/air pressure). The device can also be configured and handled by the comfortable software GSOFT40K. There is the possibility to block the stopping of the logger by the buttons to protect the logger of unauthorised handling.	
The device supports the display of units relevant for the air conditioning technology: wet bulb temperature, dew point temperature, enthalpy, atmospheric humidity or absolute humidity. The <b>EASYLog 80CL</b> provides a big variety of additional functions:	
<ul style="list-style-type: none"> <li>• <b>SeaLevel correction:</b> instead of the barometric air pressure the pressure at sea level can be displayed (input of height above sea level needed).</li> <li>• <b>Min-/max- value memory:</b> callable by the buttons, the highest and lowest value since the start (or reset) of the logger is saved here.</li> <li>• <b>Min-/max- alarm function:</b> the exceeding of adjustable min-/max- alarm boundaries by the displayed value is monitored.</li> </ul>	
<b>Optional:</b> alarm output for alarm message of the logger available!	

#### Specification:

<b>Measuring range, Display ranges:</b>	
<b>Humidity:</b>	0.0 ... 100.0 % RH
<b>Temperature:</b>	-25.0 ... +60.0 °C
<b>Air pressure:</b>	300.0 ... 1100.0 hPa
<b>Additional available display ranges:</b>	
<b>Wet bulb temperature:</b>	-27.0 ... 60.0 °C
<b>Dewpoint temperature:</b>	-40.0 ... 60.0 °C
<b>Enthalpy:</b>	-25.0 ... 999.9 kJ/kg
<b>Atmospheric humidity:</b>	-0.0 ... 640.0 g/kg
<b>Absolute humidity:</b>	0.0 ... 200.0 g/cm³
<b>Resolution display and memory:</b>	0.1 °C, 0.1 % RH and 0.1 hPa or 1 digit
<b>Accuracy:</b>	
<b>Humidity:</b>	± 2 % in range 10-90 %
<b>Temperature:</b>	± 0.3 °C ± 0.017 * (T - 25 °C)
<b>Air pressure:</b>	± 1.0 hPa (typ., at 0 - 60 °C)

- double display
- up to 64 recording sequences can be saved
- big storage for up to 250.000 measuring values for each unit (humidity, temperature, air pressure, ...) = 1.000.000 values for all
- Various additional measurement categories are available: dew point temperature, wet bulb temperature, enthalpy, atmospheric humidity or absolute humidity

Sensors:	
<b>Humidity/ Temperature:</b>	sensor mounted in sensor tube (sensor is exchangeable)
<b>Air pressure:</b>	sensor integrated in housing
<b>Sensor tube:</b>	approx. Ø 15 mm made of polyamide
<b>Protection cap:</b>	screw-type plastic protection cap for quick responses
<b>Display:</b>	two 4½-digit LCD-displays
<b>Recording interval:</b>	4 s ... 5 h, free programmable via buttons on the device or via the software GSOFT 40K
<b>Storage capacity:</b>	250.000 data sets (humidity, temperature, air pressure) in max. 64 recording sequences
<b>Recording time:</b>	7 years (at 15 min. interval)
<b>Battery service life:</b>	approx. 5 years (at 15 min)
<b>Working temperature:</b>	-25 ... +60 °C
<b>Storage temperature:</b>	-30 ... +70 °C
<b>Interface:</b>	EASYBus-interface 3-pin mini-integral plug.
Needed connection-cable EBSK01 not included in delivery (see accessories page 99)	
<b>Note:</b> With an according interface converter you can connect 60 logger without having any problems.	
<b>Housing:</b>	48.5 x 48.5 x 35.5 mm (H x W x D) sensor and plug not included. Housing made of shock resistant plastic, transparent front made of polycarbonate, splash water-proof: IP 65 (excl. protection cap)
<b>Noise immunity (EMC):</b>	the <b>EASYLOG</b> have been manufactured in accordance with the regulations concerning EMC (2004/108/EG). The device meets EN 61326-1 (table 2, class B) additional error: < 0.5 %

#### Options:

- **ALARM:** additional alarm-output open-collector output via 4-pole miniature mounting connector (IP65) including 1 m cable. Max. switching power: 28 V, 50 mA
- **WPF4** Certificate of calibration humidity (measuring points: approx. 20 / 40 / 60 / 80 %)
- **WPD5** Certificate of calibration pressure (measuring points 300 / 500 / 700 / 900 / 1100 hPa)

Attention: Our software GSOFT40K as well as a level converter (EBW1, EBW3, EBW64 or EB2000MC) are required for all EASYLOG devices for configuration and to read-out logger data. (p.r.t. p. 95 a. 98)

# E.A.S.Y.Bus® System

## PRINCIPLE OVERVIEW

### Characteristics of the EASYBus system

- Low-cost wiring by using a twisted 2-pin connection line in either bus or tree design (polarity-free); can be used in any combination
- Bus line for simultaneous power supply and signal transmission
- Bus length up to 1000 m, extensible by using a repeater
- Fully automatic start-up installation via software
- Sensor modules can be changed, removed or added during operation at any time
- Connection of up to 240 sensor modules
- Optimum transmission reliability by means of CRC check
- Bus system is able to process data up to 20 measuring values per second
- Response time inside the EASYBus-system approx. 1 s; but approx. 20 ms by using a local controlling system

### The EASYBus-hardware

- 2-pin connection line, based on the principle of the M-Bus
- Polarity-free bus connection
- Bus system voltage 36 V DC, minimum 24 V DC
- Maximum allowable bus power loss: 12 V DC
- Master/slave system; data transmission of the slaves only on demand



**Temperature monitoring and regulation:**  
Cooling chambers  
Laboratory + utility rooms  
Storage rooms



**Relative humidity / dew point / temperature monitoring:**  
Storage rooms, Heating systems / air condition, Museums / exhibition rooms / Libraries, Laboratories/utility rooms



**Relative humidity / atmospheric pressure, CO<sub>2</sub> monitoring:**  
Manufacturing rooms/storage rooms, Office rooms (to condition the air of the room), Greenhouses



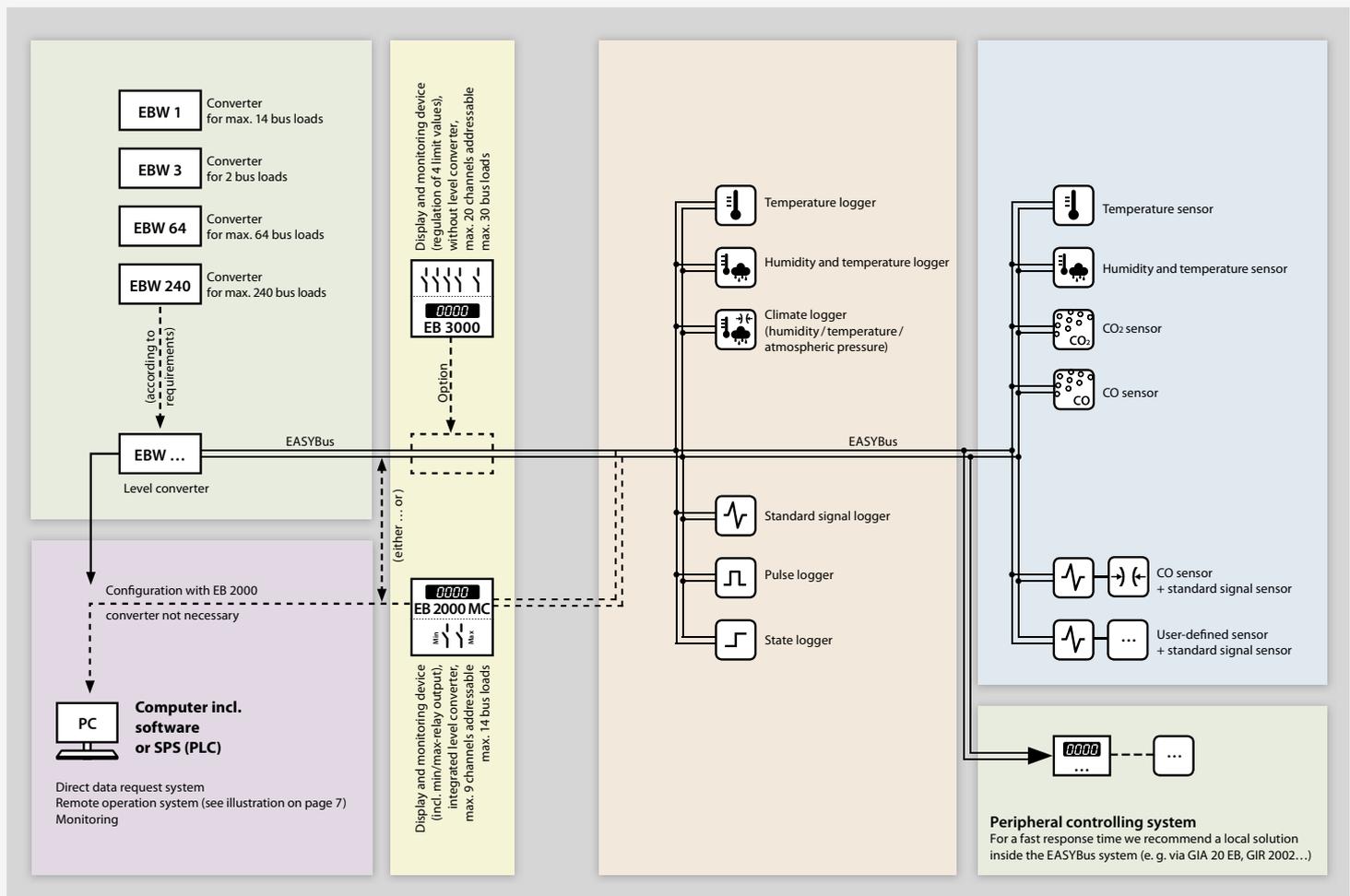
**CO monitoring:**  
Underground garages / Parking garages  
Motorcar garage / car repair  
Indoor go-kart tracks

### Level converter

### Centralized data collection

### Sensor modules including measured data storage (data logging functionality)

### Sensor modules without measured data storage



Handheld instrument

Display / Controller

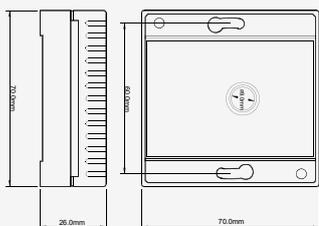
Logger / EASYBus

Transmitter

Temperature probe

Alarm / Protection

## EASYBus - sensor modules for humidity/temperature



E.A.S.Y.Bus - Modul

### EBHT - 2R

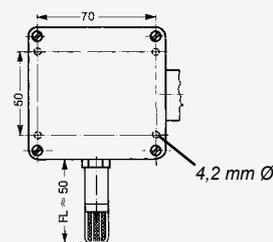
EASYBus - sensor modules for humidity/temperature

#### Option:

- **VO:**  
Option „On-site display“
- **HO:**  
Option „High-humidity sensor (0 ... 100 %)“, incl. „encapsulated PCB“
- **UNI:**  
Option „selectable humidity display unit“

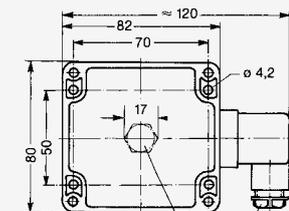
#### Specification:

<b>Measuring range:</b>	
<b>Humidity:</b>	0.0 ... 100.0 % RH
<b>recommended range (standard):</b>	30 ... 80 % RH
<b>recommended range (option -HO):</b>	5 ... 95 % RH
<b>Temperature:</b>	-25.0 ... 70.0 °C or -13.0 ... 158.0 °F
<b>Display options:</b>	refer to below
<b>Resolution:</b>	0.1 % RH or 0.1 °C / 0.1 °F
<b>Accuracy: (at nominal temperature = 25 °C)</b>	
<b>Humidity:</b>	±2.5 % RH (at recommended range)
<b>Temperature:</b>	±0.4 % of measuring value ±0.3 °C
<b>Electric connection:</b>	2 pin screw-type terminal, no polarity, max. 1.5 mm <sup>2</sup>
<b>Ambient temperature:</b>	-25 ... 50 °C
<b>Housing:</b>	70 x 70 x 26 mm (L x W x D)
<b>Option Display:</b>	10 mm high LCD-display

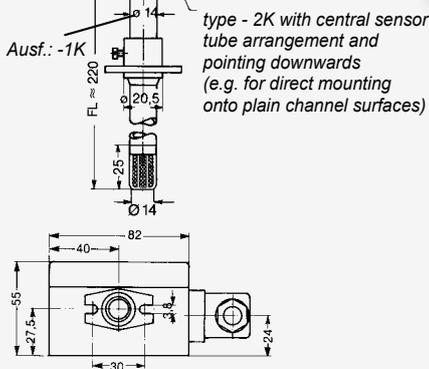


EBHT - 1R  
incl. option VO

E.A.S.Y.Bus - Modul



EBHT - 2K



### EBHT - 1R

EASYBus-sensor modules for humidity/temperature (sensor tube at the side, FL = 50 mm)

### EBHT - 1K

EASYBus-sensor modules for humidity/temperature (sensor tube at the side, FL = 220 mm)

### EBHT - 2K

EASYBus-sensor modules for humidity/temperature (sensor tube pointing downwards, FL = 220 mm)

### EBHT - KABEL

EASYBus-sensor modules for humidity/temperature (separated sensor tube) type incl. option HO

### EBHT - SHUT

EASYBus-sensor modules for humidity/temperature (incl. heat absorption hat) type incl. option HO and LACK

#### Accessories and spare parts:

**Spare protection cap**  
with stainless steel gauze (105 µ mesh size)  
- for standard and high humidity use

**Bronze filter**  
(not for use in high humidity use)

#### Specification:

<b>Measuring range:</b>	
<b>Humidity:</b>	0.0 ... 100.0 % RH
<b>recommended range (standard):</b>	30 ... 80 % RH
<b>recommended range (option -HO):</b>	5 ... 95 % RH
<b>Temperature:</b>	-40.0 ... 120.0 °C or -40.0 ... 248.0 °F
<b>Display options:</b>	with option UNI an alternative display unit can be shown instead of the humidity measuring value. The unit selection will be done via the interface or at the keyboard (by option VO).
<b>Wet bulb temperature:</b>	-27.0 ... 60.0 °C
<b>Dewpoint temperature:</b>	-40.0 ... 60.0 °C
<b>Enthalpy:</b>	-25.0 ... 999.9 kJ/kg
<b>Atmospheric humidity:</b>	0.0 ... 640.0 g/kg
<b>absolute humidity:</b>	0.0 ... 200.0 g/m <sup>3</sup>
<b>Resolution:</b>	0.1 % RH or 0.1 °C / 0.1 °F
<b>Accuracy: (at nominal temperature = 25 °C)</b>	
<b>Humidity:</b>	±2.5 % RH (at recommended range)
<b>Temperature:</b>	±0.4 % of measuring value ±0.2 °C
<b>Electric connection:</b>	elbow-type plug EN 175301-803/A (IP65), output 2-wire connection, max. 1.5 mm <sup>2</sup> each, no polarity
<b>Ambient temperature:</b>	
<b>electronic, housing:</b>	-25 ... 50 °C
<b>sensor (sensor tube):</b>	-40 ... 100 °C (for short time up to 120 °C)
<b>Housing:</b>	82 x 80 x 55 (L x W x D), material: ABS, IP rating: IP65
<b>Sensor tube:</b>	tube-Ø 14 mm, screwable, protection cap with stainless steel gauze (105 µm). Total length approx 50 mm or 220 mm (standard)
<b>Version KABEL:</b>	„separated sensor tube“, sensor head (Ø 14 x 68 mm) connected to housing via approx. 1 m teflon cable.
<b>Version SHUT:</b>	„Heat-absorption hat / weather protection shield“, avoids falsification of meas. data due to sun/rain etc - p.r.t. page 110
<b>Optional extended length</b>	<b>300, 400 or 500 mm available. (please specify upon order!)</b>
<b>Option Display:</b>	10 mm high LCD-display The option VO additionally has 3 pushbuttons for calling min./max. values and adjustment of measuring parameters (offset and scale correction)

#### For outdoor use:

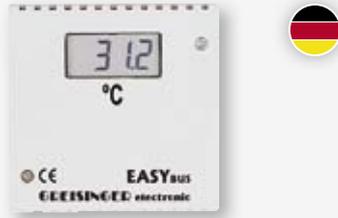
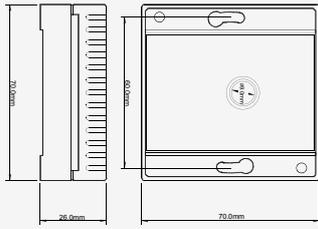
Option „encapsulated PC board“ required. We also recommend using a heat absorption hat (weather protection shield) to avoid falsification of measuring data due to sun/rain etc. (p.r.t. page 110)

#### Other types upon request !

#### Option:

- **VO:**  
Option „On-site display“
- **HO:**  
Option „High-humidity sensor (0 ... 100 %)“
- **UNI:**  
Option „selectable humidity display unit“
- **LACK:**  
Option „Encapsulated PC-board“
- **FL300, FL400, FL500:**  
Option „Longer probe tube“

## EASYBus - sensor modules for temperature



E.A.S.Y.Bus - Modul

### Specification:

<b>Measuring range:</b>	<b>EBT - 2R:</b> -25.0 ... 70.0 °C or -13.0 ... 158.0 °F
	<b>EBT - 2RE:</b> -50.0 ... 150.0 °C or -58.0 ... 302.0 °F
<b>Resolution:</b>	0.1 °C / 0.1 °F
<b>Accuracy:</b>	±0.4 % of meas. value ±0.3 °C (at nominal temperature = 25 °C)
<b>Sensor element:</b>	Pt1000 according to DIN IEC 751
<b>Electric connection:</b>	2 pin screw-type terminal, no polarity, max. 1.5 mm <sup>2</sup>
<b>Ambient temperature:</b>	-25 ... 50 °C (electronic)
<b>Housing:</b>	stream-lined housing for indoor installation (can be directly mounted on flush-type sockets)
<b>Dimensions:</b>	70 x 70 x 26 mm (L x W x D)
<b>Sensor (EBT-2RE):</b>	V4A-can, 5 mm Ø, 50 mm long, approx. 1 m silicone cable
<b>Option Display:</b>	10 mm high LCD-display

### Options:

- VO: Option „On-site display“

### EBT - 2R

EASYBus - sensor modules for temperature

### EBT - 2RE

EASYBus - sensor modules for temperature

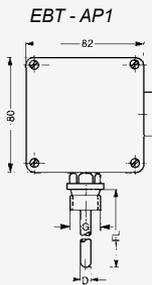
Type with external sensor for lower or higher temperatures.

Sensor: like GTF2000LE on page 127 of catalog

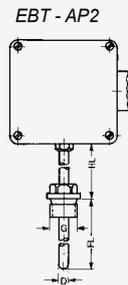


EBT - AP1  
water proof  
IP 65

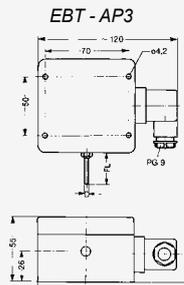
E.A.S.Y.Bus - Modul



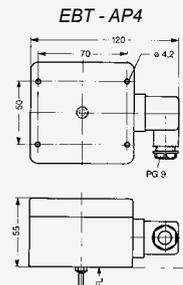
Standard:  
G = 1/2"  
FL = 100 mm  
D = 6 mm



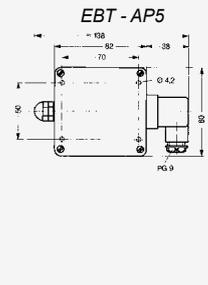
Standard:  
G = 1/2"  
HL = 50 mm  
FL = 100 mm  
D = 6 mm



Standard:  
FL = 50 mm  
D = 3 mm



Standard:  
FL = 100 mm  
D = 6 mm



### EBT - AP1

EASYBus - sensor modules for temperature (measuring range: -50.0 ... +150.0 °C) \*

### EBT - AP2

EASYBus - sensor modules for temperature (measuring range: -50.0 ... +400.0 °C) \*

### EBT - AP3

EASYBus - sensor modules for temperature (measuring range: -50.0 ... +150.0 °C) \*

### EBT - AP4

EASYBus - sensor modules for temperature (measuring range: -50.0 ... +150.0 °C) \*

### EBT - AP5

EASYBus - sensor modules for temperature (measuring range: -199.9 ... +650.0 °C)

### EBT - SHUT

EASYBus - sensor modules for temperature incl. heat absorption hat (measuring range: -25.0 ... +80.0 °C)

\* observe necessary order information!

### Design types:

<b>EBT - AP1:</b>	With threaded pin „G“ for direct screw connection.
<b>EBT - AP2:</b>	For higher temperatures, threaded pin „G“ at a distance from housing. HL = collar tube length.
<b>EBT - AP3:</b>	Indoor or outdoor probe for direct wall mounting (encapsulation of electronics required for outdoor use).
<b>EBT - AP4:</b>	Duct-type probe with probe tube arranged centrally and pointing downwards.
<b>EBT - AP5:</b>	Transducer for existing Pt1000 sensors or for applications where probe and housing need to be separated (e.g. extremely high ambient temperature or due to design reasons).
<b>EBT - SHUT</b>	without illustration; p.r.t. page 110

Other design types upon request - please do not hesitate to contact us!

### Specification:

<b>Measuring range:</b>	
- AP1, AP3, AP4:	-50.0 ... 150.0 °C or -58.0 ... 302.0 °F
- AP2:	-50.0 ... 400.0 °C or -58.0 ... 752.0 °F
- AP5:	-199.9 ... 650.0 °C or -199.9 ... 999.9 °F
- SHUT:	-25.0 ... 80.0 °C or -13.0 ... 176.0 °F
<b>Sensor element:</b>	Resistance thermometer Pt1000 acc. to DIN IEC 751
<b>Resolution:</b>	0.1 °C / 0.1 °F
<b>Accuracy (electronic):</b>	(at nominal temperature = 25 °C) ±0.2 % of meas. value ±0.2 °C

### Sensor accuracy:

	(Pt1000)
<b>Standard:</b>	acc. to DIN K1.B (±0.3 °C at 0 °C)
<b>Option:</b>	1/3 DIN: ±0.1 °C at 0 °C (upcharge p.r.t. page 127)
<b>Electric connection:</b>	elbow-type plug EN 175301-803/A (IP65), output 2-wire connection, max. 1.5 mm <sup>2</sup> each, no polarity
<b>Sensor connection:</b>	2-wire connection available (e.g. EBT - AP5)
<b>Ambient temperature (electronic):</b>	-25 ... 70 °C
<b>Housing:</b>	82 x 80 x 55 (L x W x D), material: ABS, IP rating: IP65
<b>Mounting position:</b>	any
<b>Fixing:</b>	by means of screw-thread or fixing holes in the housing (accessible after top cover has been removed).
<b>Mounting distance:</b>	50 x 70 mm
<b>Fixing screws:</b>	max. shaft Ø: 4mm
<b>Sensor mounting:</b>	sensors are electrically insulated as a standard.
<b>Thread sizes G:</b>	1/2" (standard) material V4A
<b>options:</b>	G1/4", G3/8", G1/2", M5, M6, M8, M10, M12, other threads upon request!
<b>Sensor tube:</b>	„D“: 3 mm, 4 mm, 5 mm, 6 mm and 8 mm - material: V4A
<b>Collar tube:</b>	HL = please specify length desired (for ..AP2 only) (V4A-tube)
<b>Option Display:</b>	10 mm high LCD-display The option VO additionally has 3 push-buttons for calling min./max. values and adjustment of measuring parameters (offset and scale correction).

### Options:

- VO: Option „On-site display“ (LCD with 10 mm high digits)
- LACK: Option „Encapsulated PC-board“ (for outdoor use)
- FL... (Longer probe tube); -HL... (longer collar tube): Price incl. up to 100 mm, extended length: price per 100 mm

### Ordering information

at least necessary:

Type, sensor element and type specific sensor tube data: „FL“ and „D“ (AP1 - AP4), „G“ (AP1, AP2), „HL“ (AP2).

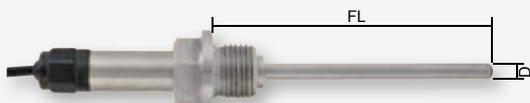
**Ordering examples:** all data to be mentioned in any case!

EBT - AP1, G = 1/2", FL = 100 mm, D = 6 mm  
EBT - AP3, FL = 50 mm, D = 3 mm

## EASYBus - sensor modules for temperature



**EBT - IF1**  
(Standard: FL = 100 mm, D = 6 mm)



**EBT - IF2**  
(Standard: FL = 100 mm, D = 6 mm, G1/2")



**EBT - IF3**  
(Standard: HL = 100 mm, FL = 50 mm, D = 6 mm, G1/2")

E.A.S.Y.Bus - Modul

### EBT - IF1

EASYBus - sensor modules for temperature

### EBT - IF2

EASYBus - sensor modules for temperature

### EBT - IF3

EASYBus - sensor modules for temperature

#### Specification:

**Measuring range:** The probe length FL has to be chosen long enough, that the allowable temperature range of the electronics situated in the tube sleeve is not exceeded.

**EBT - IF1 (standard):** -30.0 ... +100.0 °C

**EBT - IF2 (standard):** -30.0 ... +100.0 °C

**EBT - IF3 (standard):** -70.0 ... +400.0 °C

other measuring ranges (max. -200 ... +500 °C) upon request

**Measuring probe:** internal Pt1000-sensor

**Accuracy: (at nominal temperature = 25 °C)**

**Electronic:** ±0.2% of meas. value ±0.2 °C

**Measuring probe:** standard: DIN class B  
optionally higher sensor accuracy available

**Interface:** EASYBus-interface  
attached 2-pole cable, cable-length approx. 1 m.  
For direct connection to a converter or to the EASYBus.

**Operating ambient of electronics (in tube sleeve):**

**Working temperature:** -25 ... 70 °C

**Relative air humidity:** 0 ... 100 % RH

**Housing:** stainless steel housing

**Dimensions:** depending on sensor construction

**tube sleeve:** Ø 15 x 35 mm (without screwing)

**tube length FL:** 100 or 50 mm or on customer requirement

**tube diameter D:** Ø 6 mm or on customer requirement  
(available Ø: 4, 5, 6 and 8 mm)

**collar tube length HL:** 100 mm or on customer requirement

**thread:** G1/2" or on customer requirement (available threads M8 x 1, M10 x 1, M14 x 1.5, G1/8", G1/4", G3/8", G3/4")

**Min-/max-value memory:** the min-/max-value will be stored

**Adjusting:** via interface by means of offset and scale values

#### Option:

- FL=...: longer tube
- HL=...: longer collar tube
- D=...: other tube diameter
- G=...: other thread

## EASYBus - sensor modules for standardized signals



**EBN / W - ...**  
with elbow-type plug

E.A.S.Y.Bus - Modul



**EBN / K - ...**  
with connection cable

Abb.  
incl. option VO

### EBN / K - ...<sup>1)</sup>

EASYBus - sensor modules for standardized signals

### EBN / W - ...<sup>1)</sup>

EASYBus - sensor modules for standardized signals

<sup>1)</sup> - Please specify desired standardized signal upon order: (e.g. EBN / K - 0..10 V)

#### General:

All standard signals (0-2 V, 0-10 V, 0-20 mA, 4-20 mA, others on request) can be acquired on the EASYBus with its current module.  
When using a according interface converter an the **EASYControl net** software different transmitters can be connected resp. watched.

#### Specification:

**Input signal:** => specify desired type upon order  
0 ... 2 V, 0 ... 10 V, 0 ... 20 mA or 4 ... 20 mA.  
(input is not isolated for EASYBus)

**Measuring range:** -1999 ... 9999 digit, Measuring range and decimal point can be set via EBxKonfig software.  
(available free on our homepage).

**Accuracy:** ± 0.5 % (at nominal temperature = 25 °C)

**Working temperature:** -25 ... +60 °C

**Storage temperature:** -30 ... +70 °C

**Interface:** EASYBus-interface  
attached 2-pole cable, cable-length approx. 1 m.  
For direct connection to a converter or to the EASYBus.

**Housing:** 48.5 x 48.5 x 35.5 mm (L x W x D)  
(with elbow-type plug: 50.5 x 90 x 39.5 mm),  
splash-water proof IP65

**Electric connection:** (for input signals)

- EBN / K - ...: for connection to standardized signal source via 0.5 m connection cable.

- EBN / W - ...: elbow-type plug according to EN 175301-803/A for plug-in into an existing transmitter connection.

#### Option:

**VO:**  
On-site display

## EASYBus - sensor modul for carbon monoxide (CO)



E.A.S.Y.Bus - Modul

### EBG - CO - 1R

EASYBus - sensor modul for carbon monoxide (CO)

#### General:

High quality CO transmitter for detection of carbon monoxide in underground garages, parking garages, boiler plants, heating systems, garages as well as in the ambient air.

The CO sensor module has a very long-lasting electrochemical measuring cell and could be easily installed.

#### Highlights:

- long-lasting electrochemical measuring cell
- automatic zero calibration
- 3 years warranty for the CO sensor element

#### Applications:

- underground garages, parking garages
- boiler plant and heating systems
- motorcar garage

#### Specification:

<b>Measuring range:</b>	0 ... 300 ppm CO (carbon monoxide)
<b>Measuring principle:</b>	electrochemical, permanent measuring
<b>Reproducibility:</b>	< 3 ppm according to VDI 2053
<b>Response Time T<sub>90</sub>:</b>	< 60 s
<b>Cross sensitivity:</b>	≤ 2 % of 300 ppm CO (acc. to VDI 2053)
<b>Linearity error:</b>	≤ 2 % of 300 ppm CO (acc. to VDI 2053)
<b>Offset adjustment:</b>	automatically
<b>Interface:</b>	EASYBus-interface
<b>Auxiliary energy:</b>	14 ... 30 V DC, max. 50 mA
<b>Working condition:</b>	-10 ... +40 °C, 15 ... 95 % RH (non-condensing)
<b>Option: on site display</b>	3½-digit LCD-display
<b>EMC:</b>	according to EN 50081-1, EN 50082-2 B
<b>Electric connection:</b>	elbow-type plug acc. to EN 175301-803/A (IP65), max. wire cross section: 1.5 mm <sup>2</sup> , wire diameter from 4.5 ... 7 mm
<b>Housing:</b>	ABS, 82 x 80 x 55 mm (without elbow-type plug)
<b>Mounting:</b>	with fixing holes for wall mounting
<b>Mounting distance:</b>	70 x 50 mm (W x H)
<b>Fixing screws:</b>	max. shaft-Ø 4 mm
<b>Weight:</b>	approx. 200 g

#### Option:

##### VO:

on site display

#### Accessories and spare parts:

##### GZ-01

test gas cap GT (for controlled flow with test gas)

##### GZ-02

gas bottle with 12l test gas: 30 ppm CO

##### GZ-03

gas bottle with 12l test gas: 300 ppm CO

##### GZ-04

gas valve unit MiniFlo for gas bottles with 12l

##### GSN 24

plug-in power supply (230 V<sub>AC</sub> => 24 V<sub>DC</sub>/300 mA)

additional accessories upon request

## EASYBus - sensor modul for carbon dioxide (CO<sub>2</sub>)



E.A.S.Y.Bus - Modul

### EBG - CO2 - 1R

EASYBus - sensor modul for carbon dioxide (CO<sub>2</sub>)

#### General:

Due to the fact, that CO<sub>2</sub> is an important indicator for the quality of air in rooms, it's super important to measure the CO<sub>2</sub> content.

The recommended CO<sub>2</sub> limit value for ambient air is 1000 ppm. An exceeding of this limit causes tiredness and a loss of concentration.

The high quality and precise CO<sub>2</sub>-module works according to the infrared principle (NDIR). An auto-calibration procedure compensates aging effects and is responsible for an excellent long term stability of this CO<sub>2</sub>-module. Additionally, there is a local display which shows beside the actual CO<sub>2</sub> concentration, the minimum and maximum values as well as an optical alarm.

#### Highlights:

- excellent long-term stability
- auto-calibration procedure
- for surveillance of the recommended CO<sub>2</sub> concentration in ambient air

#### Specification:

<b>Measuring range:</b>	
<b>Standard:</b>	0 ... 2000 ppm CO <sub>2</sub> (carbon dioxide)
<b>Opt. /5000:</b>	0 ... 5000 ppm CO <sub>2</sub> (carbon dioxide)
<b>Measuring principle:</b>	infrared principle (NDIR)
<b>Accuracy:</b>	
<b>Standard:</b>	±50 ppm ±2 % of meas. value (at 20 °C, 1023 mbar)
<b>Opt. /5000:</b>	±50 ppm ±3 % of meas. value (at 20 °C, 1023 mbar)
<b>Interface:</b>	EASYBus-interface
<b>Auxiliary energy:</b>	12 ... 30 V DC, max. 600 mA
<b>Display:</b>	approx. 10 mm high, 4-digit LCD-display
<b>Working condition:</b>	-10 ... +50 °C, 5 ... 95 % RH, 850 ... 1100 hPa
<b>Storage condition:</b>	-25 ... +60 °C, 5 ... 95 % RH, 700 ... 1100 hPa
<b>Electric connection:</b>	elbow-type plug acc. to EN 175301-803/A (IP65), max. wire cross section: 1.5 mm <sup>2</sup> , wire diameter from 4.5 ... 7 mm
<b>Terminal assignment:</b>	2 x EASYBus, no polarity 2 x Auxiliary energy
<b>Housing:</b>	ABS, 82 x 80 x 55 mm (without elbow-type plug)
<b>Mounting:</b>	with fixing holes for wall mounting
<b>Mounting distance:</b>	70 x 50 mm (W x H)
<b>Fixing screws:</b>	max. shaft-Ø 4 mm
<b>Weight:</b>	approx. 225 g
<b>Features:</b>	- min-/max-value memory - optical alarm - input of offset and scale for adjusting

#### Option:

##### 5000:

measuring range: 0 ... 5000 ppm CO<sub>2</sub>

#### Accessories and spare parts:

##### GSN 24-750

plug-in power supply (230 V<sub>AC</sub> => 24 V<sub>DC</sub>/750 mA)

## EASYBus-display and monitoring device for 20 channels



E.A.S.Y.Bus - Modul

### EB 3000

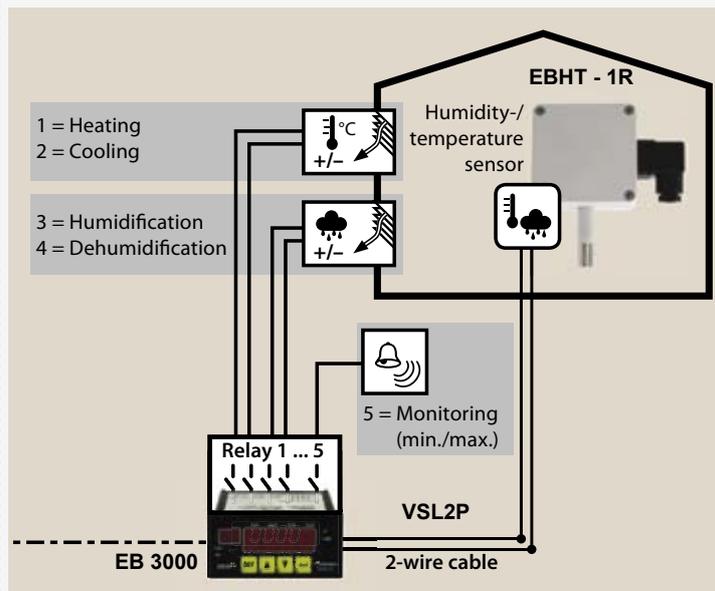
EASYBus-display and monitoring device for 20 channels

#### General:

- Up to 20 sensor-modules or loggers can be connected
- Sensor module supply and data transfer are carried out via one single 2-wire line
- 5 relay outputs (4 x controlling, 1 x alarm)
- Controller functions can be assigned to any channel, e.g.:
  - 4 x two-point-controllers (of 4 sensors)
  - 2 x three-point-controllers (of 2 sensors)
  - 4-way switch (of 1 sensor), ...
- 2 further functions / calculations:
  - average value over more sensors
  - difference of 2 sensors
  - special functions (upon request)
- Alarm monitoring for all connected EASYBus-moduls
- easy configuration via front-side keypad or via interface
- Via serial interface the connected devices can be read or additionally be monitored with a PC.
- Up to 1000 m cable-length possible
- Additional connection of a second EB 3000 for enlargement

#### Specification:

<b>Display range:</b>	-1999 ... +9999 digit
<b>Resolution, Accuracy:</b>	depending on sensor module used
<b>Sensor modules:</b>	all intelligent EASYBus sensor modules
<b>Sensor supply:</b>	via EB 3000
<b>max. bus load:</b>	30 EASYBus standard loads
<b>measuring channels:</b>	20
<b>permitted cable length:</b>	500 m (depending on type of cable and wiring)
<b>Switching outputs:</b>	4 relay outputs (NO), shared input. Outputs can be assigned to any channel
<b>Switching power:</b>	230 VAC, 5 A, ohm resistive load
<b>Switching function:</b>	2-point controller, 2-point controller inverting Switching points and delay for each output freely selectable
<b>Alarm output:</b>	1 relay output (change-over contacts)
<b>Switching power:</b>	230 VAC, 5 A, ohm resistive load
<b>Alarm function:</b>	Common alarm for all sensors.
<b>Configuration:</b>	directly on the device or via additional configuration software (supported converter is needed).
<b>Min./Max. value memory:</b>	from all connected sensor modules the max. and min. value are callable via front-side keypad.
<b>Calculation functions:</b>	there are 2 "virtual" channels additionally to the sensor-channels. A calculated value can be displayed here. Possible calculation functions: sensor-deviation, averaging above x sensors, etc.
<b>Self diagnosis:</b>	permanent self-diagnosis, diagnosis of all connected sensor modules to ensure trouble-free function.
<b>Display:</b>	main display: LED, 4-digit, 13 mm channel display: LED, 2-digit, 7 mm 11 more LEDs for e.g.: switching status and alarm
<b>Interface:</b>	EASYBus-interface with supported converter (e.g. EBW1) GRS232 compatible, for communication with a PC.
<b>Housing:</b>	48 x 96 x 100 mm (H x W x D).
<b>Panel cutout:</b>	43 x 90,5 mm (H x W).
<b>Front:</b>	Transparent membrane keyboard IP65. Sealing for housing for installation according to IP65 will have to be ordered separately.
<b>Connection:</b>	2-wire connection in ring-, tree- or star type. No polarity.
<b>Connection terminals:</b>	screw-type/plug-in terminals
<b>Ambient temperature:</b>	-25 ... 50 °C (permissible ambient temperature)
<b>Voltage supply:</b>	230V AC 50/60 Hz
<b>Power consumption:</b>	approx. 9 VA



### EB 3000 FTR

Cost effective Set for Moisture / Temperature Controlling

#### Scope of Supply:

- EB 3000: monitoring and controlling device
- EBHT - 1R: temperature / humidity modul (p.r.t. page 90)
- VSL2P: 10 m twisted pair cable (p.r.t. page 99)

#### General:

Cost effective monitoring and controlling of temperature and humidity. The humidity- / temperature sensor EBHT-1R will be connected with the EB 3000 via a single 2-wire twisted pair cable (e.g. bell wire). The maximum distance between sensor and controlling device is 500 m.

The components are fully configured. The only remaining work is to connect the modules via a 2-pole twisted wire and input the switching points.

#### Advantages:

- Simple installation and polarity free 2-wire system
- 4 switching outputs (humidify, dehumidify, heating, cooling) and 1 alarm output
- Easy upgrade to 20 single sensors (temperature, humidity, standard signals, CO, CO<sub>2</sub> etc.)
- Excellent cost-performance-ratio

#### Application:

Refrigeration warehouse, green house, storage room, terrarium, etc.

#### Note:

For configuration of the EB 3000 and recording / reading of connected EASYBus modules, a serial converter EBW 1 is needed.

