Industrial measurement 2013

MEASURING CONTROLLING REGULATING

GREISINGER
electronic

MADE IN GERMANY

A subsidiary of GHM MESSTECHNIK

Digital Indicators • Data Loggers • Bus systems • Remote Inquiry • Temperature Probes • Alarm Protection Devices • Software • EASYBus • Sensors

pH / Redox / Conductivity • Flow/ Flowrate • Level / Fill Level • Material Moisture • Temperature • Oxygen • Humidity • Pressure • etc.

GREISINGER electronic

Greisinger electronic plant

Our EMC test laboratory

The GREISINGER electronic GmbH was founded in Regenstauf 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 m².

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 (5 x 3 x 2.5 m) where EMC tests are performed already during the development of new products.

Furthermore to mention is the 60 m² air-conditioned calibration lab for calibration and adjustment of e.g. temperature, pressure, humidity products.

For many applications, especially considering the ISO9000ff documented measurings 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 DKD Certificates to fulfill your quality requirements according to ISO9000.

Quality Standard and Certification

MADE IN GERMANY

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 - the only way to ensure 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.st 2003.

Development, production and marketing are certified according to Directive 94/9/EC since May 1.st 2003. Several products are already examined and certified according to the Directive 94/9/EC.

DNV Business Assurance

Managementsystem Zertifikat

Zertifikat-Nr.: 113635CC1-2012-AQ-GER-TGA

Hiermit wird bescheinigt, dass das Unternehmen

Greisinger electronic GmbH

Hans-Sachs-Str. 26

93128 Regenstauf - Deutschland

ein Managementsystem in Übereinstimmung mit dem Standard

ISO 9001:2008

eingeführt hat.

Dieses Zertifikat ist gültig für die folgenden Produkt- oder Dienstleistungsbereiche:

Entwicklung, Fertigung und Vertrieb von mess-, steuer- und regeltechnischen Komponenten für industrielle Anwendungen sowie Kalibrierdienstleistungen

Datum der Erstzertifizierung: 24.05.2012

Das Zertifikat ist gültig bis: 23.05.2015

Das Audit wurde durchgeführt unter der Leitung von: Christoph Zimmermann, Lead Auditor

Ort und Datum: Essen, 24.05.2012

Mitwirkende Zertifizierungsstelle: DNV Business Assurance Germany GmbH

TGA-ZM-04-92-00

Michael Kim, Leiter Zertifizierungsstelle

Product overview

Service

HANDHELD INSTRUMENTS (with sensors and accessories)

INDUSTRIAL MEASUREMENT

Calibration and Certificate

all from one source

	for return to national standards	
1. Readjustment	**2. Factory Calibration Certificate**	**3. DKD Calibration Certificate**
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.	DIN EN ISO 9000ff demands a traceable calibration of measuring and test equipment. This calibration certificate is a low-priced alternative to the 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 acts as measuring and test equipment within quality management systems according to DIN EN ISO 9000ff or similar, as long as there 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's also possible that internal demands of the particular companies makes a DKD Calibration Certificate necessary.

1. Readjustment: (without certificate of calibration) Readjsutment of the device

2. Factory calibration certificate: WK

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

Temperature:

Certificate of calibration WPT
incl. 1 meas. point
additional meas. point (from -30 to +500°C)
additional meas. 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-meas. values (approx. 20% / 40% / 60% / 80 % RH increasing and decreasing; measuing 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_2
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) guiding price - exact costs on request.

Temperature:

DKD-certificate (incl. 1 meas. point)
additional meas. 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 pres. 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

Calibration and Testing

Complete Solutions: Komplett

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.

Novelties

material humidity

BaleCheck 100
page 26

material humidity

GMR 110
page 26

climate & CO_2

AirCheck 100
page 44

temperature

GTH 200 air
page 10

climate

GFTB 200
page 20

temperature

MT 400
page 14

temperature

ST 512
page 15

liquid level

GMNV-1C
page 144

pressure

GMUD-MP
page 110

made in Germany

WK factory calibration certificate available

Temperature handheld instruments

Application: / Device	GMH 3710	GMH 3750	GMH 2710	GMH 2710-K	GTH 175/Pt	GTH 175/Pt-E	GTH 175/Pt-K	GMH 175	GTH 200 air	GMH 3210	GMH 3230	GMH 3250	GTH 1150	GMH 1150	GTH 1170	GMH 1170
Reference- / precision measurement	✓	✓														
Quality management	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
Difference meas.											✓	✓				
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	GMH 2710-K	GTH 175/Pt	GTH 175/Pt-E	GTH 175/Pt-K	GMH 175	GTH 200 air	GMH 3210	GMH 3230	GMH 3250	GTH 1150	GMH 1150	GTH 1170	GMH 1170
Technische Daten																
Sensor element	Pt100	Pt100	Pt1000	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
(max.) Meas. range [°C]	-200.. +850	-200.. +850	-200.. +200	-200.. +250	-199.. +199	-199.. +199	-199.. +199	-199.. +199	-20.. +70	-220.. +1750	-220.. +1750	-220.. +1750	-50.. +1150	-50.. +1150	-65.. +1150	-65.. +1150
Accuracy (typ.)	≤ 0,03 °C		± 0,1 °C		± 0,1% v. MW.			± 0,1°C	± 0,5 % v. MW. ± 0,1°C	± 0,03% v. MW. ± 0,05% FS (Bsp. für Typ K)			≤ 1%		± 0,05% v. MW. ± 0,2% FS.	
Resolution [°C]	0,01 / 0,1	0,01 / 0,1	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
Plug-in probe	✓	✓						✓		✓	✓	✓	✓	✓	✓	✓
Meas. inputs	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1
Display rows	2	2	2	2	1	1	1	1	1	2	2	2	1	1	1	1
Funktionen:																
Min/Max, Hold, Auto-Off	✓	✓	✓	✓					✓	✓	✓	✓			✓	✓
Alarm (buzzer)		✓										✓				
Data logger		✓										✓				
Interface	✓	✓								✓	✓	✓				
Analog output	✓	✓								✓						
Catalog page	p. 7	p. 7	p. 8	p. 8	p. 9	p. 9	p. 9	p. 9	p. 10	p. 11	p. 11	p. 11	p. 12	p. 12	p. 12	p. 12

Pt100 - High-Precision Thermometer
Reference meter for any calibration requirement

- Suitable for all Pt100 4-wire probes with 4-pin miniature DIN-plug
- Highest accuracy and resolution (0,01°C)
- Freely adjustable analog output 0-1V or serial interface
- Offset and slope input
- Min-/max- value memory, hold function
- incl. calibration protocol

Additional functions of the GMH3750:

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

GMH 3710 access. not incl.

GMH 3750 access. not incl.

Microprocessor precision thermometer for Pt100 4-wire

Application: reference measurings in liquids, soft media, air/gases.

Specifications

Measuring range:
-199,99 ... +199,99°C resp. -200,0 ... + 850,0°C
-199,99 ... +199,99°F resp. -328,0 ... +1562,0 °F
Resolution: 0,01°C resp. 0,1°C
0,01°F resp. 0,1 °F
Linearisation: digital stored characteristic curve GMH3750 add. supports an userdefined curve.
Auto-range: automatically or manually choose of the measuring range.
Accuracy: (±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 °
Temperature drift: ≤ 0,002 °C / K
Probe: Pt100, 4-wire, in acc. to DIN EN 60751 probe connection via 4-pin miniature DIN-plug
Nominal temperature: 25°C
Working temperature: -25 to +50°C
Relative humidity: 0 to +95%RH (non-condensing)
Storage temperature: -25 to +70°C
Display: two 4½ digit LCDs (12.4mm or 7mm high), as well as additional arrows.
Pushbuttons: 6 membrane keys
Output: 3-pin jack connector Ø3.5 mm, choice between seriell interface or analog output
- 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: 0...1V, freely adjustable (resolution 13bit, accuracy 0.05% at nom. temp.)
Power supply: 9V-battery, type IEC 6F22 (included) as well as additional d.c. connector for external 10.5-12V direct voltage supply. (suitable power supply: GNG10/3000)
Low battery warning: ' bAt '
Power consumption: approx. 1 mA
Dimensions: 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.
Weight: approx. 155 g

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 GMH3750:
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
- Regulating function: with the help of the switching module GAM3000 (optinally) electric equipment can be switched on/off or alarm memorised (p.r.t. page 41)
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 sec. ... 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

plug-in probes Pt100 p.r.t. page 123
GLF 401 Mini Air probe (p.r.t. p. 123)

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. 62)
ST-R1 device protection bag
GNG 10 / 3000 power supply
miscellaneous accessories p.r.t. pages 60 - 62

Calibrated Systems

General

The overall error of a measuring consists of the sum of the instrument error and the probe error. To minimise 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 (GMH3750) or. with probe adjusting via offset and slope input (GMH3710).

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.

GMH 3750 / SET1
incl. certificate of calibration
optimized measuring range: -20 .. +70°C
Temperature probe: GTF 401 1/3 DIN, Pt100, 4-wire *(for tech. data please refer to p. 123)*
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
optimized measuring range: 0 .. +250°C
Temperature probe: GTF 401 1/3 DIN, Pt100, 4-wire *(for tech. data please refer to p. 123)*
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
optimized measuring range: -20 .. +70°C
Temperature probe: GTF 401 1/3 DIN, Pt100, 4-wire *(for tech. data please refer to p. 123)*
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
optimized measuring range: -20 .. +70°C
Temperature probe: GTF 401 1/3 DIN, Pt100, 4-wire *(for tech. data please refer to p. 123)*
System accuracy: better than 0,1°C *(at opt. range)*
Calibration points: -20°C / 0°C / 70°C

Calibration accessories

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

Software description:
Comfortable software to edit the user defined sensor curve of the GMH3750. (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 61)

Waterproof HACCP-Thermometer

with Pt1000-probe

WK

HACCP

Features

- Waterproof (device and probe)
- Easy handling
- Min-/Max. value memory
- High accuracy (±0.1 °C ±1 digit)
- Automatic freezing of constant measuring value (Auto-Hold)
- Battery life time > 6000 hours
- incl. calibration protocol

GMH 2710 Temperature measuring device incl. universal probe

GMH 2710-K Temperature measuring device incl. teflon probe

Field of application

High-precision measurements:

- Laboratory
- Quality management
- Production process control

Areas:

- Foods (HACCP)
- Medicine / pharmaceutics
- Chemistry
- Fishkeeping, aquafarming, aquaculture
- Etc.

General functions

- Auto-Power-Off
- Min-/Max. value memory
- Can be calibrated (zero point & slope)
- Automatic freezing of constant measuring value (Auto-Hold)
- Low battery display “BAT”

Accessories

K 50 BL
silicone protection cover (blue)

K 50 RE
silicone protection cover (red)

GKK 1105

Specification

Measuring ranges:	
GMH 2710	-200.0 ... +200.0 °C
GMH 2710-K	-200.0 ... +250.0 °C
Resolution:	0.1 °C
Accuracy:	
at -20.0 ... 100.0 °C	±0.1 °C ± 1 digit
at -70.0 ... 200.0 °C	±0.1 % of meas. value ±2 digit Probe is calibrated to the device
Probe:	Pt1000, 2-wire, potential-free, waterproof and steam-tight, permanently connected to device Ø 3 mm / length: 100 mm,
GMH 2710	Plastic handle, 135 mm long, max. 70 °C 1 m PVC-cable, max. 100 °C
GMH 2710-K	Teflon handle and 1m Teflon cable, both handle and cable are resistant to permanent high temperatures up to 250 °C, stainless steel bend protection
Reaction time T_{90}:	approx. 10 s
Display:	two 4-digit LCD (12.4 mm and 7 mm)
Nominal temperature:	+25 °C
Working temperature:	-25 to +50 °C
Storage temperature:	-30 to +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) 215 g (incl. battery and probe) Impact resistant ABS housing

High accuracy and precision for a minimum of price!

PRECISION POCKET THERMOMETER

GTH 175/Pt

Battery operation, complete with probe

Application: high-precision measurements in liquids, core measurements (using insertion probe), for air/gases or as reference device for calibrating other, more expensive systems!

Specification

Measuring range:	-199,9 ... +199,9 °C
Resolution:	0,1 °C
Accuracy: (at nom. temperature)	0,1 % of m.v. ±2 digit (within range of: -70.0 ... +199.9 °C), probe is calibrated to the device, ie. the error in the range of 0 to 100 °C will be approx. 0,1 °C ± 1 digit.
Probe:	Pt1000, 2-wire, electrically isolated and mounted in st. steel tube (1.4571) 3 mm Ø and approx. 100 mm long, plastic handle approx. 135 mm long, anti-buckling glanding and 1 m of highly flexible silicone cable - permanently connected to the device.
Display:	3½ digit, approx. 13 mm high
Nominal temperature:	+25 °C
Working temperature:	-30 to +45 °C
Storage temperature:	-30 to +70 °C
Power supply:	9V battery type IEC 6F22 (included)
Battery service life:	approx. 200 operating hours
Low battery warning:	„BAT“
Dimensions: device:	approx. 106 x 67 x 30 mm (H x W x D). impact resistant ABS plastic housing
Weight:	approx. 190 g (incl. battery and probe)

GTH 175/Pt-E instrument with insertion probe

Specification: refer to GTH 175/Pt
probe (st. steel tube, Ø 3mm x 100mm) like above, however with insertion probe for all soft media

GTH 175/Pt-K core temperature meas. instrument

Specification: refer to GTH 175/Pt
probe (st. steel tube, Ø 3mm x 100mm) like above, however with teflon handle and 1m teflon cable. Both handle and cable are resistant to **air temperature of up to 250 °C** and can remain in the oven.

Option (upcharges)

- Probe water-proof
Probe like GTH 175/Pt but with PVC-cable (max. 100 °C) and sealed handle (max. 70 °C)

Special design types: (on request)
e.g. probe cable in another length, sensor tube in another length.

Accessories

GB 9 V spare battery
GKK 1100 case (340 x 275 x 83 mm) with foam lining
Komplett-offering device incl. certificate of calibration and case

p.r.t. page 5

for additional accessories p.r.t. page 60 - 62

High accuracy and precision, plug-in probe, battery and permanent mains operation possible

PRECISION THERMOMETER

GMH 175

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

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

Specification

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, volt-free sensors see below or refer to page 124.
Display:	3½ digit, approx. 13 mm high
Working temperature:	-30 to +45 °C (**low temperature** - for use in cold storage rooms!)
Storage temperature:	-30 to +70 °C
Power supply:	9V-Battery type IEC 6F22 (included) as well as additional d.c. connector for external 10.5-12V 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

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 any solid surface

GLF 175 air/gas probe
for clean media
Detailed description and more probes please refer to page 124

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

GB 9 V spare battery

for additional accessories p.r.t. page 60 - 62

Precision room thermometer

GTH 200 air

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 ±0.2 °C (at 20 °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

Measuring range:	-20.0 … 70.0 °C
Resolution:	0.1 °C
Accuracy:	(±1 digit) (at nominal temperature) ± 0.5% of meas. value ±0.1 °C
Sensor:	Pt 1000, 1/3 DIN class B
Response time:	T90 = approx. 5 s
Display:	31/2 -digit, 13 mm high LCD-display
Nominal temperature:	25 °C
Working temperature:	-20 … 70 °C
Working humidity:	0 … 95% RH (non condensing)
Storage temperature:	-25 … 70 °C
Power supply:	9V battery, type IEC 6F22 (included)
Current consumption:	max. 0.1 mA
Used battery indicator	automatically if battery used: “BAT”
Battery service time:	approx. 6000 operating hours with alkaline battery
Auto-off-function:	selectable, 1 ... 120 min or continuous operation
Min / max value memory:	Lowest and highest values are saved.
Housing:	impact-resistant ABS housing, approx. 106 x 67 x 30 mm (H x W x T); additionally the sensor head at the “length” side, 35 mm long, Ø 14 mm; resulting total length 141 mm
Weight:	approx. 135 g incl. battery
Scope of supply:	device, operation manual, battery

Low cost hay temperature measuring probe

Typ electronic 0120

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**

Specification

Measuring range: -20.0 ... +120.0 °C

Resolution: 0.1 °C

Accuracy: ± 2 °C (at nominal temperature)

Probe connection: approx. 3m long connection cable with cinch plug ans connection adaptor GAD-1 Cinch

Measuring rod: fibre glass probe, approx. 4 m long, approx. 10 mm Ø, 1 measuring point in the probe tip

Cutter tip: double-edged screw-type tip with integrated temperature sensor

Display: 3½-digit, 13mm high LCD-display,
display illumination by keypress

Nominal temperature: 25 °C

Working temperature: 0 to 50 °C

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

Storage temperature: -10 to 60 °C

Power supply: separate supply for measuring electronics and illumination
measuring electronics: 9 V battery, type IEC 6F22 (1 pcs.)
illumination: mignon / LR 06 / AA 1,5V (2 pcs.)

Battery life: meas. electronics approx. 200 hours of operation
illumination: approx. 50 - 100 hours of operation (depending on battery type)

Dimensions, weight (device): approx. 160 x 90 x 45 mm, approx. 480g

Scope of supply: device, hay temperature probe 4m, measuring spike, plastic case, batteries, manual

Spare elements:

Fibre glass probe, 4m

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

General functions:
- 5 different thermocouples can be used! (types J, K, N, S, T)
- Correction of meas. values for surface meas. can be switched on / off
- Serial interface, device can be connected to bus system

Additional functions of GMH 3230 and GMH 3250:
- 2 plug-in probes can be connected and read simultaneously
- Temperature differences

Additional functions of the GMH 3250:
- 2 integrated logger functions
- Optical and acoustic min-/max- alarm
- Real-time clock with day, month and year

Additional functions of the GMH 3210:
- Analog output 0 - 1 V

GMH 3210 **accessories not incl. for** connection of **1 plug-in probes**
GMH 3230 **accessories not incl. for** simultaneous connection of **2 plug-in probes**
GMH 3250 **accessories not incl. for** simultaneous connection of **2 plug-in probes**

suitable probes p.r.t. p. 125-127!

Specification:	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: (MR1)	-65,0 ... +300,0°C	-199,9 ... +999,9°C	
(MR2)	-220 ... +1372°C	-220 ... +1372°C	
	further measuring ranges online at www.greisinger.de		
Accuracy: (extract)			
Type K: (for MR1)	±0,03%of m.v. ±0,05%f.s.	±0,03% of m.v. ±0,05%f.s. (≥-60°C) ±0,2% of m.v. ±0,05%f.s. (<-60°C)	
(for MR2)	±0,08%of m.v. ±0,1%f.s.	±0,08% of m.v. ±0,1%f.s. (≥-100°C) ±1°C ±0,1%f.s (<-100°C)	
Working temperature:	-25 to +50°C	-25 to +50°C	
Probe connections:	1	2	2
Display:	2 four digit LCDs (12.4mm and 7mm high)		
Output:	3-pin jack connector Ø3.5mm		
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 10.5-12V direct voltage supply. (suitable power supply: GNG10/3000)		
Power consumption:	approx. 0.3 mA	approx. 1,6 mA	approx. 1,6 mA
Housing dimensions:	142 x 71 x 26 mm (L x W x D), Impact-resistant ABS plastic housing. Front side IP65, integrated pop-up clip for table top or suspended use. **Weight:** approx. 155 g		
Functions:			
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:			
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

Functional Description

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:
with a resolution of 0,1° or 1°. 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 ... 1V, freely adjustable
(resolution 13bit, accuracy 0.05% at nom. temp.)

Min-/Max-alarm:
The meas. values of probe 1 or 2, probes 1 and 2 or the temp. 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:
- **manuelly:** 99 data sets (data recall via keyboard or interface)
- **cycle:** 9.999 data sets (data recall via interface)
- **adjustable cycle time:** 1sec. ... 1h
  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.

Maximum speed, universal application, low price

QUICK RESPONSE THERMOMETER

GTH 1150

Battery operation, for plug-in probes

GMH 1150

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

Measuring range:	-50 ... +1150 °C
Resolution:	1 °C
Accuracy: (at nominal temperature)	≤ 1 % ± 1 Digit (from -20 to +550 and 920 to 1150 °C) ≤ 1.5 % ±1 Digit (from 550 to 920 °C) from -20 to -50 °C according to attached correction table
Probe connection:	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 125 - 129.*
Display:	3½ digit, approx. 13 mm high
Nominal temperature:	25 °C
Working temperature:	0 to 45 °C
Storage temperature:	-20 to +70 °C
Power supply:	9V battery type IEC 6F22 (included). Additional at GMH 1150: d.c. connector for external 10.5-12V direct voltage supply. (suitable power supply: GNG10/3000)
Power consumption:	approx. 0.4 mA
Battery service life:	approx. 700 operating hours
Low battery warning:	„BAT“
Dimensions: 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.
Weight:	approx. 150 g (GTH 1150), approx. 160 g (GMH 1150)

Accessories

GTF 300 wire probe (for measuring ranges -65 ... 300 °C)

additional NiCr-Ni probes *p.r.t. page 125 - 129*

GB 9 V spare battery

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

GKK 3000 case (275 x 229 x 83 mm) with punched lining
suitable for all devices of the GMH3xxx-series, GMH 1150

ST-KN device protection bag, suitable for GTH 1150

ST-N1 device protection bag, suitable for GMH 1150

GNG 10 / 3000 power supply

for additional accessories p.r.t. page 60 - 62

High precision, low power consumption, min-/max-value memory, hold function, auto-off function, down to -25°C ambient temperature, °C and °F, offset/scale

Komplett

PRECISION QUICK RESPONSE THERMOMETER

GTH 1170

Battery operation, for plug-in probes, °C / °F (0,1° or 1°), min./max. value memory, hold, automatic-off, offset/scale

GMH 1170

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

Measuring ranges:	-65,0 ... +199,9 °C or -65 ... +1150 °C (-85,0 ... +199,9 °F or -85 ... +1999 °F)
Resolution:	0,1 °C or 1 °C (0,1 °F or 1 °F)
Accuracy: ± 1 digit (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
Temperature drift:	0,01 %/K
Point of comparison:	±0,3 °C
Probe connection:	standard flat-pin plug (free of thermo-voltage) suitable for all NiCr-Ni (type K) - probes. *(for suitable probes please refer to pages 125 - 129)*
Offset and Scale:	digital offset and scale adjustment for optimum precision.
Display:	3½ digit, approx. 13 mm high
Working temperature:	-25 to +50 °C
Storage temperature:	-25 to +70 °C
Power supply:	9V battery type IEC 6F22 (included)
Measuring interval:	approx. 3 meas. / sec.
Power consumption:	approx. 0.15 mA
Battery service life:	approx. 2000 operating hours
Low battery warning:	„BAT“
Auto-off-function:	selectable from 1 to 120 min. or deactivated.
Min./Max. value memory:	memorizing of max. and min. values.
Hold function:	By pressing a button the current values will be memorized.
Dimensions: 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.
Weight:	approx. 135 g (GTH 1170), approx. 150 g (GMH 1150)

Accessories

NiCr-Ni probes *p.r.t. page 125 - 129*

GB 9 V spare battery

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

GKK 3000 case (275 x 229 x 83 mm) with punched lining
suitable for all devices of the GMH3xxx-series, GMH 1170

ST-KN device protection bag, suitable for GTH 1170

ST-N1 device protection bag, suitable for GMH 1170

Komplett-offering *p.r.t. page 5*
device incl. certificate of calibration and case

for additional accessories p.r.t. page 60 - 62

Temperature infrared handheld instruments




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
Specification				
Meas. range [°C]	-20..+330	-32..+530	-35..+1000	-35..+900
Resolution [°C]	0,1	0,1	0,1	0,1
Response time T_{95}	< 1 sec.	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
Functions				
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 meas. protocols, software for visualisation
Interface				✓
Catalog page	**p. 14**	**p. 14**	**p. 15**	**p. 15**

The low-cost IR-thermometer

MT 400

(with laser pointer)

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.