#### Accessories and spare parts:

##### EBW 1

Interface converter, for connection of max. 9 EASYBus data loggers to the RS232 interface of your PC. (power supply: 230V/50Hz)

##### EBS 20M

Software for recording and archiving of max. 20 sensor modules (p.r.t. p. 97)

## EASYBus-display and monitoring device for 9 channels



FRONT  
24 x 48



E.A.S.Y.Bus - Modul

### EB 2000 MC

EASYBus-display and monitoring device for 9 channels

#### General:

- Display and monitor up to 9 sensor modules or loggers.
- automatically detects the number and type of sensor modules connected.
- Sensor module and logger supply as well as data transfer are carried out via one single 2-wire line.
- Monitoring of all sensor and logger functions as well as cable and sensor damage etc.
- 2 volt-free relay outputs for separate min./max. alarm.
- RS232-interface ensures easy configuration
- The EB 2000 MC can be used as a interface converter RS232 - EASYBus so that all EASYBus-moduls connected can be read and configured via the EB 2000 MC.

#### Specification:

<b>Measuring range:</b>	-1999 ... +9999 digit
<b>Resolution:</b>	depending on sensor module used.
<b>Accuracy:</b>	depending on sensor module used.
<b>Sensor modules:</b>	all intelligent EASYBus sensor modules as well as EASYLOG (max. 9) can be connected. 2-wire connection in ring-, tree- or star type. No polarity, max. cable length: 200 m.
<b>Sensor supply:</b>	via EB 2000 MC.
<b>Fault messages:</b>	sensor damage, sensor short circuit, values above/below permissible area.
<b>Self diagnosis:</b>	constant monitoring to ensure trouble-free function.
<b>Interface:</b>	RS232 for easy configuration, or as interface converter RS232 - EASYBus.
<b>Min./Max. value memory:</b>	for up to 9 different sensor modules, selectable via front side keyboard.
<b>Min./Max. alarm:</b>	2 volt-free relays (make contact), 10 A (ohmic load), 250 V, 50/60 Hz, for min./max. alarm, programmable via front side button or RS232-interface.
<b>Alarm delay:</b>	from 0 ... 9999 minutes, can be set individually for each channel.
<b>Display:</b>	4-digit, red, 13 mm high LED-display. 16 additional LEDs for display and monitoring functions.
<b>Front:</b>	Transparent membrane keyboard IP65. Sealing GGD 4896 for housing for installation according to IP65 will have to be ordered separately.
<b>Housing:</b>	rack-type housing 48 x 96 x 100 mm (H x W x D).
<b>Panel cutout:</b>	43 x 90.5 mm (H x W).
<b>Connection terminals:</b>	screw-type/plug-in terminals
<b>Ambient temperature:</b>	0 ... 50 °C
<b>Voltage supply:</b>	230 V AC 50/60 Hz (standard)
<b>Power consumption:</b>	approx. 3,5 VA

#### Option:

- **Voltage supply:**  
12 V AC, 24 V AC or 115 V AC 50/60Hz (others upon request)

## Cost savings



EB 3000 / EB 2000 MC

**COST SAVINGS IN ALL AREAS!**

#### General:

- short installation time - only one 2-pin line.
- polarity must not be observed by installation
- minimum material requirement - only one display and monitoring device for up to 9 / 20 sensor modules
- minimum time requirement for planning and commissioning - automatic sensor module detection, expandable for up to 9 / 20 sensor modules of any type.

#### Accessories and spare parts:

##### APG-4

surface-mounted housing (incl. sealing)

##### GGD 4896

add. sealing for panel mounting acc. to IP65

##### EBW 1

Interface converter, for connection of max. 9 EASYBus data loggers to the RS232 interface of your PC. (power supply: 230 V/50 Hz)

##### GRS 01/9

interface adapter RS232:  
(adapter cable to 9-pin PC-interface)

##### EBSK 01

connection cable 1 m, for **EASYLog**, EBN

##### EBSK 03

connection cable 3 m, for **EASYLog**, EBN

##### VSL 2P

twisted special cable for EASYBUS-system, cross section 2 x 0,75 mm<sup>2</sup>

##### AKL 1P

special-branch terminal or connection to VSL2P, 2 pieces

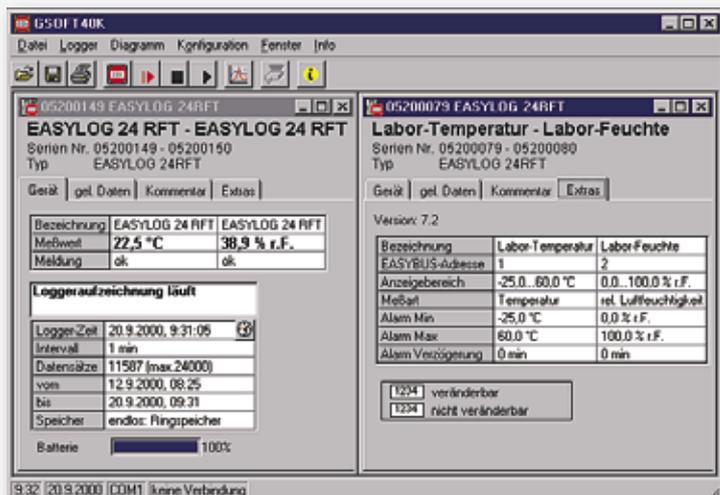
##### EASYBus-Configurator

software for comfortable editing of all EB 3000-parameters. (downloadable from our homepage: Service --> Download) **free**

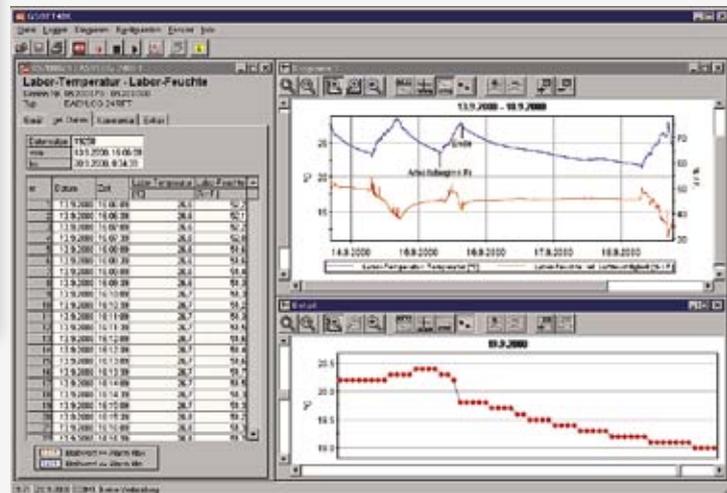
##### Sensor-, Logger-Module

p.r.t. page 84 - 93  
for temperature, humidity, norm. signal, frequency,...

Handheld instrument  
Display / Controller  
Logger / EASYBUS  
Transmitter  
Temperature probe  
Alarm / Protection



**(INCL. CONNECTION CABLE EBSK01)**



## GSOFT 40K

### General:

Comfortable multilingual (English, German, Czech and French language) operation software for the very easy operation of the **EASYLogs** and T-Logg's.

### Comfortable user interface - the essentials on a glance:

The programme is menu driven, the most important commands are additionally available in a toolbar. Whenever necessary the software gives hints and messages. Therefore any user with a few basics about how to operate standard Windows software will be able to operate it. Loggers can be connected, started and read out by single mouseclicks.

### Display of logger state informations

All necessary informations are compressed to a single clearly arranged window for each connected logger.

### Setting of special functions

The loggers are supporting alarm functionality - easily configurable by the GSOFT 40K Software. All other important logger settings are displayed, too. E.g. a label up to 16 characters long can be assigned to each logger channel, which is stored in the logger. You may for example label the location or other useful details by using this function.

### Additional entering of remarks

If You have read out a logger and want to store the data on disk or harddisk there is the possibility to additionally enter remarks of any length for each recording, for example to describe and comment unusual occurrences during the recording.

### The data: Tables and diagrams

After reading out the recordings the data will be displayed in form of a table. With the diagram the data of several loggers can be displayed simultaneously.

### Additional diagram functions:

- labelling of measuring values
- real time axis
- zooming of any section within the diagram
- legend (inactivate able)
- measurement cursor (inactivate able)
- marking of measurings with symbols (inactivate able)

The main target of the design of GSOFT40K was most easiest operationability, therefore just a few easy mouseclicks are necessary to display data fast and clear. Both diagrams and tables are displaying the data in realtime, even daylight savings time settings are taken into account automatically. And of course tables and diagrams can be printed out.

### E.A.S.Y.Bus & simultaneous operation and display of several loggers

Because of the EASYBus more than one logger can be connected at the same time at a single serial PC interface. Distances of up to 1000 m can be covered. To simplify operation all connected loggers can be operated at the same time. This reduces the expense of operation time and even largest EASYBus-systems can be controlled easily.

### Remote operation via conventional and mobile telephone nets

With GSOFT 40K loggers can be operated and read out via any distance by the means of the conventional or the mobile telephone nets. Because of this feature measuring values and recordings can be collected centrally covering distances of hundreds of kilometers. (p.r.t. page 100)

### Automated Read Out

All loggers connected directly or via conventional an mobile telephone nets can be read out automatically. The points of time can be entered separately (e.g. each day lor each week ... at X.XX o'clock), the read out data will be archived on hard disk. The system gets even more reliable and the handling of multiple loggers gets much easier.

### Export function

To be able to use the logger data with other software applications (EXCEL, WORD,... ), a flexible export function is integrated. The data can be converted to textfiles which can be processed by all popular programmes.

### System requirements:

One of the following 32- or 64-bit Microsoft Windows operating system is required: Windows XP, Windows Vista, Windows 7, Windows 8 (not working under Windows RT and at ARM or Intel Itanium based Windows systems)

## Update GSOFT 40K

(for registered users with declaration of serial number of original version)

**Update can downloaded freely from our homepage**  
(prerequisite: existence version > 7.0)

EASYBus - Software



**EASYControl net**

Network-compatible data logging

**Description:**

This software allows cost-efficient network-compatible data logging and monitoring systems. The visualization can be done by any computer in the network. EASYBus as well as GHM hand-held instruments are supported at the same time.

**Secured:**

- User accounts (with secured password transmission).
- Stored data can't be modified or manipulated later

**Live:**

- Constantly updating data
- Time assignment of the data
- Load ancient data and complete them with „live“ data

**Peripheral:**

- Uncoupling of data acquisition, data storage and visualisation
- Component communication via LAN
- Data visualisation by local network

**Controlled:**

- Trigger EBB Out switching channels via EASYBus

**Clear:**

- Different kinds of visualisation (table, digital, tachometer, chart)
- Display multiple graphs "live" in one chart
- Tooltips (with status information) for each measuring point in the chart
- Blinking symbols on error or status message in the visualisation
- Displaying error- and status messages.
- Displaying min- max- and mean value of the sensors
- Generate reports and store them as PDF, Excel or Word file

**System requirements:**

A 32- or 64-bit version of one of the following Windows operating systems: Windows XP, Windows Vista, Windows 7, Windows 8. (not executable with Windows RT, ARM of Intel Itanium based Windows systems)

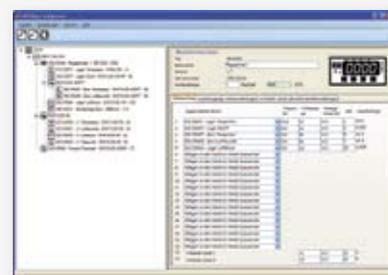
**EASYBus-Configurator**

Software for initial installation and configuration of EASYBus-systems.

**Description:**

- Listing of all connected modules in a treeview, therefore an easy overview of the system is possible.
- configuration of EASYBus modules can be done clearly.

You can download this software from our homepage ([www.greisinger.de](http://www.greisinger.de)) for free.



**EBS 20M**

20-Channel Measurement Data Logging

**EBS 60M**

60-Channel Measurement Data Logging

**Description:**

This software makes up a low-price and comfortable multi-channel acquisition program for measuring data. The program is suitable for recording, monitoring, visualization and documentation. Simultaneous use of different serial Bus-Systems: EASYBus, GMH handheld devices, GDSUB 1000

**Application:**

- On-site recording
- Process and system control, monitoring of climate and buildings
- Real time monitoring of measuring data, i.e for data evaluation and logging for cost listings, overview of consumption, optimisation of processes, and other statistics

**Highlight:**

- Simultaneous use of several serial interfaces
- Simultaneous use of different serial converters
- Quick and easy installation
- Freely scalable diagrams and alarm limits
- Visualization of actual measurements values
- Trusted data storage via SQL database
- Data export in currant file formats

**Modules:**

- Large-digit display
- Diagram display
- Table display
- Visualization of alarm limits
- Visualization of all recorded datas in one diagram

**Measuring Cycle:**

smallest possible measuring cycle: 500 ms

**System requirements:**

A 32- or 64-bit version of one of the following Windows operating systems: Windows XP, Windows Vista, Windows 7, Windows 8. (not executable with Windows RT, ARM of Intel Itanium based Windows systems)

Handheld instrument

Display / Controller

Logger / EASYBus

Transmitter

Temperature probe

Alarm / Protection



**EBW 1**

interface converter

**General:**  
for connection of max. 7 EASYBus-modules to the RS232-interface (9-pin Dsub) of your PC.

Specification:	
<b>Voltage supply:</b>	230 V AC / 50Hz, 12 / 24 V DC on request
<b>Power consumption:</b>	approx. 5 W
<b>Max. permissible sensor modules:</b>	7 (depending on type of the used sensor modules)
<b>Permissible cable length:</b>	200 m (depending on type of cable and wiring)
<b>Baud rate:</b>	4800 Baud
<b>Serial connection:</b>	RS232
<b>Electrical isolated:</b>	yes
<b>Overload display:</b>	no
<b>Short-circuit proof:</b>	yes (limited: 30 s)
<b>Operating temperature:</b>	0 ... 50 °C
<b>Humidity:</b>	20 ... 80 % RH, non-condensing
<b>Storage temperature:</b>	-20 ... +70 °C
<b>Dimensions (H x W x D):</b>	112 x 80 x 45 mm
<b>Bit-Recovery</b>	no

**Scope of supply:**  
interface converter, 9-pin Dsub extension cable



**EBW 3**

interface converter

**General:**  
for connection of one EASYBus-module (e.g. EASYLOG ) to the USB-interface of your PC. (Power supply: via USB)

Specification:	
<b>Voltage supply:</b>	not necessary
<b>Power consumption:</b>	max. 0.5 W
<b>Max. permissible sensor modules:</b>	1 (depending on type of the used sensor modules)
<b>Permissible cable length:</b>	10 m (depending on type of cable and wiring)
<b>Baud rate:</b>	4800 Baud
<b>Serial connection:</b>	USB
<b>Electrical isolated:</b>	yes
<b>Overload display:</b>	no
<b>Short-circuit proof:</b>	no
<b>Operating temperature:</b>	-25 ... 50 °C
<b>Humidity:</b>	20 ... 80 % RH, non-condensing
<b>Storage temperature:</b>	-25 ... +70 °C
<b>Dimensions (H x W x D):</b>	56 x 31 x 24 mm
<b>Bit-Recovery</b>	no

**Scope of supply:**  
interface converter

**Interface accessories**

**USB-Adapter**  
for connection of an interface converter (except EBW 3) to the USB-interface of your PC



**EBW 64**

interface converter

**General:**  
For connection of max. 64 EASYBus-modules to the RS232-interface of your PC.

Specification:	
<b>Voltage supply:</b>	230 V AC / 50Hz
<b>Power consumption:</b>	approx. 15 W
<b>Max. permissible sensor modules:</b>	64 (depending on type of the used sensor modules)
<b>Permissible cable length:</b>	1000 m (depending on type of cable and wiring)
<b>Baud rate:</b>	4800 Baud
<b>Serial connection:</b>	RS232
<b>Electrical isolated:</b>	yes
<b>Overload display:</b>	yes
<b>Short-circuit proof:</b>	yes (passiv)
<b>Operating temperature:</b>	0 ... 50 °C
<b>Humidity:</b>	20 ... 80 % RH, non-condensing
<b>Storage temperature:</b>	-20 ... +70 °C
<b>Dimensions (H x W x D):</b>	100 x 75 x 110 mm
<b>Bit-Recovery</b>	yes

**Scope of supply:**  
interface converter, 9-pin Dsub extension cable



**EBW 240**

interface converter incl. software EASYControl net

**General:**  
interface converter for connection of max. 240 EASYBus-modules to the RS232-interface of your PC.

Specification:	
<b>Voltage supply:</b>	230 V AC / 50 Hz (over power adapter)
<b>Power consumption:</b>	approx. 30 W
<b>Max. permissible sensor modules:</b>	240 (depending on type of the used sensor modules)
<b>Permissible cable length:</b>	1000 m (depending on type of cable and wiring)
<b>Baud rate:</b>	4800 Baud
<b>Serial connection:</b>	RS232
<b>Electrical isolated:</b>	yes
<b>Overload display:</b>	yes
<b>Short-circuit proof:</b>	yes (activ)
<b>Operating temperature:</b>	0 ... 55 °C
<b>Humidity:</b>	20 ... 80 % RH, non-condensing
<b>Storage temperature:</b>	-20 ... +60 °C
<b>Dimensions (H x W x D):</b>	200 x 240 x 55 mm (without power adapter)
<b>Bit-Recovery</b>	yes

**Scope of supply:**  
interface converter, plug-in power adapter, 9-pin Dsub extension cable, software EASYControl net.

**GSA 9S-25B**  
connection-adapter: 9-pin Dsub-plug <=> 25-pin Dsub-socket

**Note:**  
the EASYBus-monitoring device EB 2000 can be used as a converter for max. 9 sensor modules.

EASYBus - components



Sensor modules:

**Logger-Module**

p.r.t. page 86 - 88  
(for temperature, humidity, pressure, norm. signals, frequency)

**Sensor-Module**

p.r.t. page 90 - 93  
(for temperature, humidity, norm. signals, frequency, ...)

**GIA 20 EB**

p.r.t. page 70  
EASYBus module for norm. signal and temperature, with 2 switching outputs

**GIA 2000**

p.r.t. page 73  
EASYBus module for norm. signal and temperature

**GIR 2002**

p.r.t. page 74/75  
EASYBus module for norm. signal and temperature, with 2 relay outputs

**EBB 1 IN**

EASYBus sensor module with 1 digital input to monitor a electrically insulated contact

**EBB 4 IN**

EASYBus sensor module with 4 digital input to monitor a electrically insulated contact

**Input:** EBB 1 IN: 1 digital input for electrically insulated contact  
EBB 4 IN: 4 digital inputs for electrically insulated contact

**Housing:** snap-on housing

**Dimensions:** approx. 22,5 x 78 x 105 mm

E.A.S.Y.Bus - Modul



Logger accessories:

**ESK-1**

external starting key, independent from mains supply to start logger of the type **EASYLog 40...** and **EASYLog 24...** in the starting mode St.Et

**GWH 40K**

wall suspension with lock as protection against theft suitable for all **EASYLog** (except **EASYLog 40NS W**), **EBN/K - ...**, **GIA0420WK** and **GRA0420WK**

**GWH 10**

simple wall suspension, made of stainless steel, suitable for all **EASYLog** (except **EASYLog 40NS W**).  
mount wall suspension at the monitoring point, the logger may now be easily put in.

Cable:

**EBSK 01**

special plug with approx. 1 m of cable for connection of one **EASYLog**, **EBN..** to the EASYBus

**EBSK 03**

special plug with approx. 3 m of cable for connection of one **EASYLog**, **EBN..** to the EASYBus

**EBSK 10**

special plug with approx. 10 m of cable for connection of one **EASYLog**, **EBN..** to the EASYBus  
(Please note: the **EASYLog** will be supplied without connection cable. The **GSOFT40K** includes a connection cable **EBSK01**. Please order **EBSK01**, **EBSK03** resp. **EBSK10** as required in case of permanent bus connection!)

**VSL 2P**

Twisted special cable for EASYBus-system, cross section 2 x 0,75 mm<sup>2</sup>

**AKL 1P**

Special branch terminal for connection to **VSL2P**, 2 pieces

Interface converter:

**EBW 1, EBW 64, EBW 240**

EASYBus interface converter, RS232, main supply  
p.r.t. page 98

**EBW 3**

EASYBus interface converter, USB  
p.r.t. page 98

**GW 110 PB**

EASYBus Profibus Gateway  
(further information: [www.greisinger.de](http://www.greisinger.de))

Interface accessories:

**USB-Adapter**

for converter connection to an USB interface

**GRS 01/9**

interface cable for **EB2000 MC** for connection to 9-pin RS232 interface of a PC

**GRS 02/9**

interface cable for **EBW2** for connection to a MODEM ...

**GSA 25S-9B**

connection-adapter: 25-pin Dsub-plug <=> 9-pin Dsub-socket

**GSA 9S-25B**

connection-adapter: 9-pin Dsub-plug <=> 25-pin Dsub-socket

Software:

**EBS 20M**

Windows software for recording and archiving of max. 20 sensor modules  
p.r.t. page 97

**EASYControl net**

Windows software for monitoring, recording, displaying, p.r.t. page 97

**GSOFT 40K**

Windows software to service the **EASYLog**  
p.r.t. page 96

**ProfiLab-Expert**

Windows software,  
p.r.t. page 66

**EASYBUS.dll**

Windows-function library for interface communication EASYBus - PC,  
to integrate in your own programmes



## Alarm monitoring

### EBUW 232 A

independent alarm monitoring module for EASYBus-modules  
The EBUW232A monitors independently, it means without additional PC up to 240 EASYBus-modules for their alarm conditions. If an alarm is present, the alarm output of the EBUW 232 A will be set. With the included adapter cable the relay module GNR 232 A can be controlled. Additionally an adequate to the bus connected switching module (EBB ... OUT) can be controlled.

**Power supply:** 6 - 12 V DC, max. 10 mA  
(connection over approx. 50 cm adapter cable)

**Switching output:** NPN open-collector,  
max. switching capacity: 24 V, 50 mA  
(connection over adapter cable)

### GNG 12 - LE

plugin power supply 12 V DC / 300 mA

### GNR 232 A

Power supply and relay module for EBUW 232 A

**Power supply:** 230 V, 50/60 Hz  
**Outout voltage:** 12 V DC  $\pm 5\%$  (regulated) 25 mA  
**Relay output:** volt-free changeover contacts, switching current  
max. 10 A ohmic load

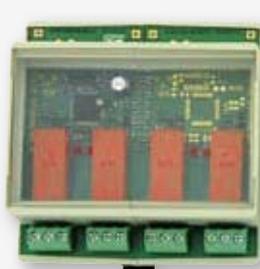
**Connection:** screw-type terminal  
**Dimensions:** 96 x 61 x 60 mm (H x B x T)

### EB 2000 MC

EASYBus-display and monitoring device for 9 channels  
p.r.t. page 95

### EB 3000

EASYBus-display, regulating and monitoring device for 20 channels  
p.r.t. page 94



E.A.S.Y.Bus - Modul

## Switching modules

### EBB 2 OUT / BP

EASYBus switching module, 2 relays, bus-powered

### EBB 2 OUT / 12V

EASYBus switching module, 2 relays

### EBB 4 OUT / BP

EASYBus switching module, 4 relays, bus-powered

### EBB 4 OUT / 12V

EASYBus switching module, 4 relays

## General:

The EBB ... OUT / ... are switching modules for the EASYBus that can be arbitrarily placed on a location in the bus system. The control of the modules' relays is realized by an alarm monitoring module EBUW 232A or by PC-software (e.g. EASYControl).

**There are 2 different design types of the switching modules:**

- ... / BP:** Bus Power - no external auxiliary supply needed
- ... / 12V:** external 12 V-supply needed - this allows faster switching and a higher operating reliability due to adjustable preferred relay states in case of a system failure. (Power supply unit not in scope of supply)

Specification:	EBB 2 OUT / BP	EBB 4 OUT / BP
<b>Power supply:</b>	Powered by the EASYBus	
<b>Switching outputs:</b>	2 changers	4 changers
<b>Switching reaction:</b>	< 1 s	< 2 s
<b>Switching power:</b>	max. 250 V AC / 16 A ohmic load	
<b>Connection:</b>	screw type terminal	
<b>Dimensions:</b>	96 x 48 x 60 mm	96 x 94 x 60 mm

Specification:	EBB 2 OUT / 12V	EBB 4 OUT / 12V
<b>Power supply:</b>	12 V DC $\pm 10\%$ / 150 mA	
<b>Switching outputs:</b>	2 changers	4 changers
<b>Switching reaction:</b>	< 0,1 s	< 0,1 s
<b>Switching power:</b>	max. 250 V AC / 16 A ohmic load	
<b>Connection:</b>	screw type terminal	
<b>Dimensions:</b>	96 x 48 x 60 mm	96 x 94 x 60 mm



## Remote operation

### MODEM 2600

analog hat rail MODEM with alarm input and SMS alarm for the EASYBus remote data transfer via analog telephone nets.

**Scope of delivery:**  
1 x Modem, 1 x plug power supply, 1 x TAE cable, 1 x protocol converter EBUW 232, 1 x null modem cable, 1 x 9-pol. DSub connection cable

### MODEM 3500 GSM

GSM MODEM with alarm input and SMS alarm for the EASYBus remote data transfer via 900 MHz mobile nets (D1, D2, etc.).

**Scope of delivery:**  
1 x Modem, 1 x protocol converter EBUW 232, 1 x null modem cable, 1 x 9-pol. DSub connection cable

## Accessories:

**Antenna GSM**  
(Dual-band industrial antenna with bracket)

### DFM 232 SET

Wireless data connection, 433 MHz, consisting of transmitter and receiver for wireless data transmission to EASYBus-modules via 433 Mhz radio network. Bi-directional RS 232 interface (DB9), e.g for the connection of EBW 1, large range of up to 1500 m at free air, within buildings similar to DECT telephones.

### LAN 3100

Gigabit Ethernet to USB converter  
For inquiring EASYBus modules, GMH handheld devices with interface or GDUSB 1000 via network. 2 USB ports for direct connection of EBW 3, USB 3100N or GDUSB 1000 (up to 15 with USB hub). Connection of EBW 1, EBW 64 or EBW 240 via USB adapter (included to scope of delivery)

**Accessories:**  
power supply unit, USB adapter, operation manual, driver CD

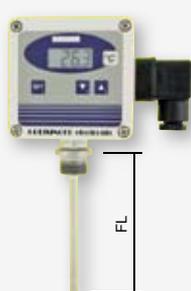
Transmitter

Application:	Device	GTMU ..	GTP-SG / GNTP-SG	GTMU - IF ..	T03 BU ..	RT420 ..	GITT01 ..	MU 500 ..	ST 500 ..	IR-CT 20	TF1 ..	GRHU .. MP	GHTU .. MP	GSMU ..	GMUD-MP-..	A-10 / S-10 .. / S-11 ..
Temperature		✓	✓	✓	✓	✓	✓	✓		✓	✓		✓			
Air humidity												✓	✓			
Air flow														✓		
Pressure															✓	✓
- Protection							✓	✓	✓							
Description		Wall- or channel-mounted version	snap-on housing	Stainless steel housing	Analog head transmitter	Head transmitter	programmable head transmitter	electr. isolated head transmitter, snap-on	Universal isolating signal converter, snap-on	Infrared Transmitter	Temperature Switch	Wall- or channel-mounted version	Wall- or channel-mounted version	Wall-mounted or Mini version	Wall mounted version / transmitter board	Stainless steel pressure transmitter
Catalog page:		102/103	104	105	105	106	107	108	108	109	109	110	110	114	111	112

Application:	Device	GT1-CO / GT10-CO2-1R	OXY 36 .. MP	GPHU .. / GRMU ..	GLMU .. MP	EFFI / EFFU	EFK2 / EFKP / EFKM	RRI - 0.. / ..	FCM ..	FH... / FHK.. / EPI	VISION 2008 / VTH 25 ..	GBS ..	GNS ..	RWI ..	LC .. / GNS-KIT	GEE 771C-DN...
Carbon monoxide / -dioxide		✓														
Oxygen			✓													
pH / Redox				✓												
Conductivity					✓											
Rotational speed						✓										
Flow							✓	✓	✓	✓	✓					✓
Level												✓	✓	✓	✓	
- Protection												✓				
Description		Wall-mounted version	Wall-mounted version	Wall-mounted version	Wall-mounted version	Stainless steel housing	Stainless steel housing	Flow meter (with rotor)	Flow switch with angle plug	Flow meter with NPN-Output	Flow transmitter with Hall-effect sensor	Water level / well probe	Level switch with microswitch / reed contact	Float switch	Level transmitter	Flow meter
Catalog page:		115	116	117	118	119	119	120	120	121	122	113	122	123	124	113

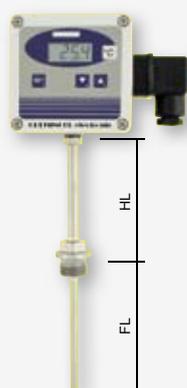
# Freely scaleable temperature transducer

## Design types:



**GTMU-MP-AP1**  
for direct screw connection  
probe with threaded stem „G“

**Standard type:**  
G = 1/2", FL = 100 mm, D = 6 mm



**GTMU-MP-AP2**  
for high temperatures  
threaded stem at a distance of  
HL (collar tube) from housing

**Standard type:**  
G = 1/2", HL = 100 mm,  
FL = 100 mm, D = 6 mm



**GTMU-MP-AP3**  
indoor / outdoor probe  
for direct wall mounting

**Standard type:**  
FL = 50 mm, D = 3 mm



**GTMU-MP-AP4**  
duct probe  
centrally mounted sensor tube  
pointing downwards (for clamping  
ring screw connection p.r.t. page 139)

**Standard type:**  
FL = 100 mm, D = 6 mm



**GTMU-MP-SHUT**  
with heat-  
protective shield

## GTMU-MP-AP1

Freely scaleable temperature transducer

## GTMU-MP-AP2

Freely scaleable temperature transducer

## GTMU-MP-AP3

Freely scaleable temperature transducer

## GTMU-MP-AP4

Freely scaleable temperature transducer

## GTMU-MP-SHUT

Freely scaleable temperature transducer

### General:

The new generation of our transducers brings more flexibility thanks to state of the art digital microprocessor technology. Due to the many different design types and a measuring range of -50 ... 400 °C nearly all kinds of applications can be covered.

- on site temperature display
- output signal freely scalable
- user-adjustment possible
- possible output signals: 4-20 mA, 0-1 V or 0-10 V

### Specification:

**Measuring range:** -50.0 ... +400.0 °C, free scaleable  
The probe length FL has to be chosen long enough, that the allowable temperature of the case and the electronics of 70 °C is not exceeded!

### Accuracy: (at 25°C)

**Display - Temperature:** ±0,4 % of measuring value ±0.2 °C

**output signal:** ±0.2 % FS (compared to display)

**Probe:** Pt1000, 2-wire, DIN class B (standard)  
optional higher sensor accuracy available (p.r.t. page 126)

**Output signal:** standard: 4-20 mA (2-wire), freely scaleable  
option: 0-1 V, 0-10 V (other output signals upon request)

**Connection:** 4-20 mA (2-wire)

**for option AV01, AV10:** 0 - 1 (10) Volt (3- or 4-wire)

**Auxiliary energy:** 12 ... 30 VDC or 18 ... 30 VDC (for output: 0- ... V)

**Reverse voltage protection:** 50 V, permanently

**Permissible impedance (at 4-20 mA):**  $R_A [\Omega] \leq (U_V [V] - 12 V) / 0,02 A$

**Permissible load (at 0-1(10)V):**  $R_L [\Omega] > 3000 \Omega$

**Display:** approx. 10 mm high, 4-digit LCD-display

**Working temperature:** -25 ... 70 °C (electronic)

**Storage temperature:** -25 ... 70 °C

**Relative humidity (electronic):** 0 ... 95 % RH (non-condensing)  
If there is a risk of condensation due to temperature changes, please use our encapsulated or lacquered types (option).

**Housing:** ABS (IP65)

**Probe tube:** stainless steel

<b>Probe length:</b>	for standard length please refer to design type
	<b>Optional:</b> any other tube length possible The probe length FL has to be chosen long enough, that the allowable temperature of the case and the electronics of 70 °C is not exceeded!
<b>Option SHUT:</b>	Heat protective shield / weather protective shield <b>Application:</b> The weather protective shield is designed for highly precise outdoor measurements. Strong solar radiation or rain does not influence the measurement values. <b>Design:</b> Weather protective shield made of plastic, Ø 110 mm, heights approx. 140 mm. Additionally there is a wall mounting panel made of stainless steel with 3 mounting holes for screws with maximal shaft diameter 5 mm. Largest overhang 160 mm.
<b>thread „G“:</b>	G1/2" (standard) optional: G1/4", G3/8", G3/4", M10, M12, M14, M16
<b>Probe diameter „D“:</b>	3, 4, 5, 6 or 8 mm
<b>Electric connection:</b>	elbow-type plug acc. to EN 175301-803/A (IP65)
<b>Mounting:</b>	4 housing holes for wall mounting or by means of plastic tube clamps for duct mounting
<b>Functions:</b>	min-/max-value memory, offset and slope digital adjustable, output signal freely scalable (without tools)

### Option:

- **AV01:** output signal 0-1 V
- **AV10:** output signal 0-10 V
- **LACK:** encapsulated PC board (for outdoor application, i.e. applications where condensation is possible)
- **FL=...:** longer tube
- **HL=...:** longer collar tube
- **D=...:** other probe diameter
- **G=...:** other thread

### Accessories and spare parts:

Clamping ring screw connection please refer to page 139

### Ordering information:

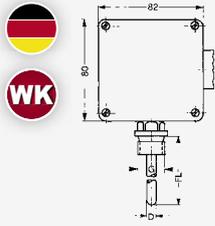
If no additional data is added to the design type, the probe will be manufactured with standard dimensions. If different dimensions are needed, they have to be specified.

### Ordering examples:

GTMU-MP, type 1  
GTMU-MP, type 3, FL = 100 mm, D = 4 mm

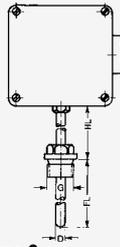


# Temperature transducer GTMU complete with Pt100 or NiCr-Ni (type K) sensor



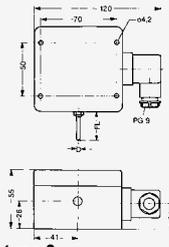
**design type 1**  
for direct screw connection probe with threaded stem „G“

**Standard type:**  
G = 1/2", FL = 100 mm, D = 6 mm



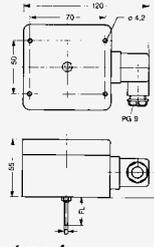
**design type 2**  
for high temperatures threaded stem at a distance of HL (collar tube) from housing

**Standard type:**  
G = 1/2", HL = 50 mm, FL = 100 mm, D = 6 mm



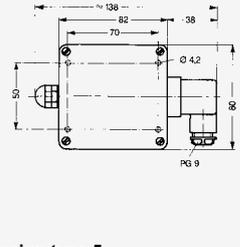
**design type 3**  
indoor / outdoor probe for direct wall mounting

**Standard type::**  
FL = 50 mm, D = 3 mm



**design type 4**  
duct probe centrally mounted sensor tube pointing downwards. (for clamping ring screw connection p.r.t. page 139)

**Standard type:**  
FL = 100 mm, D = 6 mm



**design type 5**  
for external probes measuring transducer for Pt 100 or NiCr-Ni sensors already existing on site or for applications where sensor and housing need to be spaced. (e.g. due to extremely high ambient temperatures or to design reasons).

- GTMU-AP1** Temperature transducer
- GTMU-AP2** Temperature transducer
- GTMU-AP3** Temperature transducer
- GTMU-AP4** Temperature transducer
- GTMU-AP5** Temperature transducer

**General:**  
You can choose between 5 design types of the GTMU and 2 sensor types to get an optimised solution for your needs. The types 1 - 4 are supplied complete with sensor, measuring transducer etc., calibrated and thus ready for use. Type 5 does not include sensor which is either already existing at your works or will have to be ordered separately according to your specifications (p.r.t. pages 131-132, 135-136)

**Specification:**

**Practical sensor elements:**

- **resistance thermometer:** Pt100 class B (higher sensor precision p.r.t. page 126)
- **thermocouple:** NiCr-Ni class 1

**Max. measuring ranges: (not available for every design type)**

<b>Pt100:</b>	-200 ... +800 °C
<b>NiCr-Ni:</b>	-200 ... +1372 °C

**Standard measurings ranges:**

<b>Pt100:</b>	0 ... 100 °C, 0 ... 200 °C, -50 ... +50 °C, -50 ... +150 °C
<b>NiCr-Ni:</b>	0 ... 100 °C, -50 ... +150 °C, -200 ... +300 °C, 0 ... 600 °C, 0 ... 1200 °C

**optional:** any other measuring range against upcharge

**Accuracy electronics:** ±0,2 % FS (Pt100) or ±0,2 % ±0,5 °C (NiCr-Ni)  
Higher precision e.g. via optionally different transducer (GITT01, RT420)

**Output signal:**

<b>standard:</b>	4 - 20 mA (2-wire)
<b>optional:</b>	0-1 V, 0-2 V, 0-5 V, 0-10 V (3- or 4-wire) (not available for GITT01, RT420)

**Auxiliary energy:** Uv = 12 ... 30 V DC (at 0-10 V: Uv = 18 ... 30 V DC); (for special types GTMU/GITT and GTMU/RT420: 8 ... 30 V)

**Reverse voltage protection:** 50 V permanently

**Allowable burden (for 4-20 mA):**  $R_A [Ω] ≤ (U_v [V] - 12V) / 0,02 A$  (for special types GITT and RT420 refer to this pages)

**Allowable load (for 0-\_\_ Volt):**  $R_L > 3000 Ω$

**Ambient temperature electronics:** 0 ... +70 °C (-40 ... +85 °C at .../RT420 and .../GITT)

**Temperature coefficient:**

<b>Pt100:</b>	0,01 % / °C
<b>NiCr-Ni:</b>	0,05 % / °C

**Storage temperature:** -20 ... +70 °C

**Housing:** ABS (IP65)

**Probe tube:** stainless steel

**Probe length:** for standard length please refer to design type, optional: any other tube length possible

**Thread „G“:** 1/2" (standard), optional: G1/4", G3/8", M5, M6, M8, M10, M12

**Probe diameter „D“:** 3, 4, 5, 6 or 8 mm

**Sensor installation:**

<b>Pt100:</b>	sensors will be electrically insulated at our works.
---------------	--

<b>NiCr-Ni:</b>	sensors are not electrically insulated as a standard (connection between sensor and outer sheathing). Optional electrically insulated design-type available.
<b>Mounting:</b>	with holes for wall mounting
<b>Mounting distance:</b>	70 x 50 mm (W x H)
<b>Fixing screws:</b>	max. shaft-Ø 4 mm
<b>Electric connection:</b>	elbow plug acc. to EN 175301-803/A (IP65)
<b>Sensor connection: (for type 5)</b>	Pt 100: 2- or 3-wire connection possible. NiCr-Ni: 2-wire only PG 7 screwed conduit entry for sensor cable connection by screw-type terminal on PC board

**Option:**

**GTMU / GITT**  
electrically isolated transducer (available sensors: Pt100, Pt1000, NiCr-Ni, only output 4-20 mA possible)

**GTMU / RT420**  
transducer for outdoor usage (available sensors: Pt100, only output 4-20 mA possible)

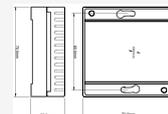
- **AV...:** other output signal (please state desired output voltage - not available with GITT and RT420)
- **MB=...:** any other measuring range (please state desired measuring range)  
*No upcharge for option -AV..., -MB if more than 10 pcs per type are ordered.*
- **LACK:** encapsulated PC board (for outdoor application, i.e. applications where condensation is possible)
- **POT:** electrically insulated NiCr-Ni-probe
- **FL=...:** longer tube
- **HL=...:** longer collar tube
- **D=...:** other probe diameter
- **G=...:** other thread
- **VO:** on-site display (for output signal 4-20 mA, auxiliary energy Uv = 17 ... 30 V DC)

**Ordering information:**  
At least necessary ordering information: design type, sensor and meas. range. If no additional data is added to the design type, the probe will be manufactured with standard dimensions.

**Ordering examples:**  
GTMU, type 1, Pt100 DIN KL.B., 0 ... 100 °C  
GTMU, type 3, NiCr-Ni, 0 ... 1200 °C, FL=100 mm, D=4 mm, POT

We also offer the sensors without the integrated transducer. The sensor connection then are directly connected to the elbow plug.

- GTMU-OMU** design type 1
- GTMU-OMU** design type 2
- GTMU-OMU** design type 3 or design type 4. (available sensors: Pt100 (4-wire), Pt1000 (4-wire), NiCr-Ni)
- GTU-2R-OMU** designer housing for ambient (available sensors: Pt100 (4-wire), Pt1000 (4-wire))



Note: the housing also maybe mounted directly to a concealed distribution box.

## Temperature-measuring transmitter in snap-on housing



### GTP-SG

Temperature-measuring transmitter in snap-on housing

#### General:

Design-type: PC board completely ready for operation (sensor not included) with any measuring range and any output. 3-pin connection terminal for Pt100 in 2 or 3-wire technology. Connection terminal for output in 2-, 3-, or 4-wire technology - depending on type desired.

#### Specification:

<b>Sensor element:</b>	for Pt 100 acc. to DIN IEC 751. Suitable sensors available (prepared or unprepared) from stock - please refer to pages 135-136.
<b>Sensor connection:</b>	2- or 3-wire connection. Automatic line resistance compensation for 3-wire connection.
<b>Measuring ranges: from -200 ... +800 °C</b>	
<b>Standard ranges:</b>	GTP 0100: 0 ... 100 °C GTP 0200: 0 ... 200 °C GTP 5050: -50 ... +50 °C GTP 5015: -50 ... +150 °C OPTION: any measuring range available against upcharge
<b>Output signal:</b>	4 - 20 mA (2-wire), optionally 0 - 1 V, 0 - 2 V, 0 - 5 V, 0 - 10 V (3- or 4-wire)
<b>Auxiliary energy:</b>	U <sub>v</sub> = 12 ... 30 V DC (at 0-10 V: U <sub>v</sub> = 18 ... 30 V DC)
<b>Reverse voltage protection:</b>	50 V permanent
<b>Permissible impedance (at 4-20 mA):</b>	$R_A [\Omega] \leq (U_v [V] - 12 V) / 0,02 A$
<b>Permissible load (at 0-__ Volt):</b>	$R_L > 3000 \Omega$
<b>Operating temperature electronics:</b>	0 ... +70 °C
<b>Accuracy electronics:</b>	±0,2 % FS
<b>Temperature coefficient:</b>	0,01 % / °C
<b>Storage temperature:</b>	-20 ... +70 °C
<b>Relative atmospheric humidity:</b>	0 ... 80 % RH (non-condensing) Option: encapsulated PC board
<b>Type option:</b>	for top-hat rail (panel mounting), Width of housing (pitch) 22.5 mm
<b>Mounting:</b>	4 holes, 3,5 mm Ø each
<b>Mounting distance:</b>	43,5 x 58 mm (W x H)
<b>Miscellaneous:</b>	potentiometer for zero point and scale
<b>Electric connection:</b>	screw-type terminals with wire protection and drill holes for testing pin, wire Ø max. 1,5 mm <sup>2</sup> . option: screw-type/plug-in terminal

#### Option:

- **AV010:**  
option: output signal 0-10 V
- **AV...:**  
option: other output signal (please state desired voltage)
- **MB:**  
option: arbitrary measuring range (please state desired measuring range)  
*No upcharge for option -AV..., -MB if more than 10 pieces are ordered.*
- **LACK:**  
option: encapsulated PC board (for outdoor application, i.e. applications where condensation is possible)  
PC board for measuring transducer mounted in water-proof surface-type housing (IP65) p.r.t. type GTMU design-type 5 (page 103)

#### Order codes (examples):

**GTP0100 / LACK:**  
PCB, 4-20 mA = 0 ... 100 °C, encapsulated PC board  
**GTP-SG / AV010, MB: -50...+200 °C:**  
snap-on housing, 0-10 V = -50 ... +200 °C

## Temperature-measuring transmitter in snap-on housing



### GNTP-SG

Temperature-measuring transmitter in snap-on housing

#### General:

Design-type: PC board completely ready for operation (sensor not included) with any measuring range and any output. 2-pin connection terminal for NiCr-Ni-sensor or compensation line. Optionally available: PC board with DIN type flat-pin jack free from thermo voltage for direct plug-in of temperature sensors with DIN type flat-pin plug. Connection terminals for output 2- to 4-pin (depending on output in 2-, 3- or 4-wire technology).

#### Specification:

<b>Sensor element:</b>	for NiCr-Ni (type K) acc. to DIN IEC 584, suitable sensor can be supplied custom-designed according to your specifications or in standard design from stock (p.r.t. pages 128-132)
<b>Measuring range: from -200 till +1200 °C</b>	
<b>Standard ranges:</b>	GNTP 0100: 0 ... 100 °C GNTP 0600: 0 ... 600 °C GNTP 01200: 0 ... 1200 °C GNTP 5015: -50 ... +150 °C GNTP 2030: -200 ... +300 °C OPTION: any measuring range available against upcharge
<b>Output signal:</b>	4 - 20 mA (2-wire), optionally available 0 - 1 V, 0 - 2 V, 0 - 5 V, 0 - 10 V (3- or 4-wire)
<b>Auxiliary energy:</b>	U <sub>v</sub> = 12 ... 30 V DC (at 0-5 V, 0-10 V: U <sub>v</sub> = 18 ... 30 V DC)
<b>Reverse voltage protection:</b>	50 V permanently
<b>Permissible impedance (at 4-20 mA):</b>	$R_A [\Omega] \leq (U_v [V] - 12V) / 0,02 A$
<b>Permissible load (at 0-__ Volt):</b>	$R_L > 10 k\Omega$
<b>Operating temperature electronics:</b>	0 ... +70 °C
<b>Accuracy electronics:</b>	±0,2 % FS ±0,5 °C
<b>Temperature coefficient:</b>	0,05 % / °C
<b>Storage temperature:</b>	-20 ... +70 °C
<b>Relative atmospheric humidity:</b>	0 ... 80 % RH (non-condensing) Option: encapsulated PC board
<b>Type option:</b>	for top-hat rail (panel mounting), Width of housing (pitch) 22.5 mm
<b>Mounting:</b>	4 holes, 3,5 mm Ø each
<b>Mounting distance:</b>	43,5 x 58 mm (W x H)
<b>Miscellaneous:</b>	potentiometer for zero point and scale
<b>Electric connection:</b>	screw-type terminals with wire protection and drill holes for testing pin, wire Ø max. 1,5 mm <sup>2</sup> . option: screw-type/plug-in terminal

#### Option:

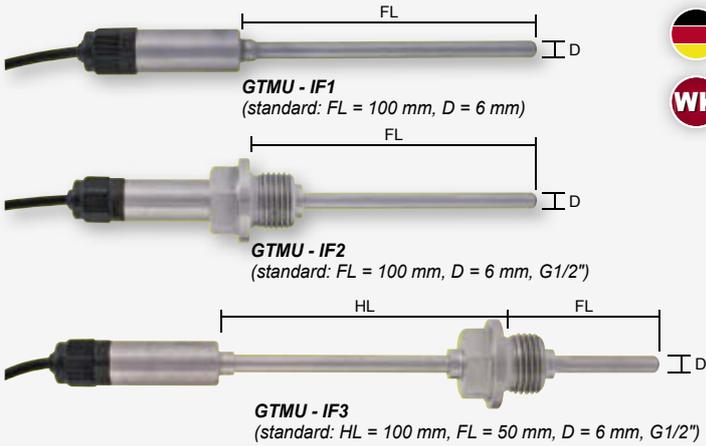
- **AV010:**  
option: output signal 0-10 V
- **AV...:**  
option: other output signal (please state desired voltage)
- **MB:**  
option: arbitrary measuring range (please state desired measuring range)  
*No upcharge for option -AV..., -MB if more than 10 pieces are ordered*
- **LACK:**  
option: encapsulated PC board  
(for outdoor application, i.e. applications where condensation is possible)  
PC board for measuring transducer mounted in water-proof surface-type housing (IP65) p.r.t. type GTMU design-type 5 (page 103)

#### Order codes (examples):

**GNTP-SG / MB...: 0 ... 300 °C, LACK:**  
PCB, 4-20 mA = 0 ... 300 °C, encapsulated PCB board  
**GNTP5015-SG / AV: 0-1V: snap-on housing, 0-1 V = -50 ... +150 °C**

Temperature transmitter with digital adjustment

Analog Pt100-transmitter with digital adjustment



**GTMU - IF1**

Temperature transmitter with digital adjustment

**GTMU - IF2**

Temperature transmitter with digital adjustment

**GTMU - IF3**

Temperature transmitter with digital adjustment

Specification:	
<b>Measuring range:</b>	The probe length FL has to be chosen long enough, that the allowable temperature range of the electronics situated in the tube sleeve is not exceeded.
<b>GTMU - IF1 (standard):</b>	-30.0 ... +100.0 °C
<b>GTMU - IF2 (standard):</b>	-30.0 ... +100.0 °C
<b>GTMU - IF3 (standard):</b>	-70.0 ... +400.0 °C
	other measuring ranges (max. -200 ... +500 °C) upon request
<b>Measuring probe:</b>	internal Pt1000-sensor
<b>Accuracy: (at nominal temperature = 25 °C)</b>	
<b>Electronic:</b>	±0.2 % of measuring value ±0.2 °C
<b>Measuring probe:</b>	standard: DIN class B optionally higher sensor accuracy available
<b>Output signal:</b>	4 ... 20 mA (2-wire)
<b>Auxiliary energy:</b>	U <sub>v</sub> = 10 ... 30 V DC
<b>Permissible burden:</b>	R <sub>A</sub> ≤ (U <sub>v</sub> - 10 V) / 0,022 A [R <sub>A</sub> in Ohm, U <sub>v</sub> in V]
<b>Scaling:</b>	the transducer can be scaled freely within the measuring ranges via GTMU-IF programming tool.
<b>Operating temperature of electronic (in tube sleeve):</b>	-25 ... 60 °C
<b>Housing:</b>	stainless steel housing
<b>Dimensions:</b>	depending on sensor construction
<b>tube sleeve:</b>	Ø 15 x 35 mm (without screwing)
<b>tube length FL:</b>	100 or 50 mm or on customer requirement
<b>tube diameter D:</b>	Ø 6 mm or on customer requirement (available Ø: 4, 5, 6 and 8 mm)
<b>collar tube length HL:</b>	100 mm or on customer requirement
<b>thread:</b>	G1/2" or on customer requirement (available threads M8x1, M10x1, M14x1,5, G1/8", G1/4", G3/8", G1/2", G3/4")
<b>Electric connection:</b>	approx. 1 m long 4-pin cable (2 x current loop, 2 x interface)

- Option:**
- **FL=...:** longer tube
  - **HL=...:** longer collar tube
  - **D=...:** other tube diameter
  - **G=...:** other thread
  - **MB=...:** other measuring ranges, set by factory
  - **M12:** electric connection: M12 plug



**Accessories and spare parts:**  
**GTMU-IF - Programming tool**  
 USB-interface adaptor for GTMU-IF, incl. configuration software



**T03 BU / WE \*1**

(transmitter 0-10 V, set by our works)

\*1 = please specify design-type desired on your order.  
 e.g. T03BU, Pt100 3-wire, 0 ... 10 V = 0 - 250 °C

**General:**  
 These transmitter are designed for industrial applications and are used to measure the temperature through Pt100 resistance thermometers in 2-/3-wire circuits connections.  
 The 0 ... 10 V output signal is linear with temperature.  
 The advantages of a continuous analog signal path and those of digital adjustment have been combined in the realization of this transmitter series.

Specification:	
<b>Measurement input:</b>	Pt100 (DIN EN60751)
<b>Range limits:</b>	-200 ... +850 °C, with digital adjustment
<b>Measuring span:</b>	40 ... 1050 K
<b>Zero shift:</b>	at span < 75 K: -40, -20, 0, 20 or 40 °C at span = 75 K: ± 50 °C at span > 75 K: ± (span * 0.2 + 35 °C)
<b>Sensor connection:</b>	2- or 3-wire connection
<b>Measuring current:</b>	< 0.5 mA
<b>Max. perm. line resistance (3-wire):</b>	11 Ohm per conductor
<b>Sampling time:</b>	continuous because of analog signal path
<b>Output signal:</b>	0 ... 10 Volt, 3-wire technology
<b>Setting time on a temperature change:</b>	≤ 10 ms
<b>Transfer characteristic:</b>	linear with temperature
<b>Transfer accuracy:</b>	±0.2 % FS
<b>Calibration accuracy:</b>	±0.2 °C or ±0.2 % of measuring span
<b>Supply voltage: U<sub>b</sub></b>	15 ... 30 V DC
<b>Supply voltage error:</b>	±0.01 % FS / V
<b>Permissible load R<sub>L</sub>:</b>	R <sub>L</sub> ≥ 10 kOhm
<b>Load error:</b>	±0.1 % FS
<b>Operating temperature:</b>	-40 ... +85 °C
<b>Relative humidity:</b>	0 ... 95 % RH (non condensing)
<b>Storage temperature:</b>	-40 ... +100 °C
<b>Electromagnetic compatibility (EMC):</b>	conforming to CE acc. to DIN EN 61326
<b>Electric connection:</b>	via terminals, cross section of connection terminals max. 1.75 mm <sup>2</sup>
<b>Housing:</b>	PC-housing, suitable for installation in connection head acc. to DIN 43729 form B.
<b>Operating position:</b>	unrestricted
<b>Dimensions:</b>	Ø 44 mm x 21 mm
<b>IP-rating:</b>	housing: IP54, connection terminals: IP00
<b>Weight:</b>	approx. 45 g

**Accessories and spare parts:**  
**Rail adapter**  
 (rail adapter for snap-on to top-hat rail)  
**Programming tool for T03BU**  
 The programming tool consists of: configurations software, connection cable USB



RT420 with rail adapter

**FOR HEAD AND RAIL CASE MOUNTING**  
**PANEL-MOUNTED-RESISTANCE THERMOMETER**  
**WITH MEASURING TRANSDUCER RT420**

- low-price and robust (complete sealed - no pots, therefore vibration resistant and long time stable)
- freely programmable - extreme wide measuring range of -200 ... 850 °C (measuring span already from  $\geq 25$  °C)
- selectable probe connection as 2- / 3- or 4-wire
- high accuracy (0.1%)
- large ambient temperature range (-40 ... +85 °C)
- error message in case of sensor damage or sensor short-circuit
- functional warranty 5 years

## RT420 / WE \*1

head transmitter, set by our works

## Schienenadapter

for snap-on the RT420 to top-hat rail

## RT420 - SG / WE \*1

set by our works and mounted in snap-on rail housing

\*1 = Ordering data required:

1. required probe connection (2- / 3- or 4-wire)
2. measuring range from / to (max. range: -200 ... +850 °C)

Order example: RT420 / WE, 4-wire, 0 ... 50 °C

RT420-SG / WE, 3-wire, -50 ... +150 °C

Specification:	
Measuring range:	-200 ... +850 °C, universally programmable
Measuring span:	25 ... 1050 K
Zero shift:	-200 ... +825 °C
Resolution:	14 bit
Sensor connection:	2-, 3- or 4-wire connection
Measuring current:	< 0.3 mA
Permitted resistance of connection cable:	max. 20 Ohm / wire
Compensation for cable error:	$\pm 0.02$ K / Ohm (at 3-wire)
Sensor monitoring:	monitoring for sensor damage and short-circuit
Measuring cycle:	< 700 ms
Linearisation:	linear to temperature acc. to IEC/DIN/EN 60 751-2
Accuracy:	$\pm 0.25$ °C or $\pm 0.1$ % of measuring span
Temperature effect:	< $\pm 0.01$ % / 1 K
Analog output:	4 ... 20 mA, 2-wire technology
Accuracy output:	< 0.1 % of signal span
Auxiliary energy: $U_B$ :	8 ... 35 V DC (max. ripple factor: 3 Vss @ 50/60 Hz)
Permitted burden $R_A$ :	$R_A \leq (U_B - 8 V) / 0,023 A$ [ $R_A$ in Ohm, $U_B$ in V]
Effect of auxiliary energy:	$\pm 0.01$ % / V
Power-on time:	10 s
Damping:	adjustable from 0 ... 30 s
Output limits:	programmable, 3.5 mA, 23 mA
Signal for sensor damage:	programmable, 3.5 mA or 23 mA
Operating temperature:	-40 ... +85 °C
Relative humidity:	0 ... 98 % RH (non condensing)
Storage temperature:	-55 ... +90 °C
Electromagnetic compatibility (EMC):	conforming to $\text{CE}$ acc. to DIN EN 61326
Housing:	housing suitable for head mounting
Dimensions:	$\varnothing 44$ mm x 19 mm
IP rating:	Housing: IP40, connection terminals: IP10
Electric connection:	via screw-type terminals
Weight:	approx. 35 g

## Accessories and spare parts:

### Programming tool for RT420

The configuration set contains: configuration software, connection cable USB, battery plug, connection cable and operating manual  
 For easy storage management at customers site  
 (customer programmability - all ranges and wiring options can be fully utilised)

## GTF103 / RT420

Panel-mounted resistance thermometer (p.r.t. page 136)  
 Pt100 cpl. with measuring transducer RT420

### General:

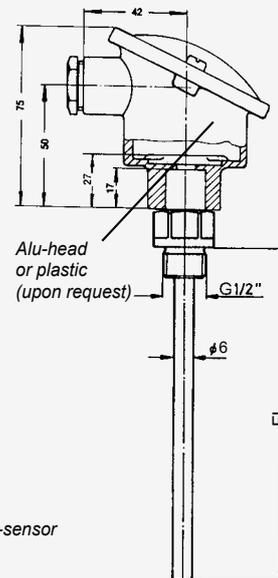
Transducer and Pt100 can be taken out in form of an insert. (Price valid for standard length 100 mm and temperature range as to customers specification between -50 ... +400 °C)  
 Special designs upon request - please contact us!



GTF103/RT420



RT420-insert with Pt100-sensor of a GTF103/RT420



Alu-head or plastic (upon request)  
 G1/2"  
 $\varnothing 6$

Programmable, electrically isolated, 4-20 mA universal transmitter GITT01



UNIVERSALLY PROGRAMMABLE FOR  
RESISTANCE THERMOMETERS / THERMOCOUPLES  
RESISTANCE SENSOR / VOLTAGE SENSOR

- electrically isolated
- output linear to temperatur
- high accuracy for the entire ambient temperature range (-40 ... 85 °C)
- available with  $\text{Ex}$  - protection
- error messages in case of sensor damage or short-circuit, settings acc. to NAMUR NE43
- configuration can be carried out during measuring

GITT01 \*1

GITT01 - Ex \*1

(Ex-protection: ATEX II 1G Ex ia IIC T6/T5/T4)

\*1 = Transmitter can either be programmed by customer or by our works - please specify type upon order. (e.g. GITT01, NiCr-Ni (type K), 4 ... 20 mA = 0 - 300 °C)

Specification:			
Input signal: can be universally programmed to			
- Resistance thermometer:	max. meas. range	min. meas. span	
Pt100	acc. to IEC 751 -200 ... +850 °C	10 K	
Pt500	acc. to IEC 751 -200 ... +250 °C	10 K	
Pt1000	acc. to IEC 751 -200 ... +250 °C	10 K	
Ni100	acc. to DIN 43760 -60 ... +250 °C	10 K	
Ni500	acc. to DIN 43760 -60 ... +150 °C	10 K	
Ni1000	acc. to DIN 43760 -60 ... +150 °C	10 K	
- Thermocouples:	max. meas. range	min. meas. span	
Type B	PtRh30-PtRh6 0 ... +1820 °C	500 K	
Type C	W5Re-W26Re (ASTME 988) 0 ... +2320 °C	500 K	
Type D	W3Re-W25Re (ASTME 988) 0 ... +2495 °C	500 K	
Type E	NiCr-CuNi -270 ... +1000 °C	50 K	
Type J	Fe-CuNi (acc. to IEC 584) -210 ... +1200 °C	50 K	
Type K	NiCr-Ni -270 ... +1372 °C	50 K	
Type L	Fe-CuNi (acc. to DIN 43710) -200 ... + 900 °C	50 K	
Type N	NiCrSi-NiSi -270 ... +1300 °C	50 K	
Type R	Pt13Rh-Pt -50 ... +1768 °C	500 K	
Type S	Pt10Rh-Pt -50 ... +1768 °C	500 K	
Type T	Cu-CuNi (acc. to IEC 584) -270 ... + 400 °C	50 K	
Type U	Cu-CuNi (acc. to DIN 43710) -200 ... + 600 °C	50 K	
	MoRe5-MoRe41 0 ... +2000 °C	500 K	
- Resistance-type sensor:	max. meas. range	min. meas. span	
Resistance	10 ... 400 Ohm	10 Ohm	
Resistance	10 ... 2000 Ohm	10 Ohm	
- Voltage sensor:	max. meas. range	min. meas. span	
Voltage	-10 ... 100 mV	5 mV	

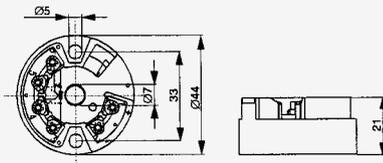
Resistance thermometer:	
Sensor connection:	2-, 3- or 4-wire connection
Meas. current:	< 0,6 mA
Max. perm. line resistance:	11 Ohm / line
Accuracy:	
Pt100, Ni100:	±0.2 °C or ±0.08 % of measuring span
Pt500, Ni500:	±0.4 °C or ±0.16 % of measuring span
Pt1000, Ni1000:	±0.2 °C or ±0.08 % of measuring span
Temperature effect:	Td = ± (15ppm/K * max. meas. range + 50ppm/K * meas. span)

Thermocouples:	
Sensor connection:	2-wire connection
Sensor current:	< 350 nA
Accuracy (typ.):	±0.5 K (types: K, J, E, L, U), ±1,0 K (types: N, C, D), ±2.0 K (types: S, B, R, MoRe5-MoRe41)
CJC:	Pt100 internal or external (0 ... 80 °C)
CJC accuracy:	±1 °C
Temperature effect:	Td = ± (50ppm/K * max. meas. range + 50ppm/K * meas. span)
Output signal:	4 ... 20 mA or 20 ... 4 mA, 2-wire technology
Linearisation:	temperature linear, resistance linear or voltage linear
Auxiliary energy: U <sub>B</sub>	8 ... 30 V DC (max. ripple factor: 5 Vss for Ub>13 V)
Electr. isolation (E/O):	Ueff = 2 KV AC
Permitted load R <sub>A</sub> :	R <sub>A</sub> ≤ (U <sub>B</sub> - 8 V) / 0.022 A [R <sub>A</sub> in Ohm, U <sub>B</sub> in V]
Supply effects:	≤ ±0.01 % / V deviation from 24 V
Load effect:	≤ ±0.02 % / 100 Ohm
Digital filter:	0 ... 60 s, configurable
Switch-on delay:	approx. 4 s
Response time:	1 s
Output limits:	3.8 ... 20.5 mA
Signal in case of sensor damage:	3.6 mA or ≥21.0 mA, configurable
EMC:	Interference immunity and emission acc. to EN 61326-1 and NAMUR NE21
Operating temperature:	-40 ... +85 °C
Climate class:	acc. to EN 60654-1, class C; condensation permissible
Vibration strength:	4 g / 2 ... 150 Hz acc. to IEC 60 068-2-6
Electric connection:	via terminals, cross section of connection terminals max. 1.75 mm <sup>2</sup>
Housing:	PC-housing, suitable for installation in connection head acc. to DIN 43729 form B.
Dimensions:	Ø 44 mm x 21 mm
IP-rating:	housing: IP54, connection terminals: IP00
Weight:	approx. 40 g
Ex-approved:	ATEX II 1G Ex ia IIC T6/T5/T4
Power supply set:	Ui ≤ 30 V DC, Ii ≤ 100 mA, Pi ≤ 750 mW Ci, Li = negligibly small
Measuring circuit:	Uo ≤ 8.2 V DC, Io ≤ 4.6 mA, Po ≤ 9.35 mW
Max. connection values:	Lo = 4.5 mH (ia IIC), 8.5 mA (ia IIB) Co = 974 nF (ia IIC), 1900 nF (ia IIB)

**Accessories and spare parts:**

**Rail adapter**  
(rail adapter for snap-on to top-hat rail)

**Programming tool for GITT01**  
The programming tool consists of configurations software, connection cable USB



Handheld instrument  
Display / Controller  
Logger / EASYBus  
Transmitter  
Temperature probe  
Alarm / Protection

## Temperature transmitter (electrically isolated)



### MU 500-51-...

Temperature transmitter (Pt100)

### MU 500-53-...

Temperature transmitter (Pt1000)

### MU 500-Ex-51-...

Temperature transmitter (Pt100)

### MU 500-Ex-53-...

Temperature transmitter (Pt1000)

#### General:

- Electrically isolated: between input / output / supply voltage
- 2 power-supply-designs with wide range of allowed supply voltage: 10 ... 30 V DC / 10 ... 42 V AC or 85 ... 265 V AC / 110 ... 125 V DC
- 22.5 mm standard case for rail mounting TS35
- Several measuring ranges, selectable via rotary switch at front panel (13 for Pt100, 16 for Pt1000)
- Offset and span adjustable

#### For Ex-designs:

Input intrinsically safe ATEX II (1) G [Ex ia] IIC, II (1) D [Ex iaD]  
Burden: max. 1000 Ω



#### Specification:

<b>Measuring ranges:</b>	selectable via rotary switch
<b>Pt100:</b>	-50 ... 0, -50 ... 50, -30 ... 20, -30 ... 70, -20 ... 30, -20 ... 80, 0 ... 50, 0 ... 100, 0 ... 150, 0 ... 200, 0 ... 300, 0 ... 450, 0 ... 600 °C
<b>Pt1000:</b>	-50 ... 0, -50 ... 50, -30 ... -20, -30 ... -10, -20 ... -10, -20 ... 0, -10 ... 0, -10 ... 10, 0 ... 10, 0 ... 20, 0 ... 30, 0 ... 40, 0 ... 50, 0 ... 100, 0 ... 150, 0 ... 200 °C
<b>Offset adjust:</b>	offset: approx. ±8 Ω (± 20 °C for Pt100, ± 2 °C for Pt1000) span: approx. ±20 %
<b>Sensor connection:</b>	2- or 3-wire connection
<b>Sensor current:</b>	approx. 1 mA (Pt100), approx. 0.25 mA (Pt1000)
<b>Output signal:</b>	0 - 20 mA, 4 - 20 mA, 0 - 10 V or 2 - 10 V (selectable via DIP switch)
<b>max. load:</b>	burden ≤ 1 kΩ (at mA), load: max. 15 mA (at V)
<b>Basic accuracy:</b>	≤ 0.2 % of measuring range
<b>Temperature coefficient:</b>	≤ 0.01 %/K
<b>Output accuracy:</b>	≤ 0.1 % of measuring range
<b>Power supply:</b>	... - 0 - 00 85 ... 265 V AC / 110 ... 125 V DC ... - 5 - 00 10 ... 42 V DC / 10 ... 30 V AC
<b>Power consumption:</b>	max. 2.2 W / 3.3 VA
<b>Isolation voltage:</b>	500 V AC, according to VDE 0110 Gr. 2 between input/output/supply voltage
<b>Test voltage:</b>	4 kV DC between input/output/supply voltage
<b>Working temperature:</b>	-10 ... 60 °C
<b>Electrical connection:</b>	screw-terminals with pressure plates, max. 2.5 mm <sup>2</sup>
<b>Dimensions:</b>	22.5 x 75 x 110 mm (W x D x H)
<b>Protection:</b>	IP 30 (case), IP 20 (terminals)
<b>Ex-certification:</b>	TÜV 03 ATEX 2283, II (1) G [Ex ia] IIC, II (1) D [Ex iaD]
<b>Connection data:</b>	
<b>MU 500-ex-ia-51-...</b>	U <sub>0</sub> = 1.3 V, I <sub>0</sub> = <3 mA, P <sub>0</sub> = <3 mW, C <sub>0</sub> = 29 μF, L <sub>0</sub> = 100 mA, C <sub>i</sub> = 5 nF, L <sub>i</sub> = 0 mH
<b>MU 500-ex-ia-53-...</b>	U <sub>0</sub> = 4.9 V, I <sub>0</sub> = <3 mA, P <sub>0</sub> = <3 mW, C <sub>0</sub> = 2.2 μF, L <sub>0</sub> = 100 mA, C <sub>i</sub> = 5 nF, L <sub>i</sub> = 0 mH

#### Ordering example:

**MU 500-53-5-00:**

input = Pt1000, power supply: 10 ... 42 V DC / 10 ... 30 V AC

## Isolating signal converter



### ST 500-Ex-10-0-00

Isolating signal converter (230 V AC)

### ST 500-Ex-10-5-00

Isolating signal converter (10 ... 30 V DC/AC)

#### General:

Isolating signal converter for application in zone 0 or zone 20 (constant explosion risk) with integrated transmitter supply. It allows the direct connection of active 2-wire sensors (4 ... 20 mA) and 3-wire sensors in the Ex-area.

- Input intrinsically safe ATEX II (1) G [Ex ia] IIC, II (1) D [Ex iaD]
- 2 power-supply-designs with wide range of allowed supply voltage: 10 ... 30 V DC / AC or 85 ... 253 V AC
- Electrically isolated: between input / output / supply voltage
- 22.5 mm standard case for rail mounting TS35
- Universal inputs/outputs for (0)4 ... 20 mA and (0)2 ... 10 V

#### Specification:

<b>Measuring ranges:</b>	selectable
<b>Current input:</b>	0 ... 20 mA or 4 ... 20 mA (R <sub>i</sub> = 25 Ω, max. 100 mA overload)
<b>Voltage input:</b>	0 ... 10 V or 2 ... 10 V (R <sub>i</sub> = ~ 40 kΩ, max. 100 V overload)
<b>Offset adjust:</b>	approx. ±20 %, adjustable
<b>Transmitter supply:</b>	approx. 20 V DC, R <sub>i</sub> = approx. 300 Ω
<b>Output signal:</b>	0 - 20 mA, 4 - 20 mA, 0 - 10 V or 2 - 10 V (selectable via DIP switch)
<b>max. load:</b>	burden ≤ 1 kΩ (at mA), load: max. 15 mA (at V)
<b>Basic accuracy:</b>	≤ 0.3 % of measuring range
<b>Temperature coefficient:</b>	≤ 0.01 %/K
<b>Repeat accuracy:</b>	≤ 0.1 % of measuring range
<b>Rise time:</b>	T <sub>90</sub> = < 100 ms
<b>Power supply:</b>	... - 0 - 00 85 ... 253 V AC ... - 5 - 00 10 ... 30 V DC / AC
<b>Power consumption:</b>	max. 3.5 VA
<b>Isolation voltage:</b>	500 V AC, according to VDE 0110 Gr. 2 between input/output/supply voltage
<b>Test voltage:</b>	4 kV DC between input/output/supply voltage
<b>Working temperature:</b>	-10 ... 55 °C
<b>Electrical connection:</b>	screw-terminals with pressure plates, max. 2.5 mm <sup>2</sup>
<b>Dimensions:</b>	22.5 x 75 x 110 mm (W x D x H)
<b>Protection:</b>	IP 30 (case), IP 20 (terminals)
<b>Ex-certification:</b>	TÜV 97 ATEX 1150, II (1) G [Ex ia] IIC, II (1) D [Ex iaD]
<b>Connection data:</b>	U <sub>0</sub> = 25.2 V, I <sub>0</sub> = 95 mA, P <sub>0</sub> = 600 mW, C <sub>0</sub> / L <sub>0</sub> (ia/IIC) = 47 nF / 2 mH or 107 nF / 0.2 mH, C <sub>0</sub> / L <sub>0</sub> (ia/IIB) = 370 nF / 15 mH or 430 nF / 1 mH, C <sub>i</sub> , L <sub>i</sub> = negligible

The intrinsically safe circuit is electrically isolated from the non-intrinsically safe circuits up to a sum of the peak values of the nominal voltage of 375 V.

## Infrared - measuring transducer



**NON-CONTACT TEMPERATURE**

**MEASURING FROM -50 TO 975 °C**

### IR-CT 20

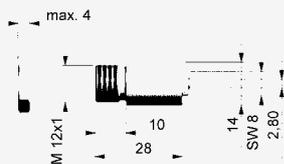
-50 ... +975 °C, optic 22:1  
Precision infrared transducer

<b>Application:</b>	
Glass, paper, plastic industries, automotive industry, metal industry, quality assurance / maintenance	
<b>Specification:</b>	
<b>Measuring range:</b>	-50 ... +975 °C freely scaleable via programming keys
<b>Spectral sensitivity:</b>	8 - 14 μm
<b>Optic resolution:</b>	22:1 (precision glass optics)
<b>System accuracy:</b>	± 1% or ±1 °C (higher value applicable)
<b>Repeat accuracy:</b>	±0.5 % or ±0.5 °C (higher value applicable)
<b>Nominal temperature:</b>	23 ± 5 °C
<b>Temperature coefficient:</b>	0.05 % or 0.05 °C/K (higher value applicable)
<b>Temperature resolution:</b>	0.1 °C
<b>Response time:</b>	150 ms (95%)
<b>Emission-, trans- mission factor:</b>	adjustable from 0.100 ... 1.100
<b>Output signals:</b>	0-20 mA, 4-20 mA, 0-5 V, 0-10 V thermocouple type J or K
<b>Output impedance:</b>	
<b>mA</b>	max. 500 Ohm (at 8-36VDC)
<b>V</b>	min. 100 kOhm load resistance
<b>Thermo couple:</b>	20 Ohm
<b>Supply voltage:</b>	8-36 VDC
<b>Power consumption:</b>	max. 100 mA
<b>Cable length:</b>	1 m (standard), 3 m, 15 m
<b>IP rating:</b>	IP65 (NEMA-4)

<b>Ambient temperature:</b>	
<b>Measuring head:</b>	-20 ... +180 °C
<b>Electronic box:</b>	0 ... +65 °C
<b>Storage temperature:</b>	
<b>Measuring head:</b>	-40 ... +180 °C
<b>Electronic box:</b>	-40 ... +85 °C
<b>Relative humidity:</b> 10 - 95 % RH, non condensing	
<b>Vibration (meas. head):</b>	
<b>IEC 68-2-6:</b>	3G, 11-200 Hz, each axis
<b>Shock (meas. head):</b>	
<b>IEC 68-2-27:</b>	50G, 11 ms, each axis
<b>Weight (meas. head / elec. box):</b>	40 g / 420 g
<b>Dimensions electronic box:</b>	120 x 70 x 30 mm
<b>Scope of supply:</b> electronics-box with LCD, stainless steel sensor head (M12) incl. screw nut, 1 m high temperature sensor head cable, manual	

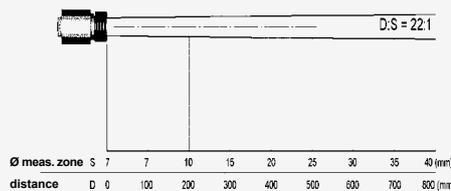
- small infrared sensor heads with 22:1 optical resolution
- rugged and applicable without cooling up to 180 °C ambient
- adjustable emission factor
- freely scaleable analogue output
- illuminated liquid crystal display

<b>Option:</b>	
<b>- CB3</b>	3 m sensor head cable
<b>- CB15</b>	15 m sensor head cable
<b>- CF</b>	auxiliary lens for measuring of smallest objects measuring zone dia 0,6 mm @10 mm, in long distance 1.5:1
<b>Accessories and spare parts:</b>	
<b>MW</b>	mounting bracket, fixed
<b>MB</b>	mounting bolts with M12x1 thread
<b>MG</b>	mounting fork, adjustable in 2 axis with M12x1 mount
<b>FVS</b>	standard blow clear header
<b>FVL</b>	laminar blow clear header
<b>WPS</b>	calibration certificate 23 °C, 110 °C, 510 °C

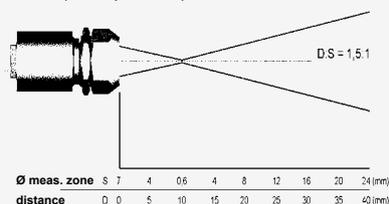


Further special design types (e.g. for metal processing, or with other optics) up on request

Optic resolution (standard)



Optic resolution (with option CF)



## Temperature Switch

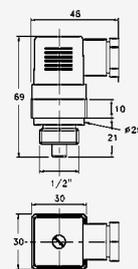


### TF1 ...

Temperature Switch

<b>General:</b>	
A totally sealed bimetal thermostat opens or closes when the pre-fixed switch value is overrated or undercut. Sensor has to be fully wetted. Switch value is indicated for increasing temperature 2 K/min. TF1 thermostats just monitor the temperature. A regulation is due to the huge hysteresis not possible.	
<ul style="list-style-type: none"> <li>• optional installation</li> <li>• compact dimensions</li> <li>• n.o. or n.c. position</li> <li>• metering substances: water, gas/air, oil</li> </ul>	

<b>Specification:</b>															
<b>Switch value: (declared when placing order)</b>															
<b>40 °C</b>	Order Nr: TF1 40														
<b>50 °C</b>	Order Nr: TF1 50														
<b>60 °C</b>	Order Nr: TF1 60														
<b>70 °C</b>	Order Nr: TF1 70														
<b>80 °C</b>	Order Nr: TF1 80														
<b>90 °C</b>	Order Nr: TF1 90														
<b>100 °C</b>	Order Nr: TF1 100														
<b>110 °C</b>	Order Nr: TF1 110														
<b>120 °C</b>	Order Nr: TF1 120														
<b>130 °C</b>	Order Nr: TF1 130														
<b>Hysteresis:</b>	10 ... 20 K														
<b>Accuracy:</b>	±10 K														
<b>Media Temperature:</b>	<table border="1"> <tr> <th>Switch</th> <th>Media Temperature:</th> </tr> <tr> <td>40 °C</td> <td>-20 ... +90 °C</td> </tr> <tr> <td>50 °C</td> <td>-20 ... +100 °C</td> </tr> <tr> <td>60 °C</td> <td>-20 ... +110 °C</td> </tr> <tr> <td>70 °C</td> <td>-20 ... +120 °C</td> </tr> <tr> <td>80 °C</td> <td>-20 ... +130 °C</td> </tr> <tr> <td>from 90 °C</td> <td>-20 ... +140 °C</td> </tr> </table>	Switch	Media Temperature:	40 °C	-20 ... +90 °C	50 °C	-20 ... +100 °C	60 °C	-20 ... +110 °C	70 °C	-20 ... +120 °C	80 °C	-20 ... +130 °C	from 90 °C	-20 ... +140 °C
Switch	Media Temperature:														
40 °C	-20 ... +90 °C														
50 °C	-20 ... +100 °C														
60 °C	-20 ... +110 °C														
70 °C	-20 ... +120 °C														
80 °C	-20 ... +130 °C														
from 90 °C	-20 ... +140 °C														
<b>Connection:</b>	G1/2A male thread socket brass														
<b>Pressure (PN):</b>	100 bar														
<b>Electric data:</b>	NO (NC upon request) 250 V AC, 10 A plug EN 175301-803/A														
<b>Weight:</b>	120 g														
<b>Protection class:</b>	IP65														



# humidity and humidity/temperature transducer GRHU ... MP and GHTU ... MP

## Design types



**Surface mounting**  
Tube Length: 50 mm  
Design type: ...-1R

**Duct mounting**  
Tube Length: 220 mm  
Design type: ...-1K

**Duct mounting**  
Tube Length: 220 mm  
Design type: ...-2K

**FLEXIBLE  
PLASTIC FILTER**



- on-site display for humidity and temperature
- output ranges freely scaleable
- adjustment by operator possible
- output signals for humidity and temperature are electrically isolated
- available output signals: 4-20 mA, 0-1 V or 0-10 V

## humidity transducer:

**GRHU - 1R - MP** (FL = 50 mm)

**GRHU - 1K - MP** (FL = 220 mm)

**GRHU - 2K - MP** (FL = 220 mm)

**GRHU - SHUT - MP**

**GRHU - KABEL - MP**

## humidity / temperature transducer:

**GHTU - 1R - MP** (FL = 50 mm)

**GHTU - 1K - MP** (FL = 220 mm)

**GHTU - 2K - MP** (FL = 220 mm)

**GHTU - SHUT - MP**

**GHTU - KABEL - MP**

## General:

The newest generation of humidity/temperature transducer offers even greater possibilities to compensate the special sensor characteristics due to the newest microprocessor technology. Regarding precision, temperature stability and functionality a new dimension is entered. The transducer can be used for almost all applications due to the different types (e.g. wall or channel mount, with separated probe or with heat absorption hat) and the wide temperature range (electronic: -25 °C ... +50 °C; sensor: -40 ... +120 °C).