Example applications:

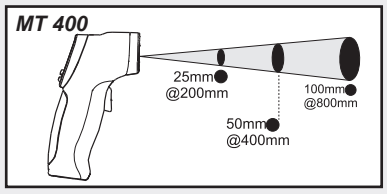
- **Electrics** – locating overheated cables
- **Heating / ventilation / air-conditioning** – monitoring of heat exchanger
- **Food** – Checking the temperature of stored food

Specification:

Measuring range: -20 … 343 °C
Resolution: 0.1 °C or 0,1 °F
Accuracy: (at 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 (t95): < 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: 9V battery
Features: BAT, min/max, hold, °F, background illumination
Dimensions: 82 x 41.5 x 160 mm
Weight: approx. 180 g
Scope of supply: 1 device, 1 operation manual, 1 battery

Accessories

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



Intelligent multi purpose infrared thermometer with precision glass optic, setting a standards

- **adjustable emission rate from 0.100 to 1.000 (for numerous materials important)**
- **Adjustable visible and audible alarm**
- **Optical resolution 20:1**
- **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**

GIM 530 MS

Calibration certificate (testpoints at 23°C, 110°C a. 510°C)

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.

Examples for application:

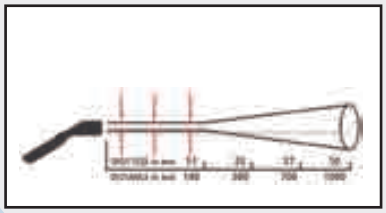
- **Electrical and mechanical service and maintenance**
- **Heating, ventilation, air-conditioning - finding thermal bridges etc.**
- **Motor vehicle diagnosis, electricity, home improvement**
- **Checking food temperature during keeping warm or storing**

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 to 530°C (highest value shall be valid)
±1°C ± 0.07°C/°C from 0°C to -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 to -32°C
Optical Resolution (D:S): 20 : 1
Response time (t_{95}): 0.3 seconds
Spectral range: 8 - 14 µm
Emission rate: 0.100 to 1.000, free selectable
Laser: < 1mW 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: 9V 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:

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



Display

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

Cost-efficient infrared measuring technology for contact-free surface temperature measurements within seconds.

- Dual-laser
- Alarm function

ST 512

Contact-free infrared digital thermometer

General example applications for infrared digital thermometer:

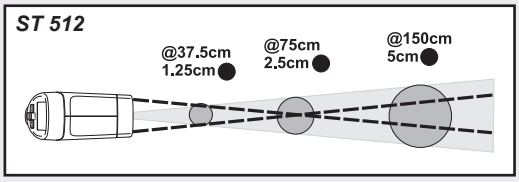
- **Monitoring of circuit boards:** overheated parts
- **Heating / ventilation / air-conditioning:** detecting bad isolation, untight pipes, energy consumption, general service measurements, etc.
- **Electrical systems, machines, power engines:** detecting hot spots at electric connections, temperature 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 bis 1000 °C
Resolution:	0,1 °C
Accuracy:	-50 °C … -23 °C ±7°C (typical)
(at ambient temperature = 23°C till 25°C)	-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_{95}):	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:	9V battery
Display:	LCD-display with function indicator symbols and background illumination
Working conditions:	0 … 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:	approx. 163 g
Scope of supply:	1 device, 1 operation manual, 1 battery

Option:

- **Calibration certificate** (25 / 100 / 200 °C)
  Initial calibration at first delivery



The new LaserSight - series Temperatures in the cross-hair

GIM 3590

Non-contact infrared digital thermometer incl. software

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 1mm. Its position sensor turns the display always to the most comfortable orientation.

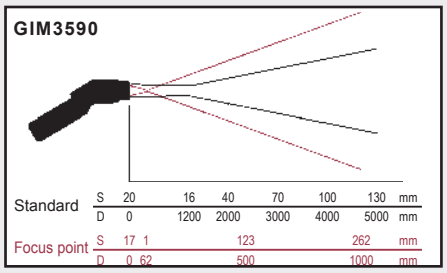
- **Measuring range -35 to 900°C**
- **switchable focus point optics**
- **laser cross-hair shows real measuring point size**
- **Optical resolution 75:1**
- **Flip-display**
- **additional thermocouple input**
- **USB interface and graphical software**

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:	±0.75K or ± 1% of m.v. (at 23°C ± 5°C)
Response time (t 95):	150ms
Optical resolution:	75:1 16mm @ 1200mm
at focus point optic:	1mm @ 62mm
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%, non condensing
Data logger:	100 measurements protocols
Interface:	USB
Software:	oscilloscope software, 20 readings/ s
Voltage supply:	2 x AA alkaline battery o. USB
Weight:	420 g
Scope of supply:	Device incl. USB cable & software, bag, insertion probe type K, batteries, carrying loop, calibration protocol, transport case

Options:

- **Certificate of calibration**
- **Tripod**



Humidity / flow rate handheld instrument

Application: / Device	GMH 3330	GMH 3350	GFTH 95	GFTH 200	GFTB 200
Air conditioning	✓	✓	✓	✓	✓
Ambient air monitoring	✓	✓	✓	✓	✓
Meteorology					✓
Living climate					✓
Flow measurement	✓	✓			
Air pressure meas.					✓
Calculation of					
Dew point Td	✓	✓		✓	✓
Wet bulb temperatur Twb				✓	✓
Moisture content x					✓
Absolute humidity d					✓
Dew point distance	✓	✓			
Enthalpy	✓	✓			

Function / Equipment: / Device	GMH 3330	GMH 3350	GFTH 95	GFTH 200	GFTB 100
Specification					
Meas. range					
Humidity	0,0..100,0 % r.F.		10,0..95,0 % r.F.	0,0..100,0 % r.F.	0,0..100,0 % r.F.
Humidity (rec. range)	11..90 % r.F.		30..80 % r.F.	11..90 % r.F.	11..90 % r.F.
Temperature	-40..+120 °C / add. external probe		-20..70 °C	-25..+70 °C	-25..+70 °C
Flow	0,05..5,00 bzw. 0,55..20,00 m/s		-	-	-
Pressure	-		-	-	10..1100 mbar
Accuracy					
Humidity (rec. range)	± 0,1 %		± 3 %	± 2,5 %	± 2,5 %
Temperaturr	± 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
Resolution	0,1 % r.F / 0,1 °C / 0,01 m/s		0,1 % r.F / 0,1 °C	0,1 % r.F / 0,1 °C	0,1 % r.F. / 0,1 °C / 0,1 mbar
Plug-in probe	✓	✓		✓	
Functions					
General functions	Min/Max, Hold, Auto-Off	Min/Max, Hold, Auto-Off		Min/Max, Hold	Min/Max, Hold, Auto-Off
Interface	✓	✓			✓
Alarm		✓			✓
Data logger		✓			
Catalog page	**p. 17**	**p. 17**	**p. 19**	**p. 19**	**p. 20**

humidity, temperature and flow rate measuring device

Komplett

WK

- Double display of humidity and temperature
- Compact probe for humidity and temperature measuring resp. flow rate measuring (probe exchange without re-calibration)
- Calculation of dew point temperature, dew point distance and enthalpy
- Additional NiCr-Ni-socket for surface measurement
- Min-/Max value memory, Hold function
- Serial interface, device can be connected to bus system (up to 5 devices can be connected to one PC interface)
- Battery/d.c. operation

Additional functions of the GMH3350:

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

GMH 3330 probe not included

GMH 3350 probe not included

Please order probes separately! (p.r.t. page 18)
(No re-calibration required for probe exchange!)

Specification:

Measuring ranges:
Rel. 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. page 18)
Resolution: 0,1 %RH., 0,1 °C / 0,1 °F, 0,01 m/sec.
Accuracy (device): (±1 digit, at nominal temperature = 25°C)
Rel. 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: (p.r.t. page 18) No calibration required for exchange of humidity/temperature or flow rate probe.
Probe connection: 6-pin screened Mini-DIN-socket
NiCr-Ni-connection: for miniature flat-pin plug
Display: two 4½ digit LCDs (12.4mm or 7mm high), as well as additional functional arrows.
Working temperature: -25 to +50°C
Relative humidity: 0 to +95%RH (non-condensing)
Storage temperature: -25 to +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: 9V-battery, type IEC 6F22 (included) as well as additional d.c. connector for external 10.5-12V direct voltage supply. (suitable power supply: GNG10/3000)
Auto-Off-Function: 1...120 min (can also be deaktivated).
Power consumption: approx. 2,5 mA (incl. TFS0100)
Low battery warning: ⚠ 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)

Functional range:
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 meas.
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. 125). A compensation value can be set for surface meas. 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 tge 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:
-manuelly: 99 data sets (data recall via keyboard or interface)
-cycle: 5.400 data sets (data recall via interface)
-adjustable cycle time: 1sec. ... 1h
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:

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 5)

miscellaneous accessories (case, mains adaptors, etc.) suitable for all GMH3xxx devices **p.r.t. p. 60 - 62**

Meas. probes for GMH 3330 and GMH 3350

humidity / temperature

Humidity/temperature:

TFS 0100 E **(0,0 ... 100,0 %RH)**
Humidity/temperature probe, exchangeable

Specification :

Meas. ranges:
Humidity: 0,0 ... 100,0 %RH (rec. range of application: 11...90%RH)
Temperature: -40,0 ... +120,0 °C (attention: working temperature of electronics!)

Accuracy: (at nominal temperature = 25°C)
Humidity: ±2,5 %RH
Temperature: ±0,5 °C

Sensors:
Humidity: capacitive polymer humidity sensor
Temperature: Pt1000, 1/3 DIN

Electronics: PC board with amplifier and data memory for sensor data (calibration, etc.) integrated in probe handle.

Working temperature: -25 to +60°C (handle and electronics)
-40 to +120°C (for short time up to +120°C) (sensor head and tube)

Relative humidity: 0 to +100 %RH

Dimensions: Probe tube: Ø14 x 119 mm, plastic handle: Ø19 x 135 mm, approx. 1m PVC conn. cable with 6-pin Mini-DIN-plug

Weight: 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 123)
Quick-response surface probes for walls, floors etc.

GTF 300 (p.r.t. page 125)
Quick-response basic thermocouple probe for universal applications (surface measurement)

flow speed

Water:

STS 005 **(0,05 ... 5,00 m/sec.)**
Flow measuring probe with snap-on head, exchangeable

Specification:

Sensor type: windmill-type anemometer
Meas. range: 0,05 ... 5,0 m/sec.
Accuracy: ±1 % of range ± 3% of meas. value (at nominal temperature)
Permiss. angle flow: ±20°, without additional meas. faults
Working temperature: 0 to +70 °C
Relative humidity: 0 to +100 %RH (non-condensing)
Dimensions: Probe head: Ø 11 x 15mm, tube: Ø 15 mm overall length 165 mm, required insertion opening: Ø 16 mm, approx. 5m PVC connection cable with 6-pin Mini-DIN-plug
Weight: approx. 75 g

Air:

STS 020 **(0,55 ... 20,00 m/sec.)**
Flow measuring probe with snap-on head, calibrated and exchangeable.

Specification:

Sensor type: windmill-type anemometer
Meas. range: 0,55 ... 20,00 m/sec.
Accuracy: ±1 % of range ± 3% of meas. value (at nominal temperature)
Permiss. angle flow: ±20°, without additional meas. faults
Working temperature: 0 to +70 °C
Relative humidity: 0 to +100 %RH (non-condensing)
Dimensions: Probe head: Ø 11 x 15mm, tube: Ø 15 mm overall length 165 mm, required insertion opening: Ø 16 mm, approx. 5m PVC connection cable with 6-pin Mini-DIN-plug
Weight: approx. 75 g

Spare parts and accessories:

STE 005
Spare snap-on head for STS 005

STE 020
Spare snap-on head STS 020

GTS **Telescopic rod (overall length 1 m)**
Please specify when ordering - no retrofit assemblage possible!

picture shows GTS with assembled STS020

Humidity/Temperature Meas. Device

Digital-Hygro-/Thermometer

GFTH 95

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 (recom. 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 to 80%)
Measuring probe:
temperature: Pt 1000
humidity: capacitive polymer humidity sensor
Response time: T_{90} = 15 sec.
Display: 3½-digit, 13mm 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: 9V-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:

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 4)**

Humidity / Temperature / Dew Point Measuring Device

Digital-Hygro-/Thermometer

Measuring set

GFTH 200

GFTH 200 SET

(incl. infra-red thermometer GIM 530 MS and case)

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

Specification:

Measuring range:
Temp: -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)
temperature (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 sec.
terminal for external probe: for connection of any Pt1000-probes with 3.5mm mono plug (for suitable probes p.r.t. page 124)
Display: 3½-digit, 13mm 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: 9V-battery type IEC 6F22
Power consumption:
approx. 9µA at 1 measurings / 60s
approx. 100µA at 1 meas. / sec. (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 14.

Accessories:

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 124)

further temperature probe refer to page 124

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. p. 5)

Climate measuring device
Precision Hygro- / Thermo- / Barometer

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

Applications:
- 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

Digital-Hygro-/Thermo-/Barometer

GFTB 200

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 display of the 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.

Specifications:

Measuring ranges:
Temperature: -25.0°C ... +70.0 °C
Air humidity: 0.0 ... 100.0 % r.F. (recommended range: 11 … 90 % RH)
Air pressure: 10.0 ... 1100.0 mbar
Calculated parameters:
Dew point temperature Td: -40.0 ... 70.0 °C
Wet bulb temperature Twb: -27.0 ... 70.0 °C
Moisture content x: 0.0 ... 280.0 g/kg
Absolute humidity d: 0.0 ... 200.0 g/m³
Resolution: 0.1%r.F.; 0,1°C bzw. 0.1°F, 0.1mbar
Accuracy: (±1 Digit) (at nominal temperature = 25 °C)
Temperature: ±0,5 % v.MW. ±0,1°C (Pt1000 1/3 DIN B)
Air humidity: ±2,5 % r.F. (at range 11 bis 90%)
Air pressure: ±1,5 mbar (750...1100 mbar)
Sensors:
Temperature: Pt1000
Air humidity: capacitive polymer humidity sensor
Air pressure: piezo-resistive sensor hybrid
Response time: T_{90} = 10 sec.
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:
Electronics: -25...70 °C; 0...80 % r.F. (non condensing)
Sensors: -25...70 °C; 0...100 % r.F.
Power supply: 9V-Batterie Typ IEC 6F22
Current consumption: max. 20 µA at 1 meas. / 60 s (mode SLOW)
approx. 70 µA at 1 meas. / 1 s (mode FAST)
Used battery indicator: automatically if battery used: "BAT"
Auto-off-function: When Auto-off is activated, the device switches automatically off, if keypad is not attended for a longer time (selectable 1..120min).
Interface: Serial interface, via electrical isolated interface converter USB 3100 of USB 3100 N (accessories) directly connectable to PC

Min / max value memory: Lowest and highest values are saved for all units.
Hold function: The current displayed value is 'frozen' (all units are affected)
Configurable display: choice between automatically displaying all values rotationally or manual selection, units not needed can be excluded
Sea level correction: 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)
Tendency indicator (for barometer)**:** air pressure falling/increasing
Offset- and scale: digital offset- and scale adjustment of measurements
Housing: impact-resistant ABS housing,
approx. 106 x 67 x 30 mm (H x W x T); additionally the sensor head at the "length" side, 35 mm long, Ø 14 mm; resulting total length 141 mm
Weight: 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)

Complete-offering:

GFTB 200 SET

(GFTB200 incl. infra-red thermometer GIM 530 MS and case GKK 3000)

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 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 infra-red thermometer GIM530MS please refer to catalog page 14.

Accessories:

GKK 252 case (235 x 185 x 48mm) with foam lining
WPF4 Certificate of calibration, humidity, for ISO9000ff **(p.r.t. p. 4)**
WPD5 Certificate of calibration, pressure, for ISO9000ff **(p.r.t. p. 4)**

miscellaneous accessories p.r.t. page 60 - 62

Material moisture handheld instruments

Application: / Device	GMK 210	GMK 100	GMI 15	GMR 110	GMH 3810	GMH 3830 + appropriate electrode	GMH 3850 + 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	GMH 3850	BaleCheck 100	BaleCheck 200
Specification									
Method	capacitive (non-destructive)			resistive (Resistance)					
Sensor / Probe	integrated			integrated		external		external GSF40	external GSF40TK
Meas. 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	p. 23	p. 23	p. 22	p. 26	p. 26	p. 24	p. 24	p. 27	p. 27

Material Moisture Measurement
with GREISINGER handheld instruments

- **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.

- Another method is to measure the material moisture indirectly by means of the **relative humidity** (i.e. with GMH 3330 + TFS 0100 E): 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.

- 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.

For further information on this topic please see the devices' manuals and our homepage www.greisinger.de under Download -> Documents

Capacitive moisture detection

without damaging of material up to 4 cm of depth

Indicator for moisture in wood and buildings

GMI 15

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.

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 and GMH 3850

Specification:

Display:	3½-digits, 13 mm high LCD
Power supply:	9V-battery (type IEC 6F22)
Power consumption:	approx. 5 mA
Low battery warning:	„BAT“ displayed automatically in case of low battery.
Working temperature:	0 to 50 °C
Storage temperature:	-20 to +70 °C
rel. humidity:	0 to 80 %RH (non-condensing)
Housing:	Impact resistant ABS plastic housing, approx. 106 x 67 x 30 mm (H x W x D).
Weight:	approx. 150 g (ready for use)

Display range:

concrete / floor pavement

0 ... 5	=	dry
6 ... 9	=	humid, normal humidity level
10 ...	=	wet

wood / fibre glass reinforced polyester

0 ... 3	~ 0...12%	: dry
3 ... 6	~ 12...20%	: air-dry
6 ... 11	~ 20...30%	: wind-dry
11 ...	~ 30% ...	: wet

Capacitive moisture measurement and moisture rating

without damaging of material, 2 measurement depth

Measuring device moisture in wood and buildings

GMK 100

The GMK 100 is a capacitive material moisture measur-ing device with direct moisture display in percent. It is optimally suited for home and handicraft. 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, 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:

Display:	2 displays for material and measured value, backlight
Moisture rating:	
Visuel:	Rating of the moisture in 6 levels from WET to DRY
Akustisch:	Signal tone
Measurement depths:	10 mm and 25 mm
Materials:	18 characteristic curves for wood and popular materials, additionally reference curve for high-resolution relative measurements
Working temperature:	-25 to 50 °C
Storage temperature:	-25 to 70 °C
Power supply:	9V-battery (Type IEC 6F22)
Power consumption:	approx. 0,12 mA
Power backlight:	approx. 2,5 mA
Functions:	Used-battery-display, Auto-Off-Function, Hold
Housing:	impact-resistant ABS plastic housing, front: IP65, approx. 106 x 67 x 30 mm (H x W x D).
Weight:	approx. 135 g (incl. battery)

Accessories:

PW 25 Testing probe to control the device

Capacitive moisture measurement and moisture rating

without damaging of material, 2 measurement depth

CARAVAN and BOAT

GMK 210

The GMK 210 is a capacitive material moisture measur-ing device with direct moisture display in percent. It is optimally suited for home and handicraft. 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**

Specification:

Display:	2 displays for material and measured value, backlight
Moisture rating:	
Visuel:	Rating of the moisture in 6 levels from WET to DRY
Akustisch:	Signal tone
Measurement depths:	10 mm and 25 mm
Materials:	14 characteristic curves for wood (with assignment tabel for wood species) and GFK, insulating materials i.e. Styropor additionally reference curve for high-resolution relative measurements
Working temperature:	-25 to 50 °C
Storage temperature:	-25 to 70 °C
Power supply:	9V-battery (Type IEC 6F22)
Power consumption:	approx. 0,2 mA
Power backlight:	approx. 2,5 mA
Functions:	Used-battery-display, Auto-Off-Function, Hold
Housing:	impact-resistant ABS plastic housing, front: IP65, approx. 106 x 67 x 30 mm (H x W x D).
Weight:	approx. 145 g (incl. battery)

Accessories:

PW 25 Testing probe to control the device.

Precision Material Moisture Meas. Device

for wood, building material, straw, hay, paper, textiles etc.

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

- 466 wood characteristic curves
- 28 building material characteristic curves
- moisture estimation
- display of moisture content u or wet-basis moisture content w
- external temperature probes connectable
- serial interface or analog output 0-1V, freely adjustable
- incl. calibration protocol

Additional functions of the GMH 3850

- 2 integrated logger functions
- 4 programmable user curves
- Real-time clock

GMH 3830 **Resistive material-moisture and temperature measuring device, access. not included**

GMH 3850 **Resistive material-moisture and temperature measuring device, access. not included with data logger and user programmable material curves**

Description:

the GMH3830 offers important advantages in handling, user-friendliness, functional range and accuracy for your metrological work.

The absolute moisture content of 494 materials is displayed directly. The cumbersome usage of calculation tables now is history. Additionally you get a evaluation of your material state (wet/dry) of nearly all materials instantly. Of course the formerly used wood groups A, B, C and D of the predecessor models are further more supported.

General 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.

Datalogger (only GMH 3850):

This instrument is indispensable for the documentation of material state by quality assurance systems.

By means of the integrated data logger there can be recorded up to 10000 measuring values and processed on demand. Additionally there can be 4 material curves individually programmed to acquire data by reference measurings with dry ovens or CM-method. This instruments finally makes paper correction tables useless.

Specification:

Measuring principle:
moisture: resistive material-moisture-measuring matching DIN EN 13183-2:2002
temperature external: thermocouple, NiCr-Ni (type K)
temperature internal: NTC

Characteristic curves: 494

Measuring range:
moisture: 0,0 to 100,0 % moisture content (depending on characteristic curve)
temperature: -40,0...+200,0°C (-40,0...+392,0°F)

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

Resolution: 0,1% resp. 0,1°C (0,1°F)

Accuracy device: (at nominal temperature)
wood: ±0,2 % moisture content (deviation from characteristic curve at range 6...30%)
building mat.: ±0,2 % moisture content (deviation from characteristic curve)
temperature (external): ±0,5% v. MW ±0,3°C

Temperature compensation: automatically or manual

Sensor connection:
moisture: BNC
temperature: flat pin plug (free of thermo-voltage)

Perm. working temperature: -25 to 50 °C

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

Pushbuttons: 6 membrane keys

Output: 3-pin jack connector Ø3.5mm, choice between serial interface or analog output
- 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: 0...1V, freely adjustable

Power supply: 9V-battery, additional d.c. connector for external 10.5-12V direct voltage supply (suitable power supply: GNG10/3000).