## Option:

**- HO:**  
High-humidity sensor (for humidity measuring < 20 % RH and > 80 % RH)  
*Note: Upon ordering the range of application can be stated, for this the device will be optimised free of charge (e.g. 10-40 % or 60-90 %).*

**- UNI:**  
selectable humidity display unit

**- LACK:**  
Encapsulated PC board (for outdoor application, i.e. applications where condensation is possible)

**- FL300, FL400, FL500:**  
(Extra long sensor tube - 300, 400 or 500 mm - no interim lengths possible)

**- AV01:**  
output signal 0-1 V (note: please refer to connection)

**- AV01G:**  
output signal 0-1 V (note: please refer to connection)

**- AV10:**  
output signal 0-10 V (note: please refer to connection)

**- AV10G:**  
output signal 0-10 V (note: please refer to connection)

## Accessories and spare parts:

**Spare protection cap**  
with stainless steel gauze (105µm mesh size) - for standard and high humidity use

**Bronze filter**  
(not for use in high humidity)

## Order code (examples):

**GHTU-2K-MP / AV10, FL300:**

GHTU-2K-MP, 0-10V, FL = 300 mm

**GRHU-MP / KABEL, HO:**

GRHU-MP, with separated sensor tube and high humidity sensor

Specification:	
<b>Measuring ranges</b>	
<b>Humidity:</b>	0.0 ... 100.0 % RH (temperature compensated)
<b>Temperature:</b>	-40.0 ... 120.0 °C or -40.0 ... 248 °F
<b>Recommended humidity range:</b>	20.0 ... 80.0 % RH (standard) 5.0 ... 95.0 % RH (with option high humidity)
<b>Display options:</b>	with option UNI an alternative display unit can be shown instead of the humidity measuring value. The unit selection will be done via the interface or at the keyboard.
<b>Wet bulb temperature</b>	-27.0 ... 60.0 °C
<b>Dewpoint temperature</b>	-40.0 ... 60.0 °C
<b>Enthalpy</b>	-25.0 ... 999.9 kJ/kg
<b>Atmospheric humidity</b>	0.0 ... 640.0 g/kg
<b>Absolute humidity</b>	0.0 ... 200.0 g/m³
<b>Accuracy: (at 25 °C and in recommended range)</b>	
<b>Display:</b>	humidity: ±2.5 % RH temperature: ±0.4 % of measuring value ±0.2 °C
<b>Add. output signal:</b>	each ±0.2 % FS
<b>Temperature compensation:</b>	automatically
<b>Output signal:</b>	GRHU 1 x 4-20 mA (2-wire), freely scaleable GHTU 2 x 4-20 mA (2-wire), freely scaleable option: 0-1 V, 0-10 V (other output signals upon request)
<b>Connection:</b>	4 - 20 mA (2-wire), note for GHTU: output signals are electrically isolated from each other
<b>for option AV01, AV10:</b>	0 - 1 (10) Volt (3-wire), note for GHTU: output signals are electrically isolated from each other
<b>for option AV01G, AV10G:</b>	0 - 1 (10) Volt (3- or 4-wire), note for GHTU: output signals are electrically isolated from each other
<b>Auxiliary energy:</b>	12 ... 30 VDC or 18 ... 30VDC (for output: 0-10V)
<b>Reverse voltage protection:</b>	50 V, permanently
<b>Perm. impedance (at 4-20 mA):</b>	$R_A [\Omega] \leq (U_V [V] - 12V) / 0.02 A$
<b>Permissible load (at 0-1(10)V):</b>	$R_L [\Omega] > 3000 \Omega$
<b>Display:</b>	approx. 10 mm high, 4-digit LCD-display, alternating humidity and temperature display
<b>Working temperature:</b>	-25 ... 50 °C (electronics)
<b>Sensor head and tube:</b>	-40 ... 100 °C - for short time up to 120 °C
<b>Storage temperature:</b>	-25 ... 70 °C
<b>Relative humidity (electronic):</b>	0 ... 95 % RH (non-condensing) If there is a risk of condensation due to temperature changes, please use our encapsulated or lacquered types (optionally available).
<b>Housing:</b>	ABS (IP65)
<b>Sensor tube:</b>	tube 14 mm Ø, with screw-type protection cap
<b>Sensor length:</b>	50 mm (...1R) or 220 mm (...1K, ...2K) option: 300 mm, 400 mm, 500 mm
<b>Design type Kabel:</b>	with separated sensor tube, Sensor head (Ø14x 68 mm) connected to device via 1 m teflon cable. Inclusive option high-humidity sensor
<b>Design type Shut:</b>	heat absorption hat / weather protection shield <b>Application:</b> The heat absorption hat is especially designed for measurements in the open air. The measuring results that can be achieved will not be influenced by either sun or rain. <b>Design:</b> Heat absorption hat made of plastic, Ø 110 mm, approx. 140 mm high. Additionally equipped with a stainless steel base for wall mounting, with 3 fixing holes for screws with a max. shaft Ø of 5 mm. Large projection approx. 160 mm.
<b>Electric connection:</b>	elbow-type plug acc. to EN 175301-803/A (IP65)
<b>Mounting:</b>	4 housing holes for wall mounting or by means of plastic tube clamps for duct mounting
<b>Functions:</b>	min-/max-value memory, offset and slope adjustable, output signal scaleable



Pressure measuring transducer for absolute pressure or over/under pressure and pressure difference



**FREELY SCALABLE**

- change between 4-20 mA / 0-10 V
- with display
- switching output

**GMUD MP-S**

(pressure range > 25 mbar)

**GMUD MP-F**

(fine pressure range ≤ 25 mbar)

**General:**  
Microprocessor controlled, digital pressure transducer with display and operation via 3 buttons. With freely scalable analog output that can be switch between 4-20 mA and 0-10 V.

**Application:**  
Suitable for: air and non-aggressive gases  
**Area of application:**  
controlling, measuring and monitoring, climate and ventilation, environmental and medical technology

**Types of pressure:**  
**Absolute pressure** (vacuum used as reference) for measuring over pressure over absolute zero (sensor displaying barometric air pressure when coming into contact with atmospheric pressure).  
**Relative pressure** (reference atmosphere or ambient pressure) for over/under pressure measurements and pressure difference measurements (sensor displaying zero when coming into contact with atmospheric or ambient pressure).

Specification:			
<b>Sensor element:</b>	piezoresistive pressure sensor with integrated temperature		
<b>Relative fine pressure range:</b>	<b>Measuring range</b>	<b>Overload</b>	<b>Burst pressure</b>
MP-F-MR0	0.000 ... 1.000 mbar rel.	150 mbar	200 mbar
MP-F-MR1	0.00 ... 10.00 mbar rel.	150 mbar	200 mbar
MP-F-MR2	0.00 ... 20.00 mbar rel.	150 mbar	200 mbar
Optimized special ranges possible: see option - MBF (e.g. -15 ... +15 mbar)			
<b>Relative pressure range:</b>	<b>Measuring range</b>	<b>Overload</b>	<b>Burst pressure</b>
MP-S-MR0	0.0 ... 100.0 mbar rel.	1000 mbar	1500 mbar
MP-S-MR1	0.0 ... 500.0 mbar rel.	1000 mbar	1500 mbar
MP-S-MR2	0 ... 1000 mbar rel.	2000 mbar	3000 mbar
MP-S-MR3	0 ... 2000 mbar rel.	4000 mbar	6000 mbar
MP-S-MR4	0 ... 5000 mbar rel.	7000 mbar	7000 mbar
<b>Absolute pressure range:</b>	<b>Measuring range</b>	<b>Overload</b>	<b>Burst pressure</b>
MP-S-MA0	0 ... 1100 mbar abs.	2000 mbar	3000 mbar
MP-S-MA1	0 ... 2000 mbar abs.	4000 mbar	6000 mbar
Optimized special ranges possible: see option - MBS (e.g. -350 ... +350 mbar)			

<b>Typ. accuracy:</b>	<b>GMUD MP-S:</b> ±0,15 % FS (lin.), ±0,6 % FS (hysteresis and temperature 0 ... 70 °C) <b>GMUD MP-F:</b> ±0,35 % FS (lin.), ±0,6 % FS (hysteresis and temperature 0 ... 70 °C)
<b>Output signal:</b>	4 ... 20 mA / 0 ... 10 V (selectable in menu)
<b>Auxiliary energy:</b>	only needed if 0 ... 10 V output signal is selected (18 ... 30 V DC / 24 V AC)
<b>Permissible burden:</b>	(4 ... 20 mA): $R_A[\Omega] \leq (U_v[V] - 12[V]) / 0.02 A$
<b>Permissible load:</b>	(0 ... 10 V): $\geq 3000 \Omega$
<b>Operating temperature:</b>	-20 ... +70 °C
<b>Storage temperature:</b>	-40 ... +70 °C
<b>Display / operation:</b>	4-digit 7-segment display and 3 buttons
<b>Pressure connection:</b>	universal pressure connecting pieces for 6 x 1 mm or 8 x 1 mm plastic tubes (4 or 6 mm inner pipe diameter)
<b>Mounting position:</b>	any position (small influence of mounting position for low ranges)
<b>Housing:</b>	ABS (IP65): with fixing holes for wall mounting (accessible after cover has been removed)
<b>Electric connection:</b>	elbow-type plug acc. to EN 175301-803/A (IP65) max. wire cross section: 1.5 mm <sup>2</sup> , wire/cable Ø: 4.5 ... 7 mm
<b>ordering example:</b>	GMUD MP-S/MBS: -700 ... +700 mbar, OUT: ±700 mbar rel. with switching output GMUD MP-S-MR0/LACK, OUT: 0 ... 100 mbar rel. with lacquering and switching output

<b>Option:</b>
- <b>LACK:</b> card coated on both sides (for outdoor application)
- <b>OUT:</b> switching output (max 28 V, 40 mA), switches if meas. value falls below or exceeds limit value connection via 2nd elbow-type plug
- <b>WE:</b> default settings according to customer's specifications, includes: output signal, measuring range, default state in case of error (without upcharge if together with MBF / MBS)
- <b>MBF:</b> option any fine pressure range < 25 mbar, please state desired measuring range
- <b>MBS:</b> option any pressure range > 25 mbar ... 5000 mbar please state desired measuring range
Tube and accessories: see page 54 - 55.



## Water level / well probe Tank contents measuring probe



FOR SIMPLE AND INEXPENSIVE  
APPLICATIONS

### GBS 01

Water level / well probe

#### General:

Suitable for permanent level measuring in tanks, rivers, lakes, drinking-water wells, drilling holes, waste water plants...

### GBS 02

Tank contents measuring probe, for difficult measuring conditions

#### General:

For measuring the level of fuel and other aggressive media. The sensor is highly precise, insensitive to lateral flow and offers optionally lightning protection and other output signals (e.g. 0-10 V). For measuring of gasoline please order ex-design.

#### Description:

piezoresistive pressure sensor with temperature compensation. Welded, non-corrosive design with integral and additionally sealed water-proof connecting cable. The pressure compensation is done via a cable-integrated air path to the atmosphere. A special feature is the lateral flow resistance, which prevents media ingress. Therefore only the cable has to be replaced in case of a corresponding defect.

#### Specification:

<b>Measuring ranges:</b>	0.1 bar (100 mbar) to 10 bar = 1 to 100 m water column
<b>Available ranges:</b>	0.1, 0.25, 0.4, 0.6, 1, 1.6, 2.5, 4, 6, 10
<b>Overload (bar):</b>	1 2 2 3 5 8 8 10 10 10
<b>Output signal:</b>	4-20 mA (option: 0-10 V only for GBS02)
<b>Permissible impedance:</b>	4-20 mA: $R_x [Ω] < (U_v [V] - 10 V) / 0,02 A$
<b>Permissible load:</b>	0-10 V: $R_L [Ω] > 100 \text{ kΩ}$
<b>Auxiliary energy:</b>	10 ... 30 V DC (14 ... 30 V DC at 0-10 V)
<b>Accuracy:</b>	accuracy (% of span):
<b>GBS01:</b>	≤ 0.5 setting of cut-off point) resp. ≤ 0,25 (BFSL)
<b>GBS02:</b>	accuracy (% of span):
	≤ 0,25 (setting of cut-off point) resp. ≤ 0,125 (BFSL);
	(at 0.1 bar: ≤ 0.5 setting of cut-off point) resp. ≤ 0.25 (BFSL)
<b>Hysteresis (% of span):</b>	≤ 0.1
<b>Repeatability (% of span):</b>	≤ 0.05
<b>Stability per year (% of span):</b>	≤ 0.2 (at reference conditions)
<b>Operating temperature:</b>	-10 ... +50 °C (GBS01) or -10 ... +85 °C (GBS02)
<b>Temperature coefficient (% of span):</b>	≤ 0.02 / K (for meas. range > 0.4 bar)
<b>Filling:</b>	KN77, food safe
<b>Housing:</b>	chromium-nickel alloy 1.4571. Male thread G 1/2" accessible after removal of plastic protection cap.
<b>Probe dimensions:</b>	Ø 27 mm, length of metal body: approx. 100 mm (GBS01), approx. 147 mm (GBS02), cable Ø approx. 7.5 mm
<b>Electric connection:</b>	10 m stationary casted PUR cable (GBS01) resp. FEP-cable (GBS02). Glass-fibre screen protects cable against tearing. (Extra long cable against upcharge - please specify when ordering)

#### Options GBS01:

**extra long connection cable (PUR)**  
till max. 300 m, upcharge per m

#### Options GBS02:

**extra long connection cable (FEP, teflon)**  
till max. 100 m

**output signal 0-10 V**

**lightning protection, -protection, meas. range 16 and 25 bar**

## Inline compressed air flowmeter for compressed air consumption measurements



### GEE 771C-DN15

Flowmeter with DN15 sensor and assembly ball valve DN15

### GEE 771C-DN20

Flowmeter with DN20 sensor and assembly ball valve DN20

### GEE 771C-DN25

Flowmeter with DN25 sensor and assembly ball valve DN25

#### Application:

**Leakage detection:** Consumption of compressed air despite of shut-down installations is a serious hint for a leak in one of the pipes (even a 1.5 mm sized hole can already cost energy costs of € 1,500!)

**Improvement in efficiency:** Compressed air is one of the most expensive form of energy in many plants! Therefore the knowledge about the consumption is essential for the application of an energy management system (e.g. acc. to DIN50001)

#### Description:

The inline flowmeter is based on the thermal mass flow measuring principle and is well suited for flow measurements in pipes DN15 till DN25.

It allows measuring the consumption of compressed air (optionally also nitrogen, CO<sub>2</sub>, oxygen, helium or other non-corrosive, incombustible gases).

The device sets standards in terms of accuracy and repeatability, its unique mounting concept as well as its close-to-application adjustment at a pressure of 7 bar.

The mounting in a measurement assembly ensures easy installation and removal of the sensor for regular calibration and assures at the same time an exact and reproducible positioning of the flow sensor in the pipe. There are two signal outputs to read-out the measured values. Depending on the application the outputs can be configured as analog output (current or voltage), switching output or pulse output for consumption measurement.

#### Configuration software

The flow meter can be configured to its desired use by means of its integrated USB interface and a software included in shipping. Functions of the software:

- configuration of outputs (range / switching points)
- 2 point adjustment for flow and temperature
- read-out of consumption meter
- reset of min-/max- values and consumption meter

#### Specification:

<b>Measuring unit:</b>	Volume flow acc. to DIN1343
<b>Measuring range:</b>	DN15: 0.32 ... 63 Nm <sup>3</sup> /h
	DN20: 0.57 ... 113 Nm <sup>3</sup> /h
	DN25: 0.90 ... 176 Nm <sup>3</sup> /h
<b>Meas. range temperature:</b>	-20 ... +80 °C
<b>Output 1:</b>	Analog output 0(4) ... 20 mA or 0 ... 10 V
<b>Output 2:</b>	Pulse output or switching output
<b>Power supply:</b>	18 - 30 V AC/DC, max. 200 mA
<b>Working temperature:</b>	-20 ... +60 °C
<b>Media temperature:</b>	-20 ... +80 °C
<b>Working pressure:</b>	max. 16 bar

#### Accessories and spare parts:

**GEE-KH-DN15:**  
Assembly ball valve DN15

**GEE-KH-DN20:**  
Assembly ball valve DN20

**GEE-KH-DN25:**  
Assembly ball valve DN25

**GEE-AK-2m:**  
Connection cable transmitter ↔ sensor, 2 m

## Air flow measuring transducer



GSMU 1020 C5:  
sensor tube connected  
via cable

GSMU 1020 B5:  
sensor tube permanently connected

### GSMU 1020 B5

Air flow measuring transducer

### GSMU 1020 C5

Air flow measuring transducer

#### General:

- 3 measuring ranges integrated in each device
- selection between 2 different response times
- high accuracy
- almost independent of flow direction
- shock resistant
- resistant to pollution

#### Application:

air conditioning and ventilation technology, process and environmental technology  
Measuring principle: no moving parts. Hot-film anemometer principle.

#### Specification:

##### Measuring range flow:

**GSMU 1020 ...** 0 ... 10 m/s, 0 ... 15 m/s and 0 ... 20 m/s  
Measuring range can be set by means of jumper.

**Output signal:** 0 - 10 Volt (Iout < 1.0 mA) or  
4 - 20 mA (Ri < 450 Ohm)  
Output signal can be set by means of jumper.

##### Measuring accuracy: (at 20 °C, 45 % RH, 1013 hPa)

0 ... 10 m/s: ± 0.2 m/s ± 3 % of measured value  
0 ... 15 m/s: ± 0.2 m/s ± 3 % of measured value  
0 ... 20 m/s: ± 0.2 m/s ± 4 % of measured value

**Response time: T<sub>90</sub>**  
(at 10 m/s): typ. 4 s or 0,2 s  
Response time can be set by means of jumper.

**Dependency on flow direction:** < 3 % of measured value at Δα < 10°

**Voltage supply:** 24 V AC / DC ± 20 %, max. 150 mA

**max. load:** 500 Ohm

**Connection:** screw-type terminals up to 1.5 mm<sup>2</sup>

**Operating temperature:** -10 ... +50 °C

**Storage temperature:** -20 ... +60 °C

**Housing:** 80 x 80 x 35 mm (H x W x D)

**Material:** ABS

**Protection rating:** IP65 (electronic box)

**Sensor tube:** length = 200 mm (+18 mm for sensor head), Ø 12 mm

**GSMU...B5:** sensor tube permanently connected to housing

**GSMU...C5:** sensor tube connected to housing via cable (approx. 1 m long)

Other tube or cable lengths upon request.

**Electromagnetic Compatibility (EMC):** Conforming to **CE** acc. to DIN EN 50081-1 and DIN EN 50082-2

#### Accessories and spare parts:

##### GNG 24/150

power supply: 24 VDC, 150 mA

##### GNT 0520

mains transformer: 230 V~ to 24 V~, with mounting clamp and screw-type terminals. Dimensions approx. 62 x 56 x 32.5 mm

## Miniature Air Velocity Transmitter



### GSMU 575

Miniature Air Velocity Transmitter

#### General:

The transmitter is for measuring air velocity. The measurement method is based on the hot-film anemometer principle, for that purpose, a special thin-film sensor element has been developed. An accurate and reliable determination of the air velocity depends on the correct positioning of the sensor probe in the air stream. Accurate measurements are only possible if the sensor probe is installed where there is no turbulence.

#### Application:

- heating, ventilating
- air conditioning technology
- supply air control of ovens

#### Specification:

**Working range:** 0 ... 20 m/s  
other upon request

**Output signal:** 0 ... 10 V (max. 1 mA)

**Accuracy:** at 20 °C / 45 % RH, 1013 hPa, at 1 ... 20 m/s  
±(0.4 m/s + 6 % of measured value)

**Response time:**  
(bei 10 m/s T<sub>90</sub>) typ. 4 s

**Power supply:** 19 ... 29 V DC

**Power consumption:** max. 70 mA

**Temperature range:** working temperature: -20 ... 60 °C  
storage temperature: -30 ... 60 °C

**Connection:** 0.5 m cable, PVC 3 x 0.25 mm<sup>2</sup>, wire end ferrule

**Electromagnetic Compatibility (EMC):** EN61326-1  
EN61326-2-3

**Housing:** polycarbonate, Length: 120 mm, Ø 12 mm

**Protection class:** IP20 (measuring head), IP40 (housing)

#### Accessories and spare parts:

##### GNG 24/150

power supply: 24 VDC, 150 mA

## CO-Transducer

**GT1 - CO**

CO-Transducer

**General:**

High quality, TÜV certified CO transmitter for detection of carbon monoxide in underground garages, parking garages, boiler plants, heating systems, garages as well as in the ambient air. The CO transducer has a very long-lasting electrochemical measuring cell and could be easily integrated in existing CO surveillance systems (without loss of validity of existing TÜV certificates). Via two-wire system, displays, controller and alarm devices with 4-20 mA input could be connected without any problem.

**Highlights:**

- TÜV certification according to VDI 2053
- also suitable as replacement sensor for existing CO surveillance systems
- long-lasting electrochemical measuring cell
- automatic zero calibration
- 3 years warranty for the co sensor element

**Application:**

- underground garages, parking garages
- boiler plant and heating systems
- motorcar garage

**Specification:**

<b>Measuring range:</b>	0 ... 300 ppm CO (carbon monoxide)
<b>Measuring principle:</b>	electrochemical, permanent measuring
<b>Reproducibility:</b>	< 3 ppm according to VDI 2053
<b>Response Time T<sub>90</sub>:</b>	< 60 s
<b>Cross sensitivity:</b>	≤ 2 % of 300 ppm CO (acc. to VDI 2053)
<b>Linearity error:</b>	≤ 2 % of 300 ppm CO (acc. to VDI 2053)
<b>Offset adjustment:</b>	automatically
<b>Output signal:</b>	4 - 20 mA, wire, max. burden = 500 Ohm
<b>Power supply:</b>	12 - 28 V DC (at option VO: 16 - 28 V DC)
<b>Permissible burden:</b>	R <sub>A</sub> [Ω] ≤ (U <sub>V</sub> [V] - 12 V or 16 V) / 0,02 A
<b>Working condition:</b>	-10 ... +40 °C, 15 ... 95 % RH (non-condensing)
<b>Option: on site display</b>	approx. 13 mm high, 3½-digit LC-display
<b>EMC:</b>	according to EN 50 081-1, EN 50 082-2 B
<b>Electric connection:</b>	elbow-type plug acc. to EN 175301-803/A (IP65), max. wire cross section: 1.5 mm <sup>2</sup> , wire diameter from 4.5 ... 7 mm
<b>Housing:</b>	ABS, 82 x 80 x 55 mm (without elbow-type plug)
<b>Mounting:</b>	with fixing holes for wall mounting
<b>Mounting distance:</b>	70 x 50 mm (W x H)
<b>Fixing screws:</b>	max. shaft-Ø 4 mm
<b>Weight:</b>	approx. 190 g

**Option:**

**VO:**  
on site display

**Accessories and spare parts:**

- GZ-01**  
test gas cap GT (for controlled flow with test gas)
- GZ-02**  
gas bottle with 12l test gas: 30 ppm CO
- GZ-03**  
gas bottle with 12l test gas: 300 ppm CO
- GZ-04**  
gas valve unit MiniFlo for gas bottles with 12l
- GSN 24**  
plug-in power supply (230 VAC => 24 VDC/300mA)

additional accessories upon request.

CO<sub>2</sub>-Transducer**GT10 - CO<sub>2</sub> - 1R**CO<sub>2</sub>-Transducer**General:**

Due to the fact, that CO<sub>2</sub> is an important indicator for the quality of air in rooms, it's super important to measure the CO<sub>2</sub> content. The recommended CO<sub>2</sub> limit value for ambient air is 1000 ppm. An exceeding of this limit causes tiredness and a loss of concentration. The high quality and precise CO<sub>2</sub>-transducer works according to the infrared principle (NDIR). An auto-calibration procedure compensates aging effects and is responsible for an excellent long term stability of this CO<sub>2</sub> transducer. Due to the freely adjustable output signal the transmitter could be used for nearly each existing controller input etc. Additionally, there is a local display which shows beside the actual CO<sub>2</sub> concentration, the minimum and maximum values as well as an optical alarm.

**Highlights:**

- excellent long term stability
- auto-calibration procedure
- for surveillance of the recommended CO<sub>2</sub> concentration in ambient air
- output signal free scaleable

**Specification:**

<b>Measuring range:</b>	standard: 0 ... 2000 ppm CO <sub>2</sub> (carbon dioxide) optional: 0 ... 5000 ppm CO <sub>2</sub> (carbon dioxide)
<b>Measuring principle:</b>	infrared principle (NDIR)
<b>Accuracy:</b>	standard: ±50 ppm ±2 % of meas. value (at 20 °C, 1023 mbar) opt. /5000: ±50 ppm ±3 % of meas. value (at 20 °C, 1023 mbar)
<b>Output signal:</b>	4 - 20 mA (3-wire), standard 0 - 1 V or 0 - 10 V (3-wire), upon upcharge
<b>Output scaling:</b>	free scaleable, by entering display range
<b>Auxiliary energy:</b>	12 ... 30 V DC, max. 600 mA (at option 0-10 V: 18 ... 30 V DC, max. 600 mA)
<b>Perm. burden (at 4-20 mA):</b>	R <sub>A</sub> < 200 Ω
<b>Perm. load (at 0-...Volt):</b>	R <sub>L</sub> > 3000 Ω
<b>Display:</b>	approx. 10 mm high, 4-digit LC-display
<b>Working condition:</b>	-10 ... +50 °C, 5 ... 95 % RH, 850 ... 1100 hPa
<b>Storage condition:</b>	-25 ... +60 °C, 5 ... 95 % RH, 700 ... 1100 hPa
<b>Electric connection:</b>	elbow-type plug acc. to EN 175301-803/A (IP65), max. wire cross section: 1.5 mm <sup>2</sup> , wire diameter from 4.5 ... 7 mm
<b>Housing:</b>	ABS, 82 x 80 x 55 mm (without elbow-type plug)
<b>Mounting:</b>	with fixing holes for wall mounting
<b>Mounting distance:</b>	70 x 50 mm (W x H)
<b>Fixing screws:</b>	max. shaft-Ø 4 mm
<b>Weight:</b>	approx. 225 g
<b>Features:</b>	- min-/max-value memory, - optical alarm, - input of offset and scale for adjusting

**Option:**

- 5000:**  
measuring range: 0 ... 5000 ppm CO<sub>2</sub>
- AV01:**  
output signal 0-1 V
- AV010:**  
output signal 0-10 V

**Accessories and spare parts:**

- GSN 24-750**  
plug-in power supply (230 V<sub>AC</sub> => 24 V<sub>DC</sub>/750 mA)

## air oxygen measuring transducer



### OXY 3690 MP

air oxygen measuring transducer incl. oxygen sensor GGO370/MU

Specification:	
<b>Measuring ranges:</b>	
oxygen concentration:	0.0 ... 100.0 % O <sub>2</sub> (gaseous)
temperature:	-20.0 ... 50.0 °C
<b>Accuracy device (at nominal temperature 25 °C):</b>	
oxygen:	±0.1 % ± 1 digit
temperature:	±0.1 °C ± 1 digit
<b>Output signal (only O<sub>2</sub>):</b>	
	4 - 20 mA (2-wire - standard) 0 - 10 V (3-wire - option)
<b>Electric isolation:</b> input electrically isolated	
<b>Auxiliary energy:</b> 12 ... 30 V DC (at output 4-20 mA) 18 ... 30 V DC (at output 0-10 V - option)	
<b>Perm. impedance (at 4-20 mA):</b> R <sub>A</sub> [Ω] ≤ (U <sub>v</sub> [V] - 12 V) / 0.02 A	
<b>Permissible load (at 0-10 Volt):</b> R <sub>L</sub> > 3000 Ω	
<b>Working condition:</b> 0 ... +50 °C, 0 ... +95 % RH (non-condensing)	
<b>Storage temperature:</b> -20 ... +70 °C	
<b>Reverse voltage protection:</b> 50 V permanently	
<b>Display:</b> approx. 10 mm high, 4-digit LCD-display	
<b>Housing:</b> ABS (IP65 - with the exception of sensor plug)	
<b>Dimensions:</b> 82 x 80 x 55 mm (without elbow-type plug and sensor plug)	
<b>Electric connection:</b> elbow-type plug acc. to EN 175301-803/A (IP65), max. wire cross section: 1.5 mm <sup>2</sup> , wire diameter from 4.5 ... 7 mm	
<b>Sensor connection:</b> 5-pin jack connector, screwable	
<b>Calibration:</b> 1-point calibration in atmospheric air.	
<b>Air pressure compensation:</b> 500 ... 2000 hPa abs., manually input	

Oxygen sensor:	
<b>Sensor type:</b>	GGO 370 / MU
<b>Measuring range:</b>	0.0 ... 100.0 % O <sub>2</sub>
<b>Response time T<sub>90</sub>:</b>	<10 s, depending on temperature
<b>Warranty:</b>	12 months (assuming appropriate usage according to the manual)
<b>Application area:</b>	suitable for air and pure oxygen, suitable for high CO <sub>2</sub> -concentrations

<b>Temperature compensation:</b> integrated in oxygen sensor	
<b>Connection cable:</b>	approx. 1.3 m, with 5-pin plug, screwable
<b>Operating pressure:</b>	500 ... 2000 hPa (static).
For air and gas-stream use the oxygen sensor GOO.../MU.	
<b>Working condition:</b>	-5 ... +45 °C, 0 ... +95 % RH (non-condensing)
<b>Storage temperature:</b>	-15 ... +60 °C
<b>Dimensions of housing:</b>	approx. Ø 40 x 103 mm (153 mm incl. anti-buckling glanding), housing with M16x1-screw thread (sensor can be connected to line tubes by means of an included adapter piece)
<b>Weight:</b>	approx. 135 g

Option:	
- AV010:	output signal 0 - 10 V
- GOO:	oxygen sensor GOO 370 / MU, open sensor type, suitable for air and gas-stream. (further information p.r.t. p 47)
- KL10:	sensor connection cable 10 m
- LO:	design type for fast measurements of low oxygen contents (0-25 %) with sensor element GOEL 380

Accessories and spare parts:	
<b>GOEL 370</b>	spare sensor element for GGO 370 / MU

## oxygen measuring transducer for dissolved oxygen in liquids



### OXY 3610 MP

oxygen measuring transducer incl. oxygen sensor GWO3600MU

Specification:	
<b>Measuring ranges:</b>	
oxygen concentration:	0.00 ... 25.00 mg/l (dissolved)
temperature:	0.0 ... 50.0 °C
<b>Accuracy device (at nominal temperature 25 °C):</b>	
oxygen:	±1.5 % of m.v ± 0.2 mg/l
temperature:	±0.1 °C ± 1 digit
<b>Output signal (only O<sub>2</sub>):</b>	
	4 - 20 mA (2-wire - standard) 0 - 10 V (3-wire - option)
<b>Electric isolation:</b> input electrically isolated	
<b>Auxiliary energy:</b> 12 ... 30 V DC (at output 4-20 mA) 18 ... 30 V DC (at output 0-10 V - Option)	
<b>Perm. impedance (at 4-20 mA):</b> R <sub>A</sub> [Ω] ≤ (U <sub>v</sub> [V] - 12 V) / 0.02 A	
<b>Permissible load (at 0-10 Volt):</b> R <sub>L</sub> > 3000 Ω	
<b>Working condition:</b> 0 ... +50 °C, 0 ... +95 % RH (non-condensing)	
<b>Storage temperature:</b> -20 ... +70 °C	
<b>Reverse voltage protection:</b> 50 V permanently	
<b>Display:</b> approx. 10 mm high, 4-digit LCD-display	
<b>Housing:</b> ABS (IP65 - with the exception of sensor plug)	
<b>Dimensions:</b> 82 x 80 x 55 mm (without elbow-type plug and sensor plug)	
<b>Electric connection:</b> elbow-type plug acc. to EN 175301-803/A (IP65), max. wire cross section: 1.5 mm <sup>2</sup> , wire diameter from 4.5 ... 7 mm	
<b>Sensor connection:</b> 5-pin jack connector, screwable	
<b>Calibration:</b> 1-point calibration: simple quick calibration in atmospheric air.	

oxygen sensor (GWO3600MU):	
<b>Electrode:</b>	active membrane type, with integrated NTC-resistor
<b>Response time:</b>	95 % in 10 s, depending on temperature
<b>Operation life:</b>	3 years or more, depending on maintenance
<b>Operating pressure:</b>	max. 3 bar.
<b>Flow rate:</b>	min. 30 cm/s
<b>Build in diameter:</b>	Ø 12.0 ±0.2 mm (suitable for ½" screw connection)
<b>Overall length:</b>	approx. 220 mm (with anti-buckling glanding)
<b>Build in length:</b>	approx. 110 mm
<b>Connection cable:</b>	approx. 4 m, with 5-pin plug, screwable
<b>Warranty:</b>	12 months
<b>Working temperature:</b>	0 ... +40 °C
<b>Scope of supply:</b>	device incl. electrode, GWOK01 and KOH100

Option:	
<b>AV010:</b>	output signal 0-10 V

Accessories and spare parts:	
<b>GWO 3600 MU</b>	Spare electrode with 4 m cable
<b>Upcharge for electrode with 10 m cable length</b>	
<b>Upcharge for electrode with 30 m cable length</b>	
<b>GSKA 3600</b>	protection cap for depth measuring
<b>GAS 3600</b>	working set (consisting of 3 spare diaphragm heads and 100 ml KOH-electrolyte)
<b>GWOK 01</b>	spare diaphragm head
<b>KOH 100</b>	spare electrolyte KOH, 100 ml-bottle

**pH-measuring transducer with on site display**

**WITH ELECTRICALLY ISOLATION**



**GPHU 014 MP / BNC**

pH-measuring transducer with on site display without electrode

**GPHU 014 MP / Cinch**

pH-measuring transducer with on site display without electrode

**General:**

- automatically and manually temperatur compensation
- external Pt1000-temperature probe connectable
- sensor input electrically isolated
- 2-point calibration

**Specification:**

<b>Measuring range:</b>	0.00 ... 14.00 pH
<b>Accuracy:</b>	0.02 pH ±1 digit (at nominal temperature = 25 °C)
<b>Output signal:</b>	4 - 20 mA (2-wire), standard 0 - 10 V (3-wire), upon upcharge
<b>Electric isolation:</b>	input electrically isolated
<b>Auxiliary energy:</b>	12 ... 30 V DC (for option 0-10 V: 18 ... 30 V DC)
<b>Perm. impedance (at 4-20mA):</b>	$R_A [\Omega] \leq (U_v [V] - 12 V) / 0.02 A$
<b>Permissible load (at 0-10Volt):</b>	$R_L > 3000 \Omega$
<b>Electrode:</b>	any standard pH electrode is suitable. (pH electrode not included in scope of supply)
<b>Input resistance:</b>	$10^{12} \text{ Ohm}$
<b>Electrode socket:</b>	BNC-socket or Cinch-socket
<b>Temperature compensation:</b>	-30 ... 150 °C, manually via 3 keys or automatically via external Pt1000 sensor.
<b>Adjustment:</b>	via 3 keys and integrated LCD
<b>Temp. sensor socket:</b>	2 x banana socket Ø 4 mm, for Pt1000 probe
<b>Display:</b>	approx. 10 mm high, 4-digit LCD-display
<b>Working temperature:</b>	0 ... +50 °C (electronic)
<b>Storage temperature:</b>	-20 ... +70 °C
<b>Electric connection:</b>	elbow-type plug acc. to EN 175301-803/A (IP65)
<b>Housing:</b>	ABS
<b>IP rating:</b>	IP65, with the exception of electrode and temperature connection sockets. (cpl. IP65 upon request)
<b>Dimensions:</b>	82 x 80 x 55 mm (H x W x D)
<b>Mounting:</b>	with fixing holes for wall mounting
<b>Mounting distance:</b>	70 x 50 mm (W x H)
<b>Fixing screws:</b>	max. shaft-Ø 4 mm

**Option:**

- AV010:**  
output signal 0-10 V
- MB...:**  
limited measuring range (please state the desired range) (i.e.: 2.00 ... 10.00 pH)

**Accessories and spare parts:**

- GTF 2000 WD - B**  
water proof Pt1000-temperature probe, with 2 banana plugs Ø 4mm  
for additional Pt1000-temperature probes **p.r.t. page 127, 135-136**
- GE 100-BNC**  
standard electrode, BNC-plug
- GE 117-BNC**  
pH electrode with integrated Pt1000-sensor, 1 x BNC-plug and 1 x banana plug Ø 4mm, thread PG13.5, pressure resistant up to 6 bar
- PG 13.5**  
plug on thread adapter for pressureless use
- GAK 1400**  
working and calibration set (p.r.t. page S. 41)  
for additional electrodes and accessories p.r.t. page 40, 127 and 135-136

**Ordering example:**

GPHU 014 MP / BNC, AV010:  
pH-transmitter with BNC-electrode socket and 0-10 V output signal

**Redox-measuring transducer**

**WITH ELECTRICALLY ISOLATION**



**GRMU 2000 MP / BNC**

Redox-measuring transducer without electrode

**GRMU 2000 MP / Cinch**

Redox-measuring transducer without electrode

**Specification:**

<b>Measuring range:</b>	±2000 mV or special limited measuring ranges acc. to customer specification!
<b>Accuracy:</b>	0.2 % FS (at nominal temperature = 25 °C)
<b>Output signal:</b>	4 - 20 mA (2-wire), standard 0 - 10 V (3-wire), upon upcharge
<b>Electric isolation:</b>	input electrically isolated
<b>Auxiliary energy:</b>	12 ... 30 V DC (for option 0-10 V: 18 ... 30 V DC)
<b>Perm. impedance (at 4-20mA):</b>	$R_A [\Omega] \leq (U_v [V] - 12 V) / 0.02 A$
<b>Permissible load (at 0-10Volt):</b>	$R_L > 3000 \Omega$
<b>Electrode:</b>	Redox electrode GE105-BNC (electrode not included in scope of supply!)
<b>Input resistance:</b>	$10^{12} \text{ Ohm}$
<b>Electrode socket:</b>	Cinch-socket (standard) BNC-socket with upcharge
<b>Option: on site display</b>	approx. 10 mm high, 4-digit LCD-display
<b>Working temperature:</b>	0 ... +50 °C (electronic)
<b>Storage temperature:</b>	-20 ... +70 °C
<b>Electric connection:</b>	elbow-type plug acc. to EN 175301-803/A (IP65)
<b>Housing:</b>	ABS (IP65) with the exception of electrode connection sockets. (cpl. IP65 upon request)
<b>Dimensions:</b>	82 x 80 x 55 mm (H x W x D)
<b>Mounting:</b>	with fixing holes for wall mounting (accessible after removal of cover), Mounting distance: 70 x 50 mm (W x H) Fixing screws: max. shaft-Ø 4 mm

**Option:**

- VO:**  
on site display
- AV010:**  
output signal 0-10 V
- MB...:**  
limited measuring range (please state the desired range)

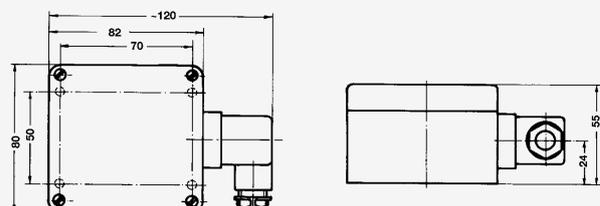
**Accessories and spare parts:**

- GE 105-BNC**  
redox electrode with cinch-plug and testing solution
- PG 13.5**  
plug on thread adapter for pressureless use,  
with external thread PG 13.5 (suitable for any electrode)  
For additional electrodes and accessories p.r.t. page 40

**Ordering example**

**GRMU 2000 MP / BNC, VO:**  
GRMU2000MP with BNC electrode socket and on site display

**Dimensioned sketch GPHU / GRMU:**



## Conductivity measuring transducer



### GLMU 200 MP

Conductivity measuring transducer incl. 2-pol measuring cell

#### General:

- Compact conductivity measuring cell
- Output signal freely scaleable
- Adjustable cell constant
- Selectable temperature compensation mode
- On site display for the conductivity or temperature
- Exchangeable unit stickers

#### Application:

- Easy, low-cost conductivity measurement
- Drink water monitoring
- Fish farming / water monitoring
- Fresh and sea water aquaristics

Specification:	GLMU 200 MP	GLMU 400 MP
<b>Measuring range: (free selectable by user)</b>		
<b>Conductivity:</b>	0.0 ... 200.0 µS/cm	0.0 ... 200.0 µS/cm
	0 ... 2000 µS/cm	0 ... 2000 µS/cm
	0.00 ... 20.00 mS/cm	0.00 ... 20.00 mS/cm
	0.0 ... 200.0 mS/cm	0.0 ... 200.0 mS/cm
	--	0 ... 500 mS/cm
<b>specific resistance:</b>	5.0 ... 100.0 kOhm*cm	0.0 ... 200.0 kOhm*cm
	0.50 ... 10.00 kOhm*cm	0.00 ... 20.00 kOhm*cm
	50 ... 1000 Ohm*cm	1 ... 5000 Ohm*cm
	5.0 ... 100.0 Ohm*cm	1.0 ... 500.0 Ohm*cm
	--	1.00 ... 50.00 Ohm*cm
<b>TDS:</b>	0.0 ... 200.0 mg/l	0.0 ... 200.0 mg/l
	0 ... 2000 mg/l	0 ... 500.0 mg/l
	--	0 ... 2000 mg/l
	--	0.0 ... 20.0 g/l
	--	0 ... 200 g/l
<b>Salinity:</b>	0.0 ... 70.0	0.0 ... 70.0
<b>Temperature meas.:</b>	-5.0 ... +140.0 °C (transducer)	-5.0 ... +140.0 °C (transducer)
	0.0 ... +80.0 °C (meas. cell)	0.0 ... +80.0 °C (meas. cell)
<b>Measuring cell:</b>	2-pole measuring cell	4-pole measuring cell
<b>Standard meas. cell:</b>	conductivity measuring cell with graphite electrodes and integrated temperature sensor. The cell constant is measured and preset ex works. Measuring cell in breakage-protected plastic pole, heat resistant up to 80 °C, Ø 12 mm, length of shaft 120 mm, approx. 1 m connection cable. For pressureless applications use the slip-on thread adapter PG 13.5. For pressures up to 6 bar order cell with fixed PG 13.5 thread (optionally).	
<b>Accuracy: (at nominal temperature = 25 °C)</b>		
<b>Conductivity:</b>	±0.5 % of measuring value ±0.3 % FS	
<b>Temperature meas.:</b>	±0.2 °C ±1 digit	
<b>Meas. cell connection:</b>	7-pole diode connector	
<b>Cell constant:</b>	K = 0.30 ... 1.20, freely adjustable	
<b>Temperature compensation:</b>	off: no compensation Lin: linear compensation (from 0.3 ... 3.0 %/K) (selectable by user) nLF: non-linear function of natural water according to EN27888 (ISO 7888)	
<b>Display:</b>	approx. 10 mm high, 4-digit LC-display	
<b>Output signal:</b>	4 - 20 mA (2-wire), standard 0 - 1 V or 0 - 10 V (3-wire), upon upcharge	
<b>Electric isolation:</b>	input electrically isolated	
<b>Auxiliary energy:</b>	12 ... 30 V DC (for option 0-10 Volt: 18 ... 30 V DC)	
<b>Reverse voltage protection:</b>	50 V permanent	

### GLMU 400 MP

Conductivity measuring transducer incl. 4-pol measuring cell

#### General:

- High-quality conductivity measuring cell, insensitive to dirt
- Output signal freely scaleable
- Adjustable cell constant
- Selectable temperature compensation mode
- On site display for the conductivity or temperature
- Exchangeable unit stickers

#### Application:

- Higher saline concentrations (e.g. brine measuring)
- Measurements in polluted solutions / waste water
- Control of neutralization
- Heavily polluted liquids

**Perm. impedance (at 4-20 mA):**  $R_A [\Omega] \leq (U_v [V] - 12 V) / 0.02 A$

**Permissible load (at 0-10 Volt):**  $R_L > 3000 \Omega$

**Working temperature:** -25 ... +50 °C (transducer)  
0 ... +80 °C (standard measuring cell)

**Storage temperature:** -25 ... +70 °C

**Electric connection:** elbow-type plug acc. to EN 175301-803/A (IP65)

**Housing:** ABS (IP65) with the exception of electrode socket

**Dimensions:** 82 x 80 x 55 mm, without elbow-type plug and socket

**Warranty:** 12 months

**Mounting:** with fixing holes for wall mounting,  
Mounting distance: 70 x 50 mm (W x H)

#### Option:

**- LTG**  
for organic matter (alcohol, petrol, diesel)  
up to max. 1000 µS/cm  
with glass shaft, unplatinated,  
1.35 m PUR-cable

**- PG**  
electrode with thread PG 13.5  
(for use up to 6 bar)

**- AV010:**  
output signal 0-10 V

**- AV01:**  
output signal 0-1 V

**- KL=...:**  
longer measuring cell cable (recommended max. 5 m)

#### Accessories and spare parts:

**LFE 202**  
spare 2-pol measuring cell (for GLMU 200 MP)

**LFE 200**  
spare 4-pol measuring cell (for GLMU 400 MP)

**PG 13,5**  
plug on thread adapter for pressureless use

**GKL 100**  
100 ml control solution, 1413 µS/cm (pursuant DIN 27888)

**GEH 1**  
Swivel-arm electrode retainer



## Rotational speed sensor proximity switch with analog output



### EFFI-...

Rotational speed sensor

### EFFU-...

Rotational speed sensor

- Design types:**
- **V:** magnetic field sensor (magneto-resistive)
  - **H:** preloaded Hall sensor
  - **I:** inductive sensor

#### General:

The EFFI and EFFU combine a proximity switch with the signal processing to standard signals in one device.

The scaling of the standard signal output can be done at face.

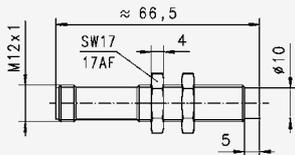
#### Programming:

- The value for 0 Hz is fixed: 4 mA or 0 V
- For programming the upper output limit (20 mA or 10 V) you have to adjust the max. frequency in the system. By connecting two contacts the device is programmed to this value.

#### Specification:

##### 3 different measuring principles:

<b>design type -V:</b>	magnetic field sensor (magneto-resistive)
<b>design type -H:</b>	preloaded Hall sensor
<b>design type -I:</b>	inductive sensor
<b>Sensing distance:</b>	4 mm
<b>Measuring range:</b>	1 ... 4095 Hz
<b>Output signal</b>	EFFI: 4 - 20 mA (3-wire), EFFU: 0 - 10 V (3-wire)
<b>Sampling interval:</b>	periods measurement, output update 50 ms
<b>Output accuracy:</b>	±0.25 % of full scale
<b>Auxiliary energy:</b>	10 ... 30 V DC (at EFFU: 15 ... 30 V DC)
<b>Idle current:</b>	max. 20 mA (without load)
<b>Electrical connection:</b>	4-pole locking plug M12 x 1 (connection cable see below)
<b>Working temperature:</b>	0 ... 70 °C
<b>Protection class:</b>	IP 67
<b>Housing materials:</b>	nickel plated brass, PA66
<b>Dimensions:</b>	~ Ø 10 x 66,5 mm
<b>Weight:</b>	approx. 25 g



## M12 - connection cable



### KM4P-G02

straight connector, 4-pole, 2 m cable

### KM4P-G10

straight connector, 4-pole, 10 m cable

### KM4P-W02

90° connector, 4-pole, 2 m cable

### KM4P-W10

90° connector, 4-pole, 10 m cable

### KM4P-GL

connector for self-tailoring, 4-pole

#### General:

Screened PUR-connection cable with moulded M12x1-connector (and loose ends). Available in straight and angular design.

## Caloric flow controller



### EFK2

Caloric flow controller

### EFKP

Caloric flow controller

### EFKM

Caloric flow controller

#### General:

The flow controllers EFK... monitor liquids and gaseous substances. The instrument combines compact dimensions with a integral probe, a LED trend display (for FLOW) with dual-colour status indicator and an output whose switch-point can be adjusted via a potentiometer.

- no moving parts in the monitored medium
- mounting largely independent of pipe diameter
- low pressure loss
- high working pressures (up to 100 bar)

#### Application:

- Metalworking industry: cooling liquid and lubricant monitoring
  - Steel industry: coolant circuits
  - Chemical industry: protection against dry running (for pumps), detection of leaks and fill level monitoring
  - Beverage industry: monitoring of cleaning processes
- Sensors suitable for: Water, oil, aggressive substances

#### Specification:

<b>Measuring principle:</b>	calorimetric
<b>Operating range:</b>	2 ... 150 cm/s (for water)
<b>Display:</b>	
<b>EFK2</b>	2-colour LED (red < threshold, green > threshold)
<b>EFKP, EFKM</b>	9 LEDs (red - threshold, green 1-8 - flow)
<b>Switch-point adjustment:</b>	via potentiometer
<b>Output:</b>	
<b>EFK2</b>	relay contact (max. 30 V / 2 A) NO (open = no flow)
<b>Optional:</b>	NPN-transistor output (max. 24 V / 100 mA) PNP-transistor output (max. 24 V / 100 mA)
<b>Output:</b>	
<b>EFKP, EFKM</b>	NPN-transistor output (max. 24 V / 200 mA)
<b>Optional:</b>	PNP-transistor output (max. 24 V / 200 mA)
<b>Auxiliary energy:</b>	24 V DC ±10 %
<b>Power consumption:</b>	max. 70 mA
<b>Electrical connection:</b>	4-pole locking plug M12 x 1 (connection cable see left)
<b>Working pressure:</b>	max. 100 bar
<b>Working temperature:</b>	15 ... 70 °C
<b>Mounting position:</b>	arbitrary
<b>Protection class:</b>	IP 65 (EFK2), IP 60 (EFKP), IP 67 (EFKM)
<b>Mech. connections:</b>	screw-in thread G1/2A
<b>Option:</b>	screw-in thread G1/4A
<b>Probe length:</b>	approx. 29 mm (incl. thread)
<b>Materials:</b>	
<b>Probe:</b>	stainless steel 1.4571
<b>Housing:</b>	EFK2: stainless steel 1.4305 EFKP: PA6.6 EFKM: brass, nickel plated
<b>Dimensions:</b>	EFK2: Ø 35 x 97 mm (W x H x D) (without M12-plug) EFKP: 50 x 50 x 95 mm (W x H x D) EFKM: Ø 73 x 81 mm (W x H x D)

#### Option:

**G1/4A:** device connection G1/4A

**PNP:** output: PNP

**NPN:** output: NPN

## Flow meter (rotor)



### RRI - 010 / ...

Flow meter (DN10, G3/8)

### RRI - 025 / ...

Flow meter (DN25, G1)

#### General:

The flow meter measures the flow rate with an impeller rotating due to the flow. The flow rate is proportional to the rotational frequency. The rotational speed is measured by an inductive proximity switch.

- no magnets, but with inductive sensor
- largely wear-free due to high-quality ceramic axis and bearing
- output signal NPN (optional PNP)
- no inlet and outflow zone needed
- uncomplicated flow measurement
- intrinsically safe behaviour
- modular design with several connecting systems
- connections plug- and pivotable

#### Application:

Sensors suitable for: Water, oil (viscosity up to 10 mm<sup>2</sup>/s (10 cSt.))

#### Specification:

**Measuring principle:** rotor (inductive sensor)

Designs:	bore	measuring range	pulse rate <sup>1</sup>
RRI-010 / 020:	2 mm	(0.1) 0.5 ... 1.5 l/min.	approx. 10200 Imp./l
RRI-010 / 050:	5 mm	(0.2) 2.0 ... 10 l/min.	approx. 3345 Imp./l
RRI-010 / 070:	7 mm	(0.4) 2.0 ... 12 l/min.	approx. 1755 Imp./l
RRI-025 / 080:	8 mm	(2) 3 ... 30 l/min.	approx. 1216 Imp./l
RRI-025 / 120:	12 mm	(3) 5 ... 60 l/min.	approx. 607 Imp./l
RRI-025 / 160:	16 mm	(4) 6 ... 100 l/min.	approx. 252 Imp./l

**Accuracy:** ±3 % of meas. value (in special measuring range)

**Repeatability:** ±1 % of full scale

**Pressure decrease:** max. 0.5 bar (at max. flow)

**Working pressure:** max. 16 bar

**Output signal:** NPN (optional: PNP)

**Auxiliary energy:** 5 ... 30 V DC, max. 10 mA (closed current, without load)

**Electrical connection:** 2 m cable (optional: 4-pole locking plug M12 x 1)

**Working temperature:** 0 ... 60 °C

**Protection class:** IP 67

**Mechanical connection:** **nominal bore**      **threat**  
 RRI-010..: DN 10                      G 3/8, female thread <sup>2</sup>  
 RRI-025..: DN 25                      G 1, female thread <sup>2</sup>

**Mounting position:** horizontal or ascending direction of flow

#### Materials:

**Housing:** Questra (DN25) / PPS (DN10)

**Connection <sup>2</sup>, rotor:** PVDF

**Bearing:** Iglidur X

**Axis:** ceramics ZrO<sub>2</sub>-TZP

**Seal:** viton

**Dimensions:** 84 x 29 x 88 mm (RRI-010...), 110 x 73 x 103 mm (RRI-025...)

<sup>1</sup> precise value on type plate, max. variability within a batch: ±10 %

<sup>2</sup> other threat types (male thread, ...) or materials for connectors upon request

#### Options:

**PNP:**  
output signal PNP

**M12:**  
Electr. connection = plug M12 x 1

## Flow switch



### FCM - 6 (2,5 l/min)

Flow switch incl. DIN plug

### FCM - 3 (6 l/min)

Flow switch incl. DIN plug

#### General:

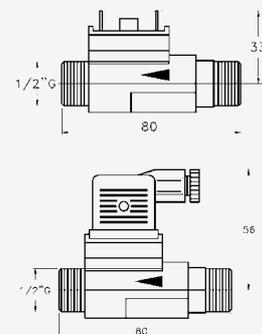
FCM flow switch has been designed to offer a very simple and safety control against the missing flow passage. The electrical components are separated from the mechanical parts and the reed contact is magnetically actuated. The switch head is fixed to the body by a fast self locking system and can be replaced without removing the flow switch from the pipe. No adjustment or setting is required after the switch head replacement.

- No setting required
- Easy and fast replacement of the switch head
- Low pressure loss
- Horizontal and vertical mounting
- Liquid and gas applications

#### Specification:

<b>Body:</b>	Brass
<b>Process connection:</b>	G 1/2"
<b>Sensing element (Piston):</b>	Polypropylen
<b>Accuracy:</b>	± 15 %
<b>Temperature max.:</b>	90 °C
<b>Pressure loss :</b>	0,5 bar at max. flow rate
<b>Flow rate max.:</b>	25 l/min
<b>Weight:</b>	170 g
<b>Reed contact</b>	N.O. / No flow condition
<b>Contact rating</b>	300 V, 70 VA, 0,5 A
<b>Wiring:</b>	Angle plug
<b>Protection class:</b>	IP65
<b>Mounting:</b>	Horizontal and Vertical
<b>Set point l/min</b>	<b>Nominal</b> <b>ON</b> <b>OFF</b>
<b>FCM - 6</b>	2.5              2.8      1.7
<b>FCM - 3</b>	6                6.3      4.1

#### Dimensions:



## Flow sensors for various applications (suitable evaluation devices: GIA20EB, GIR230FR, GIA2000, GIR2002)



### FHK - Ryton - xx

**General:**

- exact measurements of fluid volumes
- long lifetime, higher temperatures

**Application:**  
non-alcoholic and alcoholic beverages, chemicals, water, wine, etc.

### FHK - PVDF - xx

**General:**

- all part in contact with medium: made of plastic
- adequate for chemical media (request)

**Application:**  
**chemical industry:** products containing tensides, alkaline products, acids  
**industry:** monitoring of cooling medium circuits of machines, dosing and consumption quantity measurements

Specification:			
	... - 10	... - 20	... - 33
<b>Nozzle:</b>	1.0 mm	2.0 mm	3.3 mm
<b>Meas. range (l/min):</b>	0.05 ... 0.50	0.11 ... 2.30	0.20 ... 5.00
<b>Number of pulses (pulses/l):</b>			
FHK-Ryton	~ 2223	~ 1013	~ 509
FHK-PVDF	~ 4962	~ 2078	~ 1033
<b>Pressure range:</b>	max. 20 bar (at 20 °C)		
<b>Medium viscosity:</b>	< 50 cSt.		
<b>Meas. accuracy:</b>	±2 %		
<b>Repeatability:</b>	< 0.25 %		
<b>Power supply:</b>	3.8-24 V DC; max. 8 mA		
<b>Output signal:</b>	Open collector, NPN		
<b>Flow connections:</b>	2 x G $\frac{1}{4}$ " IG parallel		
<b>Working temperature:</b>	-10 ... 100 °C		
<b>Dimensions:</b> approx. 55 x 40 x 66 mm (incl. plug)			
<b>Housing:</b>	FHK-Ryton	FHK-PVDF	
<b>Material:</b>	PPS (Ryton)	PVDF	
<b>Nozzle:</b>	1.4305	PTFE	
<b>Turbine:</b>	PVDF	PVDF	
<b>Sealing:</b>	Viton	Viton	
<b>Magnets:</b>	ceramic SrFeO (in contact with medium)	ceramic SrFeO (not in contact with medium)	

\* = other nozzles and meas. ranges upon request



### FH-Messing Flach

**General:**

- highly accurate measurements
- lead-free brass, food safe

**Application:**  
Food industries, industry, machine and equipment building, dosing

Specification:	
<b>Meas. range: *</b>	approx. 0.2 - 8.3 l/min
<b>Nozzle: *</b>	D = 4 mm
<b>Number of pulses:</b>	approx. 409 pulses / liter
<b>Pressure range:</b>	max. 20 bar (at 20 °C)
<b>Medium viscosity:</b>	< 50 cSt.
<b>Accuracy:</b>	±2 %
<b>Repeatability:</b>	< 0.25 %
<b>Power supply:</b>	3.8-24 V DC; max. 8 mA
<b>Output signal:</b>	Open collector, NPN,
<b>Flow connections:</b>	2 x G $\frac{1}{4}$ " IG parallel
<b>Working temperature:</b>	-10 ... 100 °C
<b>Dimensions:</b>	approx. 50 x 40 x 39 (w/o plug)
<b>Material housing:</b>	brass (lead-free)
<b>Nozzle:</b>	Inox 1.4305
<b>Magnets:</b>	ceramic SrFeO (in contact with medium)
<b>Sealing:</b>	silicone

\* = other nozzles and meas. ranges upon request



### FHKU - Arnite - xx

**General:**

- highly accurate measurements of liquid media
- long lifetime, food safe

**Application:**  
Water and water-like media in machine and equipment building

### FHKU - Ryton - xx

**General:**

- all part in contact with medium: made of plastic and stainless steel
- better chemical compatibility than arnite
- higher temperatures

**Application:**  
Measuring of low-viscous media, cooling, machine and equipment building

### FHKU - 100

**General:**  
for larger flow volumes

Specification (FHKU-Arnite and Ryton):				
	... - 10	... - 20	... - 30	... - 40
<b>Nozzle:</b>	1.0 mm	2.0 mm	3.0 mm	4.0 mm
<b>Meas. range (l/min):</b>	0.05 ... 0.50	0.10 ... 2.30	0.12 ... 5.60	0.15 ... 8.30
<b>Number of pulses:</b>	~ 2063	~ 988	~ 565	~ 381
<i>Pressure range, medium viscosity, accuracies, current supply and output signal see FHK.</i>				
<b>Flow connections:</b> 2 x G $\frac{1}{4}$ " A				
<b>Housing:</b>	FHKU-Arnite	FHKU-Ryton		
<b>Material:</b>	PBT (Arnite)	PPS (Ryton)		
<b>Nozzle:</b>	PPS (ryton) (1 and 2 mm) 1,4305 (3 and 4 mm)			
<b>Turbine:</b>	PVDF	PVDF		
<b>Magnets:</b>	ceramic SrFeO (in contact with medium)		ceramic SrFeO	
<b>Sealing:</b>	silicone		silicone	
<b>Dimensions:</b>	77 x 43 x 61 mm		77 x 43 x 67 mm	
<b>Working temperature:</b>	-10 ... 65 °C		-10 ... 100 °C	
<b>Specification (FHKU-100):</b>				
<b>Nozzle:</b>	D = 10 mm			
<b>Meas. range:</b>	approx. 3-26.7 l/min			
<b>Impulszahl:</b>	approx. 65 pulses/liter			
<b>Flow connections:</b> 2 x G $\frac{1}{2}$ " A				
<b>Housing:</b>	PPS(Ryton), nozzle: Ryton, sealing: Viton			
<i>other specifications see FHKU-Ryton.</i>				



### FHKSC

**General:**

- compact design
- measuring of very small quantities
- highly suitable for suction operations

**Application:**  
**Beverage industry:** wine, spirits, mineral water, etc. and chemically slightly aggressive media

Specification:	
<b>Meas. range *:</b>	approx. 0.08 - 0.57 liter/min
<b>Nozzle *:</b>	D=1.2 mm
<b>Number of pulses:</b>	approx. 1925 pulses/liter
<b>Pressure range:</b>	-1 ... +0.3 bar (at 20 °C)
<b>Medium viscosity:</b>	< 50 cSt.
<b>Accuracy:</b>	±2 %
<b>Repeatability:</b>	< 0.25 %
<b>Power supply:</b>	3.8-20 V DC; <8 mA
<b>Output signal:</b>	Open collector, NPN
<b>Flow connections:</b>	2 x 6 mm-hose connection
<b>Working temperature:</b>	-10 ... 65 °C
<b>Dimensions:</b>	approx. 57 x 41 x 36 mm.
<b>Material housing:</b>	PBT (Arnite), sealing: silicone
<b>Magnets:</b>	ceramic SrFeO (in contact with medium)

\* = other nuzzles (1.0, 1.8 and 2.0 mm) and correspondingly other meas. ranges upon request.



### EPI

**General:**

- suitable for higher viscous media
- calibratable

**Application:**  
chemicals, oil, sirup, liquid soap, catchup, mayonnaise, cleaning agent concentrate

Specification:	
<b>Meas. range:</b>	approx. 0.06 - 5.35 l/min (depends on viscosity)
<b>Nozzle:</b>	D=7 mm
<b>Number of pulses:</b>	approx. 462 pulses/liter
<b>Pressure range:</b>	max. 10 bar (at 20 °C)
<b>Medium viscosity:</b>	approx. 5 - 8000 cSt.
<b>Accuracy:</b>	± 1 % (depends on viscosity)
<b>Repeatability:</b>	< 0.25 %
<b>Power supply:</b>	4.5-24 V DC; max. 13 mA
<b>Output signal:</b>	Open collector, NPN
<b>Flow connections:</b>	2 x G $\frac{1}{2}$ " IG parallel
<b>Working temperature:</b>	-10 ... 65 °C
<b>Dimensions:</b>	approx. 88 x 68 x 57 incl. plug
<b>Material housing:</b>	PEEK, sealing: Viton
<b>Magnets:</b>	neodymium (not in contact with medium)

## Flow measuring transducer with Hall-effect sensor



**FOR LOW VISCOS, NON AGGRESSIVE LIQUIDS**

### VISION 2008

Flow measuring transducer incl. elbow-type plug

#### General:

- minimum size, maximum accuracy
- easy installation,
- installation in any position possible
- optimum-quality due to high-quality materials used
- no maintenance

#### Application:

- manufacturing of oil and gas burners, flow heaters or cooling systems
- for dish washers and washing machines
- automotive technology (measuring of petro consumption, etc.)
- laboratories, chemical works, pharmaceutical industry
- agriculture and horticulture

#### Specification:

<b>Rotor-position scanning:</b>	Hall-Sensor
<b>Measuring range:</b>	1.5 ... 25 l/min
<b>Resolution:</b>	approx. 1000 pulses/l
<b>Measuring agent:</b>	clean liquids, we recommend filtering with approx. 20 ... 40 micron
<b>Viscosity:</b>	up to approx. 15 cSt.
<b>Accuracy:</b>	±3 % ranging from 10 - 10 %
<b>Repeatability:</b>	< 0.5 %
<b>Working temperature:</b>	-20 ... +100 °C
<b>Operating pressure:</b>	25 bar
<b>Electric connection:</b>	elbow-type plug acc. EN 175301-803/A, type C industrial
<b>Auxiliary energy:</b>	5 - 24 V DC, approx. 8 mA
<b>Multiplier (R):</b>	1 - 2.2 kOhm
<b>Output signal:</b>	frequency 5 - 416 Hz, open collector NPN
<b>Output current:</b>	max. 20 mA
<b>Dimensions:</b>	approx. 55 x 17 x 30 mm
<b>Material:</b>	
<b>Housing:</b>	Grilamid TR55 (PA12)
<b>Rotor:</b>	Grilamid (PA12 Ferrit)
<b>Bearings:</b>	PTFE 15 % graphite
<b>Delivery connection:</b>	G 3/8" thread
<b>DN:</b>	8 mm
<b>Weight:</b>	approx. 15 g



## Axial turbine flow sensor for liquids



### VTH 25 MS - 180

cpl. with 2 m of cable, ready for plug-in.

#### General:

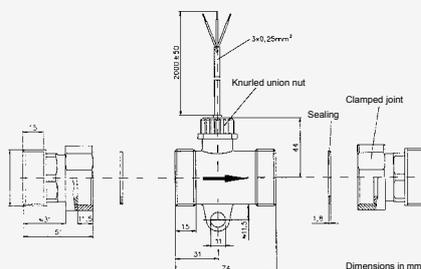
The flow sensor VTH25MS-180 is a measuring transducer used for measuring the volume flow or for dosing. It is suitable for a wide range of applications due to its compact design, large measuring range and high measuring accuracy.

#### Application:

- cooling water measurements, tapping installations, dosing units
- medical technology, plastics industry, laboratory
- solar systems, heating application, heat quantity measurement
- bakery machines, kitchen machines
- machine tools

#### Specification:

<b>Sensor:</b>	Hall-effect-sensor
<b>Measuring range:</b>	4 ... 160 l / min, max. 80 l/min with continuous operation (signal emission as of 1 l / min)
<b>Resolution:</b>	approx. 65 pulses / litre
<b>Measuring agent:</b>	liquids
<b>Max. particle size:</b>	0.5 mm
<b>Measuring accuracy:</b>	±3 % of measured value
<b>Repeatability:</b>	±0.5 %
<b>Working temperature:</b>	Tmax = 85 °C
<b>Max. operating pressure:</b>	10 bar
<b>Auxiliary energy:</b>	10 - 30 V DC
<b>Output signal:</b>	frequency, open collector NPN
<b>Output current:</b>	max. 20 mA
<b>Material:</b>	
<b>Duct:</b>	brass
<b>Turbine cage:</b>	PPO Noryl GFN 3V 960
<b>Rotor:</b>	PPO Noryl GFN 2V 73701, with solenoids
<b>Bearings:</b>	sapphire / PA
<b>Shaft:</b>	CrNi-steel (1.4436)
<b>Delivery connection:</b>	R 1 1/4" - outer thread
<b>Nominal width:</b>	DN 25



## Device for monitoring the level (capacitive)



### GNS-SCV-W

Probe for application in water and all conductive liquids

### GNS-SCV-Z

Probe for application in oil and all no-conductive liquids

#### General:

The GNS-SCV capacitive probes are the best way to monitor the level condition of liquids as water, oil gasoline and solid products as powder and granular.

- Sealed
- No moving parts
- very reliable

#### Application:

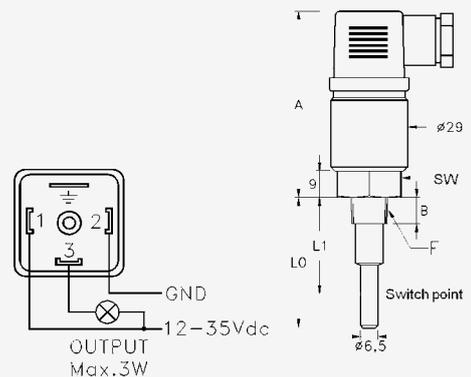
- Water
- Oil
- Gasoline
- Solid products as powder or granular

#### Specification:

<b>Stromversorgung:</b>	12 ... 35 V DC / 5 mA
<b>Schaltausgang:</b>	NPN no-active / max. 3 W
<b>Electrical connection:</b>	Plug EN 175301-803/A
<b>Process connection:</b>	1/4" NPT, Brass
<b>Switch delay:</b>	4 s
<b>Electrode:</b>	Cu-Zn
<b>Electrode coating:</b>	PTFE
<b>Electrode length:</b>	50 mm
<b>Switch point:</b>	
<b>40 mm ± 2 mm</b>	vertical mounting
<b>on the axis of SCV</b>	horizontal mounting
<b>Pressure max.:</b>	25 bar
<b>Temperature max.:</b>	-30 ... +125 °C

#### Dimensions [mm]:

SW	A	B	L0	L1
24	74	10	50	40 ± 2



## Level Switch



### GNS-C1

Level Switch (with 1 microswitch)

### GNS-C2

Level Switch (with 2 microswitches)

#### General:

These level switches offer the most reliable solution for liquid level control where side mounting system is required.

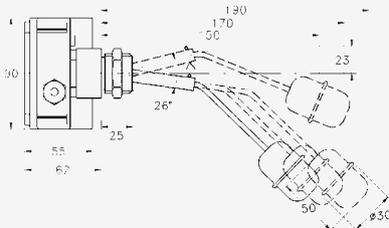
- Switch head magnetically actuated
- 1 or 2 microswitches
- Adjustable stem length
- Brass or AISI-316 construction
- good repeatability
- very reliable

#### Specification:

<b>Processconnection:</b>	G1"
<b>Float - S50 (S.G.):</b>	> 0,7 g/cm <sup>3</sup>
<b>Pressure max.:</b>	25 bar
<b>Temperature max.:</b>	180 °C
<b>Working temperature:</b>	-30 ... +55 °C
<b>Relative Humidity:</b>	0 ... 90 % RH
<b>Hysteresis max.:</b>	20 mm
<b>Weight:</b>	440 g
<b>Body materials:</b>	Natural Brass or Stainless steel (AISI-316)
<b>Float material:</b>	Stainless steel (AISI-316)
<b>Microswitch:</b>	1x or 2x SPDT
<b>Voltage:</b>	250 V AC / 48 V DC
<b>Current:</b>	3AAC / 3ADC
<b>Electr. Connection:</b>	via screw terminals
<b>Wiring:</b>	Independent micro switches separately wired SPDT
<b>Protection Class:</b>	IP65 (Housing)

#### Order Example:

GNS-C2-O: Level switch with 1 microswitch, Body material Brass  
 Body Materials  
 - O Natural Brass  
 - S Stainless Steel AISI - 316



#### Stem position:

	1 Microswitch		2 Microswitch	
	ON	OFF	ON	OFF
Long	-46 mm	-63 mm	-32 mm	-49 mm
Medium	-48 mm	-61 mm	-34 mm	-47 mm
Short	-50 mm	-60 mm	-36 mm	-46 mm

Switch point tolerance: ±5 mm

## Float switch



### RWI-016PPK

Float switch (polypropylene)

### RWI-016PVK

Float switch (PVDF)

### RW-015HKL

Float switch (stainless steel)

#### General:

Mechanical level controller for liquids. A magnet-equipped float triggers a pre-fixed reed switch.

- wall mounting
- reliable
- good repeatability
- stainless steel design for high temperatures

#### Application:

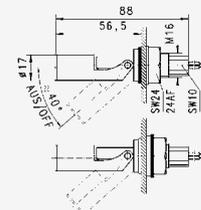
Sensor suitable for: Water, oil

#### Specification:

	RWI-016PPK	RWI-016PVK	RW-015HKL
<b>Measuring principle:</b>	reed switch	reed switch	reed switch
<b>Switch type:</b>	n.c. or n.o depending on installation position		
<b>Switching power:</b>	250 V AC, 0.5 A, 50 VA	250 V AC, 0.5 A, 50 VA	220 V AC, 0.28 A, 30 VA
<b>Density medium:</b>	>0.6 g/cm <sup>3</sup>	>0.75 g/cm <sup>3</sup>	>0.70 g/cm <sup>3</sup>
<b>Working temperature:</b>	max. 90 °C	max. 130 °C	max. 200 °C
<b>Working pressure:</b>	PN = 3 bar	PN = 6 bar	PN = 5 bar
<b>Mounting position:</b>	horizontal	horizontal	horizontal
<b>Protection class:</b>	IP 65	IP 65	IP 65
<b>Electrical connection:</b>	~ 50 cm cable	~ 50 cm cable	~ 60 cm strand
<b>Materials:</b>			
<b>Body:</b>	PP	PVDF	stainl. steel 1.4571
<b>Float:</b>	PP	PVDF	stainl. steel 1.4571
<b>Seal:</b>	viton	viton	
<b>Weight:</b>	approx. 75 g	approx. 75 g	approx. 120 g

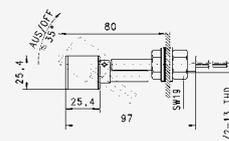
#### Dimension: RWI/016...

Assembly internally:  
Hole diameter Ø 16,5 mm



Assembly externally:  
Hole diameter Ø 23 mm

#### Dimensions: RW-015HKL



## Level transmitter



### LC-S45M...

Level transmitter (brass)

### LC-S44M...

Level transmitter (brass)

### LC-K52K...

Level transmitter (stainless steel)

Final prices depend on type, see price table below

#### General:

A magnet equipped float activates a reed chain inside a tube which is connected to resistors comparable to a potentiometer. The gapless positioning of the sensors provides a continuous signal with good resolution (up to 10-20 mm) and repeatability.

- top assembly
- selectable material combinations
- optional: with user-specific characteristic (for adjustment to tank design)

#### Application:

Sensor suitable for: Water, oil, aggressive substances (only LC-K52K...)

#### Specification:

**Tube length:** 250 mm, 500 mm, 750 mm, 1000 mm, 1500 mm and 2000 mm

**Float travel:** ..0250 ..0500 ..0750 ..1000 ..1500 ..2000

**LC-S45M... :** 190 mm 440 mm 690 mm 940 mm

**LC-S44M... :** 190 mm 440 mm 690 mm 940 mm 930 mm 1430 mm 1930 mm

**LC-K52K... :** 160 mm 410 mm 660 mm 910 mm 1410 mm 1910 mm

**Division (resolution):** 10 mm (LC-S45..., LC-K52K0250) or 20 mm

**Output signal:** 4 - 20 mA (2-wire)

**Optional:** 0 - 10 V (3-wire)

**Auxiliary energy:** 10 ... 30 V DC (at option Flex: 18 ... 30 V DC)

**Electrical connection:** angular connector acc. to EN 175301-803/A (at option Flex: 4-pole locked plug M12 x 1)

**Working temperature:** 0 ... 85 °C

**Working pressure:** max. 20 bar (LC-S...), max. 40 bar (LC-K..)

**Density medium:**  
>0,34 g/cm<sup>3</sup> (LC-S45...),  
>0,44 g/cm<sup>3</sup> (LC-S44...),  
>0,66 g/cm<sup>3</sup> (LC-K52..)

**Mounting position:** vertical, float pointing downwards

**Protection class:** IP 65

**Dimensions:** **LC-S45..**      **LC-S44..**      **LC-K52..**

**Sensor head:** ~50 x 50 x 78 mm    ~60 x 58 x 78 mm    Ø 69 x 78 mm

**Tube length:** according to design type

**Mounting SW:** SW 40                      SW 46                      SW 46

**Screw-in thread:** G1 A                      G1 1/2 A                      G2 A

**Float:** Ø 30 x 45 mm      Ø 44 x 50 mm      Ø 52 x 70 mm

#### Materials:

**Housing:** Ms58                      Ms58                      stainl. steel 1.4571

**Tube:** Ms58                      Ms58                      stainl. steel 1.4571

**Float:** Spansil                      Spansil                      stainl. steel 1.4571

#### Option:

##### AV010:

output signal 0-10 V

##### Flex:

Transmitter with Flex-head (M12-connection)  
user-specific characteristic possible

## Single contact level switch



### GNS-KIT ...

(without rod tube - state when ordering)

#### General:

The user can add by himself the level switch in the desired length the rod tube between the process connection and the float contact unit. The float contact unit is under water protected.