Power consumption: approx. 2,5 mA

Dimensions / Weight: 142 x 71 x 26 mm, 155 g

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

Functions:
Hold, Auto-Hold (automatic freezing of a constant value), **Low battery warning** (⚠ and ' bAt '), **Sort** (limitation of the choice of materials to up to 8 favourites), **Auto Power Off**

Specification (only GMH 3850):

Logger functions:
-manuelly: 99 data sets (visualisation via keys/ display or interface)
-cyclic: 10000 data sets (visualisation via interface)
-adjustable cycle time: 30sec ... 1h
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

User curves: 4, programmable via interface

20 interpolation points per curve

By means of the gratis software GMHKonfig the interpolation points can be comfortably edited and stored to the instrument. To connect the instrument to a PC one of the interface converters mentioned below is needed.

Accessories:

GSOFT 3050 logger software
GRS 3100 RS232 interface converter
USB 3100 N interface converter
GKK 3500 case (394 x 294 x 106 mm)

for additional accessories p.r.t. page 25
miscellaneous accessories p.r.t. pages 60 - 62

Accessories

1 **GMK 38**
measuring cable (BNC to 2 x banana plug) approx. 90 cm long

2 **GHE 91**
Reciprocating piston electrode, to drive measuring nails into material without auxiliary devices

3 **GSE 91**
Impact electrode, to drive measuring nails into material

4 **GEG 91**
Handle, suitable for GSE 91

5 **GSG 91**
Penetration electrode, adequate for steel nails and measuring rods

6 **GST 91**
9 steel nails (3 pieces each, 12, 16 and 23 mm long) in plastic case, Ø 2,5 mm

GST 91/40
10 steel nails, 40 mm long, Ø2.5 mm, in plastic case

7 **GST 45i**
2 Teflon isolated steel nails, 45 mm long, Ø2.5 mm

GST 60i
2 Teflon isolated steel nails, 60 mm long, Ø2.5 mm

8 **GOK 91**
Surface measuring caps (pair)
(for use with GSG 91 or GSE 91)

9 **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)

10 **GST 15B**
2 steel nails with bore hole, 15 mm long, Ø3.8 mm
(for direct connection of measuring cable GMK 38)

GST 25B
as above, Ø3.8 x 25 mm

GST 40B
as above, Ø3.8 x 40 mm

11 **GBSK 91**
Wire brush (pair) short, for depths up to approx. 100 mm
(for direct connection of measuring cable GMK 38)

12 **GBSL 91**
Wire brush (pair) long, for depths up to approx. 300 mm
(for direct connection of measuring cable GMK 38)

13 **GEF 38**
Flat electrode (pair) for screed, paper, etc.
(for direct connection of measuring cable GMK 38)

14 **GLP 91**
conducting pase 100 ml, for surface measurements and depth indication in walls, wash floors etc. with brush probes

15 **GSP 91**
sensor for surface measurements on paper, textiles etc.

GSP 91 ES
spare sensor element for GSP 91

16 **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.

17 **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.

18 **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

19 **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

20 **GTF 38**
NiCr-Ni temperature probe, volt-free, Ø2.2x25 mm, 1 m cable
(recommended for wood moisture measurements)

21 **GES 38**
NiCr-Ni injection probe, volt-free, Ø4x150mm, 1 m cable
(recommended for wood moisture measurements)

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

23 **GKK 3500**
Plastic case (394 x 294 x 106 mm) with cut-outs for device and accessories

24 **ST-RN**
Protection bag with blanked out sensor connections
(suitable for GMH 3830, GMH 3850)

pict.: GMH3830 in ST-RN

Accessories, Sets

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

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

1 2 6 20 23

SET 38 MPA
(MPA wood moisture set)

Content:
as SET 38 HF, but GHE 91 electrode instead of GSE 91
Application: wood, gluelam

Measuring material moisture

for wood and building materials with extended functions

Resistive material-moisture meas. device

GMH 3810

with integrated measuring pins

The measuring pins integrated on the reinforced front numerous measurings 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

Specification:

Measuring principle:
moisture: resistive material-moisture-measuring matching DIN EN 13183-2:2002
temperature internal: NTC
Characteristic curves: 494
Measuring range:
moisture: 0,0 to 100,0 % moisture content (depending on characteristic curve)
temperature: -40,0...+200,0°C (-40,0...+392,0°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 mat.: ±0,2 % moisture content (deviation from characteristic curve)
Temperature compensation: automatically or manual
Measuring probe: 2 pin holders M6*0.75 with 19mm pins (12mm utilisable)
Perm. working temperature: -25 to 50°C
Storage temperature: -25 to +70°C
Relative humidity: 0 to +95%RH (non-condensing)
Display: two 4-digit LCDs
Power supply: 9V-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: **Hold, Auto-Hold, Sort, Auto Power Off** (description refer to GMH3830)

Accessories:

GST 3810 replacement pins (10 pcs.)

GMK 3810 1 m measuring cable, incl. adapter *(2 x banana plug to 2 x banana plug) Allows connection of accessories*

GSE 91 impact electrode

miscellaneous accessories p.r.t. pages 60 - 62

The compact solution

for wood, plaster and building moisture measurements

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

Resistive material moisture measuring device

GMR 110

with integrated measuring needles

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

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:

Measuring principle: resistive material moisture measurement acc. to DIN EN 13183
Characteristic curves: 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)
Measuring range: 0,0 bis 100 % material moisture (depends on selected characteristics)
Moisture rating: in 6 steps (wet … dry)
Resolution: 0,1% (<20%), 1% (>20%)
Accuracy: (at nominal temperature = 25 °C)
wood: ±0,2 % material moisture (Deviation to wood characteristic curve in range 6 … 20%)
building materials: ±0,2 % material moisture (Deviation to corresponding characteristic curve)
Temperature compensation: automatically of manual
Measuring probe: 2 needle holder M6x0.75 with 19 mm measuring needles (12 mm usable length)
Working temperature: -5 … 50 °C (material not frozen)
Working humidity: 0 … 95 % RH (non condensing)
Storage temperature: -25 … 70 °C
Display: 2 LCD displays for characteristic and measuring value
Power supply: 9V battery, type IEC 6F22
Current consumption: approx. 1.8 mA
Housing: made of impact-resistant ABS, plastic foil keyboard, clear screen. IP65 at front
Dimensions: 110 x 67 x 30 mm + needles 26 mm
Weight: approx. 155 g
Features: hold, auto-hold, auto-power-off
Scope of supply: device, 2 needle protection caps, battery, operation manual

Accessories:

GST 3810
spare measuring needles (10 pieces)

GMK 3810 measuring cable incl. socket adaptor
additional special accessories at page 25

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

GB 9 V spare battery

miscellaneous accessories p.r.t. pages 60 - 62

Hay and straw humidity measuring device

for measuring in bales pressed of hay, straw or grain

NEW

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

BaleCheck 100

(incl. measuring rod and protective bag)

The BaleCheck 100 is a professional measuring device for measuring the moisture in bales of pressed hay and straw. t 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.

Areas of application:

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

Specifications:

Measuring range: 0.0 … 50 % u (material moisture)
0.0 … 100 % w (water content)
Resolution: 0.1% (till 19.9%) and 1% (from 20%)
Characteristics: hay, straw, grain, reference characteristics
Moisture rating: 6-step bar graph (wet … dry)
Temperature compensation: manual
Display: 2 displays for characteristics and measuring value
Housing/weight: impact-resistant ABS, 110 x 67 x 30 mm (HxWxD), 155 g
Working conditions: -25 … 50 °C (device), 0 … 100 °C (rod), 0 … 95% RH (non condensing)
Measuring rod: V4A stainless steel, 600 mm x Ø 10mm, 1 m connection cable with BNC-plug, 260 g, design of probe handle offers comfortable operation
Features: auto-power-off, HOLD, auto-HOLD
Power supply: 9V battery, type 6F22 (included)
Current consumption: approx. 1.8 mA
Scope of supply: device, measuring rod, protective bag, operation manual

Hay and straw humidity measuring device

incl. temperature measurement in bales of pressed hay, straw or grain

NEW

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

BaleCheck 200

(incl. measuring rod and protective bag)

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).

Areas of application:

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

Specifications:

Measuring range: 0.0 … 50.0 % u (material moisture)
0.0 … 100.0 % w (water content)
-40.0 … 200.0 °C (device)
Resolution: 0.1%, 0.1 °C
Characteristics: hay, straw, grain, reference characteristics
approx. 480 additional material moisture characteristics
Moisture rating: 9-step bar graph (wet … dry)
Temperature compensation: automatic or manual
Display: 2 4-digit LCD displays (12.4 mm and 7 mm)
Working conditions: -25 … 50 °C (device), 0 … 100 °C (rod), 0 … 95% RH (non condensing)
Housing/weight: impact-resistant ABS, 142 x 71 x 26 mm (HxWxD), 155 g
Measuring rod: V4A stainless steel, 600 mm x Ø 10mm, 1 m connection cable with BNC-/type K- plug, temperature 0 … 100 °C, 260 g,
Power supply: 9V battery, type 6F22 (included)
Current consumption: approx. 2.5 mA
Features: sort (limit material selection to up to 8 favorites), auto-power-off, HOLD, auto-HOLD, interface, analog output (0-1V), power supply terminal (10.5-12 VDC)
Scope of supply: device, measuring rod with temperature sensor, protective bag, operation manual

Conductivity handheld instruments

Application: / Device	GMH 5430	GMH 5450	GMH 3430	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 3430	GLF 100	GLF 100 RW
Specification					
Meas. range Conductivity	0,0..4,000 µS/cm bis 0..1000 mS/cm (5 ranges available) depends on electrode	0,0..4,000 µS/cm bis 0..1000 mS/cm (5 ranges available) depends on electrode	0,0..200,0 µS/cm bis 0,0..200,0 mS/cm (4 ranges available)	0..2000 µS/cm bis 0,0..100,0 mS/cm (3 ranges available)	0,000..2,000 µS/cm bis 0,0..100,0 µS/cm (3 ranges available)
Resistance	0,005..100,0 KOhm/cm	0,005..100,0 KOhm/cm	0,005..100,0 KOhm/cm	--	0,01..20,00 MOhm/cm
TDS	0..1999 mg/l	0..1999 mg/l	0..1999 mg/l	0..2000 mg/l	--
Salinity	0,0..70,0	0,0..70,0	0,0..70,0	0,0..50,0	--
Temperature	-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
Sensor connection	7-pole bayonet	7-pole bayonet	fixed connection	fixed connection	fixed connection
Electrode	2- or 4-pole	2- or 4-pole	2-pole graphite electrode	2-pole graphite electrode	2-pole stainless steal electrode
Functions					
General functions	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
Interface	✓	✓	✓		
Alarm		✓			
Data logger		✓			
Catalog page	**p. 30-31**	**p. 30-31**	**p. 32**	**p. 29**	**p. 29**

Conductivity measuring devices

WK

Highlights:

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

WK

Area of application:

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

Area of application:

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

GLF 100 **Universal conductivity measuring device** (incl. calibration protocol)

GLF 100 RW **Conductivity meter for ultra-pure water**

Specification	GLF 100	GLF 100 RW
Measuring ranges:		
Conductivity:	0 ... 2000 µS/cm	0.000 ... 2.000 µS/cm
	0.00 ... 20.00 mS/cm	0.00 ... 20.00 µS/cm
	0.0 ... 100.0 mS/cm	0.0 ... 100.0 µS/cm
Temperature:	-5.0 ... +100.0 °C	-5.0 ... +100.0 °C
TDS:	0 ... 2000 mg/l	--
Salinity:	0.0 ... 50.0	--
Resistivity:	--	0.0100 ... 0.2000 MΩ*cm
	--	0.010 ... 2.000 MΩ*cm
	--	0.01 ... 20.00 MΩ*cm
Accuracy: (±1 digit, at nominal temperature = 25 °C)		
Conductivity:	±0.5 % of m.v. ±0,5 % FS	typ. ±1% of m.v. ±0,5 % FS
Temperature:	±0.3 °C	±0.3 °C
Temp.-compensation:	off: deactivated	off: deactivated
	nLF: non-linear, acc. to EN 27888	nLF: non-linear, acc. to EN 27888
	--	LIN: linear, with adjustable coefficients
	--	NaCl: compensation for weak NaCl-solutions acc. to EN 60746-3
Reference temperatures:	20 and 25 °C	20 and 25 °C
Measuring cell:	2-pole measuring cell, Ø 12 mm (graphite) Cable length: 1,2 m	2-pole measuring cell, Ø 12 mm (stainless steel: 1.4404, 1.4435) Cable length: 1,2 m
	with integrated temperature sensor	with integrated temperature sensor
warranty for sensor element:	12 months	
Display:	approx. 11 mm high, 4½-digit LCD-display	
Working conditions		
Device:	-25 ... +50 °C, 0 ... 95 % RH (non condensing)	
Measuring cell:	-5 ... +80 °C (for short-time: 100 °C)	
Power supply:	9V-battery, type 6F22 (in scope of supply)	
Power consumption:	< 1.5 mA	
Housing:	impact resistant ABS, membrane keyboard, transparent panel, front side IP65	
Dimensions (device):	110 x 67 x 30 mm (H x W x D)	
Weight:	approx. 155 g	

Device 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

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 µS/cm
with glass shaft, platinum electrodes, 1,35 m PUR-cable, fix connected with device

Accessories

GKL 100 Conductivity control solution (100 ml bottles with 1413 µS/cm. (acc. to DIN EN 27888))

GKL 101 Conductivity control solution (250 ml bottles with 84 µS/cm)

GKL 102 Conductivity control solution (100 ml bottles with 50 mS/cm)

1 **GEH 1** Swivel-arm electrode-retainer (for up to 4 electrodes / probes)

GWZ-01 Flow-through chamber (for measuring cell with Ø 12 mm, hose connection Ø 6 mm)

for additional accessories p.r.t.p. 60 - 62

Water-proof handheld device for conductivity measurement with external electrodes

Features

- Water-proof
- Serial interface and analog output
- Data logger and alarm function
- Measurement of conductivity, resistance, salinity, TDS
- Robust silicone protection cover
- Large double display
- Background illumination
- Incl. calibration protocol

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

GMH 5430 without electrode

GMH 5450 analog output and data logger, without electrode

Specifications	GMH 5430 and GMH 5450
Measuring range:	
Number of meas. Ranges:	**5**
smallest range:	*0.000 ... 5.000 µS/cm* or 0.0 ... 500.0 µS/cm***
biggest range:	*0 ... 5000 µS/cm* or 0 ... 1000 mS/cm***
Resistivity:	0.005 ... 500.0 kOhm/cm (depends on cell constant)
TDS:	0 ... 5000 mg/l cm (depends on cell constant)
Salinity:	0.0 ... 70.0 (g salt / kg water equals PSU = Practical Salinity Unit)
Temperature:	-5.0 ... +100.0 °C, Pt1000 or NTC (10k)
Supported cell constants:	4.0000 ... 12.000 / cm - 0.4000 ... 1.2000 / cm - 0.04000 ... 0.12000 / cm - 0.004000 ... 0.012000 / cm
Accuracy (at nominal temp. 25 °C):	
Conductivity:	±0.5 % of m.v. ±0.1 % FS (depends on electrode)
Temperature:	±0.2 K
Connection:	
Conductivity, temperature:	1x 7-pole bayonet connector for connection of different measuring cells supported temperature sensors: Pt1000 or NTC (10k)
Interface / ext. supply:	4-pole bayonet connector for serial interface and supply (with accessory: USB adapter USB 5100)
Display:	4 ½ digit 7-segment, illuminated (white)
Housing:	
Protection class:	IP65 / IP67
Dimensions:	160 x 86 x 37 mm (W x H x D) 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 ca. 160 h)

depends on cell constant of used electrode
** cell constant 0.01 / cm* *** cell constant 0.1 ... 1.2 / cm*

Handheld device for conductivity measurement

GMH 5430 without electrode

NEW

GMH 5450 analog output and data logger, without electrode

Functions	GMH 5430	GMH 5450
Min / max value memory	x	x
Hold / auto-hold	x	x
Auto power off	x	x
Low battery display “BAT”	x	x
Display of condition of battery	x	x
Background lightning Period selectable (on/off or 5 s ... 2 min)	x	x
Adjustment	Cell constant manually or automatically by selectable reference solution	
GLP (Good Laboratory Practice)	adjustable calibration intervals	adjustable calibration intervals Calibration memory: latest 16 calibrations
Real-time clock	x	x
Analog output	–	0 - 1 V, freely adjustable, connection with 4-pole bayonet connector, Resolution 13 bit, accuracy 0.05% at nominal temp.
Data logger	–	cyclic: 10.000 data sets Single value: 1.000 data sets (with measuring point input, 40 adjustable measuring point texts or measuring point numbers)
Min-/max-alarm	–	Permanent monitoring of alarm boundaries for conductivity and temeprature: 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

Electrodes

	Type	Measuring range	Cell constant	Temperature measurement	Dimensions	Characteris-tics	Applications	
	**LF 200 RW**	0 ... 100 µS/cm	0,1	NTC 10k	Ø 12 mm	2-pole stainless steel	Pure and ultra pure water	
	**LF 210**	0 ... 1000 µS/cm	1	NTC 10k	Ø 12 mm	2-pole glass/ platinum	Alcohol, fuel, diesel	
	**LF 400**	0 ... 200 mS/cm	0,55	NTC 10k	Ø 12 mm	4-pole graphite	Universal application, Economy Class	
	**LF 425**	0 ... 1000 mS/cm	0,42	Pt 1000	Ø 16 mm	4-pole graphite	Tight tolerances, robust and precise for highest demands, High End Class	

General function description

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)

Additional Display for Battery and Low Battery Display “BAT”

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 °C or 25 °C).

Salinity measurement: Salinity means the sum of the concentrations of all dissolved salts in water. The unit is g/kg.

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

Accessories

EBS 20M software for long-term monitoring (p.r.t. page 58)

GSOFT 3050 (p.r.t. page 58)
Software for operation of logger devices

USB 5100
Electrically isolated interface converter, supplied via USB

GKK 3500 (p.r.t. page 56)
Device case with eggcrate foam and cut-outs for 1 device (394 x 294 x 106 mm)

GEH 1 (p.r.t. page 56)
Electrode holder for measuring electrodes with plastic handle

GNG 05/5000 (p.r.t. page 61)

Conductivity measuring devices

- Wide measuring range from 0,0 µS/cm to 200,0 mS/cm manually selectable or automatic range selection
- Double display for conductivity and temperature
- Display of resistance, salinity or TDS (dry residue of filtrate)
- Conform to the regulations of the drinking water ordinance (TrinkwV 2001) and DIN EN 27888
- Automatic temperature compensation, reference temp. (20°C / 25°C) selectable
- Extremely small measuring probe (dimensions as for pH-probe)
- Min./Max. value memory, Hold function,
- Serial interface, device can be connected to bus system (up to 5 devices can be connected to one PC interface)
- Battery and d.c. operation

GMH 3430

Conductivity measuring device incl. probe

Specification:

Measuring range:

Conductivity: 0,0 ... 200,0 µS/cm
0 ... 2000 µS/cm
0,00 ... 20,00 mS/cm
0,0 ... 200,0 mS/cm
manual setting or auto range

Temperature: -5,0 ... +100,0°C
Resistivity: 0,005 ... 100,0 kOhm * cm
Salinity: 0,0 ... 70,0
TDS: 0 ... 1999 mg/l

Resolution: 0,1 µS/cm; 1 µS/cm; 10 µS/cm or 0,1mS/cm
0,1 °C
0,001 kOhm; 0,01 kOhm or 0,1 kOhm
0,1 (salinity)
1 mg/l

Accuracy: (±1digit) (at nominal temperature = 25°C)
Conductivity: ±0,5% of m.v. ±0,3% FS or ±2µS/cm
Temperature: ±0,2% of m.v. ±0,3K

Cell constant: adjustable from 0.800 ... 1.200 cm^{-1}

Temp. compensation: automatic or off

Compensation coefficient:
- nLF: non-linear function of natural water according to EN27888 (DIN38404) (reference temperature adjustable 20°C or 25°C)
- Lin: linear compensation from 0,3 ... 3,0 %/K (reference temperature adjustable 20°C or 25°C)
- off: no compensation

Display: 2 four digit LCDs (12.4mm and 7mm high) for conductivity (resistance, salinity, TDS) and temperature, min./ max values, hold function, etc. as well as additional functional arrows.

Measuring cell: 2-pol 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 temperature: 0 to +50°C (device)
meas. cell: 0 to +80°C (permanent) 0 to +100° C (short time)

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

Min/Max-value memory: max. and min. values as well as the corresponding temperature will be memorized.

Hold function: the current meas. value will be 'frozen'.

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).

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

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

Power-Off-function: Device will be automatically switched off if no key is pressed/no interface communication takes place for the time of the power-off delay. The power-off delay can be set to values between 1 and 120 min.; it can be completely deactivated.

Low battery warning: ⚠ and ' bAt '

Power consumption: approx. 3,5 ... 6,7 mA

Housing dimensions (device): 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 for table top or suspended use.

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

Weight: approx. 255 g (incl. batteries and measuring cell)

Automatic temperature compensation: The conductivity is highly dependant on the temperature, i.e. it is only valid for one temperature. For better comparison the device offers the possibility to compensate the conductivity to a reference temperature (adjustable 20°C or 25°C).

Temperature measurement: The temperature of the agent can be displayed by means of the temperature probe integrated in the electrode.

AutoRange: Automatic selection of to the optimum meas. range for conductivity measurements. AutoRange mode can be deactivated by pressing a button.