- Sealed under water protected contact
- Rod tube in 500 mm / 1000 mm / 1500 mm available state when ordering
- IP65 protection class

#### Specification:

**Float-contact unit:** Nickel plated brass

**Density:** > 0.35 g/cm<sup>3</sup>

**Pressure max.:** 20 bar

**Temperature max.:** 105 °C

**Connection:** 1/8"

**Reed-contact:** SPDT: 230 V, 60 VA, 1,0 A

**Process connection:** Thread G1", Brass

**Electrical connecton:** Plug EN 175301-803/A

**Protection Class:** IP65

**Seal:** NBR, oil resistant

**Rod-tube:** Ø 8 mm, Brass

#### Rod-tube (state when ordering):

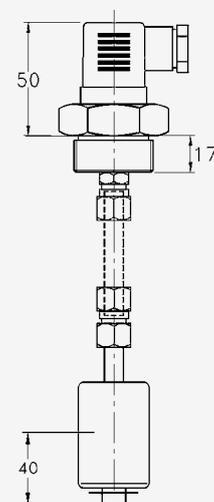
Rod-tube length:

FL = 500 mm

FL = 1000 mm

FL = 1500 mm

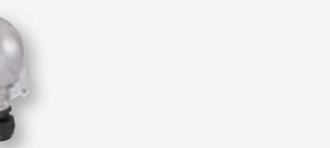
**Order example:** GNS-KIT 1000



Temperature probes



Pt100

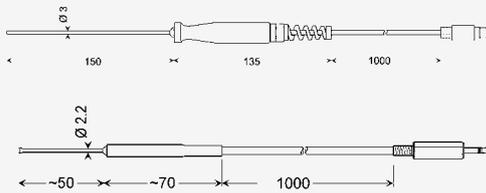


Pt1000

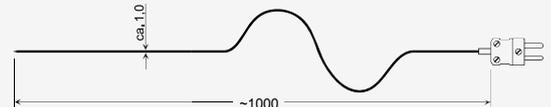


NiCr-Ni (Type K)

Application:	Device	GTF ..	GES ..	GLF 401 Mini	GOF 401 Mini	GTF ..	GES ..	GOF ..	GLF ..	GGF ..	GOF ..	GTZ ..	GTF ..	GES ..	GKF ..	GAF ..
4-pol. Mini-DIN-plug		✓	✓	✓	✓											
3,5 mm Ø jack connection						✓	✓	✓	✓	✓						
Miniature flat-pin plug												✓	✓	✓	✓	✓
Loose ends		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Description		Immersion probe for liquids / gases	Insertion probe for soft media	Probe for measurement of ambient air	Surface probe for solid surfaces	Immersion probe for liquids / gases	Insertion probe for soft media	Surface probe for solid surfaces	Probe for measurement of ambient air	Probe for deep-frozen products	Surface probe for solid surfaces	Clip-on probe	Immersion probe for liquids / gases	Insertion probe for soft media	Probe for compost grain	Asphalt probe
catalog page:		126	126	126	126	127	127	127	127	127	128	128	129	129	129	129



NiCrSi-NiSi (Type N)



NiCr-Ni (Type K)

Rt10Rh-Pt (Type S)

Freely customized probes (Pt100 / Pt1000 / NiCr-Ni)

Application:	Device	GTF 300 ..	GMF ..	GGF ..	GRF ..	GKF	GLS ..	GTT ..	GTF 101 ..	GBF ..	GTF ..	GTF 101 ..	GTF 102 ..	GTF 103 ..	TF 101 ..	GOF 1xx ..
Miniature flat-pin plug		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
Loose ends		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
Sensor head										✓	✓			✓		
- Protection												✓	✓	✓		
Description		Wire probe	Magnetic surface probe	Probe for deep-frozen products	Tire probe	Cable lug probe	Soldering tip probe	Thermo elements	Thermo elements	Probe for burning kilns	Probe for permanent high temperatures	Industrial probes, process connection without thread	Industrial probes, process connection with thread	Industrial probes, process connection with / without thread	Hermetically sealed probe	Self-adhesive probes
catalog page:		130	130	130	130	130	130	131	132	133	133	134/35	134/35	134/36	137	138

# Temperature probes

## ACCURACY

### Pt100 / Pt1000:

sensor accuracy acc. to DIN EN 60751

<b>DIN cl. B:</b> (area of validity: -50 ... +500 °C)	±0.3 °C at 0 °C
<b>DIN cl. A:</b> (area of validity: -30 ... +300 °C)	±0.15 °C at 0 °C
<b>DIN cl. AA = 1/3 DIN cl. B:</b> (0 ... +150 °C)	±0.1 °C at 0 °C
<b>1/10 DIN cl. B:</b>	±0.03 °C at 0 °C

### Thermocouples:

sensor accuracy acc. to DIN EN 60584-2

<b>class 1 for Type K:</b>	±1.5 °C at range -40 ... +375 °C
<b>class 1 for Type N:</b>	±1.5 °C at range -40 ... +375 °C
<b>class 1 for Type S:</b>	±1 °C at range 0 ... 1100 °C

### PLEASE NOTE:

customized probes have to be ordered in writing!  
return or exchange are not possible!

## SPECIAL DESIGNS

### Upcharges:

**basic fee for custom made probe**

**longer probe tube**

upcharge per further starting 100 mm

**longer cable (silicone)**

upcharge per further starting meter

**other cable material**

upcharge per meter, please refer to cable pricing p. 140

**teflon covered probe tube**

(for probes up to 200 mm)

(for probes used in acids and salt water, upper temperature range 250 °C)

**waterproof probe handle**

(casted, only possible with PVC cable -20 ... +105 °C)

**higher sensor accuracy:**

1/3 DIN class B, for Pt100 and Pt1000, tolerances: 0.1 °C at 0 °C

**higher sensor accuracy:**

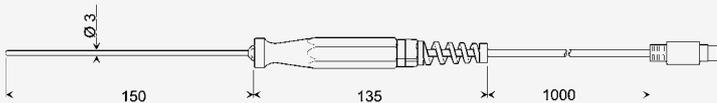
1/10 DIN class B, for Pt100-probes, tolerances: 0.03 °C at 0 °C

## Pt100 Measuring probe

### Immersion probe for liquids / gases, 4-wire

#### GTF 401

-50 ... +400 °C, DIN cl. B



#### Specification:

non-corrosive stainless steel tube (V4A), plastic handle, approx. 1 m 4-wire PVC cable, anti-buckling glanding, 4-pin miniature DIN-type plug

**Response time T<sub>90</sub>** approx. 10 s, air approx. 40 s

**suitable for** GMH 2000(SA), GMH 3530, GMH 3710, GMH 3750

#### GTF 401 1/3 DIN \*

-50 ... +400 °C, as GTF401 however 1/3 DIN class B (±0.1 °C at 0 °C)

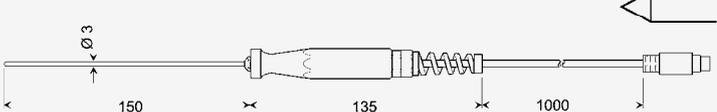
#### GTF 401 1/10 DIN \*

-50 ... +400 °C, as GTF401 however 1/10 DIN class B (±0.03 °C at 0 °C) and flexible jacket tube, Ø 3 mm

### Insertion probe for soft media, 4-wire

#### GES 401

-50 ... +400 °C, DIN cl. B



#### Specification:

Specification as for GTF401 but with needle type prod

**Response time T<sub>90</sub>** approx. 10 s

**suitable for** GMH 2000(SA), GMH 3530, GMH 3710, GMH 3750

#### GES 401 1/3 DIN \*

-50 ... +400 °C, as GES401 however 1/3 DIN class B (±0.1 °C at 0 °C)

### Immersion probe for liquids / gases, 4-wire

#### GTF 601

-200 ... +600 °C, DIN cl. B

#### Specification:

handle as per GTF150, approx. 1 m 4-wire PVC cable, 4-pin miniature DIN-type plug, flexible jacket tube, 3 mm Ø. (smaller tube diameter upon request)

**Response time T<sub>90</sub>** approx. 10 s

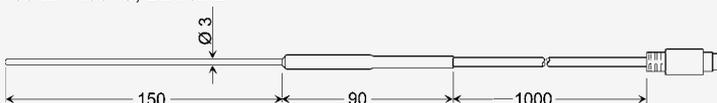
**suitable for** GMH 2000(SA), GMH 3530, GMH 3710, GMH 3750

#### GTF 601 1/3 DIN \*

-200 ... +600 °C, as GTF601 however 1/3 DIN class B (±0.1 °C at 0 °C)

#### GTF 35

-50 ... +400 °C, DIN cl. B



#### Specification:

non-corrosive stainless steel tube (V4A), approx. 1 m 4-wire PVC cable, 4-pin miniature DIN-type plug

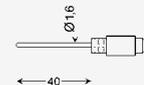
**Response time T<sub>90</sub>** approx. 10 s

**suitable for** GMH35xx, GMH3710, GMH3750

### Fast and accurate Measurement of ambient air

#### GLF 401 Mini

-25 ... +70 °C, DIN cl. A



#### Specification:

Ø 1.6 mm, FL = approx. 40 mm, 4-pin mini DIN-type plug, fast and accurate measurement of ambient air

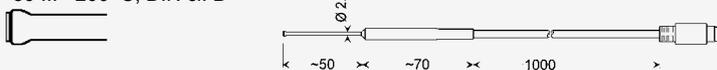
**Response time T<sub>90</sub>** approx. 15 s

**suitable for** GMH 3530, GMH 3710, GMH 3750

### Surface probe for solid surfaces

#### GOF 401 Mini

-50 ... +200 °C, DIN cl. B



#### Specification:

2 x 2.3 mm ceramic Pt1000 sensor mounted at the tip, V4A tube, 4-wire PVC cable with 4-pin miniature DIN-type plug

**Response time T<sub>90</sub>** approx. 15 s

**suitable for** GMH 3530, GMH 3710, GMH 3750

\* Please note the area of validity for the class of accuracy given above.

Pt1000 - Measuring probes, 2-wire

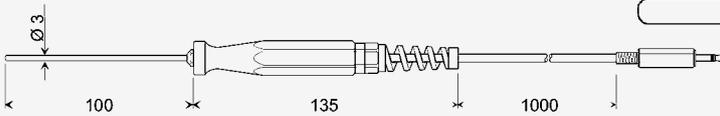
Immersion for liquids / gases

**GTF 175**

-70 ... +200 °C, Pt1000 cl. B

**GTF 175 LE**

like before but with loose cable ends



**Specification:**

non-corrosive stainless steel tube (V4A), plastic handle, anti-buckling glanding, 1 m highly flexible silicone cable, 3.5 mm gold plated jack connector

**Response time T<sub>90</sub>** fluids approx. 10 s, air approx. 40 s

**GTF 175 suitable for** GMH 175, GFTH 200

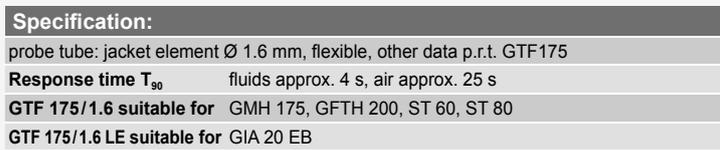
**GTF 175 LE suitable for** GIA 20 EB

**GTF 175 / 1.6**

-70 ... +200 °C, Pt1000 cl. B

**GTF 175 / 1.6 - LE**

like before but with loose cable ends



**Specification:**

probe tube: jacket element Ø 1.6 mm, flexible, other data p.r.t. GTF175

**Response time T<sub>90</sub>** fluids approx. 4 s, air approx. 25 s

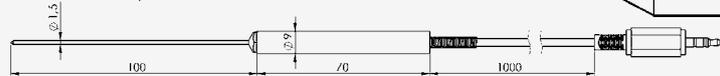
**GTF 175/1.6 suitable for** GMH 175, GFTH 200, ST 60, ST 80

**GTF 175/1.6 LE suitable for** GIA 20 EB

Insertion probe for soft media

**GES 20**

-70 ... +250 °C, Pt1000 cl. B



**Specification:**

V4A tube with Ø 1.5 mm slim insertion tip, small Teflon handle, stainless steel kink protection, 1 m Teflon cable, Ø 3.5 mm gold-plated jack plug

**Response time T<sub>90</sub>** approx. 5 s

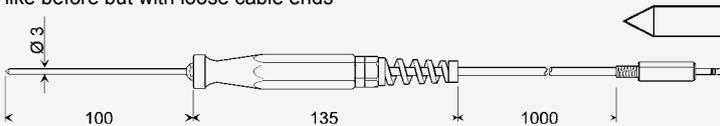
**suitable for** GMH 175, GFTH 200

**GES 175**

-70 ... +200 °C, Pt1000 cl. B

**GES 175 LE**

like before but with loose cable ends



**Specification:**

stainless steel tube (V4A) with slim insertion tip, other data p.r.t. GTF175

**Response time T<sub>90</sub>** approx. 10 s

**GES 175 suitable for** GMH 175, GFTH 200

**GES 175 LE suitable for** GIA 20 EB

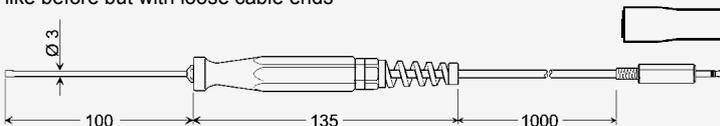
Surface probe for solid surfaces

**GOF 175**

-70 ... +200 °C, Pt1000 cl. B

**GOF 175 LE**

like before but with loose cable ends



**Specification:**

S2 x 2.3 mm ceramic Pt1000 sensor mounted at the tip. V4A tube, quadratic 3 x 3 mm at the tip, other data p.r.t. GTF175

**Response time T<sub>90</sub>** approx. 60 s

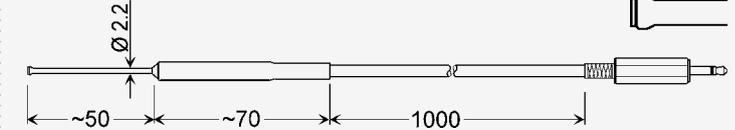
**GOF 175 suitable for** GMH 175

**GOF 175 LE suitable for** GIA 20 EB

Surface probe for solid surfaces, fast

**GOF 175 Mini**

-70 ... +200 °C, Pt1000 cl. B



**Specification:**

S2 x 2.3 mm ceramic Pt1000 sensor mounted at the tip, V4A tube, 1 m silicone cable, 3.5 mm gold plated jack connector

**Response time T<sub>90</sub>** approx. 15 s

**suitable for** GMH 175, GFTH 200

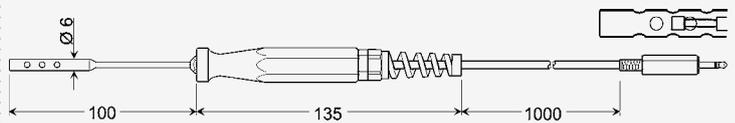
Air/gas probe for clean media

**GLF 175**

-70 ... +200 °C, Pt1000 cl. B

**GLF 175 LE**

like before but with loose cable ends



**Specification:**

(for dirty measurands use GTF175), punched V4A protection tube, fast miniaturized Pt1000 mounted freely in tube, resulting in fast response, other data p.r.t. GTF175

**Response time T<sub>90</sub>** approx. 15 s

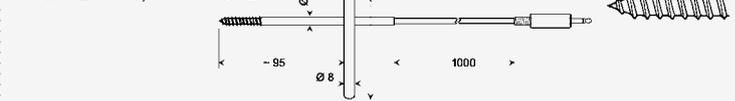
**GLF 175 suitable for** GMH 175, GFTH 200

**GLF 175 LE suitable for** GIA 20 EB

Probe for deep-frozen products

**GGF 175**

-70 ... +200 °C, Pt1000 cl. B



**Specification:**

to screw into deep-frozen products, etc. no predrilling required. Stainless steel (V4A) tube, 6 mm Ø with screw prod, flexible silicone cable, 3.5 mm phono plug, gold plated

**Response time T<sub>90</sub>** approx. 15 s

**suitable for** GMH 175, GFTH 200

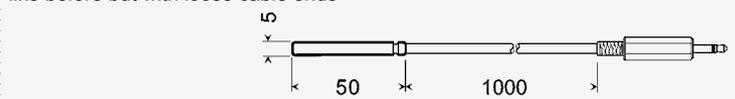
Air- / tube mounting probe

**GTF 2000**

-50 ... +200 °C, Pt1000 cl. B

**GTF 2000 LE**

like before but with loose cable ends



**Specification:**

Probe for diving tube. Tube of stainless steel, highly flexible silicone cable 2 x 0.25<sup>2</sup>, 3.5 mm gold plated phono plug, customized cable lengths (1 m standard), each beginning meter

**Option**

**-WD**  
water proof type, Construction like described before, but cable of PVC and tube enclosed water proof, max. 105 °C!

All types of probes also available for Pt100 2- / 3- or 4-wire connection

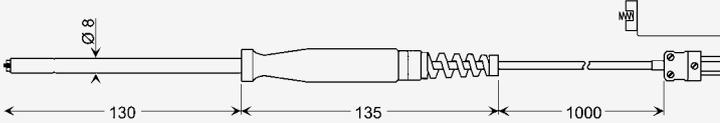
We manufacture all types of probes according to your special desires - low priced and fast. Please contact us.

# NiCr-Ni (Type K) - Measuring Probe

## Surface probe

### GOF 130

-65 ... +900 °C



#### Specification:

for any solid surface

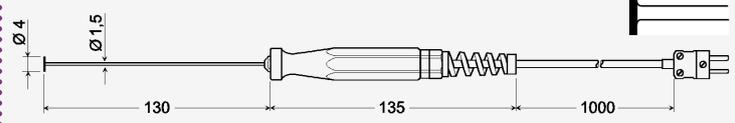
**Response time  $T_{90}$**  approx. 2 s

**further technical details:** 2 laser welded NiCr-Ni resilient springs, V4A-tube, plastic handle, silicone cable, DIN-type flat-pin plug

## Surface, immersion, air, gas probe

### GOF 500

-65 ... +500 °C



#### Specification:

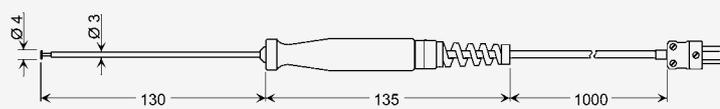
for any solid surface

**Response time  $T_{90}$**  approx. 5 s

**further technical details:** Solid copper plate, plastic handle, silicone cable, DIN-type flat-pin plug

### GOF 130CU

-65 ... +500 °C



#### Specification:

for straight and solid metal surfaces

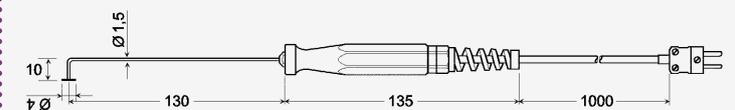
**Response time  $T_{90}$**  approx. 3 s

**further technical details:** Spring-loaded copper plate, plastic handle, silicone cable, DIN-type flat-pin plug

## Surface probe

### GOF 500 HO

-200 ... +500 °C



#### Specification:

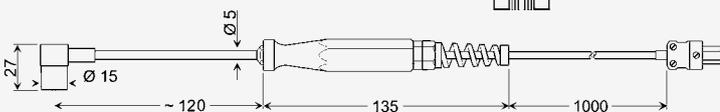
for fastest measurements

**Response time  $T_{90}$**  approx. 5 s

**further technical details:** Solid copper plate, Ø 1,5 MTE (K) Inconel 600, plastic handle, silicone cable, DIN-type flat-pin plug

### GOF 200HO

-65 ... +400 °C



#### Specification:

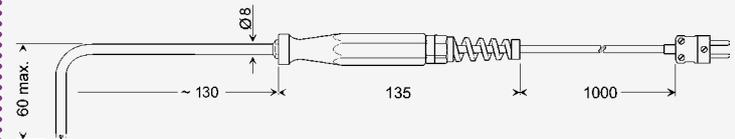
for fastest measurements in small gaps

**Response time  $T_{90}$**  approx. 2 s

**further technical details:** Small elbow-type, flexible thermocouple tapes, plastic handle, silicone cable, DIN-type plug

### GOF 900 HO

-65 ... +900 °C



#### Specification:

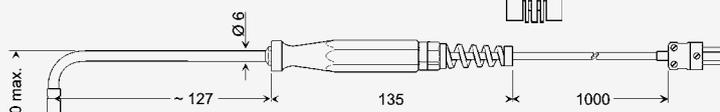
for any solid surface

**Response time  $T_{90}$**  approx. 2 s

**further technical details:** 2 laser welded NiCr-Ni resilient springs, V4A-tube, plastic handle, silicone cable, DIN-type flat-pin plug

### GOF 400HO

-65 ... +400 °C



#### Specification:

for fastest measurements

**Response time  $T_{90}$**  approx. 2 s

**further technical details:** Flexible thermocouple tapes, plastic handle, silicone cable, DIN-type plug

## Clip-on probe

### GTZ 300

-65 ... +150 °C



#### Specification:

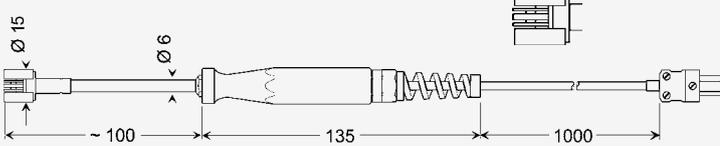
for temperature measurements at tube surfaces

**Response time  $T_{90}$**  approx. 3 s

**further technical details:** for tubes up to approx. 1" Ø, silicone cable, DIN-type flat-pin plug

### GOF 400VE

-65 ... +400 °C



#### Specification:

for fastest measurements

**Response time  $T_{90}$**  approx. 2 s

**further technical details:** Flexible thermocouple tapes, plastic handle, silicone cable, DIN-type plug

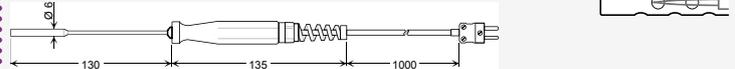
#### Accessories and spare parts:

**MH 400VE:**  
magnet holder, heat resistant up to 100 °C

## Air/gas probe

### GTL 130

-65 ... +600 °C



#### Specification:

room temperature, smoke gases etc.

**Response time  $T_{90}$**  approx. 1.5 s

**further technical details:** Stainless steel (V4A) tube, plastic handle, silicone cable, DIN-type flat-pin plug

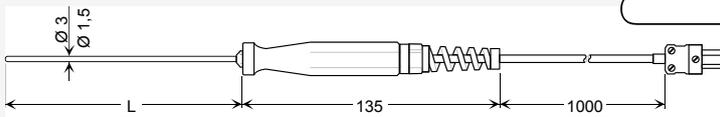
class 1 = highest precision-class according to DIN

NiCr-Ni Standard Measuring Probe „Type K“ (ctd.)

Immersion probe

**GTF 400**

-65 ... +550 °C



**Specification:**

inexpensive, fast, elastic (rigid)

**Response time T<sub>90</sub>** approx. 3 s

**further technical details:** Stainless steel tube 1.5 Ø, L=130 mm, silicone cable, DIN-type flat-pin plug

**GTF 900**

-65 ... +1000 °C



**Specification:**

inexpensive, elastic (rigid)

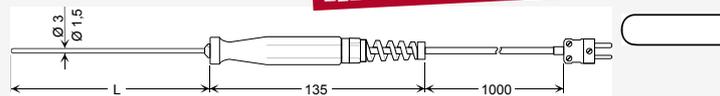
**Response time T<sub>90</sub>** approx. 5 s

**further technical details:** Stainless steel tube, 3 Ø, L=130mm, silicone cable (any length against upcharge) each additional 100 mm

Immersion probe for High-temperature

**GTF 1200**

-200 ... +1150 °C



**Specification:**

flexible thermowell

**Response time T<sub>90</sub>** approx. 3 s

**further technical details:** Inconel 1.5 Ø, L=150 mm, silicone cable, DIN-type flat-pin plug

Immersion probe

**GTF 1200/300**

-200 ... +1150 °C



**Specification:**

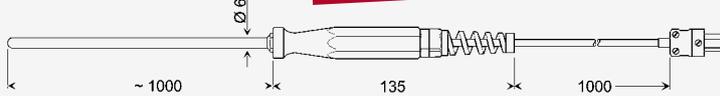
flexible thermowell

**Response time T<sub>90</sub>** approx. 5 s

**further technical details:** Inconel 3 Ø, L=300 mm, silicone cable, DIN-type flat-pin plug

**GTF 1000 AL**

-200 ... +1000 °C



**Specification:**

for aluminium melt, non-ferrous metal, etc.

**Response time T<sub>90</sub>** approx. 30 s

**further technical details:** V4A tube Ø 6x1.4 mm, L=1000 mm rigid, plastic handle, 1 m silicone cable, DIN-type flat-pin plug, add. internal jacket TC, high lifetime

Core temperature- / food probe

**GES 20K**

-65 ... +550 °C



**Specification:**

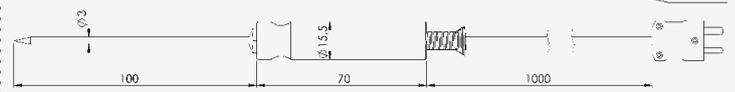
V4A tube with Ø 1.5 mm slim insertion tip, small Teflon handle, stainless steel kink protection, 1 m Teflon cable, miniature flat plug

**Response time T<sub>90</sub>** approx. 3 s

**Use for** canteen kitchen, bakeries, butcher's shops, etc.

**GES 21K**

-50 ... +250 °C



**Specification:**

big white teflon handle water- and steam-tight, stainless steel anti-buckling

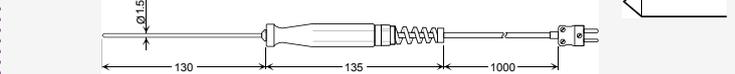
**Response time T<sub>90</sub>** approx. 5 s

**further technical details:** 1 m teflon cable, DIN-type flat-pin plug, teflon handle Use for canteen kitchen, bakeries, butcher's shops, etc.

Insertion probe

**GES 130**

-65 ... +550 °C



**Specification:**

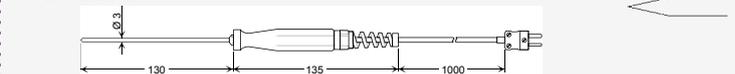
for soft media

**Response time T<sub>90</sub>** approx. 3 s

**further technical details:** Flexible stainless steel (V4A) needle, 1.5 mm Ø, plastic handle, silicone cable, DIN-type flat-pin plug

**GES 500**

-65 ... +550 °C



**Specification:**

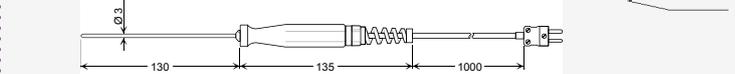
for soft media

**Response time T<sub>90</sub>** approx. 5 s

**further technical details:** Flexible stainless steel (V4A) needle, 3 mm Ø

**GES 900**

-65 ... +1000 °C



**Specification:**

inexpensive, elastic (rigid)

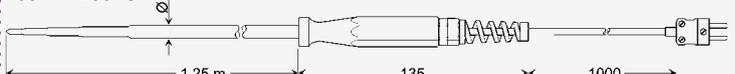
**Response time T<sub>90</sub>** approx. 5 s

**further technical details:** Stainless steel (V4A) tube, 3 Ø, L=130 mm, plastic handle, silicone cable, DIN-type flat-pin plug

Probe for compost, grain etc.

**GKF 125**

-65 ... +200 °C



**Specification:**

quick response within seconds but also rigid design

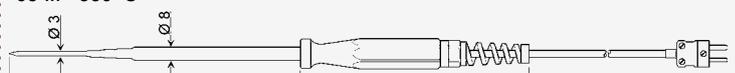
**Response time T<sub>90</sub>** approx. 6 s

**further technical details:** V4A tube 8 mm dia. reduced to 3 mm, plastic handle, silicone cable, DIN-type flat-pin plug

Injection or asphalt probe

**GAF 200**

-65 ... +550 °C



**Specification:**

for liquid or soft media etc.

**Response time T<sub>90</sub>** approx. 6 s

**further technical details:** V4A tube 8 mm dia. reduced to 3 mm, plastic handle, spiral cable stretchable to 1.2 m, DIN-type flat-pin plug

Upcharge for other probe length each 100 mm

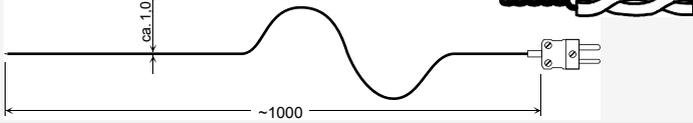
Probes as Pt100 or Pt1000 upon request

# NiCr-Ni Standard Measuring Probe „Type K“ (ctd.)

## Drahtfühler

### GTF 300

-65 ... +300 °C, Insulation up to max. +250 °C



#### Specification:

Quick-response measurements in air, liquids, for very small surfaces

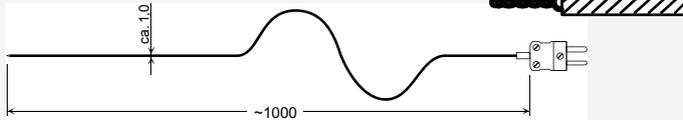
**Response time  $T_{90}$**  approx. 0.3 s

**further technical details:** Twisted pair of teflon in-sulated thermowell wires, 0.2 mm  $\varnothing$  each, welded measuring prod, very flexible, DIN-type flat-pin plug.

**Any length (up to 50 m) against upcharge.**

### GTF 300 GS

-65 ... +400 °C



#### Specification:

For high temperatures in gases, air and for solid surfaces (not suitable for liquids)

**Response time  $T_{90}$**  approx. 0.3 s

**further technical details:** Pair of glass fibre insulated thermowell wires, 0.2 mm  $\varnothing$  each, DIN-type flat-pin plug.

**Upcharge for special length of probe**

## Magnetic surface probe

### GMF 250

-65 ... +250 °C



#### Specification:

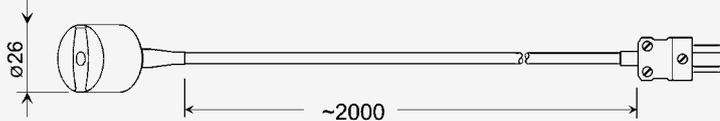
sticks at magnetic materials, resilient measuring probe with small metal plate, approx. 5 mm dia.

**Response time  $T_{90}$**  approx. 5 s

**further technical details:** approx. 1 m of twisted teflon insulated wire, DIN-type flat-pin plug

### GMF 200

-65 ... +200 °C



#### Specification:

sticks at magnetic materials, resilient measuring probe with small metal plate, approx. 5 mm dia.

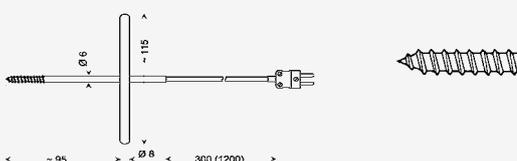
**Response time  $T_{90}$**  approx. 5 s

**further technical details:** extended type (higher magnetic force), rigid 2 m silicone cable, DIN-type flat-pin plug

## Probe for deep-frozen products

### GGF 200

-65 ... +200 °C



#### Specification:

to screw into deep-frozen products, etc. no predrilling required

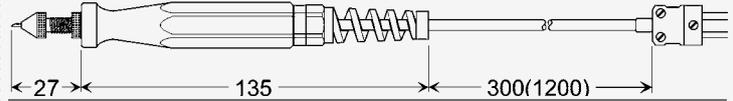
**Response time  $T_{90}$**  approx. 10 s

**further technical details:** Stainless steel (V4A) tube, 6 mm  $\varnothing$  with screw prod, spiral cable (approx. 1.2 m drawn out), DIN-type flat-pin plug

## Tire probe

### GRF 200

-50 ... +200 °C



#### Specification:

fast response insertion probe with stop screw (needle adjustable 0 ... approx. 14 mm). Suitable for measuring temperature of tires and other soft media.

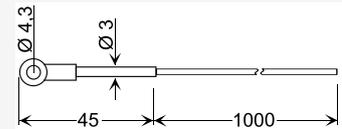
**Response time  $T_{90}$**  approx. 5 s

**further technical details:** plastic handle, spiral cable (approx. 1.2 m drawn out), DIN-type flat-pin plug

## Cable lug probe

### GKF 250

-50 ... +250 °C



#### Specification:

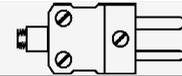
**Response time  $T_{90}$**  approx. 10 s

**further technical details:** 1 m teflon cable, loose ends

## Soldering tip probe

### GLS 500

-50 ... +500 °C



#### Specification:

for direct connection to instrument

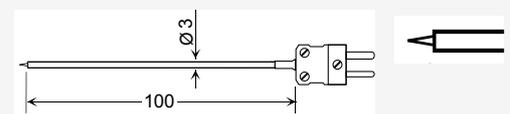
**Response time  $T_{90}$**  approx. 2 s

**further technical details:** thermo couple springs (~5 mm) with laser welded measuring point (wires 0.3  $\varnothing$ ), ceramic tube approx. 6  $\varnothing$ , DIN-type flat-pin plug

## Air-/Gas probe

### GTO 130 OK

-65 ... +400 °C



#### Specification:

(changeable probe without cable) limited suitable also for surfaces

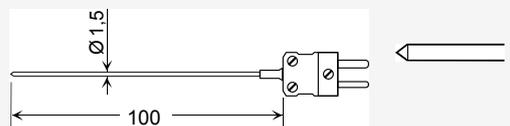
**Response time  $T_{90}$**  approx. 2 s

**further technical details:** NiCr-Ni-wire 0.5  $\varnothing$ , welded and grinded flat, V4A-tube, DIN-type flat-pin plug, rigid connection

## Insertion probe

### GTE 130 OK

-65 ... +400 °C



#### Specification:

(plug-in type without cable) for soft media

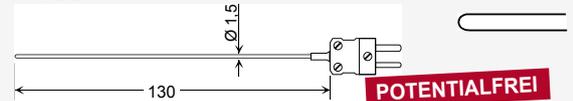
**Response time  $T_{90}$**  approx. 3 s

**further technical details:** Flexible stainless steel (V4A) needle, 1.5 mm  $\varnothing$ , DIN-type flat-pin plug, rigid connection

## Immersion probe

### GTT 1150 OK

-200 ... +1150 °C



#### Specification:

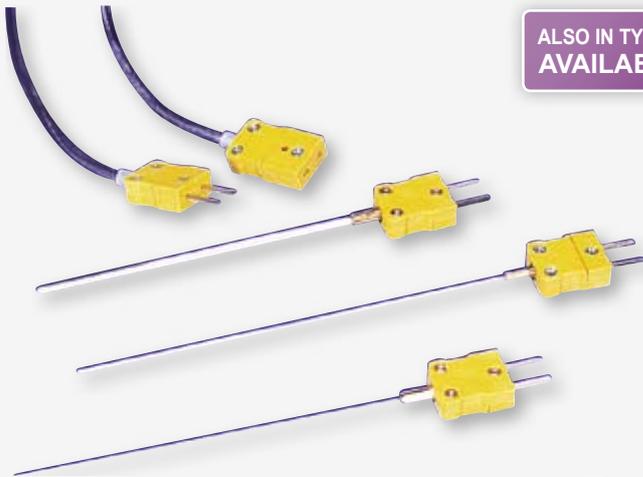
(also suitable for gases/air - use as surface probe limited)

**Response time  $T_{90}$**  approx. 3 s

**further technical details:** Thermowell, Inconel 1.5 mm  $\varnothing$ , electrically insulated, flexible, DIN-type flat-pin plug, rigid connection, (other length or  $\varnothing$  p.r.t. p. 131)

Customized jacket thermo elements NiCr-Ni, low price standard lengths available from stock

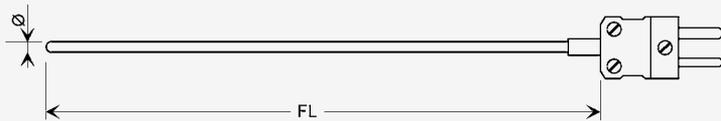
1. Jacket thermo elements NiCr-Ni (type K) complete with miniature flat-pin plug NST1200 (free from thermal e.m.f.)



ALSO IN TYPE N AVAILABLE

FLAT-PIN PLUG FREE FROM THERMAL E.M.V.

- Same material for contacts and thermo elements
- No incorrect temperature values due to different materials
- Polarity cannot be mixed up
- One plug size for Ø from 0.5 ... 6.0 mm
- Any extension possible (extension cable VKA-1m or length per customers' requests)
- Sensor elements can be exchanged easily



Type:	Ø mm	FL mm ±10mm
GTT05150	0.5	160
GTT05250		260
GTT05500		510
GTT051000		1010
GTT051500		1510
GTT10150	1.0	145
GTT10250		245
GTT10500		495
GTT101000		995
GTT101500		1495
GTT15150	1.5	145
GTT15250		245
GTT15500		495
GTT151000		995
GTT151500		1495
GTT30150	3.0	145
GTT30250		245
GTT30500		495
GTT301000		995
GTT301500		1495
GTT60150	6.0	145
GTT60250		245
GTT60500		495
GTT601000		995
GTT601500		1495

Specification:	
<b>Jacket material:</b>	Inconel 600, flexible - other materials upon request
<b>Insulation:</b>	highly compressed pure MgO
<b>Thermo wires:</b>	NiCr-Ni, DIN IEC 584, welding insulated (volt-free)
<b>Accuracy:</b>	optimum accuracy (cl. 1) = ±1.5 °C or ±0.4 % of measuring value (Almost double accuracy as compared to class 2. As a comparison with class 2: ±2.5 °C or ±0.75 % of meas. value)
<b>Temperature application range:</b>	-220 ... +1150 °C (Probe tip and front part; wire outlet: max. 200 °C) (Accuracy class 1 applicable from -40 ... +1000 °C)

Accessories and spare parts:	
<b>NKU1200</b>	(coupling free from thermal e.m.f.)
<b>NKU1200O</b>	(U-coupling free from thermal e.m.f.)
<b>NST1200</b>	(plug free from thermal e.m.f.)
<b>AGL1</b>	(silicone compensation line)
<b>VKA-1m</b>	plug-in extension cable

(Delivery on short notice from stock or within 1 or 2 working days) - please do not hesitate to contact us!

All thermo elements accuracy class 1 (Almost double accuracy than class 2!)

## Customized jacket thermo elements NiCr-Ni

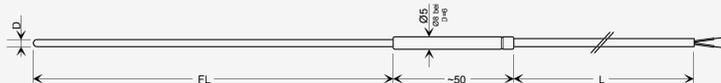
2. Jacket thermo elements NiCr-Ni (type K) complete with cable sleeve and 1 m silicone cable (compensation line), loose wire ends

ALSO IN TYPE N  
AVAILABLE



MECHANICALLY SOUND

- Can be subjected to high temperatures and pressures
- Resistant to aggressive atmospheres
- Minimum dimensions, therefore short response times
- Flexible  
(the smaller the diameter the smaller the bending radii)
- Potential-free (thermoelement wires have no connection to the outer jacket)
- Optimum accuracy acc. to DIN IEC584 class 1



L = 1 m, for other cable length or other accessories p.r.t. accessories

Type:	Ø mm	FL mm <sup>-20mm</sup>
GTF101-5/05150	0,5	150
GTF101-5/05250		250
GTF101-5/05500		500
GTF101-5/051000		1000
GTF101-5/051500		1500
GTF101-5/10150	1,0	130
GTF101-5/10250		230
GTF101-5/10500		480
GTF101-5/101000		980
GTF101-5/101500		1480
GTF101-5/15150	1,5	130
GTF101-5/15250		230
GTF101-5/15500		480
GTF101-5/151000		980
GTF101-5/151500		1480
GTF101-5/30150	3,0	130
GTF101-5/30250		230
GTF101-5/30500		480
GTF101-5/301000		980
GTF101-5/301500		1480
GTF101-5/60150	6,0	130
GTF101-5/60250		230
GTF101-5/60500		480
GTF101-5/601000		980
GTF101-5/601500		1480

Specification:	
<b>Jacket material:</b>	Inconel 600, flexible - other materials upon request and against upcharge
<b>Insulation:</b>	highly compressed pure MgO
<b>Thermo wires:</b>	NiCr-Ni, DIN IEC 584, welding insulated (volt-free)
<b>Accuracy:</b>	optimum accuracy (cl. 1) = $\pm 1.5$ °C or $\pm 0.4$ % of measuring value (Almost double accuracy as compared to class 2. As a comparison with class 2: $\pm 2.5$ °C or $\pm 0.75$ % of meas. value)
<b>Connecting cable:</b>	silicone compensation line, 1 m long (max. 200 °C), loose ends. (Longer line or other material against upcharge)
<b>Temperature application range:</b>	-220 ... +1150 °C (Probe tip and front part; wire outlet: max. 200 °C, for cable p.r.t. accessories) (Accuracy class 1 applicable from -40 ... +1000 °C)

Accessories and spare parts:	
<b>Clamping screw connection</b>	Ø 1.5, 3.0 or 6.0 mm
<b>Silicone cable</b>	(up to 200 °C)
<b>G4P Glass silk cable</b>	(up to 400 °C)
<b>NST1200</b>	Internal flat-pin plug

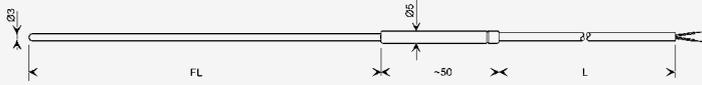
Other accessories see page 131

Delivery on short notice from stock or within 1 or 2 working days - please do not hesitate to contact us!

All thermo elements accuracy class 1 (Almost double accuracy than class 2!)