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

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

Option:

- LTG

for organic matter (alcohol, petrol, diesel)
up to max. 1000 µS/cm

with glass shaft, platinum electrodes,
1,35 m PUR-cable, fix connected with device

Accessories:

GKL 100 100ml conductivity control solution
(100ml bottles with 1413 µS/cm, pursuant to DIN EN 27888)

miscellaneous accessories (case, power supply, etc.) suitable for all GMH3xxx devices **p.r.t.p. 60 - 62**

pH / Redox handheld instruments

Application: / Device	GMH 5530	GMH 5550	GMH 3530	GPH 014	GPRT 1400 AN	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 3530	GPH 014	GPRT 1400 AN	GMH 3610	GMH 3630	GOX 20
Specification								
Meas. range	-2,000..16,000 pH (selectable resolution) -2000,0..2000,0 mV (selectable resolution) redox/mV 0,0..70,0 rH		0,00..14,00 pH -1999..2000 mV redox/mV 0,0..70,0 rH	0,00..14,00 pH	0,00..14,00 pH -1999..1999 mV redox/mV	O_2-concentration: 0,0 ... 25,0 mg/l O_2-saturation: 0 ... 300 %	O_2-concentration: 0,0 ... 70,0 mg/l O_2-saturation: 0 ... 600 % O_2-partial pressure: 0 ... 1200 hPa O_2 pressure: 500...1100 hPa abs	O_2-concentration: 0,0 ... 20,0 mg/l O_2
Temperature	-5,0..150,0 °C		-100,0..+250,0 °C		-20,0..+110,0 °C	0,0 ... 50,0 °C	0,0 ... 50,0 °C	0,0 ... 40,0 °C
Accuracy	±0,005 pH ±0,05 % FS (mV) Redox/mV ±0,1 rH		±0,01 pH ±0,1 % FS (mV) redox/mV ±0,1 rH	±0,02 pH	±0,02 pH ±0,2 % v. MW. ± 1 Digit	±1,5% v. MW ±0.2 mg/l	±1,5% v. MW ±0.2 mg/l (0...25mg/l)	O_2-concentration: ±0,2 % v. MW. ±0,2 mg/l
Temperature	±0,2 °C		±0,2 °C		±0,5 °C ± 1 Digit	Pressure: ±0,5% FS ±1Digit ±0,1°C ±1Digit		±0,3 °C (0-30 °C)
Connections	BNC-female connector		BNC-socket	CINCH-socket	CINCH-socket	6-pole Mini-DIN-socket		Electrode permanently connected to device.
Temperature	2 banana-jack		4-pole Mini-DIN	--	3,5 mm jack connect.			
Temperature-compensation	automatic and manual (Pt1000, NTC 10k)		automatic and manual (PT100)	manual	automatic and manual	automatic	automatic	manual
Functions								
General functions	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	
Interface	✓	✓	✓			✓	✓	
Analog output		✓			✓			
Calibration memory		✓						
Data logger, alarm		✓						
Catalog page	**p. 34-35**	**p. 34-35**	**p. 36**	**p. 38**	**p. 38**	**p. 39**	**p. 39**	**p. 39**

Waterproof handheld measuring device for pH / Redox

Features

- Waterproof (device and plug connections)
- Serial Interface and analog output
- Data logger- and alarm function
- GLP-features (Good Laboratory Practice)
- Robust silicone protection cover
- Big dual display
- Background lightning
- High resolution (0.001pH / 0.1 mV)
- Incl. calibration protocol

Field of application

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

GMH 5530 without electrode

GMH 5550 with analog output and data logger, without electrode

Technical data

Measuring ranges:	
pH:	-2.000 ... 16.000 pH
Redox /mV:	-2000.0 ... 2000.0 mV (for hydrogen system DIN38404: -1792 ... +2207 mV_H)
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_H)
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^{12} 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)
Display:	two 4½ - digit seven-segment display (15 mm and 12 mm)
pH-Calibration	
Automatically:	1-, 2- or 3- point calibration, GREISINGER-Standard-Buffer or Puffer to DIN19266 (A,C,D,F,G)
Manually:	1-, 2- or 3- point calibration
Protection class:	IP67 (Housing and connections)
Dimensions / Weight:	160 x 86 x 37 mm (H x W x D) incl. protection cover / 250 g incl. battery and protection cover
Housing:	impact resistant ABS housing with pop-up clip
Power supply:	2 x AAA-battery (incl. in scope of supply) power consumption: <1.0 mA
Battery life time:	1000 hours

Handheld measuring device for pH / Redox

GMH 5530 without electrode

GMH 5550 with analog output and data logger, without electrode

Functions	GMH 5530	GMH 5550
Min / max value memory	x	x
Hold / auto-hold	x	x
Auto power off	x	x
Low battery display “BAT”	x	x
Display of condition of pH-electrode	x	x
Background lightning Period selectable (on/off or 5 s ... 2 min)	x	x
Automatic temperature compensation	x	x
Adjustable calibration intervals (GLP)	x	x
Calibration memory (GLP)	-	x
Analog output	-	0 - 1 V, freely adjustable, connection with 4-pole bayonet connector, Resolution 13 bit, accuracy 0.05% at nominal temp.
Data logger	-	With measuring point input Recording interval: 1 s … 1 h Recording period: 416 days at interval 1 h Value memory: cyclic: 10000 data sets; singular: 1000 data sets
Real-time clock	-	x
Min-/max-alarm	-	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

General function description

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)

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

Low Battery Display “BAT”

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- or mV- measurement
"mVH" Conversion to hydrogen systems according to DIN38404 Teil 6

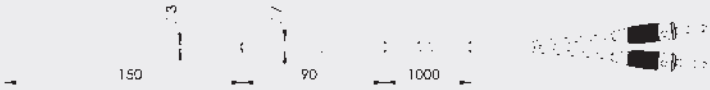
rH-Measurement
The rH-value is calculated from a measured Redox-value and a manually input pH-value.

Accessories

GE 125 waterproof pH-electrode with integrated Pt1000 temperature sensor incl. waterproof BNC-plug (p.r.t. page 37)

GE 117 (p.r.t. page 37)
pH-electrode with integrated Pt1000 temperature sensor

GTF 55 B
Pt1000 temperature immersion sensor for liquids
1 m PVC-cable with banana plugs



GE 100 BNC pH-electrode (p.r.t. page 37)

GE 105 BNC Redox-electrode (p.r.t. page 37)

GAK 1400 Working and calibration set (p.r.t. page 37)

PHL 4 pH buffer (pH 4,01 / 25 °C) 250 ml

PHL 7 pH buffer (pH 7,00 / 25 °C) 250 ml

PHL 10 pH buffer (pH 10,01 / 25 °C) 250 ml

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)

EBS 20M Software for long-term monitoring (p.r.t. page 62)

GSOFT 3050 (p.r.t. page 62)
Software for operation of logger devices

USB 5100
Electrically isolated interface converter with supply of device via USB

pH-/redox-/temperature measuring devices

- Double display for pH or redox and temperature
- Redox mode allows for automatic conversion to a hydrogen system.
- Automatic or manual temperature compensation
- Automatic buffer detection
- rH-measurements
- Evaluation of probe quality
- Battery and d.c. operation
- Serial interface
- Device can be used as thermometer, too

GMH 3530 without accessories

GMH 35 ES additional set

pH-electrode GE100BNC, temperature probe GTF35 (Pt100 4-wire), case GKK3500 and GAK1400

Specification:

Measuring ranges:
Temperature: -100,0 ... +250,0°C
or -148,0 ... +482,0°F
pH: 0,00 ... 14,00 pH
Redox (ORP): -1999 ... +2000 mV.
for hydrogen system (DIN38404):
-1792 ... +2207 mV_H (at 25°C)
rH: 0,0 ... 70,0 rH

Accuracy: (device) ±1 digit at nominal temperature = 25°C
Temperature: ±0,2°C (-20...+80°C), otherwise ±0.4°C
pH: ±0,01 pH
Redox (ORP): ±0,1% FS (mV or mV_H)
rH: ±0,1rH

Sensor connections:
Temperature: 4-pin screened Mini-DIN-socket. for Pt100 4-wire (2-wire possible)
pH, Redox: BNC-socket

Input resistance: (pH, Redox) 10^{12} Ohm
Display: 2 four digit LCDs (12.4 mm or 7 mm high)
Working temperature: 0 to +50°C
Storage temperature: -20 to +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: 9V-battery, type IEC 6F22 (included) as well as additional d.c. connector (internal pin Ø 1.9mm) for external 10.5-12V direct voltage supply. (suitable power supply: GNG10/3000)

Power consumption: approx. 3 mA

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. 165 g

Functions:

Min/Max-value memory, Hold function, Auto-Off-Function, Low battery warning

Automatic temperature compensation: Automatic temp. comp. (ATC) if temperature probe is plugged in and operating mode is "pH". Temperatur compensation ragen: 0 - 105°C. Manual temperature input if no probe connected.

pH-calibration: automatic buffer detection. Automatic compensation of temperature dependance of buffers.

acceptable electrode data:
Asymmetry: ±55 mV
Slope: 45...62 mV/pH
Sensor evaluation depending on calibration results (10 to 100%), displayed by pressing a key.
Opt. 2- or 3-point-calibration with bend of the characteristics for GREISINGER-standard-buffer (pH4.01, pH7.00, pH10.01), buffers acc. to DIN19266 (A,C,D,F,G) or manual buffer entry.

Redox-Measurements(ORP):
you have 2 choices:
"mV" standard-redox- or mV-measurement
"mV_H" Temp. compensated conversion to hydrogen system acc. to DIN38404 part 6, table 1 based on the standard redox electrode (e.g. GE105 with Ag/AgCl system and 3mol KCl) used.

rH-measurement: Calculation of the rH value by means of a redox measuring and by manually entering the pH-value. The pH-value can also be taken from a previous pH measurement.

Temperature measurements: Display of current value 12.4 mm high for thermometer mode. Min-/Max- or Hold values can be displayed in the second 7 mm high display.

Accessories:

GTF 35
temperature probe, Pt100 4-wire (p.r.t. page 123)

GE 100 BNC
Standard-electrode, BNC-plug

GE 109
pH electrode with integr. Pt100, without thread, BNC-plug and MiniDIN-plug (suitable for GMH3530)

GNG 10/3000
plug-in power supply (recommend for logger application!)

GKK 3000
case with cut-outs for GMH3xxx

USB 3100 N
interface converter to USB, electrically isolated

EBS 20M
software for transmission, recording and archiving measuring values obtained from 1 GMH3xxx (p.r.t. p. 62)

miscellaneous accessories (case, mains adaptors, etc.) p.r.t. p. 60 - 62

pH-electrodes

for goods and food, etc.

	GE 101	GE 120
Measurand	pH	pH
Measuring range	2 - 11 pH 0 - 60 °C	0 - 14 pH 0 - 80 °C
Conductivity	> 200 µS	> 200 µS
Temperature meas.	no	no
Water proof	no	no
Pressure resistant	no	no
Cable	1 m	1 m
Electrolyte	3 mol/l KCL	3 mol/l KCL
Thread	without	without
Application	foods, suspensions, ground survey, etc.	frozen food, meat, cheese, etc.
Temperature connection	-	-
Connection:		
Cinch		
BNC		

Options, upcharges:

- Cable extension
(available cable length: 1, 2, 5 und 10 m)

- Special disign types **upon request**
(electrodes with thread, other length, special applications etc.)

Accessories:

VD120
injection aid for injection electrode GE101

GAD 1 CINCH
Adapter for the plug-in of electrodes with Cinch-plugs to devices with BNC-sockets

GAD 1 BNC
Adapter for the plug-in of electrodes with BNC-plugs to devices with Cinch-sockets.

GPF 100
Plastic bottle with wide neck, 100ml

miscellaneous accessories p.r.t. p. 37

pH-electrodes, redox electrodes and accessories

	GE 014	GE 100	GE 106	GE 108	GE 151	GE 109	GE 117	GE 125	GE 173	GE 105
Measurand	pH	pH	pH	pH	pH	pH	pH	pH	pH	Redox
Measuring range	2...12 pH 0...60 °C	0...14 pH 0...80 °C	2...11 pH 10...80 °C	0...14 pH 0...80 °C	0...14 pH -5...+80 °C	0...14 pH 0...60 °C	0...14 pH 0...60 °C	0...14 pH 0...70 °C	0...14 pH 0...80 °C	± 2000 mV 0...80 °C
Conductivity	> 200 µS	> 200 µS	> 25 µS	> 200 µS	> 200 µS	> 200 µS	> 200 µS	> 200 µS	> 50 µS	> 25 µS
Temperature meas.	no	no	no	no	no	integr. Pt100	integr. Pt1000	integr. Pt1000	nein	no
Water proof	no	no	no	no	no	no	no	yes	nein	no
Pressure res.	no	no	no	6 bar	no	6 bar	6 bar	1 bar	6 bar	no
Cable	1 m	1 m	1 m	2 m	1 m	2 m	2 m	2 m	1 m	1 m
Electrolyte	3 mol/l KCL	3 mol/l KCL	3 mol/l KCL	Gel-Elektrolyt	3 mol/l KCL	Gel-Elektrolyt	Gel-Elektrolyt	Gel-Elektrolyt	Gel-Elektrolyt	3 mol/l KCL
Thread	without	without	without	PG13.5	without	without	PG13.5	without	PG13.5	without
Application	environ-mental analysis, baths, aquarium, water treat-ment etc.	environ-mental analysis, baths, aquarium, water treat-ment etc.	low-ionic media, VE-water, discus-fishes etc.	environ-mental analysis, baths, aquarium, water treat-ment etc.	electroplat-ing, partly for paints and var-nishes, alkali resist-ant	environ-mental analysis, baths, aquarium, water treat-ment etc.	environ-mental analysis, baths, aquarium, water treat-ment etc.	environ-mental analysis, Bbaths, aquarium, water treat-ment, food & beverage	biogas plants, wa-ter soluble lacquers, electro-plating, process chemistry	aquarium, ground survey, chemical analysis, sewage etc.
Temperature connection	-	-	-	-	-	Mini-DIN	4 mm Banana	4 mm Banana	-	-
Connection:										
Cinch										
BNC										

Note: elektrodes are consumption objects. Lifetime under careful treatment: > 2 Years / Warranty: 12 Month

Options, upcharges:

- Cable extension
(available cable length: 1, 2, 5, other upon request)

- Special disign types
(electrodes with thread, other length, special applications etc.)

Accessories:

GPH 4,0 / 5 Buffer capsule (5 pcs), pH4.0
GPH 4,0 / 10 Buffer capsule (10 pcs), pH4.0
GPH 7,0 / 5 Buffer capsule (5 pcs), pH7.0
GPH 7,0 / 10 Buffer capsule (10 pcs), pH7.0
GPH 10,0 / 5 Buffer capsule (5 pcs), pH10.0
GPH 10,0 / 10 Buffer capsule (10 pcs), pH10.0
GPH 12,0 / 5 Buffer capsule (5 pcs), pH12.0
GPH 12,0 / 10 Buffer capsule (10 pcs), pH12.0

All buffer salts are directly traceable to NIST standards and certified to ±0.02pH units at 25°C.

GAK 1400 Working and calibration set cons. of 5 buffer caps. each (GPH4,0, GPH7,0 und GPH10,0), 3 x GPF100, 1 x 3 mol KCl-electrolyte KCL3M and 1 x Pepsin-cleaning agent GRL100.

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 agent, 100ml

GRP 100 Redox testing solution (220mV at 25°C), 100ml

GAD 1 CINCH Adapter for the plug-in of electrodes with Cinch-plugs to devices with BNC-sockets.

GAD 1 BNC Adapter for the plug-in of electrodes with BNC-plugs to devices with Cinch-sockets.

GWA1Z thread adapter PG13.5 to G1", plastics

PG 13.5 plug on thread adapter for pressureless use, for any electrode

miscellaneous accessories p.r.t. p. 36

digital pH-Meter

GPH 014

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

Specification:

Measuring range (device):	0.00 up to 14.00 pH
Resolution:	0.01 pH
Accuracy	(device) at nominal temperature = 25°C: +/-0.02 pH +/- 1 digit
Input resistance:	10^{12} Ohm
pH-electrode:	combined measuring and reference electrode type GE 014 with refillable 3 mol-KCl electrolyte, 2-12 pH, 0 to 60° C
Calibration:	3 turning knobs for: - temperature compensation 0 to 90° C - pH7 value - pH x-value (eg 4,0, 10,0, 12,0)
Working temperature:	0 to 45 °C
Display:	3½-digit LCD display, 13mm high
Power supply:	9V battery type JEC 6F22 (incl.)
Low battery warning:	automatic; "BAT" displayed in case of l ow voltage
Battery service life:	approx. 200 operating h
Dimensions:	approx. 106 x 67 x 30 mm (H x W x D). Impact resistant ABS housing.
Weight:	approx. 200 g (incl. battery and electrode)

GAK 1400

Working and calibration set:

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 at your works.

Accessories:

GE 014 Spare electrode
GPH 014 GL Loose device (without accessories)
GE 100 Better electrode (0-14pH, 0-80°C)
GE 101 Injection electrode (2-11pH, 0-60°C)
GE 106 pH-electrode for low-ion water (as of 25 µS/cm)
GKK 252 Case (235 x 185 x 48 mm) with foam linin
GKK 1100 Case (340 x 275 x 83 mm) with foam lining
GB 9 V Spare battery

for add. accessories p.r.t. p. 35, 60 - 62

automatic temperature compensation

digital pH- / mV- / Thermometer

GPRT 1400 AN

Device ready for use incl. pH-electrode GE100, buffer capsules pH4 and pH7, two 100ml-plastic bottles as well as temperature probe.

Battery/mains operation, analog output: 1mV/digit, ATC = Automatic Temperature-Compensation.

Specification:

Mesuring range:	
Position 1 (pH):	0,00 ... 14,00 pH
Position 2 (°C):	-20,0 ... +110,0 °C
Position 3 (mV):	-1999 ... +1999 mV
Resolution:	0,01pH, 0.1°C or 1mV
Accuracy (device):	(at nominal temperature = 25°C)
(pH):	± 0,02 pH ± 1 digit
(°C):	± 0,5 °C ± 1 digit (range: -10 to 110°C)
(mV):	± 0,2 % of m.v. ± 1 digit
Input resistance:	10^{12} Ohm
pH-electrode:	combined measuring and reference electrode type GE 100 with refillable 3 mol-KCl electrolyte 0-14 pH, 0-80 °C

***Attention!** The pH-electrode does not allow for redox-measurements! Please order redox electrode GE105 separately, if required (p.r.t. p. 37)*

Temperature probe:	silicon temperature probe, electr. insulated in V4A-pipe, 6mm Ø, approx. 100mm length, approx. 1m silicone cable with 3.5mm Ø jack connector for connection to front-side socket.

Instrument is calibrated to included probe. If probe is replaced a new calibration is necessary.

Calibration:	3 turning knobs for - temperature compensation 0-90°C (automatically when probe is plugged in) - ph7-value - pHX-value (eg. 4.0, 10.0, 12.0)
Working temperature:	0 to 45 °C
Display:	3½-digit LCD display, 13mm high
Analog output:	1mV / digit, connection via 3.5 mm Ø jack connector (jack connector included)
Power supply:	9V-battery type IEC 6F22 (incl.). Additional power supply connector socket 2,5mm Ø.
Low battery warning:	automatic; "BAT" displayed in case of low voltage.
Battery service life:	approx. 100 operating h
Dimensions:	approx. 150 x 86 x 30 mm (H x W x D).

Impact resistant ABS housing with integrated pop-up clip for table top or suspended use, electrode clipped on at the side

Weight:	approx. 330 g (ready for use)

Accessories:

GPRT 1400 AN GL loose device
GTF 1400 B spare temperature probe

for add. accessories p.r.t. p. 35, 60 - 62

Oxygen measuring devices for dissolved oxygen in liquids

- Double display for oxygen and temperature
- Meas. units: O_2-concentration, O_2-saturation and O_2-partial pressure (GMH3630 only)
- Automatic air pressure compensation
- Salinity correction
- Extremely small measuring probe
- Min./Max. value memory, Hold function
- Serial interface
- Battery and d.c. operation
- Simple calibration in atmospheric air

GMH 3610 incl. oxygen electrode

GMH 3630 incl. oxygen electrode

Difference between GMH3630 and GMH3610:

Additional features of GMH3630:

- Measuring of air pressure by means of integrated pressure sensor
- Extended measuring range for O_2
- O_2-partial pressure measurement
- Correction of salinity

Specification :

Measuring ranges:

O_2-concentration:
3610: 0,0 ... 25,0 mg/l
3630: 0,0 ... 70,0 mg/l / 0,00 ... 25,00 mg/l

O_2-saturation:
3610: 0 ... 300 %
3630: 0 ... 600 % *or* 0,0 ... 250,0 %

O_2-partial pres.:
3630: 0 ... 1200 hPa or 0,0 ... 570,0 hPa
(0,0 ... 427,5 mmHg / 0 ... 900 mmHg)

Temperature:
3610 / 3630: 0,0 ... 50,0 °C

Pressure:
3630: 500 ... 1100 hPa abs.

Accuracy: (at nominal temperature = 25°C)

Oxygen:
3610: ±1,5% of m.v. ±0.2 mg/l
3630: ±1,5% of m.v. ±0.2 mg/l (0...25mg/l)
±2,5% of m.v. ±0.3 mg/l (25...70mg/l)

Temperature: ±0,1°C ±1digit
Pressure: ±0,5% FS ±1digit
Sensor connection: 6-pin screened Mini-DIN-socket.

Electrode: active membrane type. Electrode-Ø front: approx. 12mm, overall length: approx. 220 mm, anti buckling glanding, neck collar: Ø approx. 20 mm, 4 m connection cable with Mini-DIN-plug.

Response time: 95% in 10sec., dep. on temperature.
Operation life: approx. 3 years or more, dep. on maintenance
Working temp.: 0 to +40°C
Working pressure: max. 3 bar
Flow rate: min. 30 cm/sec.

Display: 2x 4 digit LCDs (12.4 / 7 mm high)
Interface: serial interface, direct connection to RS232 or USB interface of a PC via electrically isolated interface converter.
General Funtions:
Min-/Max-value memory, Hold function, Auto-Off-Function, Low battery warning
Power supply: 9V-battery, type IEC 6F22 (included) as well as additional d.c. connector for external 10.5-12V direct voltage supply. (suitable power pack: GNG10/3000)
Power consumption: approx. 3 mA
Housing dimensions:
142 x 71 x 26 mm (H x W x D), impact-resistant ABS, Front side IP65, integrated pop-up clip for table top or suspended use.
Weight: approx. 300 g (incl. battery and probe)
Temperature compensation: automatic via temperature sensor integrated in electrode.
Air pressure compensation:
3610: enter current air pressure via keyboard
3630: automatic via integrated pressure sensor. Display of current air pressure.
Correction of salinity (3630): autom. salinity value can be set via keyboard from 0,0 ... 70,0
Calibration: 1-point calibration: extremely simple quick calibration in atmospheric air. 2-point calibration (GMH3630 only): first point at atmospheric air, second point at upper measuring range (with calibration set GKS3600).
Scope of supply: device incl. electrode, GWOK01 and KOH electrolyte

GOX 20

Device incl. oxygen probe

Specification:

Measuring range:
Temperature: 0.0 ... 40.0 °C
Oxygen: 0.0 ... 20.0 mg/l O_2

Resolution:
Temperature: 0.1 °C
Oxygen: 0.1 mg/l O_2

Accuracy: (at 25°C) ±1digit
Temperature: ±0.3°C (range 0-30°C)
Oxygen: ±2% of m.v. ±0.2 mg/l

Electrode: active diaphragm type. Electrode-Ø front: approx. 12mm, length: approx. 170mm, connecting cable approx. 2 m permanently connected to device.

Response time: 95% in 10sec., depending on temperature
Operation life: approx. 3 years or more dependant on maintenance
Operation pressure: max. 3 bar
Temperature compensation: automatically via temperature sensor integrated in electrode
Calibration: simple quick-calibration in atmospheric air
Display: 3½-digit LCD display, 13mm high
Working temperature: 0 to 50 °C
Storage temperature: -5 to 70 °C
Power supply: 9V-battery type IEC 6F22
Power consumption: max. 1 mA
Low battery warning: automatic; "BAT"
Dimensions: 106 x 67 x 30 mm, ABS plastic housing
Weight: approx. 250 g (ready for use)
Scope of supply: device incl. electrode, GWOK01 and KOH electrolyte

Options (upcharges) / accessories:

- electrode with 10 m cable
- electrode with 30 m cable

GSKA 3600
protection cap for depth measuring

GWOK 01 spare diaphragm head

GKS 3600 calibration set
(consisting of calibration device, 100 ml calibration solution, 10 ml catalytic solution, measuring pipette and measuring bottle)

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

GAS 3600 Working set
(consisting of 3 spare diaphragm heads and 100ml KOH-electrolyte)

GWO 3600
Spare electrode with 4 m cable

KOH 100 Spare electrolyte 100 ml

for add. accessories p.r.t.p. 60 - 62

Gas meter

Application: / device	GMH 3691 +Sensor	GOX 100	GOX 100T	GCO 100	AirCheck 100
Measurement of Atmospheric oxygen	✓	✓	✓		
O_2 concentration	✓	✓	✓		
O_2 partial pressure	✓				
CO concentration (carbon monoxide)				✓	
CO_2 (carbon dioxide), temperature, humidity					✓
Protective gases	✓				
Diving	✓		✓	✓	
Exhaust gas monitoring				✓	
Monitoring of ambient air quality					✓

Feature / function: / device	GMH 3691	GOX 100	GOX 100T	GCO 100	AirCheck 100
Specifications					
Measuring ranges	0..100 % O_2 concentration 0..1100 hPa O_2 partial pressure-- -5..50 °C	0..100 % O_2 concentration	0..100 % O_2 concentration	0 ... 1000 ppm CO concentration 0 ... 1250 mg/m³ 0 ... 60 % COHb	0 ... 2000 ppm CO_2 concentration -10 °C ... 60 °C 5,0 ... 90,0 % r.F.
Electrode / sensor	Order sensor separately	Electrochemical oxygen partial pressure sensor in external sensor housing		Sensor internal	Sensor internal
Sensor connection	6-pole mini-DIN socket	0.7 m cable with jack plug		-	-
Function					
General functions	Min/max, hold, auto-off	Min/max, hold, auto-off	Min/max, hold, auto-off, MOD display	Min/max, hold, auto-off	
Interface	✓			✓	
Alarm	✓			✓	✓
Catalog page	**p. 42**	**p. 43**	**p. 43**	**p. 41**	**p. 44**

Compact CO - measuring device

GCO 100

- 3 display units selectable (ppm, mg/m³ and % CO Hb)
- Freely adjustable alarm boundaries - integrated acoustic alarm
- 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 9V-battery)
- Battery or power adapter operation, Power-Off-function
- External switching module for 230V/10A (= GAM3000) directly plugable
- Integrated measuring element - 3 years warranty for the sensor
- Calibration protocol within scope of supply

GCO 100

Specification:

Measuring principle: electrochemical CO measuring cell
Measuring range: 0 ... 1000 ppm CO-Concentration
Display ranges: 0 ... 1000 ppm CO-Concentration
0 ... 1250 mg/m³ CO-Concentration
0 ... 60.0 % CO Hb (estimation via exhaled breath gas)
Resolution: 1 ppm, 1 mg/m³ or 0.1 % CO Hb
Measuring element: integrated in device, measuring inlet at front plate, with inner thread for accessories screw in
Life time: >5 years at proper usage at air
suggested test interval: every 6 months (depending on precision requirements)
Accuracy: (at range 0 ... 500 ppm),
linearity: < ±5 % of measured value + 1 digit
repeatability: < ±5 % of measured value + 1 digit
Interference: (extract)

	Concentration (ppm)	residence time (min.)	display (ppm)
sulphur dioxide	50	600	<1
nitrogen dioxide	50	900	-1
nitric oxide	50	5	8
hydrogen	100	5	20
Carbon dioxide	5000	5	0

Display: approx. 11 mm high, 4½-digit LC-display
Pushbuttons: 3 membrane keys
Nominal temperature: 25 °C
Ambient condition: -10 ... +50 °C, 15 ... 90 %RH (non-condensing)
Storage temperature: -10 ... +50 °C
Power supply: 9V-battery, type IEC 6F22 (in scope of supply) as well as additional d.c. connector for external 10.5 - 12V direct voltage supply. (suitable power supply: GNG 10 / 3000)
Power consumption: <0.25 mA (>1000 operating hours)
Housing: impact-resistant ABS plastic housing, membrane keyboard, transparent panel. Front side IP65, integrated pop-up clip for table top or suspended use.
Dimensions: 142 x 71 x 26 mm (H x W x D)
Weight: approx. 155 g
Device functions:
Hold function by keypress the current measuring will be "frozen"
Max value memory the max. measured value will be stored
Alarting adjustable alarm rail, value depending alarm sound
Power-Off-function device will turn of after the set period off time (1-120 min. or deactiv), when no operating has taken.

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, scentless and lighter than air.
Even smallest concentrations are dangerous for humans!

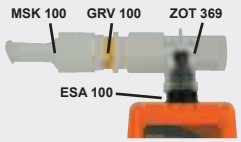
Therefore a directive exists in Germany, which limits the maximum concentration of CO gas at work (MAK / AGW) to 30 ppm

Application areas:

- 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, gas central-heating, ...)
- Detection of CO in the breath of smoker (% CO Hb)
- Cognition of CO poisoning i.e. at burnings (fire fighters, ...)

Price, accessories:

ESA 100 tube-adapter/flow diverter to screw in front plates.
ZOT 369 T-piece
GRV 100 non return valve
MSK 100 mouth peace of plastic



GAS 100 extension set for inhaled 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 9V / approx. 300mA/h, type IEC 6F22
GLI 9 V lithium battery 9V / approx. 1200mA/h
GKK 3000 case (275 x 229 x 83 mm) with punched lining
USB 3100 N interface converter to USB, elec. isolated
GAM 3000 switching module for 230VAC/10A

for additional accessories please refer to page 60 - 61

Residual oxygen meas. device

for quick and cost-effective measurement of residual oxygen

GMH 3691 GOG - H

Universal use

GMH 3691 GOG - L NEW

low oxigen-concentrations
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: (summary)

Sensor elements:
- H: GOEL 370 **- L: GOEL 380**
Measuring range (hPa O2):
- H: 0 … 1100 **- L:** 0 … 300
Measuring range (% O2):
- H: 0.0 … 100.0 **- L:** 0.0 … 25.0
Response time T_{90}:
- H: < 10 s **- L:** < 5 s
Accuracy: *(whole system - if careful calibration and measuring)*
1-point-calibration: ±0.2 %O2 ±1 digit (for concentrations < 10%)
2-point-calibration: ±0.1 %O2 ±1 digit (for concentrations < 10%)
Oxygen sensor: Oxygen partial pressure sensor, built in external sensor housing
Operation life: 12 month warranty for sensor element (if appropriate application and ambient pressure)
Working pressure: 0.5 … 2.0 bar abs.
Over- / under- pressure: max. 0.25 bar (pressure difference)
Power supply: 9V battery, type IEC 6F22
Dimensions case: approx. 394 x 294 x 106 mm
Weight: approx. 1400g (cpl. set)

for additional technical data refer to GMH3691 and corresponding sensors p. 43

Scope of supply:
Device GMH3691, hand pump with air tube, GOG oxygen sensor with penetration needle, case GKK3500, spare needle Ø 0.9mm, rubber foam sticker (40 pieces), operating manual.

Spare elements, accessories:

GOG-SET Set without instrument
Scope of supply: GOG oxygen sensor with penetration needle, hand pump with air tube, case GKK3500, spare needle and 40 rubber foam stickers

GOEL 370 spare sensor element

GOEL 380 spare sensor element

GOG-N needle, Ø 0.9 mm (5 pieces)

GOG-A rubber foam sticker (40 pieces)

Air oxygen measuring device

- Double display for oxygen and temperature
- Measured units: O_2-concentration and O_2-partial pressure
- Alarm detector with integrated horn
- Automatic temperature compensation
- Min./Max. value memory, Hold function
- Serial interface, device can be connected to bus system (up to 5 devices can be connected to one PC interface)
- Battery and d.c. operation
- Wide range of application
- Most simple calibration in atmospheric air

GMH 3691 Sensor not included - please order separately!

Specification:

Measuring ranges:
Oxygen concentration: 0,0 ... 100,0 % O_2 (gaseous)
Partial oxygen pressure: 0 ... 1100 hPa O_2
Temperature: -5,0 ... 50,0 °C
Accuracy: (device) (at nominal temperature = 25°C)
Oxygen concentration: ±0.1% ±1digit
Partial oxygen pressure: ±1 hPa ±1digit
Temperature: ±0.1°C ±1digit
Oxygen electrode: *for suitable sensores p.r.t. page 43*
Sensor connection: 6-pin screened Mini-DIN-socket.
Display: two 4 digit LCDs (12.4mm or 7mm 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 to +50°C
Relative humidity: 0 to +95%RH (non-condensing)
Storage temperature: -20 to +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: 9V-battery, type IEC 6F22 (included), as well as additional d.c. connector for external 10.5-12V direct voltage supply. (suitable power supply: GNG10/3000)
Power-Off-function: 1...120min (can also be deaktivated).
Power consumption: approx. 1,5 mA
Low battery warning: ⚠ and ' bAt '
Dimensions: 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.
Weight: 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_2 concentration will be compensated according to the abs. atmospheric pressure set (500...2000hPa).

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

Application:

Wide range of application for your home, job and hobby! For example:

- 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 breathing apparatuses (diving, etc.), oxygen monitoring for gliding.

The device can only be used to check during these applications. -> no substitute for approved monitoring device!

Accessories:

Suitable sensores **p.r.t. page 43**

GKK 3000 case (275 x 229 x 83 mm) with punched lining suitable for GMH3xxx

USB 3100 N interface converter, electrical isolated

GRS 3105 interface converter with 5 connection points, electr. isolated, for the connection of 5 GMH3xxx to one PC (RS232).

ST-R1 device protection bag with cut-out for probe connection

for add. accessories p.r.t. pages 60 - 62

Atmospheric oxygen sensores for devices of the GMH369x series

closed sensor type

- **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-adapter.

GGO 370
universal applications, diving,

GGO 380 NEW
for low oxigen-concentration, fast response time

open sensor type

- **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.

GOO 370
universal applications, diving,

GOO 380 NEW
for low oxigen-concentration, fast response time

Specification:

	GGO/GOO 370	GGO/GOO 380
Specific features:	Stronger membrane, coated electronics, temperature compensation	for low oxigen/concentration, fast response time
Measuring range:		
Partial oxygen pressure:	0 ... 1100 hPa O_2	0 ... 300 hPa O_2
Oxygen concentration:	0,0 ... 100,0 % O_2	0,0 ... 25,0 % O_2
Response time: T_{90}	<10 s.	<5 s
Operating conditions:	0 - 45 °C 0 - 95 %RH (non-condensing)	0 - 50 °C 0 - 95 %RH (non-condensing)
Ambient pressure:	0,5 to 2,0 bar abs.	.
Over-/under-pressure:	max. 0,25 bar (pressure difference sensor membrane to ambient – sensor screwed-in)	
Storage temperature:	-15 to +60 °C	
Operation life:	approx. two years (warranty for sensor element: 12 months)	
Sensor:	**GOEL 370**	**GOEL 380**
	Oxygen-partial pressure probe, mounted in external sensor housing replaceable (temperature sensor mounted in housing)	
Connection:	approx. 1,3 m cable with Mini-DIN-plug.	
Dimensions of housing:	GGO..: approx. Ø 36 mm x 95 mm (150 mm incl. anti-buckli. 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)	
Weight:	approx. 135 g (GGO...) or approx. 145 g (GOO...)	
Scope of supply:	GGO... : sensor, flow diverter, T-piece GOO... : sensor, flow diverter	

Options: (for all types)

cable length 4m
cable length 10m

Spare elements, accessories:

GOEL 370 spare sensor element for replacement by user, suitable for universal applications, diving

GOEL 380 spare sensor element for replacement by user, suitable for low oxygen concentrations

GZ-11 flow rate adapter
to measure the oxygen concentration with 6/4 mm tube

ESA 369 spare tube-adapter M16x1, for tubes with a inner-diameter of 15mm

Compact air oxygen meas. device

GOX 100
for universal applications

- 1-Button Calibration
- Automatic Power-Off
- Min-/max- value memory
- Incl. sensor GOEL 370

GOX 100T
for diving applications

- 1-Button Calibration
- MOD-Display (Maximum Operating Depth)
- HOLD function
- Incl. sensor GOEL 370

Specification:

Meas. range: 0,0 ... 100,0 % O_2
Accuracy typ.: ± 0,1 % O_2 ± 1 digit
calibrated device (range from 15 to 40 % O_2)
MOD (GOX 100T): 0 ... 100 m / 0 ... 199 ft
Sensor Connection: jack-connector cable
Sensor: Oxygen-partial pressure probe, mounted in external sensor housing
Warranty: 12 months
Working pressure: 0,5 to 2,0 bar absolute
Over-/under-pressure: max. 0,25 bar
Working temperature: 0 to 45°C (sensor)
-20 to 50°C (device)
Relative humidity: 0 to +95%RH
Power supply: 9V battery type IEC 6F22
Power consumption: approx. 120µA (over 2500 h)
Display: 3½-digit, 13mm high LCD-display
Housing: ABS-enclosure, front side IP65
Dimensions: approx. 106 x 67 x 30 mm
Weight: approx. 185g
Features: **BAT, Auto-Power-Off**

Scope of supply:
Device incl. sensor, T-piece, flow diverter

Options:

- LACK encapsulated PC board
(for applications where condensation is possible)

Spare peaces, accessories:

GOEL 370 spare sensor
GOEL 380 spare sensor
ESA 369 spare tube-adapter
ZOT 369 spare T-piece

for add. accessories p.r.t. page 60 - 62

Indoor climate monitoring
CO2 monitoring

NEW

- large CO2 displaying
- high long-term stability
- air quality rating GOOD / NORMAL / POOR
- humidity / temperature display, real-time clock, calendar
- alarm function

AirCheck 100

The indoor climate should be monitored to avoid exhaustion, lacking concentration and sickness (sick-building-syndrome) due to poor air quality.
The AirCheck 100 is a universal device for fast and continuous monitoring of the indoor climate. The air quality is rated according to its CO2 content measured with the internal long-term stable and maintenance-free infrared sensor (NDIR). After turning-on the AirCheck 100 automatically executes an offset calibration but a manual calibration is possible, too.
The CO2 content is shown on the large and well readable display together with a 3-stage rating of the ambient air (good, normal, poor). The AirCheck can be configured to optically as well as acoustically (80dB) remind to ventilate on time by 2 adjustable alarm boundaries. Temperature and air humidity measurement, real-time clock and calendar complete the device's features.

Application:

- training, conference and break rooms
- housing rooms
- offices, laboratories
- public buildings, schools
- etc.

Specification:

Measuring range:
- **CO_2:** 0 … 2000 ppm
- **Temperature:** -10 °C … +60 °C
- **Humidity:** 5,0 … +90,0 % r.F.

Resolution:
- **CO_2:** 1 ppm
- **Temperature:** 0,1 °C / 0,1 °F
- **Humidity:** 0,1 % r.F.

Accuracy:
- **CO_2:** 50 ppm ± 5 % of meas. value
- **Temperature:** ± 0,6 °C
- **Humidity:** ± 5 % r.F (@25 °C, 10-90 % r.F.)
  ± 7 % r.F (@25 °C, <10 % r.F., > 90 % r.F.)

Response time (T_{90}):
- **CO_2:** < 2 min
- **Temperature:** < 2 min
- **Humidity:** < 10 min

Measuring principle: NDIR (Non-Dispersive InfraRed)

Quality rating:
- Good: < 700 ppm (adjustable)
- Normal: 700 … 1000 ppm (adjustable)
- Poor: > „Normal"

Alarm: > 1000 ppm (adjustable)
acoustically: buzzer, 80 dB
visually: ventilator symbol displayed

Working conditions: -10 … +50 °C,
5 … 80 % r.F (avoid condensation)

Storage conditions: -20 … +60 °C, 5 … 90 % r.F. (avoid condensation)

Display: simultaneous display of CO2, temperature, humidity, clock, date

Power supply unit: IN: 100-240VAC, OUT: 5VDC / 0,6A

Dimensions: 120 mm x 85 mm (diameter x depth)

Scope of supply: 1 device, 1 power supply unit, 1 operation manual

Pressure handheld instruments

Application: / Device	GMH 5130	GMH 5150	GMH 5155	GMH 3111	GMH 3151	GMH 3156	GMH 3161-12	GMH 3181-12	GMH 3161-01	GMH 3161-07...	GMH 3161-13	GMH 3181-01	GMH 3181-07	GMH 3181-13	GDH 200-07	GDH 200-13	GDH 200-14	GPB 3300	GTD 1100	GDH xx AN	GDH 12 AN	GDUSB 1000
Relative pressure meas. (over, under- and pressure difference)	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓				✓		✓
Absolute pressure meas.	✓	✓	✓	✓	✓	✓	✓	✓									✓	✓	✓		✓	✓
Heating, ventilation, climate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Meas. in liquids	✓	✓	✓	✓	✓	✓																✓
Vacuum meas.	✓	✓	✓	✓	✓	✓	✓	✓									✓				✓	✓
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 3161-01	GMH 3161-07...	GMH 3161-13	GMH 3181-01	GMH 3181-07	GMH 3181-13	GDH 200-07	GDH 200-13	GDH 200-14	GPB 3300	GTD 1100	GDH xx AN	GDH 12 AN	GDUSB 1000
Technische Daten																						
Plug-in probe	1	1	2	1	1	2																
Meas. range pressure (max.) [mbar]	depends on sensor			depends on sensor			0..1300		..-01: -1..25 ..-07: -10..350 ..-13: -100..2000						..-07: 0..200 ..-13: 0..2000		0..11000	300..1100		..01: 0..20 ..07: 0..200 ..12: 0..1300 ..13: 0..2000 ..14: 0..11000		depends on sensor
Additional measurands																		GTD 1100: -10..+50 °C -500..+9000 m				
Units	mbar, bar, Pa, kPa, MPa, mmHg, PSI, mH_2O														mbar (hPa), mmHg, PSI ..-07: zus. Pa		mbar (hPa), mmHg, PSI	mbar (hPa), mmHg		mbar (hPa)		depends on sensor
Functions:																						
Min/Max, Zero, Auto-Off	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			Min/Max, Zero
Alarm	✓		✓		✓	✓		✓				✓	✓	✓								
Data logger	✓		✓		✓	✓		✓				✓	✓	✓								
Data logger	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓								
Analog output		✓	✓		✓	✓		✓				✓	✓	✓						✓	✓	
Catalog page	p. 46-47			p. 48-49			p. 52		p. 53			p. 53			p. 54		p. 54	p. 55		p. 56		p. 57

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

Features

- Water-proof (device and plug-in connections)
- Serial interface and analog output
- Data logger and alarm function
- Peak value detection (1000 measurements / s)
- Leakage test
- Robust silicone protection cover
- Large double display
- Background illumination
- Incl. calibration protocol

Application

Mobile use for:

- 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

GMH 5130 with 1 sensor connections, without sensor

GMH 5150 with 1 sensor connections, 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
Connections:			
Sensor	1x 7-pole bayonet connector	1x 7-pole bayonet connector	2x 7-pole bayonet connector
Output / ext. supply	4-pole bayonet connector for serial interface and supply (with accessories: USB adapter USB 5100)		
	--	analog output 0 ... 1 V	analog output 0 ... 1 V
			
Suitable probes:	GMSD / MSD sensors, available ranges (resolutions): from -1.999 … 2.500 mbar / (0.001 mbar) till 0 … 1000 bar (1 bar)		
display range max.:	-19999 ... +19999 digit		
Display unit:	depends on measuring rage selection and sensor: mbar, bar, Pa, kPa, MPa, mmHg, inHg, PSI, mH_2O		
Measuring frequency:	4 measurements / s or 1000 measurements / s		
Accuracy:	± 0.1 % FS ± 1 digit		
Display:	4 ½ digit 7-segment, illuminated (white)		
Adjustment:	offset / slope via menu		
Housing:			
Protection class:	IP65 / IP67		
Dimensions:	160 x 86 x 37 mm (H x W x D) incl. silicone protection cover (red)		
Weight:	ca. 250 g incl. battery and protection cover		
Power supply:	2x AAA battery (included), battery life 500 h (without illumination), 4 measurings / s		

Handheld device for pressure measurement

GMH 5130 with 1 sensor connections, without sensor

NEW

GMH 5150 with 1 sensor connections, analog output and data logger, without sensor

GMH 5155 with 2 sensor connections, analog output and data logger, without sensors

Functions	GMH 5130	GMH 5150	GMH 5155
Min / max value memory	x	x	x
Hold	x	x	x
Auto power off	x	x	x
Low battery display “BAT”	x	x	x
Display of condition of battery	x	x	x
Background lightning Period selectable (on/off or 5 s ... 2 min)	x	x	x
User-defined unit	conversion to arbitrary unit by linear factor		
Average filter	adjustable: 1 ... 120 s	adjustable: 1 ... 120 s	adjustable: 1 ... 120 s
Leakage test function	–	leak rate display, leak rate alarm (/s, /min, /h)	
Air velocity / flow volume	–	Pitot tube measurement (accessories)	
Analog output	–	0 - 1 V, freely adjustable, connection with 4-pole bayonet connector, Resolution 12 bit	
Data logger	–	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)	
Min-/max- alarm	–		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	

General function description

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

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

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

Low Battery Display “BAT”

Note to pressure unit selection:
A pressure unit can be selected only if the whole measuring range of this unit can also be displayed and the sensor supports the corresponding resolution.

Accessories

GMSD ... K51 pressure sensors **(p.r.t. page 50)**
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 51)**
Application field: air, aggressive gases
for over / under pressure and difference pressure measurements or absolute pressure measurements

MSD-K51 1 m connection cable for MSD sensors

EBS 20M software for long-term monitoring (p.r.t. page 62)

GSOFT 3050 (p.r.t. page 62)
Software for operation of logger devices

USB 5100
Electrically isolated interface converter, supplied via USB

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

GKK 3500
Device case with eggcrate foam and cut-outs for 1 device
(394 x 294 x 106 mm)

Hand-held pressure measuring device

GMH 3111

- one device for any measuring range (2.5 mbar ... 1000 bar)
- calibrated and fully interchangeable pressure probes
- tara, hold function, min-/max-value memory, ready for bus operation

Probes for following pressure ranges are available:

- relative pressure 2,50 mbar ... 1000 bar rel.
- pressure difference 0,00 bar ... 10,00 bar
- absolute pressure 0,00 bar ... 35,00 bar
- special measuring ranges upon request

GMH 3111 (probes not included)

GMH 3111 - ex (Ex device without probe)

suitable pressure probes page 42 / 43

Specification:	GMH 3111	GMH 3111-ex
max. display range:	-19999 ... +9999 Digit	-19999 ... +19999 Digit
Measuring range:	corresponding to used probe	
Overload:	corresponding to used probe	
Resolution:	corresponding to used probe	
Accuracy: (device)	±0,1%FS ±1Digit (at nominal temperature = 25°C)	
Pressure units:	mbar, bar, Pa, kPa, MPa, mmHg, PSI, mH_2O, can be selected.	
Probe connection:	1 sensor socket *6-pin screended lockable Mini-DIN-socket(s) for GMSD/MSD-sensors. Automatic probe detection and setting of meas. range upon plugging in of probe.*	1 sensor socket
Display:	2 x 4½-digit LCD	2 x 4½-digit LCD
Output:	serial interface	serial interface
- serial interface:	direct connection to RS232 or USB interface of a PC via interface converter GRS 3100, GRS 3105 or USB 3100 N (accessories).	
- analog output:	--	--
Power supply:	9V-battery, d.c. connector *suitable 9V-battery (type IEC 6F22) in scope of supply, d.c. connector for external 10.5-12V direct voltage supply.* *(suitable power supply: GNG10/3000)*	9V-battery, d.c. connector
Sensor adjustment:	digital offset and scale input	digital offset and scale input
Tare, 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 deaktivated).	
Housing dimensions:	142 x 71 x 26 mm, impact-resistant ABS plastic housing, Front side IP65 integrated pop-up clip for table top or suspended use.	Front side IP65 --
Weight:	approx. 150 g	approx. 190 g (incl. case)

Note to Ex- disign 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, GRS3100 and GRS3105

Please note: the operation of the interface is not allowed within the Ex area!