NiCrSi-NiSi (type N) - measuring probe (class 1)

HIGH TEMPERATURES  
COST-EFFICIENT MEASUREMENTS



**GTF101-N03250**

-50 ... +1300 °C, (short-term up to 1330 °C), FL=250 mm

**GTF101-N03500**

as above, but FL = 500 mm

**GTF101-N031000**

as above, but FL = 1000 mm

Probe Ø 3 mm

**Mantle material:** nickel-chromium-based stainless steel with extraordinary resistivity against oxidation at high temperatures and excellent corrosion resistance in chlorine and ammoniacal environments. A protective layer emerges at temperatures of approx. 980 °C and provides improved accuracy compared to other mantle materials.

The temperature can be applied to high temperatures for a longer period without noteworthy drift.

The K-effect (near-order effect) is much smaller for type N thermocouples than for type K thermocouples.

**Application:** temperature measurement of exhaust fumes

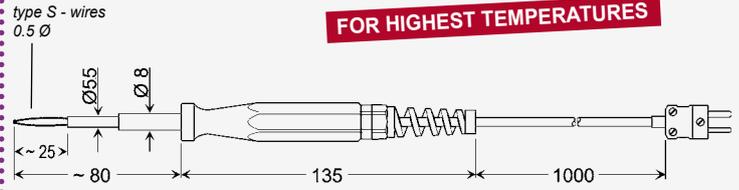
**Specifications:**

Response time $T_{90}$ :	approx. 5 s
Probe tube:	nickel-chromium-based stainless steel Ø 3 mm
Cable:	1 m silicone cable, loose ends

Surcharge for arbitrary cable length

Pt10Rh-Pt (type S) - measuring probe (class 1)

FOR HIGHEST TEMPERATURES



**GBF 1550**

+50 ... +1550 °C

Bunsen burner probe

Probe tip may be directly exposed to the flame.

**Specifications:**

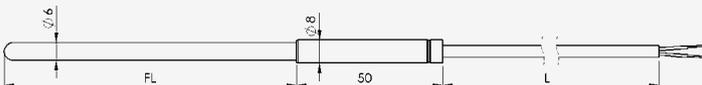
Response time $T_{90}$ :	approx. 2 s
Probe tube:	V4A tube Ø 8 mm, with reduced ceramic tube Ø 5.5 mm, plastic handle
Cable:	silicone cable
Connection:	thermovoltage-free flat-pin plug type „S“

Limit deviations for thermocouples DIN EN 60584-2 or IEC 60584 part 2

class 1

Type	Deviation	temperature range
Type T (Cu-CuNi)	± 0.5 °C	-40 ... +125 °C
	± 0.004 * [t]	+125 ... 350 °C
Type E (NiCr-CuNi)	± 1.5 °C	-40 ... +375 °C
	± 0.004 * [t]	+375 ... +800 °C
Type J (Fe-CuNi)	± 1.5 °C	-40 ... +375 °C
	± 0.004 * [t]	+375 ... +750 °C
Type K (NiCr-Ni)	± 1.5 °C	-40 ... +375 °C
	± 0.004 * [t]	+375 ... +1000 °C
Type N (NiCrSi-NiSi)	± 1.5 °C	-40 ... +375 °C
	± 0.004 * [t]	+375 ... +1000 °C
Type S (Pt10%Rh-Pt)	± 1 °C	0 ... +1100 °C
	± [1 + 0.003 * (t - 1100)] °C	+1100 ... +1600 °C
Type R (Pt13%Rh-Pt)	± 1 °C	0 ... +1100 °C
	± [1 + 0.003 * (t - 1100)] °C	+1100 ... +1600 °C

HIGH TEMPERATURES (PERMANENTLY UP TO 1300 °C)  
COST-EFFICIENT MEASUREMENTS



**GTF101-N06250**

-50 ... +1300 °C, (short-term up to 1330 °C), FL = 250 mm; more robust design with thicker protective cover

**GTF101-N06500**

as above, but FL = 500 mm

**GTF101-N061000**

as above, but FL = 1000 mm

Probe Ø 6 mm

Probe for permanently high temperatures, other data as probe Ø 3 mm

**Specifications:**

Response time $T_{90}$ :	approx. 10 s
Probe tube:	nickel-chromium-based stainless steel Ø 6 mm
Cable:	1 m silicone cable, loose ends

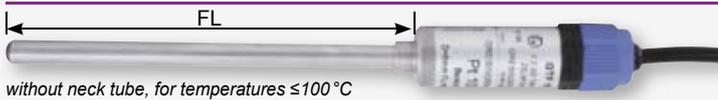
Surcharge for arbitrary cable length

additional probes (type N) see pages 131/132

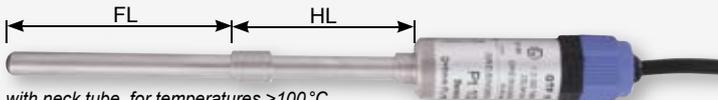


## Industrial temperature probes (ATEX 100)

For all potentially explosive atmospheres of the equipment-group II with the protection (i) or (e)



without neck tube, for temperatures  $\leq 100^\circ\text{C}$



with neck tube, for temperatures  $> 100^\circ\text{C}$

### GTF 101-Ex

-200°C ... +100°C (without neck tube)  
-200°C ... +900°C (with neck tube)

#### General:

Readily assembled voltage free temperature probe of stainless steel with connection cable. The sensor inset is not exchangeable. Mounting is done via separate clamping ring fittings GKV.

#### Upcharges:

#### Sensors:

**Pt100 / Pt1000; mineral insulated element, 4-wire:**  
meas. range: -200°C ... +100°C (600°C - with neck tube), DIN cl. B  
**type K or N, mineral insulated thermocouple:**  
meas. range: -200°C ... +100°C (900°C - with neck tube), class 1

#### Probe length:

up to 100mm (without upcharge)  
upcharge per further starting 100 mm

#### Neck tube length:

without (without upcharge)  
upcharge per starting 100 mm

#### Probe diameter:

3 mm, 4 mm, 5 mm, 6 mm oder 8 mm (without upcharge)

#### Cable:

silicone cable, standard length 1 m  
upcharge per further starting m cable

#### Ambient temperature:

-20 ... +60°C (protection type „e“) or -20 ... +80 °C (protection type „i“)

#### Type of protection:

„i“ : intrinsic safety (without upcharge)  
„e“: increased safety

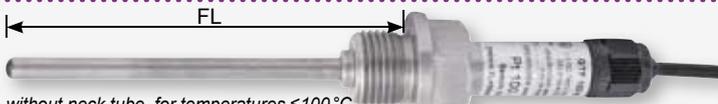
#### Potentially explosive atmospheres:

suitable for zone 1, zone 2, zone 21, zone 22

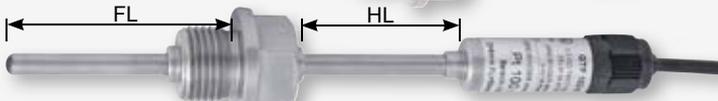
#### Clamping ring screw connection:

available at M8x1, M10x1, G1/4" and G1/2" for diameter 3 mm, 6 mm or 8 mm.  
Please refer to page 139

To determine exact order name ask for our type list. Download via homepage possible (Products -->Ex-Protection-->Temperature probes).



without neck tube, for temperatures  $\leq 100^\circ\text{C}$



with neck tube, for temperatures  $> 100^\circ\text{C}$

### GTF 102-Ex

-200°C ... +100°C (without neck tube)  
-200°C ... +900°C (with neck tube)

#### General:

Readily assembled voltage free temperature probe of stainless steel with connection cable. The sensor inset is not exchangeable. Thread is welded or brazed to the probe.

#### Upcharges:

#### Sensors:

**Pt100 / Pt1000, mineral insulated element, 4-wire:**  
meas. range: -200°C ... +100°C (600°C - with neck tube), DIN cl. B  
**type K or N, mineral insulated thermocouple:**  
meas. range: -200°C ... +100°C (900°C - with neck tube), class 1

#### Probe length:

up to 100 mm (without upcharge)  
upcharge per further starting 100 mm

#### Neck tube length:

without (without upcharge)  
upcharge per starting 100 mm

#### Probe diameter:

3 mm, 4 mm, 5 mm, 6 mm or 8 mm (without upcharge)

#### Thread:

G1/2" (standard) (without upcharge)  
G1/8", G1/4", G3/8", G3/4", M8x1, M10x1

#### Cable:

silicone cable, standard length 1 m  
upcharge per further starting m cable

#### Ambient temperature:

-20 ... +60°C (protection type „e“) or -20 ... +80°C (protection type „i“)

#### Type of protection:

„i“ : intrinsic safety (without upcharge)  
„e“: increased safety

#### Potentially explosive atmospheres:

suitable for zone 0/1, zone 1, zone 2, zone 20/21, 21, zone 22

To determine exact order name ask for our type list. Download via homepage possible (Products -->Ex-Protection-->Temperature probes).



with neck tube, for temperatures  $> 100^\circ\text{C}$



without neck tube, for temperatures  $\leq 100^\circ\text{C}$

### GTF 103-Ex

-200°C ... +100°C (without neck tube)  
-200°C ... +900°C (with neck tube)

#### General:

Readily assembled voltage free temperature probe of stainless steel connection head and clamping block. The sensor inset is exchangeable. Thread is welded or brazed to the probe. Mounting is done via clamping ring fitting or thread welded / brazed to the probe tube. The connection head is also suitable to carry a head transmitter.

#### Upcharges:

#### Sensors:

**Pt100 / Pt1000; mineral insulated element, 4-wire:**  
meas. range: -200°C ... +100°C (600°C - with neck tube), DIN cl. B  
**type K or N, mineral insulated thermocouple:**  
meas. range: -200°C ... +100°C (900°C - with neck tube), class 1

#### Probe length:

up to 100 mm (without upcharge)  
upcharge per further starting 100 mm

#### Neck tube length:

without (without upcharge)  
upcharge per starting 100 mm

#### Probe diameter:

3 mm (the sensor inset is not exchangeable) (without upcharge)  
4 mm, 5 mm, 6 mm or 8 mm (the sensor inset exchangeable)

#### Thread:

G1/2" (standard) or without thread  
G1/8", G1/4", G3/8", G3/4", M8x1, M10x1

#### Ambient temperature:

-20 ... +60°C (protection type „e“) or -20 ... +80°C (protection type „i“)

#### Type of protection:

„i“ : intrinsic safety (without upcharge)  
„e“: increased safety

#### Potentially explosive atmospheres:

suitable for zone 0, zone 1, zone 2, zone 20, zone 21, zone 22

#### Transmitter GITT 01-Ex

(please refer to page 107), output signal 4-20 mA, measuring range on customers demands, protection type „i“ intrinsic safety.  
For suitable active Ex-barrier please refer to page 107

#### Clamping ring screw connection:

available at M8x1, M10x1, G1/4" and G1/2" for diameter 3 mm, 6 mm or 8 mm.  
Please refer to page 139

To determine exact order name ask for our type list. Download via homepage possible (Products -->Ex-Protection-->Temperature probes).

Handheld instrument

Display / Controller

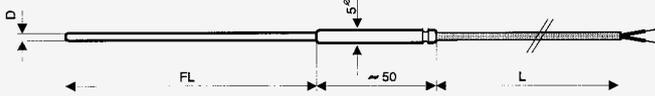
Logger / EASYBus

Transmitter

Temperature probe

Alarm / Protection

Industrial temperature probes



base price = incl. 1 m silicone cable, other cable length or materials possible upon surcharge

**GTF 101 P**

possible sensors:  
Pt100, Pt1000

**GTF 101 K**

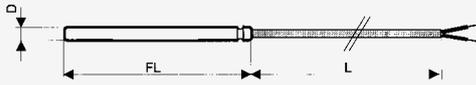
NiCr-Ni, Type K

Specifications:	Possible measuring ranges*	Possible diameters	Info
<b>GTF101P</b>	-50 ... +400 °C	3; 4; 5; 6; 8	inflexible design
	-50 ... +600 °C	1.6	design with sheath element
	-50 ... +600 °C	3	design with sheath element
	-50 ... +600 °C	6	design with sheath element
	-50 ... +850 °C		
<b>GTF101P-oKh</b>	-50 ... +400 °C	5; 6; 8 **	only available with glass silk cable
	-50 ... +250 °C	3; 4; 5; 6; 8	only available with Teflon cable
<b>GTF101K</b>	-50 ... +1000 °C	3; 4; 5; 6; 8	
	-200 ... +1150 °C	0.5; 1; 1.5; 3; 6	see GTF 101-5/ ... on page 132
<b>GTF101K-oKh</b>	-50 ... +400 °C	5; 6; 8 **	only available with glass silk cable
	-50 ... +250 °C	3; 4; 5; 6; 8	only available with Teflon cable

\* Measuring range depends on design type of probe and cable type

\*\* depending on selected cable type

Please specify desired cable length, cable jacket (e.g. PVC, silicone, Teflon, glass silk, etc.) and number of wires (e.g. 2-, 3-, or 4-wire) together with the order. Surcharges according to cable prices.

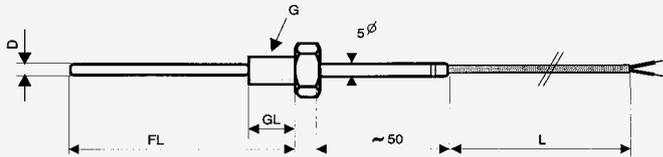


**GTF 101 P-oKh**

possible sensors:  
Pt100, Pt1000

**GTF 101 K-oKh**

NiCr-Ni, Type K



base price = incl. 1 m silicone cable, other cable length or materials possible upon surcharge

**GTF 102**

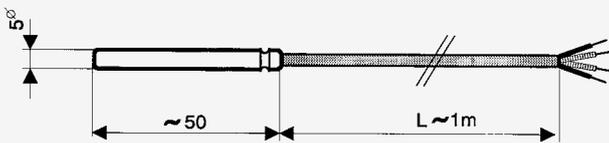
Type	Possible sensors	Possible measuring ranges*	Possible diameters	Info
<b>GTF102</b>	Pt100, Pt1000	-50 ... +400 °C	3; 4; 5; 6; 8	inflexible design
		-50 ... +600 °C	1.6	design with sheath element
		-50 ... +600 °C	3	design with sheath element
		-50 ... +600 °C	6	design with sheath element
		-50 ... +850 °C		
NiCr-Ni, Type K		-200 ... +1000 °C	3; 4; 5; 6; 8	
		-200 ... +1150 °C	3; 4; 5; 6	design with sheath element
			0.5	design with sheath element

Thread	possible diameters
<b>G 1/2"</b>	3 ... 8
<b>G 3/8"</b>	3 ... 8
<b>G 1/4"</b>	3 ... 8
<b>G 1/8"</b>	3 ... 6
<b>G 3/4"</b>	3 ... 8
<b>M 5</b>	max 3
<b>M 6</b>	max 3
<b>M 8</b>	3 ... 5
<b>M 10</b>	3 ... 6
<b>M 10 x 1</b>	3 ... 6
<b>M 12 x 1.5</b>	3 ... 8
<b>M 14 x 1.5</b>	3 ... 8

\* Measuring range depends on design type of probe and cable type

Please specify desired cable length, cable jacket (e.g. PVC, silicone, Teflon, glass silk, etc.) and number of wires (e.g. 2-, 3-, or 4-wire) together with the order. Surcharges according to cable prices.

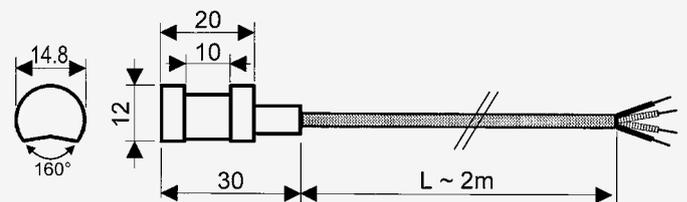
Special design types can only be ordered in written form (fax/letter) and are non-returnable!



**GTF 200 Pt100**

-50 ... +200 °C, Pt100, 4-wire

Specification:	
<b>Sensor:</b>	Pt100, DIN cl. B (±0.3 °C at 0 °C)
<b>Sensor sleeve:</b>	made of stainless steel
<b>Cable:</b>	silicone (4 x 0.14 <sup>2</sup> ), approx. 1 m suitable for 2-/ 3- or 4-wire probe



**GRO 200 Pt100**

-50 ... +200 °C, DIN cl. B, 4-wire

**GRO 200 K**

-50 ... +200 °C, NiCr-Ni (type K)

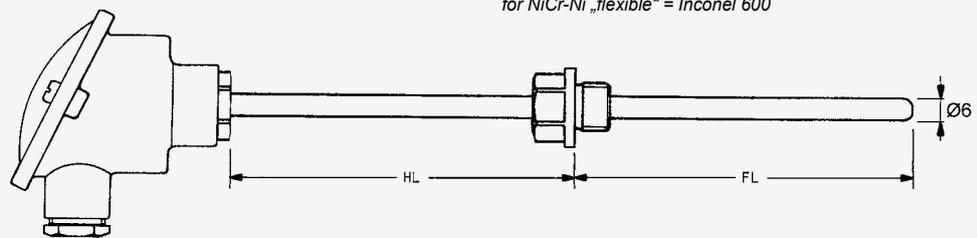
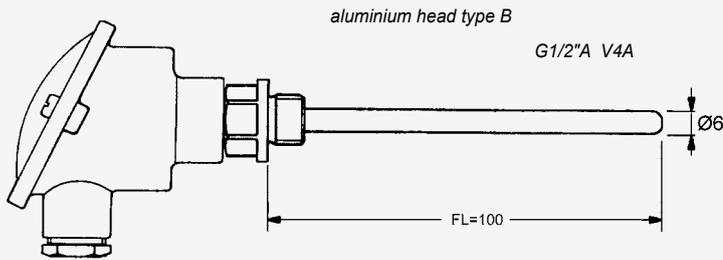
Specification:	
<b>Sensor body:</b>	made of aluminium
<b>Probe:</b>	can be mounted with cable clamp or similar constructions to pipes (any diameter)
<b>Cable:</b>	silicone, approx. 2 m
	For faster heat exchange we suggest our <b>heat-conductive paste GWL10G</b>

**GTF 200 Pt100 WD**

-20 ... +105 °C, Pt100, 4-wire  
tube enclosed water proof!

Specification:	
<b>Sensor:</b>	Pt100, DIN cl. B (±0.3 °C at 0 °C)
<b>Sensor sleeve:</b>	made of stainless steel
<b>Cable:</b>	PVC (4 x 0.14 <sup>2</sup> ), approx. 1 m suitable for 2-/ 3- or 4-wire probe

Handheld instrument  
Display / Controller  
Logger / EASYBus  
Transmitter  
Temperature probe  
Alarm / Protection



Material sensor tube:  
for Pt100, Pt1000, NiCr-Ni „not flexible“ = material V4A  
for NiCr-Ni „flexible“ = Inconel 600

## GTF 103

basic design

## GTF 103 OS

without sensor and terminal

### Sensor:

#### Pt100 / Pt1000 (2-, 3- or 4-wire)

- -50 ... + 400 °C, DIN class B
- ±200 °C, DIN cl. B
- -50 ... + 600 °C, DIN class B, Jacket-Pt100

p.r.t. Probe Diameter

#### Double - Pt100 (2 x 2-wire)

others on request

- -50 ... + 400 °C, DIN class B
- ±200 °C, DIN class B
- Double jacket Pt100

#### NiCr-Ni (type K)

- -200 ... + 1150 °C, class 1, with jacket thermo element
- -200 ... + 1000 °C, V4A

#### Double - NiCr-Ni (type K)

- -200 ... + 1150 °C, class 1

### Sensor Head:

- **DIN B-head (Alu lacquered), max. 200°C**  
note: for higher temperatures order with neck tube
- **plastic sensor head**
- **stainless steel sensor head**
- **small sensor head**  
(design type DE) with PG9-cable glanding
- **with exchangeable measuring insert**

### Thread:

Note: other threads are not available for small series!  
(For larger series on request)

- **without thread**  
for interchangeable sensor application in combination with immersion sleeve EST01 or with stainless steel clamping ring glanding for exact adjustment of sensor position.
- **thread G½“ (V4A)**  
for fixed mounting or for interchangeable sensor in combination with immersion sleeve EST02.
- **thread G¼“, G¾“ (V4A)**
- **other thread**

### Tube length (Pt100/1000 and NiCr-Ni):

- **Probe length „FL“ up to 100 mm**
- **Probe length per each started additional 100 mm**
- **Neck tube length „HL“ each started 100 mm**  
recommended for higher temperatures, because sensor head (without transmitter) is suitable just up to 200 °C or for bridging insulations.
- **Insertion spike**
- **Teflon coat (100 mm, Ø 1.5 / 3 / 4 / 5 / 6 / 8)**

### Probe diameter:

note: other diameters than stated below are not available!

#### Pt100 / Pt1000

- Ø 6 mm, not flexible
- Ø 3, 4, 5 or 8 mm, not flexible
- Ø reduced at the end (e.g. 8 to 3 mm)

#### Jacket - Pt100

- Ø 6 mm, approx. 40 mm stiff, then flexible
- Ø 3 mm, approx. 30 mm stiff, then flexible

#### NiCr-Ni (type K), not potential-free

- Ø 6 mm, not flexible
- Ø 3 mm, not flexible

#### NiCr-Ni (type K), jacket thermo element, potential-free

- Ø 6 mm, flexible
- Ø 1, 1.5 or 3 mm, flexible
- Ø 0.5 mm, flexible

### Special design types:

#### ... / RT420

with transducer for Pt100,  
Output signal 4-20 mA, working temperature -40 ... +85 °C,  
measuring ranges p.r.t. page 100 (to be stated on order!)

#### ... / T03 BU

with transducer for Pt100,  
Output signal 0-10 V, working temperature -40 ... +85 °C,  
measuring ranges p.r.t. page 99 (to be stated on order!)

#### ... / GITT

with electrically isolated transducer for Pt100/1000, NiCr-Ni,  
output signal 4-20 mA, working temperature -40 ... +85 °C,  
measuring range to be stated on order! (p.r.t. page 107)

customized products can only be ordered written and can generally  
not be exchanged!  
(Del. time from stock or 1 to 2 working days)

water proof, hermetically sealed temperature probes

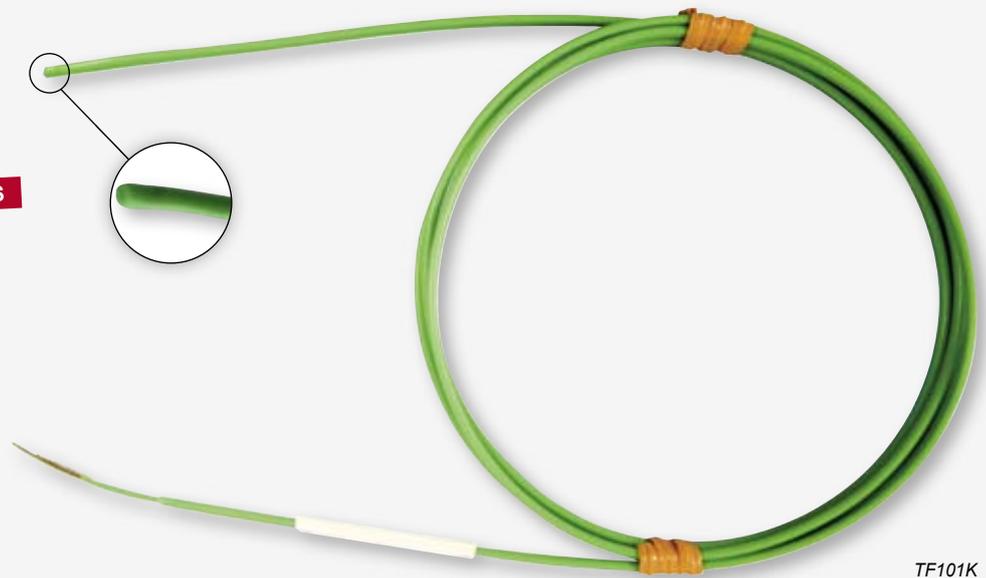


TF101P

- sealed against moisture and corrosion
- easily cleaned and sterilised
- small size provides a fast response
- also available in custom lengths
- optionally with mechanical protection (V4A-sleeve) and with thread or clamping ring screw connection available.

FOR USE IN AGGRESSIVE ENVIRONMENTS AND TIGHT PLACES

HIGHLY RESILIENT TO CHEMICALS AND OILS



TF101K

Design type Pt100:

**TF101P-1m**

Pt100, cable length 1 m

**TF101P-2m**

Pt100, cable length 2 m

**TF101P-3m**

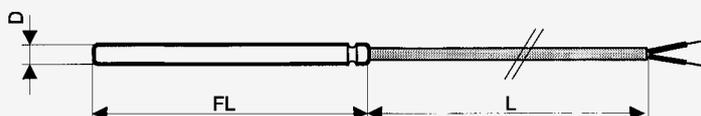
Pt100, cable length 3 m

Specification:

<b>Probe:</b>	flexible sealed PFA Pt100 sensor
<b>Connection:</b>	4-wire-connection (4 x 0.14 mm <sup>2</sup> , nickel-plated copper)
<b>nominal diameter:</b>	2.1 mm
<b>accuracy:</b>	according to DIN class A
<b>measuring range:</b>	-60 ... +250 °C also available with Pt1000

Option:

- **robust design type** (not possible at type K) with robust V4A protective tube Ø 3 mm, FL = 50 mm



Design type NiCr-Ni (type K):

**TF101K-1m**

NiCr-Ni, cable length 1 m

**TF101K-2m**

NiCr-Ni, cable length 2 m

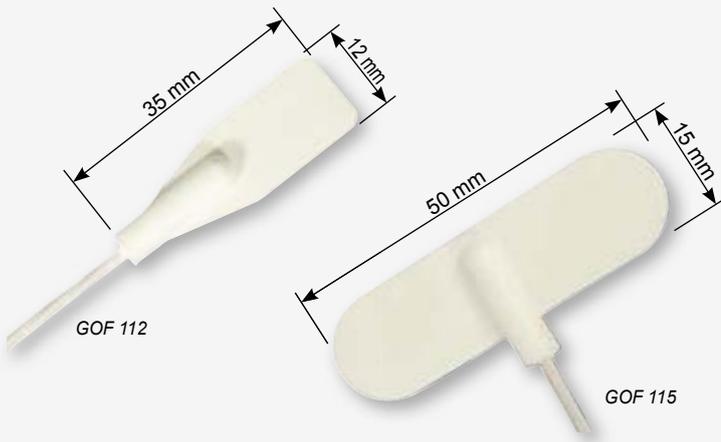
**TF101K-3m**

NiCr-Ni, cable length 3 m

Specification:

<b>Probe:</b>	These PFA insulated thermocouple wire sensors are hermetically seal-welded at the sensor tip to provide continuous PFA protection over the measurement junction. stranded NiCr-Ni-thermocouple wire (0.14 mm <sup>2</sup> )
<b>nominal cross section:</b>	1.6 mm x 2.5 mm
<b>measuring range:</b>	-270 ... +250 °C
	IP68 seal-welded tip electrically-insulated junction also available with thermocouples type J, T and E

## Self-adhesive temperature probes with moulded silicone design for surface measurement on curved and flat surfaces



- sensor have adhesive back for easy mounting
- ultra-slim silicone rubber for maximum flexibility
- resistant to a variety of chemicals and oils
- PFA-insulated connection cable, 2 m long (other length up on request)
- 2 designs for flat (GOF 112) or curved (GOF 115) surfaces available

### GOF 112 Pt

Pt100, adhesive back 35 x 12 mm, cable length 2 m, white

### GOF 112 K

NiCr-Ni, adhesive back 35 x 12 mm, cable length 2 m, green

### GOF 115 Pt

Pt100, adhesive back 15 x 50 mm, cable length 2 m, white

### GOF 115 K

NiCr-Ni, adhesive back 15 x 50 mm, cable length 2 m, green

#### Design type Pt100:

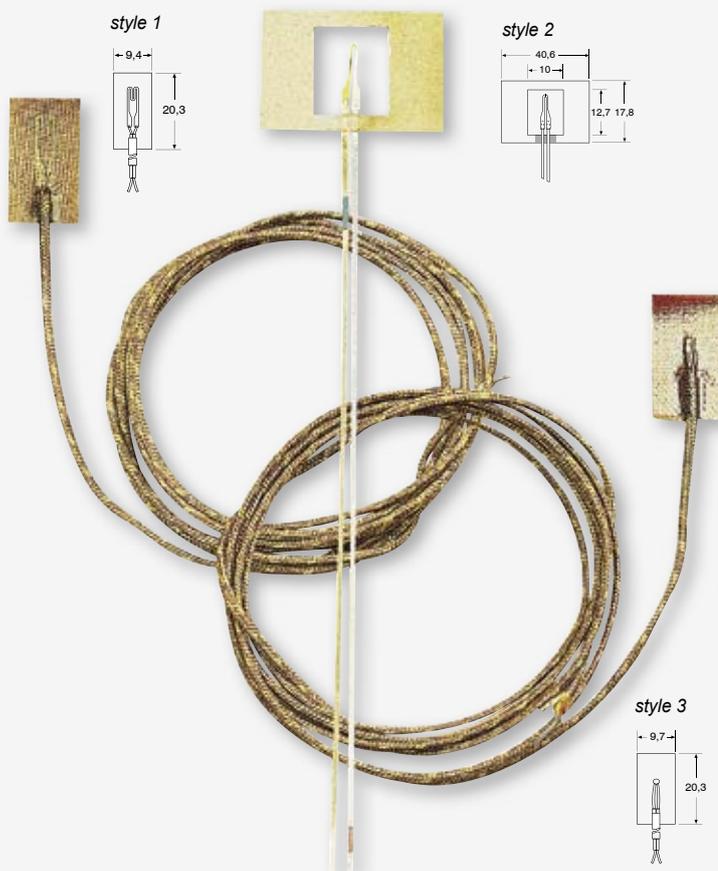
- precision Pt100-probe, DIN class A, 4-wire connection
- temperature range: -50 ... +200 °C
- also available with Pt1000

#### Design type NiCr-Ni (type K):

The integral thermocouple sensor is bonded onto the inner surface of the self adhesive aluminum foil strip, which is provided for fast response time

- stranded NiCr-Ni-thermocouple wire (0.14 mm<sup>2</sup>)
- temperature range: -50 ... +200 °C
- also available with thermocouples type J, T and E

## „Cement-On“ thermocouples



- ultra fast response time:  
(style 1:  $t_{63}$  = approx. 20 ms, style 2: approx. 5 ms, style 3: approx. 300 ms)
- also available with thermocouples type J (only design 3), T and E
- style 1 and 3 optionally available with other lengths

### GOF 120 - K1

NiCr-Ni, cable length 90 cm, max. 260 °C (short-time: 370 °C)

### GOF 120 - K2

NiCr-Ni, cable length 15 cm, max. 540 °C (short-time: 650 °C)

### GOF 120 - K3

NiCr-Ni, cable length 90 cm, max. 260 °C (short-time: 370 °C)

### OB-700

high temperature chemical set cement, 235 ml (max. 871 °C)

#### General:

The series GOF 120 are a model line of Cement-On, fast response thermocouples for fast surface temperature measurement. The model line have 3 different styles. (Please order the high temperature cement separately)

The **design styles 1 and 2** are made from 0.013 mm thermocouple alloy foil by a special process where the butt welded thermocouple junction is 0.013 mm in thickness. The thermocouples are fabricated from class 1! These styles are flat, extremely low inertia construction and are ideal means of measuring the temperature of both flat and curved metals, plastic and ceramic surfaces where very fast response is desired.

The **design style 3** is an economy version constructed from 0.25 mm diameter bead welded standard limit of error thermocouple wire. It should be used where extremely fast response time is not essential.

**VERY LOW THERMAL INERTIA**

Please note: cannot be used with high temperature cement (will break down insulation)

Industrial probes for food-, beverage- and pharma industry  
 In case of interest, please ask for the  Industrial probes brochure.



**GTL ...**

Probes according to customer specification

Specification:	
<b>Measuring range:</b>	-40 ... +200 °C (depending on probe construction)
<b>Sensor:</b>	Pt 100
<b>Process connection:</b>	M12 / G1/2" / without thread
<b>Probe head:</b>	probe head Ø 59 mm probe head Ø 18 mm Long (with transmitter) probe head Ø 18 mm Short (without transmitter)
<b>Material:</b>	sensor head: V2A, protection tube and peak: V4A
<b>Probe length:</b>	50, 100, 150, 250 or according to customer specification (in mm)
<b>Diameter:</b>	Ø 6 mm without contraction Ø 4 mm without contraction Ø 6 mm with offset probe peak Ø 3 mm
<b>Response Time:</b>	Ø 6 mm: T <sub>90</sub> ≤ 8.0 s Ø 4 mm: T <sub>90</sub> ≤ 6.5 s Ø 3 mm: T <sub>90</sub> ≤ 1.5 s
<b>Protection class:</b>	IP69K / IP67

**Option:**

- Neck tube
- Electr. connection:  
fixed cable (PG) or M12-plug
- Integrated transmitter
- Higher accuracy (1/3 DIN cl. B or 1/10 DIN cl. B)
- Display

**Accessories**

**1. Clamping ring screw connection GKV... st. steel**

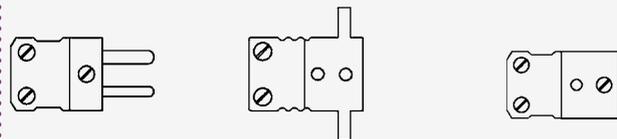
(for all probes without thread)



Type:	Outside thread	Clamp. ring-Ø (sensor tube-Ø)	Clamping ring
GKV1	M8 x 1	1.5 mm	teflon
GKV2			stainless steel
GKV3		3.0 mm	teflon
GKV4			stainless steel
GKV5	G1/4"	1.5 mm	teflon
GKV6			stainless steel
GKV7		3.0 mm	teflon
GKV8			stainless steel
GKV11	G1/2"	6.0 mm	teflon
GKV12			stainless steel
GKV9		8.0 mm	teflon
GKV10			stainless steel
GKV13	M10x1	8.0 mm	teflon
GKV14		14.0 mm	stainless steel
GKV15		6.0 mm	teflon
GKV16			stainless steel

**2. Flat-pin connections, free from thermal e.m.f.**

(for type K, N and S)



NST 1200  
NST 1300  
NST 1700

NKU 1200 O  
U-coupling for installation  
in front panels

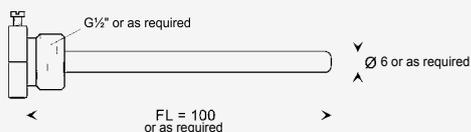
NKU 1200  
NKU 1700

- NST1200 "K"**
- NKU1200 "K"**
- NKU1200 O "K"**  
(max. 120 °C)
- NST1300 "N"**
- NST1700 "S"**
- NKU1700 "S"**

For higher temperatures use ceramic plug and coupling

3. Immersion sleeve of stainless steel

3.1. Immersion sleeve EST01 for all probes without thread



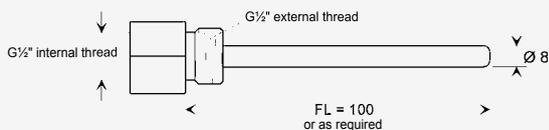
**EST01**

Basic price for 100 mm

**General:**

**Standard:** G1/2", FL=100 mm, outside-Ø = 6 mm, for probes with 5 mm Ø, customized lengths, diameters or threads are possible against upcharge - to be stated on order!

3.2. Immersion sleeve EST02 for all probes with a G1/2"-thread



**EST02**

Basic price for 100 mm

**General:**

**Standard:** G1/2" (internal/external), FL=100 mm, outside-Ø = 8 mm for probes with 6 mm Ø, customized lengths, diameters or threads are possible against upcharge - to be stated on order!

For faster heat exchange we suggest:

**GWL10G**

heat-conductive paste 10 g, in plastic gun

4. Cables and lines

4.1. Silicone cable (-50 ... +200 °C) with teflon screened wires

**S2P:**

silicone cable, 2-pole (2 x 0.25 mm<sup>2</sup>), highly flexible

**S4P:**

silicone cable, 4-pole, 4 x 0.14<sup>2</sup> cross section (insulation 2 x blue, 2 x white) (can also be used as 3-wire)

4.2. Glass silk insulated cable (-50 ... +400 °C) with stainless steel braiding

**G4P:**

glass silk insulated cable, 4-pole (4 x 0.22 mm<sup>2</sup>)

4.3. Teflon insulated cable (-200 ... +250 °C) with individual teflon insulated wires

**T2P:**

teflon insulated cable, 2-pole (2 x 0.14 mm<sup>2</sup>), with additional cable screen

**T4P:**

teflon insulated cable, 4-pole (4 x 0.14 mm<sup>2</sup>), with additional cable screen

4.4. PVC-lines (-20 ... +70 °C)

**P2P:**

PVC cable, 2-pole (2 x 0.14 mm<sup>2</sup>)

**P3P:**

PVC cable, 3-pole (3 x 0.14 mm<sup>2</sup>)

**P4P:**

PVC cable, 4-pole (4 x 0.14 mm<sup>2</sup>)

4.5. Extension cable for NiCr-Ni (Type K)

**VKA 1m:**

1 m Silicon-Compensation lines with DIN plug and DIN coupler

4.6. Compensation lines for NiCr-Ni (type K), 2-wire

**AGL1:**

Silicone cable (2 x 0.22 mm<sup>2</sup>) (max. 200 °C)

**AGL3:**

Thermo wire (can also be used as thermo couple) glass silk (2 x 0.5 mm<sup>2</sup>) (max. 400 °C)

**AGL4:**

Teflon screened twisted thermo wire, wire-Ø 0.2 mm (max. 250 °C)

**AGL5:**

Thermo wire, with glass silk braiding, wire-Ø 0,2 mm (max. 400 °C)

**AGL6:**

Teflon cable, screened - can also be used as thermo couple (2 x 0.22 mm<sup>2</sup>) (max. 250 °C), with additional cable screen

4.7. Compensation lines for Pt10RH-Pt (Type S), 2-wire

**AGL S2:**

Silicone cable (max. 200 °C)

4.8. Compensation lines for NiCrSi-NiSi (Type N), 2-wire

**AGL N2:**

Silicone cable (max. 200 °C)

5. Metal flange (for GTF 1500/...)

**GMFL:**

acc. DIN 43734, adjustable, to clamp to 15 mm stainless steel pipes

6. Sensor elements (Pt100/1000, NTC's, PTC's)

NiCr-Ni p.r.t. pages 130-132



**Pt100/1**

Ceramic lamina, 2 x 2.3 x 0.6 mm, -70 ... +500 °C, tolerance: B

**Pt100/2**

Ceramic lamina, 2.5 x 2.0 x 1.3 mm, -50 ... +500 °C, tolerance: 1/3 DIN

**Pt100/3**

Ceramic lamina, 2 x 5 x 0.9 mm, -196 ... +500 °C, tolerance: B

**Pt100/4**

Wound design, Ø 2 x 20 mm, -200 ... +600 °C, tolerance: B

**Pt100/5**

TO92-housing, -50 ... +150 °C, tolerance: B

**Pt100/6**

Ceramic lamina, 1 x 3 x 0.6 mm, -50 ... +500 °C, tolerance: B

**Pt1000/1**

Ceramic lamina, 2 x 4 x 0.9 mm, -50 ... +400 °C, tolerance: B

**Pt1000/2**

TO92-housing, -50 ... +150 °C, tolerance: B

**Pt1000/3**

Ceramic lamina, 1 x 3 x 0.6 mm, -50 ... +500 °C, tolerance: B

**KTY 81-210**

Replacement for KTY 11-6, -20 ... +110 °C

**KTY 81-121**

1 kOhm (25 °C), TO92-housing, -50 ... +150 °C

**KTY 83-110**

1 kOhm (25 °C), DO-34-housing, -50 ... +175 °C

**KTY 84-130**

1 kOhm (100 °C), DO-34-housing, -40 ... +300 °C

Other sensors upon request

Alarm and Protection Devices

Application:	Device	MINAL 182	MINAL 282 BN	ALSCHU 480	ALSCHU 480 P	ALSCHU 485	ALSCHU 485 OE	ALSCHU 485 OE / 3P	GEWAS 181 A	GEWAS 183 A	GEWAS 181 A - 1/2"	GEWAS 181 A - 3/4"	GEWAS 181 A - 1"	GEWAS 191 N	GEWAS 191 AN
Universal Application		✓	✓	✓	✓										
Level controller						✓	✓	✓							
Water leak detector		✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓
Electrodes incl.						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Alarm buzzer		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Switching output				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Water supply is switched off									✓	✓	✓	✓	✓	✓	✓
Description		Miniature alarm device (Battery operation)	Miniature alarm device (Battery / mains operation)	Alarm and protection device (switching output via SCHUKO socket)	Alarm and protection device (potential-free switching output and SCHUKO socket is current-carrying)	Electrode control device incl. two 2-pin electrodes	Electrode control device with connection for two 2-pin electrodes	Electrode control device with connection for two 3-pin electrodes	Water leak detector with 1/2" brass solenoid valve with 3/4" connections for switch-off	Water leak detector without solenoid valve, with switch-off	Water leak detector with 1/2" brass solenoid valve and switch-off	Water leak detector with 3/4" brass solenoid valve and switch-off	Water leak detector with 1" brass solenoid valve and switch-off	Water leak detector with 3/4" solenoid valve	Water leak detector with 3/4" solenoid valve and switch-off
Catalog page:		142	142	143	143	143	143	143	144	144	144	144	144	145	145

Application:	Device	GEWAS 200	GEWAS 300 SP	ALSCHU 300 SP	GEWAS 300 FG	ALSCHU 300 FG	GMNV-1C	GNS 20E-...	GSS-F25	GNS-3P-SLV	GNS-3P-SLK	GNS-3P-SLE	GNS-3P
Universal Application		✓	✓	✓	✓	✓							
Level controller				✓		✓							
Water leak detector							✓	✓	✓				
Alarm buzzer					✓								
Switching output		✓	✓	✓	✓	✓	✓	✓					
Description		Alarm and protection device for panel mounting	Alarm and protection device for panel mounting	Alarm and protection device for panel mounting	Alarm and protection device in field housing	Alarm and protection device in field housing	Level module (-detector)	Limit detector, Active output	float switch	level sensor, 3-pole with polyolefin coating	level sensor, 3-pole with kynar-coating	level sensor, 3-pole with PTFE coating	level switch with micro-switch/reed-contact
Catalog page:		145	146	142	146	142	147	147	148	148	148	148	148

Handheld instrument

Display / Controller

Logger / EASYBus

Transmitter

Temperature probe

Alarm / Protection

## Miniature alarm device for universal application



**BATTERY OR  
MAINS OPERATION**

### MINAL 182

Miniature alarm device, battery operation

### MINAL 282 BN

Battery/mains operation

Miniature alarm device for universal application  
Devices without sensors

#### Application:

extra loud alarm (more than 100 dB at 1 m distance), hence suitable for decentralised use (e.g. in basement etc.). After connection of various sensors device can be used as water detector, burglar alarm, fire alarm (overheating), heating failure detector, level detector, rain detector etc.

#### Advantages:

mobile, no power consumption unless alarm sounded; connection of any number of sensors, separately or simultaneously; loud alarm that cannot be missed.

#### Specification:

**Device:** rocker switch for tightening and alarm extinguishing, audible piezo-alarm, power consumption in case of alarm approx. 20 mA. Permanent alarm can be sounded for at least approx. 10 h. ABS case 100 x 60 x 29 mm (H x W x D)

**Operating voltage:** 9 to 12 VDC, battery 9 V type IEC 6F22 included, for MINAL 282 BN additional socket for plug-in of external power supply GNG09 for permanent operation. MINAL 182 only suitable for battery operation.

**Sensors:** jack for connection of any sensor type (see special accessories).

**Weight:** approx. 105g (incl. battery, without sensor)

#### Accessories and spare parts:

**GNG 09 - 3.5KS**  
power supply

**GWF-1S**  
plug-in water sensor, 2 m

**GWF-1S / 5m**  
plug-in water sensor, 5 m

**GWF-1S / 10m**  
plug-in water sensor, 10 m

**GAZ-1**  
branch adapter  
(required for each additional water sensor)

**VEKA 2**  
extension cable 2 m

**VEKA 5**  
extension cable 5 m

**VEKA 10**  
extension cable 10 m

## Electrode controller with two signal inputs



**FIELD FRAME**

### ALSCHU 300 FG

Electrode controller in field frame for wall mounting, device without sensor

### ALSCHU 300 SP

Electrode controller in snap-on housing for DIN rail mounting, device without sensor

**2 DIFFERENT MOUNTING FORMS**



**SNAP-ON HOUSING**

#### Application:

Automatic control of drainage pumps and wastewater lifting plants, overflow and low liquid level control, automatic filling and draining of tanks, level control of liquid reservoirs, aquariums, storage tanks, etc.  
The ALSCHU 300 .. is especially suitable for detection of conducting media (water, etc.). It is less applicable for badly or non conducting media (oils or fatty liquids), conducting foaming liquids or media causing electrically isolating deposits on the electrodes.

#### Measuring Method:

The measuring method for level detection is based on the conductive principle, i.e. the electrical conductivity of the media is monitored. If the switching amplifier detects a value below the set conductivity the state "media detected" is output, otherwise "no media". Depending on number and design of the connected level sensors the device can be used for level detection (min-/max-detection) or as 2-point controller.

#### Specification:

**Power supply:** 18 V ... 250 V AC/DC  
wide-range power supply

**Power consumption:** < 2 VA

#### 2 signal inputs:

**Triggering level:** < 80 kΩ

**Response time:** 2 s

#### 1 Relay output:

**Contact:** change-over contact, potential-free

**Switching voltage:** ≤ 250 V AC

**Switching current:** ≤ 5 A (ohmic load)

#### Protection class:

**ALSCHU 300 SP:** IP20

**ALSCHU 300 FG:** IP65

#### Electric connection:

**ALSCHU 300 SP:** onnection via screw-type terminal

**ALSCHU 300 FG:** connection via 3 PG cable glands and screw terminals

**Working temperature:** -20 ... +60 °C

**Storage temperature:** -40 ... +80 °C

**Condensation:** not allowed

#### Housing:

**ALSCHU 300 SP:** snap-on housing for DIN rail mounting  
22.5 x 75 x 110 mm (W x H x D)

**ALSCHU 300 FG:** field frame 100 x 100 x 60 mm  
(W x H x D) without PG cable glands

#### Functions / displays:

**Red / green LED:** display for switching state of relay, switching state of sensors, status (supply) of device

#### Accessories and spare parts:

**GNS-3P**  
3-pole level probe  
(p.r.t. page 148)

**GNS-3P-S..**  
3-pole level probe  
with coating  
(p.r.t. page 148)

**GSS-1**  
level sensor, 2 m cable (floating switch) for electrically non-conducting media

**GNS-1**  
level sensor, 2-pole (stainless steel electrode)

**GSAS-1**  
magnetic contact, plug-in and self-adhesive



## Plug-in level controller

**ALSCHU 485**

Electrode control device for filling or emptying, incl. two 2-pin. electrodes

**ALSCHU 485 OE**

(as above, but without electrodes - connection for two 2-pin. electrodes)

**ALSCHU 485 OE / 3P**

(as above, but without electrodes - connection for 3-pin electrodes)

We manufacture electrodes of any diameter and length according to your specifications.

**Application:**

Automatic control of drain pumps and sewage removal plants, overflow and dry running protection, automatic filling and emptying of containers, basins, tanks, control of liquid level in storage tanks, aquariums, etc.

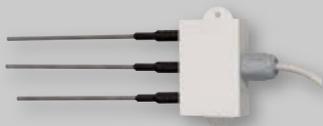
**Advantages:** no installation costs, only plug-in connections, ready for use within seconds, trouble-free operation as no moveable float switches are used, any electrode distance, can be set by customer up to 2 m etc

**Specification:**

<b>Control device:</b>	housing 112 x 71 x 48 mm (L x W x D). Flashing LED indicating control state. Selector switch for emptying or filling. Plug-in socket for electrodes.
<b>Power supply:</b>	control device 230 V 50 Hz (approx. 1 VA), automatic by connecting grounded adaptor plug.
<b>Control output:</b>	via grounded adaptor plug with earthing and socket outlet with earthing, electrode control. Direct switching capacity approx. 1200 VA at 230 V 50 Hz (approx. 5 A ohmic load). Extra high protective capacity by external triggering of a contactor or semiconductor relay.
<b>Electrodes:</b>	
<b>ALSCHU 485:</b>	2 x 2.5 mm jack sockets, 2 electrodes with stainless steel pins, plastic body with PVC cable (2 m long) included (any length available upon surcharge)
<b>ALSCHU 485 OE:</b>	2 x 2.5 mm jack sockets
<b>ALSCHU 485 OE/3P:</b>	3-pole screw terminal

**Accessories and spare parts:****GNS-3P level probe 3-pin**

standard length: 15 cm,  
switching distance: 1 cm, 2 m cable  
further information p.r.t. page 148



## Protection device for universal application

**ALSCHU 480**

Alarm protection device, plug-in for 230 V~ (with grounding contact adapter plug), with or without alarm transmitter and relay switching output (changeover contact)

**ALSCHU 480 P**

as above, but with volt-free switching output and durchgeschleifter Steckdose

**General:**

The ALSCHU 480(P) is a versatile alarm and protection device. Its universal input (3.5 mm jack bush) allows a lot of different external sensors to be connected. That includes sensors with a switching threshold <math><100\text{ k}\Omega</math> like water sensors, float switches, level switches, magnetic contacts, safety shut-off mat etc. In case of an alarm the internal buzzer sounds and a connected device (i.e. pump, machine) is switched on or off via the Schuko adaptor plug (ALSCHU 480). The desired switching function can be set via selector switch I / II. ALSCHU 480P switches on/off external devices via a potential-free 2-pole switching output. The Schuko socket of ALSCHU 480P is always current-carrying.

**Specification:**

<b>Power supply:</b>	220/240 V 50/60 Hz
<b>Power consumption:</b>	approx. 1 VA
<b>Sensor input:</b>	3.5 mm jack bush
<b>Switching threshold:</b>	input resistance <math><100\text{ k}\Omega</math> (eg. NPN no active, relay, reed contact, etc.)
<b>Switching output:</b>	
<b>480:</b>	via isolated ground receptacle (Schuko)
<b>480 P:</b>	potential-free normally open/closed contact via 2-pole cable, brought out 0.5 m
<b>Switching function:</b>	
<b>I:</b>	switching output current-carrying in alarm condition
<b>II:</b>	switching output currentless in alarm condition
<b>Switching power:</b>	
<b>480, 480 P: max 2400VA</b>	250 VAC, 10 A (ohmic load)
<b>480 P:</b>	120VDC, 2A (ohmic load), max. 240W
<b>Controlling device:</b>	112 x 71 x 48 (L x W x H), LED for operation display, device-on/off, selector switch I / II for switching function
<b>Working conditions:</b>	-20 ... 50 °C; 0 ... 80 % RH

**Accessories and spare parts:****GWF-1S**

plug-in water sensor, 2 m

**GSAS-1S**

plug-in, self-adhesive magnetic contact



### GEWAS 181 A

leak-water detector with 1/2" brass solenoid valve with 3/4" connections for hand installation, water sensor, alarm buzzer and switch-off of connected units 16 A, 230 V~

### GEWAS 183 A

leak water detector without solenoid valve, with water sensor, alarm buzzer and switchoff of connected devices 16 A, 230 V~

### GEWAS 181 A - 1/2"

leak water detector with 1/2" brass solenoid valve (flow quantity: approx. 20 l/min, installation length approx. 55 mm) for installation in the line, water sensor, alarm buzzer and switch-off of connected devices 16 A, 230 V~.

### GEWAS 181 A - 3/4"

leak water detector with 3/4" brass solenoid valve (flow quantity: approx. 91.5 l/Min, installation length approx. 80 mm) for installation in the line, water sensor, alarm buzzer and switch-off of connected devices 16 A, 230 V~

### GEWAS 181 A - 1"

leak water detector with 1" brass solenoid valve (flow quantity: approx. 141.5 l/Min, installation length approx. 95 mm) for installation in the line, water sensor, alarm buzzer and switch-off of connected devices 16 A, 230 V~

#### Application:

Any devices or machines with water connection. For direct mounting of solenoid valve in pipelines.

#### Description:

If a water film of more than 0.5 mm occurs at the water sensor the control unit automatically gives an acoustic alarm and switches the solenoid valve and the device connected to the control unit off.

#### Solenoid valve:

Brass solenoid valve, energy-saving circuitry for hand installation (1/2" with 3/4" glanding - suitable for any 1/2" tap or 1/2" tube) or with 1/2", 3/4" or 1" internal thread on both sides for line installation. De-energised when closed, for pressure loads from 0.5 to 10 bar. Servo-controlled, i.e. free water outlet has to be provided resp. infeed pressure has to exceed outfeed pressure by 0.5 bar (solenoid not suitable for closed circuits such as heating systems).

#### Specification:

<b>Power consumption:</b>	220/240 V 50/60 Hz (control unit)
<b>Leistungsaufnahme:</b>	approx. 3 Watt
<b>Control output:</b>	via power socket of safety plug adaptor
<b>max. switching current:</b>	max. 16 A (ohmic load)
<b>Water sensor:</b>	Highly sensitive, plug-in water sensor, 2 m of cable, alarm triggered as of 1/2 mm water film. Simultaneous plug in of several water sensors via socket-outlet adaptor GAZ1. Plug-in extension cable (2 m, 5 m or 10 m long) available.
<b>Solenoid valve:</b>	Hence, valve operable in permanent mode; due to energy-saving circuit valve will not run hot even without cooling agent. Valve permanently fixed to control device (approx. 1 m of connecting cable). Valve body can be removed from coil after loosening of one nut.
<b>max. working pressure:</b>	10 bar, servo-controlled (pressure difference inlet/outlet > 0.5 bar)
<b>Working voltage:</b>	200 V DC or 100 V DC in energy saving mode
<b>Working temperature:</b>	0 ... 50 °C
<b>Dimensions:</b>	control device: 110 x 65 x 45 mm (L x W x H), with suspension hook

#### Accessories and spare parts:

<b>GMV-1/2" L</b>	spare solenoid valve 1/2" for direct cable connection, approx. 1 m cable, loose ends
<b>GMV-1/2" H</b>	spare solenoid valve 1/2" manual mounting, approx. 1 m cable, loose ends
<b>GMV-3/4"</b>	spare solenoid valve 3/4" for direct cable connection, approx. 1 m cable, loose ends
<b>GMV-1"</b>	spare solenoid valve 1" for direct cable connection, approx. 1 m cable, loose ends
<b>GMV-1/2" EZL</b>	add. solenoid valve 1/2" for direct cable connection, with power saving connector, approx. 2 W, for direct connection to 230 VAC, suitable for GEWAS183A or mains operation
<b>GMV-1/2" EZH</b>	like before, but 3/4" valve for manual mounting
<b>GMV-3/4" EZ</b>	like before, but 3/4" valve for direct cable connection
<b>GMV-1" EZ</b>	like before, but 1" valve for direct cable connection
	Plug-in water sensor, socket outlet adapter, extension cable p.r.t. GEWAS 191

Handheld instrument  
Display / Controller  
Logger / EASYBus  
Transmitter  
Temperature probe  
Alarm / Protection

## Water leak detector with solenoid valve

**CAN BE INSTALLED WITHOUT ANY ADDITIONAL PARTS OR TOOLS WITHIN 2 MINUTES**



**NO MORE WATER DAMAGE!**

**24-HOUR SUPERVISION OF YOUR WASHING MACHINE AND/OR DISH WASHER OR ANY OTHER DEVICES USING WATER.**

**GEWAS 191 N**

Water leak detector with solenoid valve, complete and ready for use incl. controller, water probe, solenoid, signal buzzer

**GEWAS 191 AN**

Water leak detector with solenoid valve, complete and ready for use incl. controller, water probe, solenoid, signal buzzer but equipped with switch-off mechanism for supervised device in case of alarm (up to 16 A, 220V 50 Hz)

**Application:**

washing machine, dish washer, surgeries (eg dentists' surgeries, water-cooled devices etc.), hospitals, industry, research, laboratories, any other devices and machines with water connection (eg. hot drinks dispensers, cooling devices etc.)

**Description:**

If a water film of more than 0.5 mm occurs at the water sensor the control unit automatically gives an acoustic alarm and switches the solenoid valve off. The design type GEWAS 191 AN turns off additionally the device connected to the control unit, too.

**Specification:**

**Power supply:** 220/240 V 50/60 Hz (control unit)

**Power consumption:** approx. 3 VA

**Control output:** via power socket at device housing (only for GEWAS 191 AN) the socket of GEWAS 191 N always provides mains voltage

**max. switching current:** max. 16 A (ohmic load)

**Water sensor:** highly sensitive plug-in water probe, 2 m cable. Alarm triggered as of ½ mm water film. Several water probes can be plugged-in and used simultaneously by means of socket outlet adaptor GAZ 1. 2 m, 5 m or 10 m plug-in extension cable available.

**Solenoid valve:** glass fiber reinforced polyamide (as customary for washing machines). Safety-low voltage 12 V DC. Connections: Screw connection 3/4" for direct fastening to water tap and the standard dish washer / washing machine connection hose 1/2" with 3/4" wing or coupling nut to the solenoid valve outlet. In case of power breakdown the valve closes automatically. **Working pressure:** 6 bar servo-controlled; Minimal pressure difference between in- and outlet: inlet pressure min. 0.5 bar higher than outlet pressure

**Device housing with electronics:** enclosed case (not suitable for use in humid environment), electronics, signal buzzer, plug connections for valve and water sensor. Housing with earthing pin plug connection and socket outlet with earthing contact. Looping-in socket outlet with earthing contact used for GEWAS 191 A; alarm controlled socket outlet with earthing contact used for GEWAS 191 AN

**Dimensions:** control unit: 126 x 79 x 54 mm (L x W x H)  
solenoid valve: 82 x 102 x 41 mm

**Working conditions:** 0 ... 50 °C, 0 ... 90 % RH (non-condensing)

**Accessories and spare parts:**

**GMV191**  
spare solenoid

**GWF-1S**  
plug-in water sensor, 2 m

**GWF-1S / 5m**  
plug-in water sensor, 5 m

**GWF-1S / 10m**  
plug-in water sensor, 10 m

**GAZ-1**  
branch adapter  
(required for each additional water sensor)

**VEKA 2**  
extension cable 2 m

**VEKA 5**  
extension cable 5 m

**VEKA 10**  
extension cable 10 m

## Protection device for universal application



**PANEL MOUNTED DEVICE**

**WITH SWITCHING OUTPUT**

**GEWAS 200**

Panel-mounted alarm protection device with volt-free relay output (snap-on mounting for top hat rail in special snap-on housing), without sensor

**General:**

The GEWAS 200 is a versatile DIN rail alarm and protection device. Its universal input (screw terminals) allows a lot of different external sensors to be connected. That includes sensors with a switching threshold <100 kOhm like water sensors, float switches, level switches, magnetic contacts, etc. A connected device (i.e. pump, machine) is switched on or off via potential-free change-over contact in case of an alarm. The alarm is reset by the use of an internal / external reset button.

**Specification:**

**Power supply:** 220/240 V 50/60 Hz

**Power consumption:** approx. 3 VA

**Sensor input:** 2-pole screw terminal

**Switching threshold:** input resistance < 100 kOhm (eg. NPN no active, relay, reed contact, etc.)

**Switching output:** potential-free change-over contact

**Switching power:** 250 V AC, 10 A (ohmic load), max 2400 VA  
150 V DC, 2 A (ohmic load), max 240 W

**Dimensions:** 49 x 96 x 59 mm (L x W x H)  
LED (green) for operation display  
LED (red) for alarm condition

**Mounting:** universal foot base for all common DIN EN rails

**Working conditions:** -20 ... 50 °C and 0 ... 80 % RH

**Option:**

**-KL:**  
Screw terminal (2-pole) to connect an external reset button

**-AL:**  
Automatic alarm reset

**Accessories and spare parts:**

**GWF-1**  
water sensor without plug, 2 m

**GSS-1**  
level probe (plug-in float switch), 2 m cable for electrically non-conductive media (normally open/normally closed function can be selected by customer)

**GNS-1**  
plug-in level probe 2-pin (stainless steel electrodes)

**GSAS-1**  
plug-in, self-adhesive, magnetic contact

## Water monitor with one signal input and one relay output



2 DIFFERENT  
MOUNTING FORMS

FIELD FRAME



SNAP-ON HOUSING

### GEWAS 300 FG

Water monitor in field frame for wall mounting, device without sensor

### GEWAS 300 SP W

Water monitor in snap-on housing for DIN rail mounting, device without sensor

#### Applications:

Versatile alarm and protection device for DIN rail or surface mounting with universal input (screw-type terminals) for several external sensors. Sensors with switching threshold  $< 100 \text{ k}\Omega$  can be connected (e.g. water probes, floating switches, level probes, magnetic contacts, etc.). In case of an alarm the connected device (e.g. pump, machine) is switched off by a change-over contact. The GEWAS 300 FG additionally provides an alarm. The internal or an external push-button resets the alarm state. The GEWAS 300 ... is especially suitable for detection of conducting media (water, etc.). It is less applicable for badly or non conducting media (oils or fatty liquids), conducting foaming liquids or media causing electrically isolating deposits on the electrodes.

#### Description:

The measuring method for level detection is based on the conductive principle, i.e. the electrical conductivity of the media is monitored. If the switching amplifier detects a value below the set conductivity the state "media detected" is output, otherwise "no media".

#### Specifications:

<b>Power supply:</b>	18 V ... 250 V AC/DC, wide-range power supply
<b>Power consumption:</b>	$< 2 \text{ VA}$
<b>1 signal inputs:</b>	
<b>Triggering level:</b>	$< 80 \text{ k}\Omega$
<b>Response time:</b>	2 s
<b>1 Relay output:</b>	
<b>Contact:</b>	change-over contact, potential-free
<b>Switching voltage:</b>	$\leq 250 \text{ V AC}$
<b>Switching current:</b>	$\leq 5 \text{ A}$ (ohmic load)
<b>external alarm output:</b>	
<b>only GEWAS 300 FG:</b>	8 V, 3 kHz, $\leq 5 \text{ mA}$
<b>Protection class:</b>	
<b>GEWAS 300 SP:</b>	IP20
<b>GEWAS 300 FG:</b>	IP65
<b>Electric connection:</b>	
<b>GEWAS 300 SP:</b>	connection via screw-type terminal
<b>GEWAS 300 FG:</b>	connection via 3 PG cable glands and screw terminals
<b>Working temperature:</b>	$-20 \dots +60 \text{ }^\circ\text{C}$
<b>Storage temperature:</b>	$-40 \dots +80 \text{ }^\circ\text{C}$
<b>Condensation:</b>	not allowed
<b>Housing:</b>	
<b>GEWAS 300 SP:</b>	snap-on housing for DIN rail mounting 22.5 x 75 x 110 mm (W x H x D)
<b>GEWAS 300 FG:</b>	field frame 100 x 100 x 60 mm (W x H x D) without PG cable glands
<b>Functions / displays:</b>	
<b>Red / green LED:</b>	display for switching state of relay, switching state of sensors, status (supply) of device, status of battery
<b>Acoustic alarm:</b>	internal alarm buzzer with battery back-up (only for GEWAS 300 FG)
<b>Battery back-up:</b>	Monitoring and acoustic alarm are ensured even e.g. during power failures (only for GEWAS 300 FG)
<b>Alarm reset:</b>	alarm reset by GEWAS 300 SP: connection for external push-button GEWAS 300 FG: push-button at front side

#### Accessories and spare parts:

<b>GWF-1</b>	water sensor without plug, 2 m cable
<b>GWF-1/5m</b>	water sensor without plug, 5 m cable
<b>GWF-1/10m</b>	water sensor without plug, 10 m cable
<b>GSS-1</b>	level sensor, 2 m cable (floating switch) for electrically non-conducting media
<b>GNS-1</b>	level sensor 2-pole (stainless steel electrode)
<b>GSAS-1</b>	magnetic contact, plug-in and self-adhesive



Textile tape at the reverse side of device

### GWF-2

Textile-tape water sensor, 2 m, without plug

#### Description:

The GWF-2 detects smallest amounts of water due to the specially treated textile tape on its reverse side.

#### Application:

Washing machines and dishwashers, industry, research, laboratories, all machines and areas where a water leakage needs to be detected. In contrast to GWF-1 also suited for ultra-pure water and direct tube mounting.

#### Specifications:

<b>Housing:</b>	made of ABS with two mounting holes and PG gland
<b>Dimensions:</b>	65 x 35 x 50 mm (L x W x H), without PG gland

## Level module conductive



Figure with option rail adapter

## GMNV-1C

Level module conductive

## General:

This module is used for evaluation of single levels with conductive level sensors. The module can be directly attached to the connection head of the level probes or snap on a hat rail with the optionally available rail adapter.

The GMNV-1C uses 3-wire connection technology and it converts the conducting connection between probe rod and ground to a DC switching signal. This signal can be directly interpreted and processed e.g. by a SPS.

- no additional level device needed at control cabinet
- low installation costs
- little amount of cabling
- high immunity

## Specifications:

<b>Electrode connection:</b>	2-wire
<b>Sensitivity:</b>	0,1 / 1 / 10 / 100 kOhm (selectable by jumpers)
<b>Auxiliary voltage:</b>	15 ... 36 V DC
<b>Output:</b>	active output
<b>Output voltage:</b>	auxiliary voltage -10 %
<b>Max. output current:</b>	50 mA (short-circuit proof)
<b>Switching function:</b>	full / empty detector (selectable by jumpers)
<b>Delay:</b>	0.5 s
<b>Working conditions:</b>	-10 ... + 60 °C; 0 ... 95 % RH (non-condensing)
<b>Storage temperature:</b>	-20 ... + 60 °C
<b>Electric connection:</b>	via screw-type terminals
<b>max. wire diameter:</b>	2.5 mm <sup>2</sup>
<b>Housing:</b>	plastic
<b>Dimensions:</b>	Ø 44 x 20 mm (incl terminals)
<b>Mounting hole:</b>	Ø 4.5 mm
<b>Mounting distance:</b>	~ 33 mm (suitable for DIN B head)
<b>Weight:</b>	35 g

## Option:

rail adapter

## Limit detector conductive



## GNS 20E-200

Limit detector conductive 200 mm

## GNS 20E-500

Limit detector conductive 500 mm

## General:

Conductive measuring principle, suitable for use with aqueous, conducting media. Less suited for low- or non-conducting media and for foaming, adhesive or coating media.

## Application:

- full / empty detector in tanks
- overflow protection
- protection against dry running

## Specifications:

<b>Sensitivity:</b>	0.1 / 1 / 10 / 100 kOhm (selectable by jumpers)
<b>Auxiliary voltage:</b>	15 ... 36 V DC
<b>Output:</b>	active output
<b>Output voltage:</b>	auxiliary voltage -10 %
<b>Max. output current:</b>	50 mA (short-circuit proof)
<b>Switching function:</b>	full / empty detector (selectable by jumpers)
<b>Delay:</b>	0.5 s
<b>Working conditions:</b>	-10 ... + 60 °C; 0 ... 95 % RH (non-condensing)
<b>Storage temperature:</b>	-20 ... + 60 °C
<b>Electric connection:</b>	via screw-type terminals
<b>max. wire diameter:</b>	2.5 mm <sup>2</sup>
<b>Cable feedthrough:</b>	for cables with diameter 5 - 14 mm
<b>Connection head:</b>	aluminum DIN B head
<b>Dimensions:</b>	approx. 70 x 80 x 100 mm
<b>Thread:</b>	G ½ " (stainless steel)
<b>Protection class:</b>	IP54
<b>Electrode:</b>	stainless steel
<b>Dimensions:</b>	...-200: Ø 4 x 200 mm ...-500: Ø 4 x 500 mm
<b>Total length:</b>	...-200: approx. 230 mm (till thread end) ...-500: approx. 530 mm (till thread end)
	Electrodes can be shortened.

## 3-pin. probe for level control (conductive)



### GNS-3P-SLV

3 electrodes with Poliolefin coating  
 • cooling water  
 • all conductive liquids

### GNS-3P-SLK

3 electrodes with Kynar coating  
 • food and beverage industry  
 • chemical industry

### GNS-3P-SLE

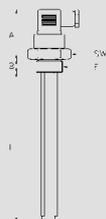
3 electrodes with PTFE coating  
 • aggressive conductive liquids

#### General:

- Coated electrodes
- Rugged construction, sealed
- Alarm or level regulation or dosage of liquids
- Combined with control electronics (ALSCHU 300, ALSCHU 485 OE / 3P or MINAL) an accurate liquids level control system

#### Specification:

<b>Number of electrodes:</b>	3 pieces
<b>Length of electrodes:</b>	500 mm, other lengths upon request, probes can be cutted to needed length
<b>Electrical connection:</b>	EN 175301-803/A plug
<b>Process connection:</b>	G 1", Polypropylen
<b>Pressure max.:</b>	6 bar
<b>Temperature max.:</b>	+100 °C
<b>Protection class:</b>	IP65
<b>Dimensions:</b>	SW: 40 mm A: 68 mm B: 20 mm L: 500 mm



## 3-pin. probe for level control (conductive)



### GNS-3P

3-pin. level probe

#### General:

- For media leaving residues (such as salt water, sewage etc.) we recommend a 3-pin electrode.
- For all industrial applications
  - Alarm-, Level- and Doseregulation
  - Optional teflon covered staffs
  - Combined with control electronics (ALSCHU 300, ALSCHU 485 OE / 3P or MINAL) an accurate liquids level control system

#### Specification:

<b>Number of electrodes:</b>	3 pieces
<b>Length of electrodes:</b>	150 mm, other lengths upon request, probes can be cutted to needed length
<b>Electrical connection:</b>	2 m cable
<b>Switching distance:</b>	10 mm
<b>Dimensions:</b>	
<b>Electrode length:</b>	150 mm
<b>Electrode diameter:</b>	3 mm
<b>Electronics box:</b>	55 x 35 mm (W x H)

#### Option:

- other length available**  
Upcharge each beginning 10 cm
- Teflon covered staffs**  
only tip is uncovered  
(for electrodes used in salt water, ...)

#### Accessories and spare parts:

- ALSCHU 485 OE / 3P**  
(p.r.t.p. 143) Electrode control device connection for 3-pin electrode
- ALSCHU 300 ...**  
(p.r.t.p. 142) Electrode controller in 2 different mounting forms: field frame or snap-on housing

## Level Switch Standard Unit



### GSS-F25

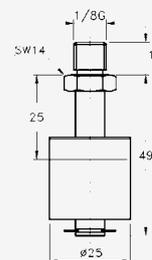
Level Switch Standard Unit

#### General:

- The level switches offer to the user a simple and reliable solution in the liquid level control application. These standard units are available with cable length of 3.0 m.
- The working principle is based on the movement of the magnetic float which drives the reed switch inside the level-stem. The cable and switch are epoxy sealed inside the stem and the sealing process is produced by a temperature controlled heating system. A rugged and free of maintenance product.
- Constructions up to 180 °C working temperature on request
  - Protection class IP65
  - Constructions ATEX on request

#### Specification:

<b>Float:</b>	PVDF
<b>Density:</b>	≥ 0.65 g/cm <sup>3</sup>
<b>Stem:</b>	PVDF
<b>Pressure max.:</b>	6 bar
<b>Temperature max.:</b>	130 °C
<b>Contact:</b>	SPST (NO)
<b>Power:</b>	70 VA / 50 W
<b>Voltage:</b>	300 V AC / 300 V DC
<b>Current:</b>	0,5 A AC / 0,7 A DC
<b>Connection:</b>	1/8"
<b>Switching difference:</b>	25 mm
<b>Accuracy</b>	±3 mm
<b>Switching point:</b>	
<b>Cable:</b>	3.0 m
<b>Electric connection:</b>	
<b>Working temperature:</b>	-30 ... +55 °C
<b>Relative humidity:</b>	0 ... 90 % RH



Portfolio of the GHM Group



Laboratory Measurement



Industrial Electronics



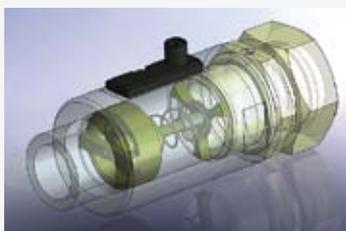
Process Engineering



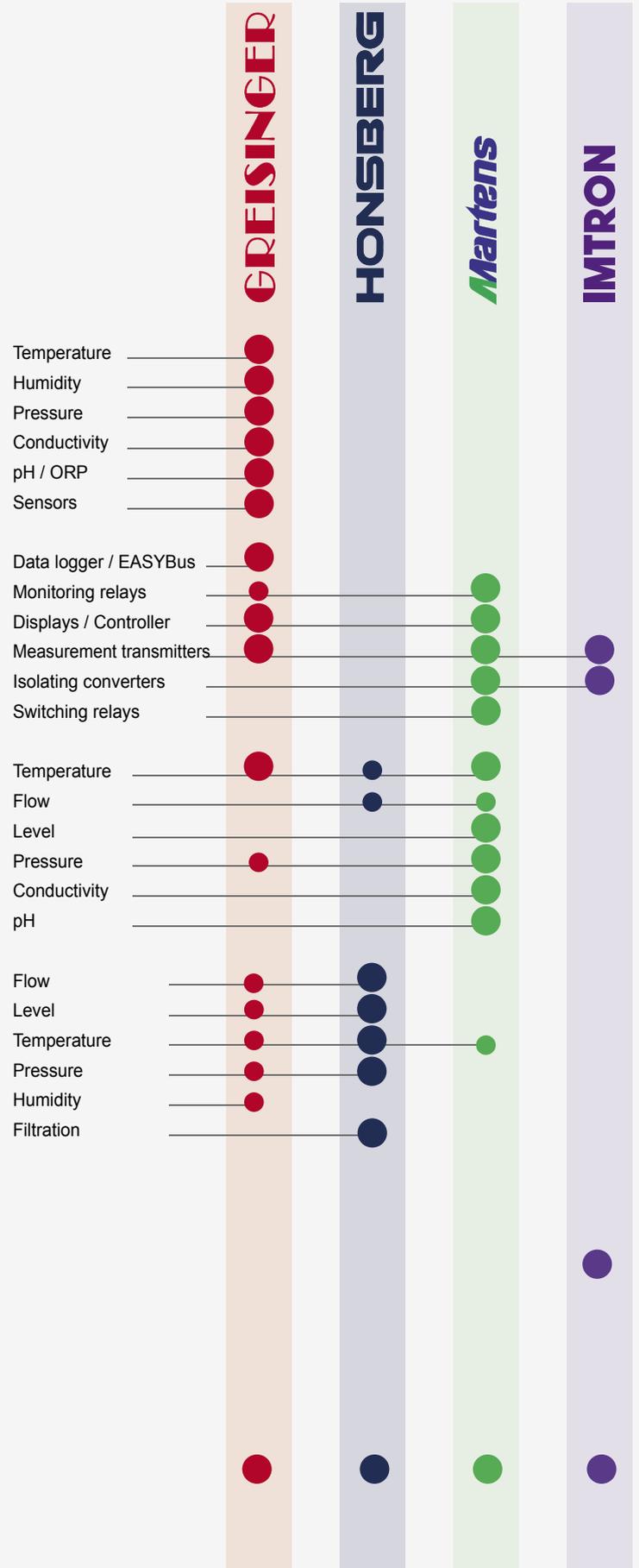
Industrial Measurement



Test Bench Measurement



Customizing



Handheld instrument  
 Display / Controller  
 Logger / EASYBus  
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 Temperature probe  
 Alarm / Protection

Competence Center

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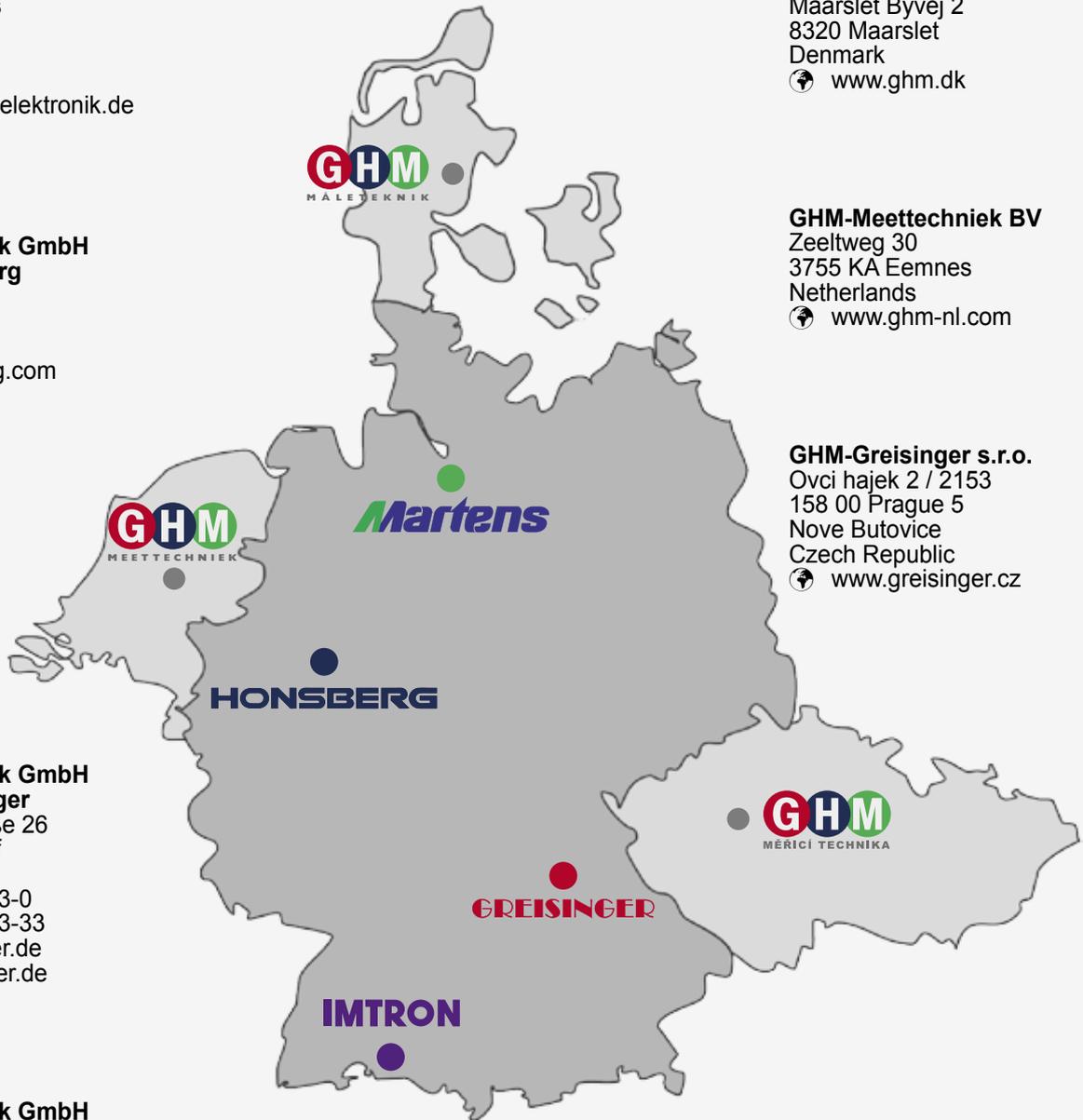
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Handheld instrument  
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Alarm / Protection

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