Working temperature: -10 to +50°C

Power supply: 9V-battery, d.c. connector

Please note: the use of d.c. connector is not allowed within the Ex area! Just d.c. con nectors 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.*

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 support these resolution.

Pressure measuring device with logger

GMH 3151 GMH 3156

Special features:

- 4½-digit display
  probes with higher resolution up on request
- logger functions
- peak value memory
- analog output 0-1V
- 1000 measurments / second
- digital sensor adjustment possible
- min- / max-alarm
- integrated horn

Additional function of the GMH3156:

- 2 GMSD/MSD-probes connectable
- difference measurement of two probes

GMH 3151 (probe not included)

GMH 3156 (probes not included)

GMH 3150 - ex (Ex device without probe)

GMH 3156 - ex (Ex device without probes)

suitable pressure probes page 50 / 51

Specification:	GMH3151	GMH3156	GMH3151-ex	GMH3156-ex
max. display range:	-19999 ... +9999 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 ±1Digit (at nominal temperature = 25°C)			
Pressure units:	mbar, bar, Pa, kPa, MPa, mmHg, PSI, mH_2O, can be selected.			
Probe connection:	**1**	**2**	**1**	**2**
	6-pin screended 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:	serial interface o. AAG		serial interface o. AAG*	
- serial interface:	direct connection to RS232 or USB interface of a PC via interface converter GRS 3100, GRS 3105 or USB 3100 N (accessories)			
- analog output:	0-1V, freely adjustable (res. 12bit)		0-1V, freely adjustable (res. 12bit)	
Power supply:	9V-battery, d.c. connector		9V-battery, d.c. connector*	
	suitable 9V-battery (type IEC 6F22) in scope of supply, d.c. connector for external 10.5-12V direct voltage supply. (suitable power supply: GNG10/3000)			
Sensor adjustment:	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 / s		4 measurements / s	
"fast" (with filter)	≥ 1000 meas. / s		1000 meas. / s	
"peak-detect"	≥ 1000 meas. / s		1000 meas. / s	
Logger functions:				
manually data sets:	99		99	
-cycle data sets:	**10000**	**4000**	**10000**	**4000**
	(max. 64 recording sequences)		(max. 64 recording sequences)	
-adjustable cycle time:	1 ... 3600 seconds		1 ... 3600 seconds	
Averaging function:	**X**	**X**	**X**	**X**
Min-/max- alarm:	**X**	**X**	**X***	**X***
Real-time clock:	**X**	**X**	**X**	**X**
Power consumption:	max. 1.6mA (4 measurements / s)		max. 1.6mA (4 measurements / s)	
	max. 7mA (1000 measurements / s)		max. 7mA (1000 measurements / s)	
Working condition:	**-25 to +50°C, 0 to +95%r.F.** (non-condensing)		**-10 ... 50°C, 0 ... 95 %RH** (non-condensing)	
Power-Off-function:	1...120 min (can also be deaktivated).			
Housing dimensions:	142 x 71 x 26 mm, impact-resistant ABS plastic housing. Front side IP65			
--	pop-up clip for table top or suspended use.		–	
Weight:	approx. 150 g		approx. 190 g (incl. case)	

* refer to note to EX-disign types at page 48

General functional 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.

Peak value memory (peak-detect): In the min-/max-value memory will be detected not filtered pressure peaks ≥1msec.

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) available as additional equipment.

Low power logger mode: (only in meas. 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. tightness).

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

- **Alarm:** 3 different alarm settings
  - "off" - alarm function deaktivated
  - "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 memoried (see accessories)

SeaLevel-correction: when connecting an abs. pressure probe the barom. air press. can also be displayed corrected to sea level "zero".
(Air pressure comp. achieved by entering the meters above sea level "zero")

Pressure sensors:

for use with GMH31xx, GDUSB (Type GMSD ...), GMH 51xx (Type: GMSD ... - K51)

Application:
- air and non aggressive gases
- sensor are 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 ..
Measuring range	-1,999...+2,500 mbar	-19,99...+25,00 mbar	-199,9...+350,0 mbar	-1000...+2000 mbar	-1.00... 10.00 bar
Overload	max. 200 mbar	max. 300 mbar	max. 1 bar	max. 4 bar	max. 10.34 bar
Resolution	0,001 mbar (0,1 Pa)	0,01 mbar (1 Pa)	0,1 mbar	1 mbar	10 mbar
Accuracy (typ.)					
hysteresis and linearity	± 0,2 % FS	± 0,2 % FS	± 0,2 % FS	± 0,2 % FS	± 0,2 % FS
temperature influence from 0-50°C	± 1,0 % FS	± 0,5 % FS	± 0,4 % FS	± 0,4 % FS	± 0,4 % FS
GMSD ...					
GMSD ... - K51					

Absolute pressure sensors: for measuring of absolute pressure

	GMSD 1,3 BA ..	GMSD 2 BA ..	GMSD 7 BA ..
Measuring range	0 ... 1300 mbar abs.	0 ... 2000 mbar abs.	0.00 ... 7,00 bar abs.
Overload	max. 4 bar abs.	max. 4 bar abs.	max. 10,34 bar abs.
Resolution	1 mbar	1 mbar	10 mbar
Accuracy (typ.)			
hysteresis and linearity	± 0,2 % FS	± 0,2 % FS	± 0,2 % FS
temperature influence from 0-50°C	± 0,4 % FS	± 0,4 % FS	± 0,4 % FS
GMSD ...			
GMSD ... - K51 *			

General Specification:

Sensor: piezoresistive pressure sensor

Pressure connection: 2 connection pins for tubes 6 x 1 mm (6mm inside-Ø and 4mm outside-Ø)

Electronics: PC board with amplifier and data memory for sensor data (measuring. range/calibration etc.) integrated in sensor housing.

Working temperature: 0 ... +70 °C

Relative humidity: 0 ... +95 % r.F. (nicht betauend)

Storage temperature: -40 ... +85 °C

Housing: 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.

Weight: approx. 75 g (..-K51: approx. 82 g)

Device connection:

GMSD ... : 1m PVC connection cable, screened with integral 6-pin Mini-DIN-plug, lockable

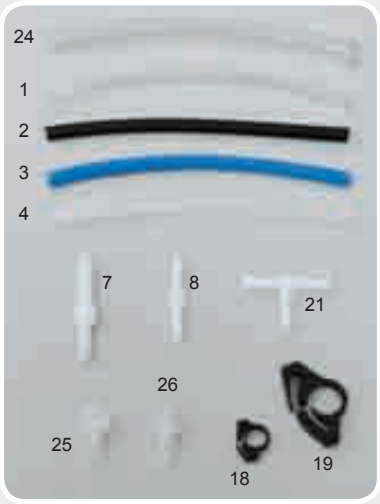
GMSD ... - K51: 1m PVC connection cable, screened with 7-pin bayonet plug

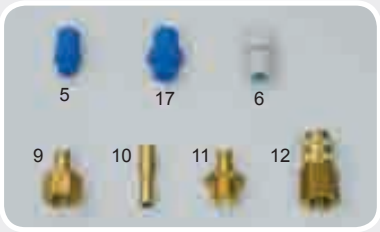
Options, upcharges:

Probes for 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



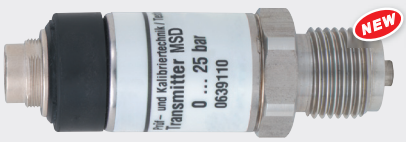


TUBE, TUBE CLIPS, ADAPTER, COUPLINGS, etc.

for GMH31xx, GMSD, GDH and pressure measuring transducers.

GDZ-01 = PVC-tube 6/4 (6 mm outside-Ø, 4 mm inside-Ø) (5 bar @ 23°C)
GDZ-24 = PVC-tube 10/7 (10 mm outside-Ø, 7 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-07 = Double reducer for tubes with 6 inside-Ø to 6/4 tube
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 6mm 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 (8mm outside-Ø and 6mm 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) (without picture)
GOG-N = needle, Ø 0.9 mm - suitable to Luer-Lock male (5 pieces) (without picture)

for additional accessories refer to page 51



Stainless steel pressure sensors:

for use with GMH31xx, GMH 51xx and GDUSB 1000 (p.r.t. page 57)
Application: • air, aggressive gases
• aggressive liquids / water, etc.

Follow-on type for **GMSD-** stainless-steel-sensors

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 ... Stainless steel pressure sensors without cable

Connection cable MSD-K31 or MSD-K51 has to be ordered separatly (Accessories)

MSD-K31 **1 m connection cable for MSD-senors for use with GMH 31xx / GDUSB 1000**

MSD-K51 **1 m connection cable for GMH 51xx**

General Specification

Sensor: stainless steel pressure sensor (parts coming into contact with media). Suitable for aggressive media, water, etc.
Accuracy: (typ. values) ± 0,2 % FS (hysteresis and linearity)
± 0,02 % FS / K (TC for zero or slope)
Electronics: PC board with amplifier and data memory for sensor data (meas. range, calibration, etc.) integrated in sensor housing, sealed sensor electronic
Reaction time: 1 ms
Medium temperature: -25 ... +100 °C (kompensierter Bereich: 0 ... 70 °C)
Working conditions: -20 ... +80 °C
Storage temperature: -40 ... +80 °C
Pressure connection: connection thread G1/2B (other on request).
Cable connection: M16 built-in plug
Housing: CrNi-steel (parts coming into contact with media)
lenght: 88,5 mm, Ø 27 mm, approx. 220 g
Protection class: IP 67 (sensor)

Options / upcharges

Higher probe accuracy
by multi point calibration (additional individual linearisation points are stored in sensor memory)

Certificate of calibration WPD5

Accessories

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 cabel 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 and GDUSB 1000
1 m PVC connection cable, screened with integral 6-pin Mini-DIN-plug and M12-socket

GMSD 1 BTS
GMSD 1 BTS-K51

well probe / submersible probe: use with GMH311x, GMH315x and GDUSB 1000
Application area: measurings in water, aggressive media, etc.
Measuring range: 0 ... 1000 mbar rel. = 0 ... 10 m depth, Sensor cable: approx. 10 m
For further information please refer to the homepage www.greisinger.de!

for additional accessories p.r.t.p. 50

TUBE ADAPTER, COUPLINGS, etc.

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
- tara function / zero point offset
- **model with Ex protection available**

Additional features for GMH 3181:

- peak value memory (>1 ms)
- 2 logger functions
- analog output 0 - 1 V
- min-/max- alarm
- integrated horn

DIGITAL-VACUUM- / BAROMETER for measuring of absolute pressure.

GMH 3161-12 (device ready for operation)

GMH 3181-12 (device ready for operation)

0 ... 1300 mbar abs.

Version specific data:	... - 12
Measuring range:	0 ... 1300 mbar absolute
Overload:	max. 4 bar absolute
Resolution:	1 mbar
Pressure units:	mbar, bar, kPa, MPa, PSI, mmHg, mH_2O - freely select able
Accuracy: (typ. values)	
hysteresis and linearity	± 0,2 % FS
temperature-influence from 0-50°C	± 0,4 % FS
Option higher accuracy available	yes
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 6x1 mm (4 mm inside-Ø) can be connected

For type specific data please refer to page 53

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")

Options (upcharges)

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 (upcharges)

Ex-protection (Ex II 2 G Ex ib IIC T4)
device type with Ex-protection
(please refer to notes at page 48)

Accessories:

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 (5bar)
6/4 (6mm outside-Ø, 4mm 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 50 - 51, 60 - 62

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 of if no operating takes place for the time of the power-off delay.
Selectable values: off, 1 ... 120 min.

Peak value memory (peak-detect):
In the min-/max-value memory will be detected not filtered pressure peaks ≥1msec.

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. tightness).

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 they remain 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)

DIGITAL-FINE MANOMETER / MANOMETER for over/under pressure and pressure difference.

GMH 3161-01
GMH 3181-01
-100 ... 2500 Pa (± 2500 Pa *1)

GMH 3161-07H
-1,00 ... 70,00 mbar (± 70,00 mbar *1)

GMH 3161-07
GMH 3181-07
-10,0 ... 350,0 mbar (± 350,0 mbar *1)

GMH 3161-07B
-10,0 ... 420,0 mbar (-7,5 ... 315,0 mmHg)

GMH 3161-13
GMH 3181-13
-100 ... 2000 mbar (± 2000 mbar *1)

Option, upcharge:
MB -1...2 BAR
measuring range: -1000 ... 2000 mbar *2

Version specific data:	... - 01	... - 07H	... - 07	... - 07B	... - 13
Measuring range:	-100 ... 2500 Pa (-1,00 .... 25,00 mbar)	-1,00 ... +70,00 mbar	-10,0 ... +350,0 mbar	-10,0 ... +420,0 mbar (-7,5 .... 315,0 mmHg)	-100 ... 2000 mbar (optional: -1000 .... 2000 mbar)
Overload:	max. 100 mbar	max. 1000 mbar	max. 1 bar	max. 1 bar	max. 4 bar
Resolution:	1 Pa (0,01 mbar)	0,01 mbar	0,1 mbar	0,1 mbar (0,1 mmHg)	1 mbar
additional pressure units:	bar, kPa, PSI, mmHg, mH_2O	bar, Pa, kPa, PSI, mmHg, mH_2O	bar, kPa, MPa, PSI, mmHg, mH_2O	bar, kPa, MPa, PSI,, mH_2O	bar, kPa, MPa, PSI, mmHg, mH_2O**Accuracy:**
(typ. values)					
hysteresis and linearity	± 0,3 % FS	± 0,1 % FS	± 0,2 % FS	± 0,1 % FS	± 0,2 % FS
temperature-influence from 0-50°C	± 0,4 % FS	± 0,4 % FS	± 0,4 % FS	± 0,4 % FS	± 0,4 % FS
Option higher accuracy available	no	already integrated	yes	already integrated	yes
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 pin, made of brass, nickel plated, pressure tubes 6x1 mm (4 mm inside-Ø) can be connected				

*1 *measuring range possible by changing the pressure connection ports* *2 *without changing the pressure connection ports*

Type specific data:	GMH 3161 - ...	GMH 3181 - ...	GMH 3160 - ... - ex	GMH 3180 - ... - 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 AAG	interface*	interface or AAG*
- serial interface:	X	X	X	X
- analog output:	--	0 - 1V, freely adjustable (resolution 12 bit)	--	0 - 1V, freely adjustable (resolution 12 bit)
Power supply:	9V-battery, d.c. connector	9V-battery, d.c. connector	9V-battery, d.c. connector*	9V-battery, d.c. connector*
	suitable 9V-battery (type IEC 6F22) in scope of supply, d.c. connector for external 10.5-12V 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 / s	4 measurements / s	4 measurements / s	4 measurements / s
"fast" (with filter)	--	≥ 1000 meas. / s	--	≥ 1000 meas. / s
"peak-detect"	--	≥ 1000 meas. / s	--	≥ 1000 meas. / s
Logger functions:	--	X	--	X
-manually:		99 data sets		99 data sets
-cycle:		10000 data sets (max. 64 recording sequen.)		10000 data sets (max. 64 recording sequences)
-adjustable cycle time:		1 ... 3600 seconds		1 ... 3600 seconds
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)	max. 0,6 mA	max. 0,6 mA (slow mode) max. 2,5 mA (fast = 100Hz)
Working condition:	-25 to +50 °C, 0 to +95 %RH (non-condensing)		-10 to 50 °C, 0 to 95 %RH (non-condensing)	
Housing dimensions:	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. case)	approx. 210 g (incl. case)

* Please refer to note to Ex-disign types at page 48

WK

FINE MANOMETER for over/under pressure or pressure difference

GDH 200 - 07

0.00 to 19.99 / 199.9 mbar (±199.9 mbar)

Device ready for use incl. battery

Functions:

- Autorange
- Excellent zero point stabilisation
- Manual slope adjustment
- 4 selectable measuring units: Pa, mbar, mmHg, PSI
- automatic off-function: 1 ... 120 Min

Specification

Measuring range:
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
Resolution: automatic change 0.1 / 0.01
Overload: max. 500 mbar
Accuracy: (at nominal temperature = 25 °C and automatic Zero point-adjustment)
Measuring range: up to 200 mbar
± 0,2 % f.s. hysteresis and linearity
± 0,4 % f.s. temperature drift from 0 to 50 °C
Measuring range: up to 20 mbar
± 1 % f.s. hysteresis and linearity
± 2 % f.s. temperature drift from 0 to 50 °C
Sensor: piezoresistive relative pressure sensor
Pressure connection: 2 pressure port sockets made of nickel-plated brass, for flexible pressure tubings 6x1 mm (4 mm inner-diameter), approx. 11 mm protrusive.
Working temperature: -25 to 50 °C
Display: 3½ digit LCD display, approx. 13 mm high
Pushbuttons: 3 membrane keys
Power supply: 9V battery type JEC 6 F 22 (included)
Power consumption: approx. 250 µA (= 1200 operating hours)
Low battery warning: „BAT“, automatic
Housing: impact resistant ABS plastic housing
Dimensions: approx. 106 x 67 x 30 mm (H x W x D) without pressure port sockets
Weight: approx. 135 g (incl. battery)

Auto-Off-Function: 1...120 min (can be deactivated either).
Min./Max. value memory: Memorizing of max. and min. values.
Zero point-adjustment: automatically
Slope-adjustment: manually
Zero function: Display value and min-/max value are set to null.

Tubes, clamps, adapters, accessories, etc. p.r.t. pages 50/51, 60/61

WK

MANOMETER for over/under pressure or pressure difference

GDH 200 - 13

0.0 to 199.9 / 1999 mbar (±1999 mbar)

Device ready for use incl. battery

Functions:

- Autorange
- Excellent zero point stabilisation
- Manual slope adjustment
- 3 selectable measuring units: mbar, mmHg, PSI
- automatic off-function: 1 ... 120 Min

Specification

Measuring range:
0.0 ... 199.9 resp. 200 ... 1999 mbar (hPa)
0.0 ... 199.9 resp. 200 ... 1500 mmHg
0.00 ... 19.99 PSI
Resolution: automatic change 1 / 0.1
Overload: max. 4000 mbar
Accuracy: (at nominal temperature = 25 °C and automatic Zero point-adjustment)
Measuring range: up to 2000 mbar
± 0,2 % f.s. hysteresis and linearity
± 0,4 % f.s. temperature drift from 0 to 50 °C
Measuring range: up to 200 mbar
± 1 % f.s. hysteresis and linearity
± 2 % f.s. temperature drift from 0 to 50 °C
Sensor: piezoresistive relative pressure sensor
Pressure connection: 2 pressure port sockets made of nickel-plated brass, for flexible pressure tubings 6x1 mm (4 mm inner-diameter), approx. 11 mm protrusive.
Working temperature: -25 to 50 °C
Display: 3½ digit LCD display, approx. 13 mm high
Pushbuttons: 3 membrane keys
Power supply: 9V battery type JEC 6 F 22 (included)
Power consumption: approx. 250 µA (= 1200 operating hours)
Low battery warning: „BAT“, automatic
Housing: impact resistant ABS plastic housing
Dimensions: approx. 106 x 67 x 30 mm (H x W x D) without pressure port sockets
Weight: approx. 135 g (incl. battery)

Auto-Off-Function: 1...120 min (can be deactivated either).
Min./Max. value memory: Memorizing of max. and min. values.
Zero point-adjustment: automatically
Slope-adjustment: manually
Zero function: Display value and min-/max value are set to null.

Tubes, clamps, adapters, accessories, etc. p.r.t. pages 50/51, 60/61

WK

VAKUUM-/BAROMETER and MANOMETER for absolute pressure

GDH 200 - 14

0 to 11000 mbar abs.

Device ready for use incl. battery

Functions:

- Sea level-adjustment possible
- suitable for relative pressure measurement (-1...10 bar) by use the zero function
- Manual slope and offset adjustment
- 4 selectable measuring units: mbar, mmHg, bar, PSI
- automatic off-function: 1 ... 120 Min

Specification

Measuring range:
0 ... 11000 mbar (hPa) abs.
0 ... 8250 mmHg abs.
0.000 ... 11.000 bar abs.
0.00 ...160.00 PSI abs.
Resolution: 1 mbar, 1 mmHg, 0.001 bar, 0.02 PSI
Overload: max. 13 bar abs.
Accuracy: (at nominal temperature = 25 °C)
± 3 mbar or 0,1 % of m.v. (whichever is higher)
± 0,3 % f.s. temperature drift from 0 to 50 °C
Sensor: piezoresistive absolute pressure sensor
Pressure connection: pressure port socket made of nickel-plated brass, for flexible pressure tubings 6x1 mm (4 mm inner-diameter), approx. 11 mm protrusive.
Working temperature: -25 to 50 °C
Display: 4½ digit LCD display, approx. 12 mm high
Pushbuttons: 3 membrane keys
Power supply: 9V battery type JEC 6 F 22 (included)
Power consumption: approx. 40 µA (= 7500 operating hours)
Low battery warning: „BAT“, automatic
Housing: impact resistant ABS plastic housing
Dimensions: approx. 106 x 67 x 30 mm (H x W x D) without pressure port socket
Weight: approx. 135 g (incl. battery)

Sea level-adjustment: barometric air pressure can be displayed null based even at sea level. (the pressure-adjustment is entered in metres above "null")

Auto-Off-Function: 1...120 min (can be deactivated either).
Min./Max. value memory: Memorizing of max. and min. values.
Zero point-adjustment: automatically
Slope-adjustment: manually
Zero function: Display value and min-/max value are set to null.

Tubes, clamps, adapters, accessories, etc. p.r.t. pages 50/51, 60/61

BAROMETER

GPB 3300

Device ready for use incl. battery

Functions:

- manual offset and slope adjustment
- sea level-adjustment possible
- 2 measuring units selectable: mbar, mmHg
- Auto-off-function: 1...120 Min

Specification

Measuring ranges:
300.0 ... 1100.0 mbar (hPa) abs.
225.0 ... 825.0 mmHg abs.
Max. Overload: 4000 mbar resp. 300 mmHg
Accuracy: (at nominal temperature)
± 2.0 mbar (typ., at 0 - 50 °C)
Sensor: piezoresistive abs. pressure sensor integrated in housing.
Nominal temperature: 25°C
Operating temperature: -25 to 50 °C
Display: 4½-digit, 12 mm high LCD-display
Pushbuttons: 3 membrane key for ON/OFF, min-/max-value memory, tara, etc.
Power supply: 9V battery type IEC 6F22
Power consumption: approx. 60 µA (= 5000 operating hours)
Low battery warning: „BAT“, automatic
Housing: impact resistant ABS housing
Dimensions: approx. 106 x 67 x 30 mm (HxWxD)
Weight: approx. 135 g (incl. battery)
Sea level-adjustment: barometric air pressure can be displayed null based even at sea level. (the pressure-adjustment is entered in metres above "null")
Auto-Off-Function: 1...120 min (can be deactivated either).
Min./Max. value memory: Memorizing of max. and min. values.
Zero point-adjustment: automatically
Slope-adjustment: manually
Zero function: Display value and min-/max value are set to null.

Accessories

GKK 252 small case
(235 x 185 x 48 mm) with foam lining
GB 9 V spare battery

other accessories p.r.t. page 60/61

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.**

altimeter / barometer / thermometer

GTD 1100

Device ready for use incl. battery

Functions:

- manual offset and slope-adjustment
- sea level-adjustment possible
- tendency-meter, summing-function (ascendency, descendency, overall)
- over 6.000 operating hours

Specification

Measuring ranges:

Temperature:	-10,0 ... +50,0°C,	Res. 0,1°C	or	14,0 ... +122,0°F,	Res. 0,1°F
Pressure:	300,0 ... 1100,0mbar,	Res. 0,1mbar	or	225,0 ... 825,0mmHg,	Res. 0,1mmHg
High:	-500 ... -200m,	Res. 1m	or	-1640 .. .-655ft,	Res. ~5ft
	-200 ... 2000m,	Res. 0.5m	or	- 654 ... 1999ft,	Res. ~2ft
	2000 ... 9000m,	Res. 1m	or	2000 ... 19999ft,	Res. ~5ft

Measuring units: hPa / mbar, mmHg, °C, °F, m, ft
Max. Overload: pressure:4000 mbar resp. 3000 mmHg
Accuracy: (at nominal temperature = 25°C)
Temperature: ±1% FS ± 1digit
Absolute pressure: ±1.5mbar ±1 digit (750...1100mbar), with certificate of calibration: ±0.5mbar ± 1digit
Sensor: piezoresistive absolute pressure sensor, integrated in housing.
Operating conditions: -10 to 50 °C; 0 to 80 %RH (non condensing)
Storage temperature: -20 to 70 °C
measuring-frequency: 1 measurings / sec.
Display: approx. 12 mm high, 4½-digit LCD-display
Controls: keypad (3 push-buttons) for On/off, min/max-value, tara-function, zero-, slope-, and sea level-adjustment slide switch for unit selection.
Power supply: 9V battery type IEC 6F22 (included)
Power consumption: approx. 50 µA (= over 6.000 operating houres with standard zinc carbon batteries)
Low battery warning: „BAT“, automatic in case of low voltage
Housing: impact resistant ABS housing, lucent screening grid. front IP65
Dimensions: approx. 106 x 67 x 30 mm (H x W x D)
Weight: approx. 135 g (incl. battery)
Sea level-adjustment: barometric air pressure can be displayed null based even at sea level. (the pressure-adjustment is entered in metres above "null")
Tendency-meter: for fallng / rising air pressure
Sum-function: Displaying the elevation (in metres for ascendency, descendency, overall)
Min./Max. value memory: Memorizing of max. and min. values.
Zero function: Display-value, min-/max-value are set to null (altitude and air pressure)
Auto-Off-Function: 1...120 min (can be deactivated either).
Zero point- and slope-adjustment: manual adjustment (for temperature and air pressure)
Zero function: Display- and min-/max-value are set to null.
System Notifications: permanent self-diagnosis and error indication.

Accessories

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

other accessories p.r.t. page 60/61

calibration certificate, p.r.t. page 4

pressure measuring instrumtents with analog output 0 - 1 V

DIGITAL MANOMETER for over/ under pressure or pressure difference

GDH 01 AN (0...1999 Pa)

GDH 07 AN (0...199,9 mbar)

Device ready for use incl. sensor (pluig-in), battery and mains operation possible,
analog output: 0-1V

DIGITAL MANOMETER for over/ under pressure or pressure difference

GDH 13 AN (0...1999 mbar)

GDH 14 AN (0...10,00 bar)

Device ready for use incl. sensor (pluig-in), battery and mains operation possible,
analog output: 0-1V

DIGITAL-VAKUUM-/BAROMETER for absolute pressure measurements

GDH 12 AN

Device ready for use incl. sensor (pluig-in), battery and mains operation possible,
analog output: 0-1V

Specification:

	GDH 01 AN	GDH 07 AN	GDH 12 AN	GDH 13 AN	GDH 14 AN
Measuring range:	0 ... 1999 Pa relative (0 ... 19.99 mbar)	0,0 ... 199.9 mbar rel.	0 ... 1300 mbar abs.	0 ... 1999 mbar (hPa) rel.	0,00 ... 10,00 bar rel.
Overload: (no destruction or new calibration of sensor)	max. 10000 Pa rel.	max. 1 bar rel.	max. 2 bar abs.	max. 4 bar rel.	max. 10,34 bar rel.
Resolution:	1 Pa (0,01 mbar)	0,1 mbar	1 mbar	1 mbar	0,01 bar
Accuracy (device): (at nominal temperature = 25°C)	1 Pa ±1 digit	0,1 mbar ±1 digit	1 mbar ±1 digit	1 mbar ±1 digit	0,01 bar ±1 digit
Temperature drift (device):	±0,01 %/K				
Sensor: (relative pressure)	piezoresistive relative pressure sensor, externally mounted in plastic case, 2 connection pins for plastic tube 6 x 1 mm (4 mm inner Ø), approx. 1 m of 4-wire PVC connecting cable with Mini-DIN 4-pin plug.				
Sensor: (absolute pressure)	piezoresistive absolute pressure sensor, externally mounted in plastic case, 1 connection pins for plastic tube 6 x 1 mm (4 mm inner Ø), approx. 1 m of 4-wire PVC connecting cable with Mini-DIN 4-pin plug.				
Application area:	Sensor suitable for air and non aggressive gases and liquids.				
Sensor accuracy: (typical values)					
hysteresis and linearity	± 0,5 % f.s.	± 0,2 % f.s.	± 0,2 % f.s.	± 0,2 % f.s.	± 0,2 % f.s.
temperature drift (0 - 50°C)	± 0,4 % f.s.	± 0,4 % f.s.	± 0,4 % f.s.	± 0,4 % f.s.	± 0,4 % f.s.
for option double accuray		± 0,1 % / ± 0,2 % f.s.	± 0,1 % / ± 0,2 % f.s.	± 0,1 % / ± 0,2 % f.s.	± 0,1 % / ± 0,2 % f.s.
Working temperature:	0 to 50 °C (device) -40 to +85°C (sensor), Temperature of sensor will be compensated from 0 to 70° C				
Display:	3½ digit LCD display, approx. 13 mm high				
Power supply:	9V battery type JEC 6 F 22 (included). Additional power supply socket for 2.5 mm Ø jack connector (automatic battery disconnection)				
Power consumption:	approx. 5 mA				
Low battery warning:	„BAT“				
Analog output:	0...1 V = 0...1999 Pa	0...1 V = 0...199,9 mbar	0...1 V = 0...1300 mbar	0...1 V = 0...1999 mbar	0...1 V = 0...10,00 bar
	socket for 3,5 mm Ø jack connector (included)				
Dimensions:	approx. 150 x 86 x 30 mm (H x W x D), impact resistant ABS plastic housing with integrated pop-up clip for table-top or suspended use, clips for lateral mounting of probe.				
Dimensions sensor case:	approx. 26 x 67.5 x 15 mm (H x W x D) with suspension eye.				
Weight:	approx. 320 g (incl. battery and sensor)				

Options:

sensor with higher accuracy

Accessories:

GB 9 V spare battery

GNG 10 power supply

GAK 9 V accu 9V

GLG 1300 accu charger for charging of two 9V accus at the same time

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

GKK 1100 case (340 x 275 x 83 mm) with foam lining for universal use

GKK 3000 case (275 x 229 x 83 mm) with punched lining suitable for all devices of the GMH3xxx-series

GKK 3100 case (275 x 229 x 83 mm) with foam lining for universal use

additional accessories p.r.t. page 60/61

Accessories: (for pressure connection)

GDZ-01 PVC-tube (5bar) 6/4 (6mm outside-Ø, 4mm inside-Ø)

GDZ-08 Double adapter for 6/4 to 6/4 tube

GDZ-16 Reducer for 6/4 tube with external thread G$^1/_4$"

GDZ-18 Tube clamp for 6/4 tube

GDZ-21 T-piece for tubes 6/4

additional tubes, clamps, accessories, etc. p.r.t. page 50/51

Universal pressure measurement system with fast recording time

INNOVATION FOR PRESSURE MEASUREMENTS

- suitable for all GMSD and MSD pressure sensors
- 1000 measurements per second
- pressure peaks detection (1 ms)
- data transfer via USB interface
- complete package incl. software for up-to-date Windows systems
- live display before and during measurement
- live diagram display during measurement
- simultaneous support of several GDUSB 1000
- 4 measuring channels (display value, min-, max- value and average)

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 recoding rate
- Test setups or on-site recordings with GDUSB 1000

General description::

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 an 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).

Specifications:

Measuring ranges:	depends on connected sensor
Max. range:	-19999 ... +19999 digit
Pressure units:	mbar, bar, Pa, kPa, Mpa, mmHg, PSI, mH2O, selectable, depending on connected sensor
Measuring rate:	1000 measurements / second
Accuracy:	±0.2 % FS (at nominal temperature = 25 °C)
Recoding interval:	1 ms (FAST mode) till 10 s adjustable via software
Connections:	
PC:	standard USB plug (type A)
GMSD/MSD:	6-pole screened mini-DIN socket with locking
Power supply:	supplied by USB interface
Dimensions:	56 x 31 x 24 mm.
Cable length (USB):	approx. 20 cm

Suitable GMSD/MSD sensors for GDUSB 1000 are at page 50 / 51.

GDUSB FastView

Software for high-speed live measurement data logging of fast pressure measurements

- More than one 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 set
- 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 of Intel Itanium based Windows systems)

This software uses open-source components under LGPL conditions. The license terms of this software provide further information.

Measuring devices for volumetric flow and flow speed

Volumetric flow anemometer

GVA 0430

cpl. in case, incl. RS232 interface cable and software

- **flow rate**
- **volumetric flow**
- **temperature**

Application:

Ventilation and air conditioning technology, meteorology, water sport, air gliding etc.

Specification:

Meas. ranges:
Flow rate: 0,40 m/s to 30,00 m/s
Temperature: -10,0 ... +50,0°C
Resolution: 0,01 m/s resp. 0,1 °C
Accuracy: (at nominal temperature = 25°C)
Flow rate: ±2 % FS
Temperature: ±0,6 °C
Meas. probes: vane probe, 70mm rotor-Ø and precision-NTC
Meas. interval: 1 meas. / sec.
Display: 2-line LCD display, 37 x 42 mmm
Working temperature: -10 to +50°C
Relative humidity: 0 to +95%r.h. (non-condensing)
Storage temperature: -10 to +50° C
Interface: serial interface RS232
Special function: averaging of 8 meas. points, averaging throughout meas. time, volumetric flow calculation, hold function, min./max. value memory
Power supply: 9V-batteries, type IEC 6F22 (included) or via external power supply
Operating time: 100 hours (with alkaline)
Low battery warning: display blinking
Automatic-Off-function: device switches off automatically after 20 minutes. Permanent mode possible.
Housing dimensions: :
device: 183 x 76 x 45 mm (W x H x D),
probe: 155 x 75 x 42 mm (W x H x D),
Weight:
approx. 350g (meas. device and probe)
approx. 1.05kg (cpl. in case)

Accessories:

GNG 8901 power supply

Thermal anemometer

TA 888

complete set in case, incl. software

- **high accuracy**
- **smallest and slow air flows measurable**
- **slimline telescopic probe**

Applications:

Classic application of the TA 888 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.

Specifications:

Measuring range:
Flow: 0.10 m/s ... 25.00 m/s
Temperature: 0.0 ... +50.0°C
Resolution:
Flow: 0.01 m/s
Temperature: 0.1 °C
Accuracy:
Flow: (5 % + 0.1 m/s) FS
Temperature: ±1 °C
Display: LCD display
Meas. interval: approx. 0.8 s
Working temp.: 0 ... 50 °C
Relative hum.: 0 ... 80 % RH
Dimensions:
- 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
Wight: approx. 275 g (only measuring device)
approx. 1800 g (complete set in case)
Scope of supply: measuring device, battery, probe, case, power supply, USB cable, software

Accessories:

Calibration certificate (10 points) (without device)
DKD- certificate (10 points) (without device)

Phonometer

Phonometer

GSH 8922

with analog output, backlight display cpl. in case

General:

Compensation of the background-noise for measuring sound-sources in the foreground. Weightig of the sound level via two weighting-filters according to the IEC standard. Assignation of the max/min value during one measuring period.

Specification:

Measuring ranges: 30 - 130 dB (6 ranges)
30 - 80, 40 - 90, 50 - 100,
60 - 110, 70 - 120, 80 - 130 dB
manual or automatic selection of range
Resolution: 0,1 dB
Accuracy: ±1,5 dB
Norms: ANSI S1.4 and IEC 651 Typ 2
Frequency rate weighted: 31,5 Hz - 8 kHz
Evaluation weight filter: 2, selectable
Type A: evaluation of the spectrum in accordance with the perceptive faculties of the human ear. (Sound insolation establishment, environmental analysis)
Type C: linear evaluation of spectrum (sonic-analysis of engines or machines)
Weight of time factor: fast or slow
Microphone: 6mm Electret condensator mic.
Display: 3½-digit LCD-backlight display, additionally quasi-analog bar graph
Analog output: AC: 0.707 Vrms,
DC: 10mV DC / dB
Working temperature: 4 to +50°C
Relative humidity: 10 to +90 % RH
Storage temperature: -20 to +60° C
Interface: RS232, (2400BD8N1)
Power supply: 9V-batteries, type IEC 6F22 (included) or via external 9V power supply
Operating time: 20 hours (with alkaline)
Housing: 256 x 80 x 38 mm (H x W x D)
Weight: approx. 240g (meas. device)

Rotation speed measuring device

via light and reflecting label or measuring tip; velocity and length measurement via measuring wheel

rotaro 3

Rotation speed measuring device incl.

- Reflecting labels
- Measuring tip, hollow tip, measuring wheels (Ø 0.1 m and Ø 6")
- extension shaft
- Calibration certificate
- Case
- Battery

Applications:

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..

Specifications:

Measuring range:	
rpm:	1.00 ... 99,999 min-1 (optical measurement) 1 ... 19,999 min-1 (mechanical measurement)
Velocity:	Ø 0.1 m: 0.10 ... 1999 m/min Ø 6": 0.10 ... 1524 m/min (other units possible: m/sec, ft/min, in/min ...)
Length:	0 ... 99999 m / ft / in
Accuracy:	
rpm:	± 0.02% of m.v. (± 1 digit)
Meas. distance:	max. 600 mm
Meas. principle:	optical/ mechanical
Memory function:	min- / max- value memory, average and last value
Power-off:	automatically after 30 s
Display:	5-digit LCD display with 10 mm height of digits and floating point at range change
Power supply:	2 x AA battery or accumulator
Working temp.:	0 ... 50 °C
Storage temp.:	-20 ... 70 °C
Housing:	plastic ABS
Approval:	CE
Dimensions:	175 x 60 x 28 mm (H x W x D)
Weight:	250 g

Rotation speed measuring device

via light and reflecting label

ecotach

Rotation speed measuring device incl.

- Reflecting labels
- Transportation slip case
- Battery

Applications:

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.

Specifications:

Measuring range:	1 ... 60.000 rpm
Accuracy:	± 0,02 % v. MW (± 1 Digit)
Meas. distance:	max. 450 mm
Meas. principle:	optical
Power-off:	automatically after 30 s
Display:	5-digit LCD display for measuring value with floating point, measuring unit, trigger signal, low-battery warning
Power Supply:	2 x AA battery or accumulator
Working temp.:	0 ... 50 °C
Housing:	plastic ABS
Approval:	CE
Dimensions:	145 x 60 x 28 mm (H x W x D)
Weight:	147 g

Handheld instruments - Accessories

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)

GKK 1420

Einlage von GKK 3000

Einlage von GKK 3500

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)

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 3410, GMH 3430, 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 3161-01, GMH 3161-07, GMH 3161-13, GMH 3181-01, GMH 3181-07, GMH 3181-13, GMH 3510, GMH 3530

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
suitable for: GMH 3330, GMH 3350, GMH 3830, GMH 3850

ST-KO device protection bag
suitable for: GTD 1100, GPB 2300, 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 100

ST-KD device protection bag with 2 round cut-outs
suitable for: GDH 200 - 07, GDH 200 - 13, GDH 200 - 14, GMR 100

GMH 1300 with mounted device

Mount:

GEH 1 Electrode retainer for measuring electrodes and probes
suitable for our electrodes (pH/redox, conductivity, oxygen, ...)
and temperature probes with plastic handle

GMH 1300 Magnetic mount for hanging up devices with integrated suspension clip

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 PCs. (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 PCs. (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, 2x banana plug

Power supply:

GB 9 V Spare battery 9V, type IEC 6F22

GLI 9 V Lithium battery 9V, approx. 1200 mAh

GAK 9 V NiMH accu 9V

AAA-AKKU AAA akku, 1.5 V, 2 pcs., NiMH akku

GLG 1300 Rechargeable battery cahrger for two 9V accus, 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 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) NEW

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)

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)

Switching modules:

GAM 3000 Switching module for the GMH3xxx-series

The GAM 3000 is an alarm or control output for the devices of the GMH3xxx-series with alarm output function. The GAM 3000 is controlled via the serial interface of the GMH3xxx. The setting of the alarm/switching limits are carried out the GMH3xxx 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

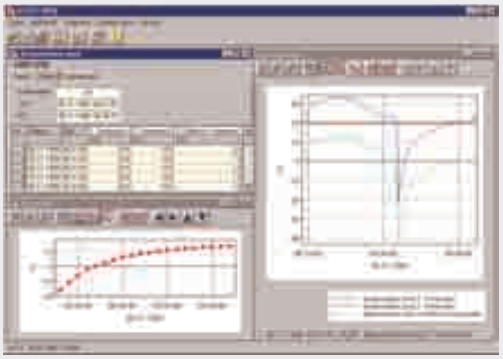
Switching power: 10 A (ohmic load)

GMH-connection: GMH3xxx interface and supply (integrated power supply 10.5V/10mA) via 1 m cable each, permanently connected to GAM 3000.

Dimensions: (controller) 112 x 71 x 48 mm (H x W x D)

Hand-held instruments - software

Operation for GMH 3xxx / GMH 5xxx - logger device



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 advice:

With GSOFT3050 you are able to operate the logger function of the GMH3000- and GMH5000 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 and 7.

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 can be switched on/off
  - 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. The setup of the windows can be stored as 'view'.

GMH 3000.DLL

Windows-functional library for interface communication.
To integrate all GMH 3xxx device functions in own Windows programms, i.e. LabView.

Long-time monitoring - Recording - Monitoring

EBS 20M

(20-Channel Measurement Data Logging)

EBS 60M

(60-Channel Measurement Data Logging)

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.

Field of 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 scaleable diagrams and alarm limits
- Visualization of actual measurements values
- Trusted data storage via SQL database
- Data export

Moduls:

- Large-digit display
- Diagram display
- Table display
- Visualization of alarm limits
- Visualization of all recorded datas in one diagram

Measuring Cycle:

depending on the number of channels: 500ms to 10s

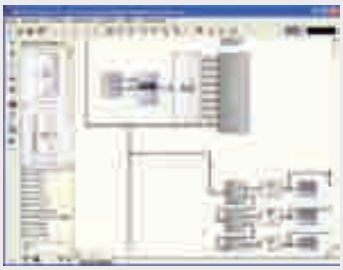
System Requirements:

Windows XP, Windows Vista, Windows 7

Simultaneous use of different serial Bus-Systems:
EASYBus, GMH handheld devices, GDUSB 1000

ProfiLab-Expert 4.0

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.

Display / Controller

	Dimensions					Measuring input							
	24 x 48	48 x 96	33 x 75	48 x 48	Special size	Normalized signal	Temperature (Pt100 / Pt1000)	Temperature (Thermocouples)	Temperature (NTC, PTC)	Frequency	Universal input	Ex - Protection	Page
DISPLAY													
GIA .. N	✓					✓							60
GIA .. N - ex	✓					✓						✓	60
GIA 2448	✓					✓							61
GTH2448/1	✓							✓					61
GTH2448/2 ../3	✓						✓						61
GTH2428/4 ../5	✓						✓						61
GTH 83 EG		✓							✓				64
GTH1150 EG		✓						✓					64
GIA 2000		✓				✓	✓	✓		✓	✓		65
GIA 0420 VO(T)					✓	✓							72
GIA 0420 VOT - ex					✓	✓						✓	72
GIA 0420 WKT					✓	✓							72
GIA 0420 WKT - ex					✓	✓						✓	72
CONTROLLER													
GIA 20 EB	✓										✓		62
GIR 230 ..	✓					✓	✓	✓	✓	✓			63
GIR 230 DIF	✓					✓	✓		✓				63
GIR 2002		✓				✓	✓	✓		✓	✓		66
GIR 2002 PID		✓				✓	✓	✓		✓	✓		66
GIR 2002 .. SW		✓				✓	✓	✓		✓	✓		68
GIR 2002 NS / DIF ..		✓				✓							69
GIR 2000 Pt ..		✓					✓						69
R 38			✓				✓	✓	✓				70
K 31 / K 32			✓			✓	✓	✓	✓				70
TLK 43				✓		✓	✓	✓	✓		✓		71
K 48				✓		✓	✓	✓	✓				71
GRA .. VO					✓	✓							73
GRA .. WK					✓	✓							73

µP-display with freely adjustable scale

Front 24 x 48

GIA 0420 N / GIA 010 N

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: II 2G Ex ia/ib IIC/IIB T4
(Further Information please refer to our Homepage www.greisinger.de)

GIA 010 N - ex

Display, input 0-10 V,
with EX-protection for all potentially explosive atmospheres
Ex qualification: II 2G Ex ia/ib IIC/IIB T4
(Further Information please refer to our Homepage www.greisinger.de)

- time-saving on-site scaling without any additional auxiliary modules
- simple device identification by means of insertion film.
- 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)

Specification:

	GIA 0420 N ..	GIA 010 N ..
Input signal:	4 ... 20 mA 2-wire	0 ... 10 V 3-wire
Voltage load:	approx. 3,5 V	-
Input resistance:	-	approx. 100 kOhm
max. input:	25 mA	15 V
Power supply:	-	12 - 28 V DC
Power consumption:	aus Stromschleife	< 10 mA

Display:	LCD display, approx. 10 mm high
Display range:	-1999 bis +9999
Decimal point:	any position selectable
Scaling:	scale freely adjustable via 3 keys at the back side of the unit
Accuracy:	< 0,2% FS ±1 Digit (at 25 °C)
Temperature drift:	< 100 ppm / K
Meas. rate:	approx. 5 measurements / sec.
Filter:	adjustable: 0,1 ... 2,0; off
Storage:	min- / max-value memory
Switching output:	electrically isolated open collector
Switching capacity:	28V DC / 50 mA
Working temp.:	-20 to 50 °C
Storage temp.:	-20 to 70 °C
Electric connection:	
GIA 0420 N ..	2 x 2-pin screw-type/plug-in terminal max. terminal range up to 1.5 mm²
GIA 010 N ..	1 x 2-pin., 1 x 3-in. screw-type/plug-in terminal, max. terminal range up to 1.5 mm²
Housing:	fibre-reinforced Noryl
Front screen:	polycarbonate
Dimensions:	24 x 48 mm (H x W, front dimensions)
panel cutout:	$21.7^{+0.5}$ x $45^{+0.5}$ mm (H x W)
mounting depth:	approx. 65 mm incl. terminal
Protection rating:	IP54 (IP65 by means of additional optional silicone O-rings, **GGD2448SET**)

Universal LowCost-LED-Display for Standard Signals and Temperature

Front 24 x 48

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: 4-20mA, 4mA=-50.0, 20mA = 100.0, 12VDC)

Specification

Meas. ranges:	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)
Display range:	-1999 ... +1999 digit (adjustable via soldering jumpers and potentiometer)
Decimal point:	any position by means of soldering jumpers (soldering jumpers accessible after removal of front panel)
Accuracy:	±0.2% ±1 digit (at nominal temperature = 25°C)
Scan rate:	approx. 3 measurements / sec.
Display:	3½-digit, red 10 mm high LED display
Working temperature:	0 to 50 °C (permissible ambient temperature)
Relative humidity:	5 to 95 %RH (non-condensing)
Storage temperature:	-20 to 70 °C
Voltage supply:	8 - 20 V DC or 18 - 29 V DC (Standard) (set via soldering jumper)
Current supply:	max. 20 mA
Housing:	glass fibre reinforced Noryl, front panel PC.
Dimensions:	24 x 48 mm (H x W) (front frame)
Mounting depth:	approx. 65 mm (incl. screw-type/plug-in terminal)
Panel mounting:	with VA-spring clamp. allowed panel thicknesses from 1 to approx. 10 mm
Panel cut-out:	$21.7^{+0.5}$ x $45^{+0.5}$ mm (H x W).
Connection terminal:	4-pin screw-type/plug-in terminal for wire cross sections from 0.14 to 1.5 mm²
Noise immunity (EMC):	meets EN50081-1 and EN50082-2 requirements, additional fault: <1%
IP rating:	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

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. 78-79, 100-121, 123-137

Front 24 x 48

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

Measuring ranges, Resolution:

GTH 2448/1:	- 50 ... +1150 °C	(NiCr-Ni)
GTH 2448/2:	-200 ... + 650 °C	(Pt100, 2-wire)
GTH 2448/3:	-60,0 ... +199.9 °C	(Pt100, 2-wire)
GTH 2448/4:	-200 ... + 650 °C	(Pt1000, 2-wire)
GTH 2448/5:	-60,0 ... +199.9 °C	(Pt1000, 2-wire)

Accuracy: (at nominal temperature = 25°C)
NiCr-Ni: ±1% ±1 digit (from -20...+550°C and 920...1150°C)
±1.5% ±1 digit (from 550... 920°C)
Pt100, Pt1000: ±0.5°C ±1 digit or ±1°C ±1 digit

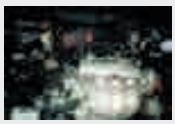
Offset compensation: (only for Pt100 and Pt1000)
The zero point offset of the sensor (e.g. due to long cables) can be compensated for by means of the spindle trimmer on the backside of the device.

Display:	3½-digit, red 10 mm high LED display
Scan rate:	approx. 3 measurements / sec.
Working temperature:	0 to 50 °C (permissible ambient temperature)
Relative humidity:	5 to 95 %RH (non-condensing)
Storage temperature:	-20 to 70 °C
Voltage supply:	8 - 20 V DC or 18 - 29 V DC (Standard) *(set via soldering jumper)*
Current supply:	max. 20 mA
Housing:	glass fibre reinforced Noryl, front panel PC.
Dimensions:	24 x 48 mm (H x W) (front frame)
Mounting depth:	approx. 65 mm (incl. screw-type/plug-in terminal)
Panel mounting:	with VA-spring clamp. allowed panel thicknesses from 1 to approx. 10 mm
Panel cut-out:	$21.7^{+0.5}$ x $45^{+0.5}$ mm (H x W).
Connection terminal:	4-pin screw-type/plug-in terminal for wire cross sections from 0.14 bis 1.5 mm²
IP rating:	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. 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 129) Cable length = 3 m (extended cable against upcharge available)
- **GKV 4** clamping ring screw connection (p.r.t. p. 136)

Universal Display and Regulating Device

Front 24 x 48

GIA 20 EB

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
- 2 integrated switching outputs
- Configurable as display or controller (5 switching functions)
- Quick regulating and controlling stage
- extensive self-monitoring and diagnostic system
- Serial interface (max. 240 devices can be combined)
- Limit functions, digital filter, min-/max value memory
- Alarm delay selectable

Specification

Measuring input: universal input for
- 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, Rotational speed: TTL-signal, switching contact
- **Counter up / down:** TTL-signal, switching contact
- **Serial interface**

Measuring rate: approx. 100 meas. / sec. (for norm. signal) resp. approx. 4 meas. / sec. (for temperature and frequency)

Measuring resp. display ranges, resolution:
Temperature: (display unit selectable: °C or °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		

Norm. signals: -1999 ... 9999 digit, scale freely adjustable
- recommended range: ≤ 2000 digit
Frequency: 0.000 Hz ... 10 kHz, display freely scaleable
Rotational speed: 0.000 U/min ... 9999 U/min, selectable prescaler: 1-1000
Counter up/down: *countervalue remains on power loss* 0 ... 9999 (10 Mio. with prescaler), pulse frequency: ≤ 10kHz selectable prescaler: 1-1000
Serial interface: Displaying and controlling from values coming via the serial interface.

Accuracy: (at nominal temperature = 25°C)
- Norm. signal: < 0.2 % f.s. ±1digit (at 0-50mV: < 0.3% f.s. ±1digit)
- Resistance thermometer: < 0.5 % f.s. ±1digit
- Thermocouples: < 0.3 % f.s. ±1digit (at type S: < 0.5% f.s. ±1digit)
Point of comparison: ± 1 °C
- Frequency, rotational speed, counter: < 0.1 % f.s. ±1digit

Outputs: 2 switching outputs, not electrically isolated
Switching behavior: Low-Side, High-Side or Push-Pull (selectable)
Connection data: Low-Side: 28V/1A; High-Side: Ub/200mA
Controller state: 2-point, 3-point, 2-point with alarm, min/max alarm to 1 output, min/max alarm to 2 outputs
Swirching point, hysteresis: freely adjustable
Response time: ≤ 20 msec. at normalized signals
≤ 0.3 sec. at temperature and frequency
Display: approx. 10 mm high, 4-digit red LED-display
Service: with 3 push-buttons (after disassembly of the frontpanel).
Option: FS3T, frontpanel with 3 push-buttons for comfortable configuration.
Trouble-free replacement is possible (refer accessories)
Min-/max-value memory: the max- and min value will be stored.
Interface: serial interface, elect. isolated, EASYBus compatible
Miscellaneous: permanent self-monitoring, digital filter function, measuring range boundary (limit)

Voltage supply: 9 to 28 V DC (standard)
Option: elec. insulated voltage supply 11-14V or 22-27V
Power consumption: max. 30 mA (without outputs)
Nominal temperature: 25 °C
Operating temperature: -20 to +50 °C
Relative humidity: 0 to 80 %RH (non condensing)
Storage temperature: -30 to +70 °C
Housing: glass fibre reinforced Noryl, front panel PC
Dimensions: 24 x 48 mm (front frame).
Mounting depth: approx. 65 mm (incl. screw-type/plug-in terminal)
Panel mounting: with VA-spring clamp.
Allowed panel thicknesses from 1 to approx. 10 mm.
Panel cut-out: 21.7+0.5 x 45+0.5 mm (H x W)
Connection terminal: screw-type/plug-in terminal: 2-pin for interface and 9-pin for outher connections.
For wire cross sections from 0.14 to 1.5 mm².
IP rating: front side IP54, with optional r-rings IP65
Noise immunity (EMC): EN61326 (appendix A, class B)

Options (upon upcharge)

- IS12 type with insulated power supply: 11-14V
- IS24 type with insulated power supply: 22-27V

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

Accessories

GGD2448SET O-rings for device mountig 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.

GNR10 Power supply and relay module for one GIA20EB (p.r.t. page 75)
(Input: 230VAC, Power supply for device + transducer, 2 relay outputs)

Temperature probes p.r.t. page 123 - 137
Transducer p.r.t. page 100 - 121
for other accessories p.r.t. page 78/79, 97/98

The Displaying and Regulating Device for 230 V

GIR 230 ...

Front
24 x 48

- 5 input executions for choice:
  - normalized signal: 4-20mA, 0-20mA, 0-10V
  - resistor: Pt100 (3-wire), Pt1000 (2-wire)
  - thermo couple: type J, K, N, S, T and 0-50mV
  - frequence
  - NTC
- 2 relay outputs and 1 switching output NPN (GIR 230 NTC: 1 relay output)
- configurable as display or controller (5 switching functions)
- extensive self-monitoring and diagnostic system
- min/max value memory, limit functions, digital filter

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 (frequence 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:
Measuring input: 4-20mA, 0-20mA, 0-10V
Display range: -1999 ... 9999 digit, scale freely adjustable
recommended range: ≤ 2000 digit
Accuracy: < 0.2 % f.s. ±1 digit (at nominal temperature = 25°C)
Measuring rate: approx. 100 measurings / sec.

GIR 230 Pt:
Measuring input: Pt100 (3-wire), Pt1000 (2-wire)
Measuring ranges, resolution:
Pt100: -200 ... +850°C resp. -50.0 ... +200.0°C
Pt1000: -200 ... +850°C
Accuracy: < 0.5 % f.s. ±1 digit (at nominal temperature = 25°C)
Measuring rate: approx. 4 measurings / sec.

GIR 230 TC:
Measuring input: types J, K, N, S, T and 0-50 mV
Measuring ranges, resolution:
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
Accuracy: < 0.3 % f.s. ±1 digit (type S: < 0.5% f.s. ±1 digit) (at 25°C)
Point of comparison: ± 1 °C
Measuring rate: approx. 4 measurings / sec.

GIR 230 FR:
Measuring input: frequency (TTL-signal)
Display range: -1999 ... 9999 digit, freely scaleable
Accuracy: < 0.2 % f.s. ±1 digit (at nominal temperature = 25°C)
Frequency measuring: 0.000 Hz ... 10 kHz
Rotational speed: 0.000 U/min ... 9999 U/min, selectable prescaler (1-1000)
Counter up/down: 0 ... 9999 (~10.000.000 with prescaler)

GIR 230 NTC:
Measuring input: NTC (2-wire)
Measuring ranges: -40.0 ... +120.0°C
Accuracy: < 0.5 % f.s. ±1digit (at nominal temperature = 25°C)
Measuring rate: approx. 4 measurings / sec.

Suitable temperature probes

Temperature probes (Pt100/1000) p.r.t. page 123/124, 131-135

Temperature probes (type K, S, N) p.r.t. page 125/129, 131-135

GTF230S ntc-temperature probe, -40 ... +120°C
sensor sleeve made of st. steel , Ø 5 x 50 mm, approx. 1m silicone-cable
Option: longer probe cable (silicone) upcharge each m:

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:
Measuring inputs: 2 x Pt1000 (2-wire) resp. 2 x NTC
Meas. ranges, resolution: **Pt1000:** -200 ... +850°C, 1°C
NTC: -40.0 ... +120.0°C, 0.1°C
Display: difference temperature sensor1 - sensor2
Accuracy: < 0.5 % f.s. ±1digit (at nominal temperature = 25°C)
Measuring rate: approx. 4 measurings / sec.

GIR 230 NS / DIF - 420mA, ... - 020mA, ... - 010V:
Measuring inputs: (2 x) 4-20 mA, (2 x) 0-20 mA or (2 x) 0-10 V
specify required input signals by order!
Display range: -1999 ... 9999 digit, scale freely adjustable
recommended range: ≤ 2000 digit
Accuracy: < 0.2 % f.s. ±1 digit (at nominal temperature = 25°C)
Measuring rate: approx. 100 measurings / sec.

General Specifications

Outputs:
Relay output: 2 (1) closing contacts (GIR 230 NTC: 1 relay output), 230V~ switching, switching power: 5A, 230VAC
Alarm output: NPN, open collector, switching power: 30mA, max. 28V
Controller states: 2-point, 3-point*, 2-point with alarm, min/max alarm to 1 output, min/max alarm to 2 outputs* (* = not available at GIR230NTC)
Switching points, hysteresis, alarm points: freely selectable

Others:
Display: approx. 10 mm high, 4-digit red LED-display
Operating conditions: -20 to +50 °C, 0 to 80 %RH (non condensing)
Power supply: 230V, 50/60Hz, approx. 2 VA
Housing: glass fibre reinforced Noryl, front panel PC
Dimensions: 24 x 48 mm (front frame).
Mounting depth: approx. 65 mm (incl. screw-type/plug-in terminal)
Panel mounting: with VA-spring clamp.
Allowed panel thicknesses from 1 to approx. 10 mm.
Panel cut-out: 21.7+0.5 x 45+0.5 mm (H x W)
Connection terminal: screw-type/plug-in terminal:
4-pin (...NTC: 3-pin) for power supply and relay outputs and
4-pin (...NTC: 3-pin) for measuring input and alarm output
For wire cross selections from 0.14 to 1.5 mm².
IP rating: front side IP54 (IP65 upon request)
Noise immunity (EMC): EN61326 (appendix A, class B)

Option (upcharge)

- 24V GIR with power supply 12 - 28 V DC
Outputs: 2 (1) relay outputs, +Ub switching

Accessories

GGD2448SET O-rings for device mounting IP65 (2 pieces)
Transducer p.r.t. page 100 - 121

for other accessories p.r.t. page 78/79

Front 48 x 96

Panel Instrument for Temperature

Front 48 x 96

Digital thermometer
for silicon sensors KTY 83

GTH 83 EG without sensor

-50,0 up to +150,0 °C

Specification

Measuring range: -50.0 to 150.0 °C
Resolution: 0.1 °C
Sensor: KTY 83-110 (please order separately),
Additional zero point offset possible via spindle trimmer at back side of device.
Accuracy (display device): (at nominal temperature = 25°C)
≤0.5°C ±1 digit (from -10 to +120°C)
Display: approx. 13mm high, 3½-digit, red LED-display
Scan rate: approx. 3 measurements / sec.
Working temperature: 0 to 50 °C
Relative humidity: 0 to 80 %RH (non-condensing)
Storage temperature: -20 to 70 °C
Power supply: 230V 50/60Hz
Option: 12/24/115V AC
12/24V DC
Housing: standard rack-type housing, 48 x 96 x 100mm (H x W x D)
IP rating: front side IP54 (with optional O-rings IP65).
Panel cutout: 43 x 90.5 (H x W)
Connection terminals: screw-type/plug-in terminals,
max. terminal range 1.5 mm²
Noise immunity (EMC):
The GTH83EG is conforming to the regulations determined by the Council for the Approximation of the Legislation amongst the Member Countries concerning EMC (2004/108/EG).
The device meets EN50081-1 and EN50082-2 requirements.
additional error: <1%

Options (against upcharge)

12VDC: Power supply: 12VDC
24VDC: Power supply: 24VDC
12VAC: Power supply: 12VAC
24VAC: Power supply: 24VAC
115VAC: Power supply: 115VAC

Accessories

GGD 4896 additional sealing for panel mounting IP65

Suitable sensors

GMF 11/180 immersion probe
GMF 30/180 immersion, air probe
GMF 15/180 screw-type probe
Other probes or custom-built sensors available. (p.r.t. page 130).

Digital thermometer
for thermocouples NiCr-Ni (type "K")

GTH 1150 EG without sensor

-50 up to +1150 °C

Specification

Measuring range: -50 to 1150 °C
Resolution: 1 °C
Sensor: NiCr-Ni (type K) (please order separately)
Additional zero point offset possible via spindle trimmer at back side of device.
Accuracy (display device): (at nominal temperature = 25°C)
< 1% ± 1 digit (from -20 to +550°C and 920 up to 1150° C);
<1.5% ± 1 digit (from 550 to 920° C),
from -50 to -20° C acc. to correction table
Display: approx. 13mm high, 3½-digit, red LED-display
Scan rate: approx. 3 measurements / sec.
Working temperature: 0 to 50 °C
Relative humidity: 0 to 80 %RH (non-condensing)
Storage temperature: -20 to 70 °C
Power supply: 230V 50/60Hz
Option: 12/24/115V AC
12/24V DC
Housing: standard rack-type housing, 48 x 96 x 100mm (H x W x D)
IP rating: front side IP54 (with optional O-rings IP65).
Panel cutout: 43 x 90.5 (H x W)
Conn. terminals: screw-type/plug-in terminals,
max. terminal range 1.5 mm²
Noise immunity (EMC):
The GTH1150EG is conforming to the regulations determined by the Council for the Approximation of the Legislation amongst the Member Countries concerning EMC (2004/108/EG). The device meets EN50081-1 and EN50082-1.
additional error: <1%

Options (against upcharge)

12VDC: Power supply: 12VDC
24VDC: Power supply: 24VDC
12VAC: Power supply: 12VAC
24VAC: Power supply: 24VAC
115VAC: Power supply: 115VAC

Accessories

GGD 4896 additional sealing for panel mounting IP65

Suitable sensors

Order all NiCr-Ni (type "K") - sensors without plug but with ferrule.
(p.r.t. pages 125 - 129, 134 - 135)
Custom-built sensors available. (p.r.t. pages 132 and 133).

Front
48 x 96

Universal Displaying Device

GIA 2000

easy operability - high accuracy - economic price

Temperature display, pressure control, tachometer, flow meter, etc.

- Universal inputs for normalized signals, frequency, Pt100, Pt1000 and thermocouples, freely adjustable
- integrated isolated power supply for meas. transducer (24V / 22mA)
- extensive self-monitoring and diagnostic system
- Serial interface - EASYBus (max. 240 devices can be combined)
- Limit functions, digital filter, min-/max value memory

Specification

Measuring input: universal input (freely adjustable) for
- Normalized signal: 4-20mA, 0-20mA, 0-1V, 0-2V, 0-10V, 0-50mV
- 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 meas. / sec. (for norm. signal and frequency) resp. approx. 4 meas. / sec. (for temperature)

Measuring resp. display ranges, resolution:
Temperature: (display unit selectable: °C or °F)

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

Norm. signals: -1999 ... 9999 digit, scale freely adjustable
- recommended range: ≤ 2000 digit
Frequency: 0.000 Hz ... 10 kHz, display freely scaleable
Rotational speed: 0.000 ... 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: ≤ 10kHz
Serial interface: Displaying and controlling from values coming via the serial interface.

Accuracy: (at nominal temperature = 25°C)
- Norm. signal: < 0.2 % f.s. ±1digit (at 0-50mV: < 0.3% f.s. ±1digit)
- Resistance thermometer: < 0.3 % f.s. ±1digit
- Thermocouples: < 0.3 % f.s. ±1digit (at type S: < 0.5% f.s. ±1digit)
Point of comparison: ± 1 °C
- Frequency, rotational speed, counter: < 0.1 % f.s. ±1digit

Analog output: (option)
freely scaleable analogue output 0-20mA / 4-20mA or 0-10V
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, elect. isolated, EASYBus compatible
Power supply for sensor: integrated isolated power supply for measuring transducer: 24 V DC ±5%, 22mA (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. 5 VA
Operating temperature: -20 to +50 °C
Relative humidity: 0 to 80 %RH (non condensing)
Storage temperature: -30 to +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: $43.0^{+0.5}$ x $90.5^{+0.5}$ mm (H x W)
Electrical connection: via screw-type/plug-in terminals
cable diameters from 0.14 to 1.5 mm².
Protection class: front side IP54, with optional sealing IP65
Electromagnetic immunity (EMC): EN61326 (appendix A, class B)

Options (upon upcharge)

- 12VDC voltage supply = 12 VDC (11-14V) [1)]
- 24VDC voltage supply = 24 VDC (22-27V) [1)]
- 24VAC voltage supply = 24 VAC ±5%
- 115VAC voltage supply = 115 VAC ±5%
- AAG020 analog output 0-20 mA, 4-20 mA (reversible) [1)]
- AAG010 analog output 0 - 10 V [1)]
1) For analog output with option 12VDC o. 24VDC

Accessories

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 => RS232 (p.r.t. page 96)

EBS 20M software for recording and archiving of the measuring values (p.r.t. page 58).

Temperature probes **p.r.t. page 123 - 137**

for other accessories p.r.t. page 78/79, 97/98

Front 48 x 96

Universal Displaying and Regulating Device

GIR 2002 On/Off - control mode

GIR 2002 PID with PID - control mode

easy operability - high accuracy - economic price

E.A.S.Y.Bus - Modul

Highlights

- universal input for normalized signals, frequency, Pt100, Pt1000, thermocouple
- 2 relay switching outputs
- 1 analog output (0(4)-20mA or 0-10V) (optional)
- 5 programmable switching modes
- electrical isolated power supply for a transmitter (24V / 22mA)
- serial interface, bus operation

Additional at GIR 2002 PID

- P, I, PI, PD or PID control mode
- motorised valve control
- continuous regulating output (optional)

Applications

- process regulating
- temperature controller
- Pressure monitoring
- rotation speed display
- flow counter
- etc.

General

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).

Specification:

Measuring input			Measuring / display ranges			Accuracy (at nominal temperature)	Measuring rate
Thermocouples							
FeCu-Ni	type J	IEC 584	-70,0 ... +300,0°C	or	-170 ... 950°C	< 0,3 % FS ±1 digit *	approx. 4 meas. / sec.
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 *	
Resistance thermometer							
Pt100	3-wire	DIN EN 60751	-50,0 ... +200,0°C	or	-200 ... 850°C	< 0,3 % FS ±1 digit	approx. 4 meas. / sec.
Pt1000	2-wire	DIN EN 60751			-200 ... 850°C	< 0,3 % FS ±1 digit	
Action signals / normalized signal							
0 ... 1 V, 0 ... 2 V, 0 ... 10 V			-1999 ... +9999 Digit, scale freely adjustable			< 0,2 % FS ±1 digit	approx. 100 meas. / sec.
0 ... 20 mA, 4 ... 20 mA						< 0,2 % FS ±1 digit	
0 ... 50 mV						< 0,3 % FS ±1 digit	
Frequency							
TTL-signal			0,000 Hz ... 10 kHz, scale freely adjustable			< 0,1 % FS ±1 digit	approx. 100 meas. / sec.
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				
Counter up / down							
TTL-signal, switching contact (NPN, PNP)			0 ... 9999 or 0 ... 999 000 (with prescaler) *selectable prescaler: 1-1000, pulse frequency: max. 10 000 Imp./sec. at TTL*			< 0,1 % FS ±1 digit	approx. 100 meas. / sec.
Serial interface: displaying and controlling from values coming via the serial interface							

* = Point of comparison: ± 1 °C

General (continuance)

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** (24VDC/22mA) of the controller.

If the device is used as a thermocouple ore 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).

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 scaleable analog output 0(4)-20mA or 0-10V
ST..1: continuous output 0(4)-20mA or 0-10V

Output 2: voltage free relay output (standard)
change-over contact, switching power: 10 A (ohmic load), 250VAC
- 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: elec. isolated NPN-switching contact (max. 1 A / 30 VDC)
AAG..3: freely scaleable analog output 0(4)-20mA or 0-10V
ST..3: continuous output 0(4)-20mA or 0-10V

Controller states: 5 or 6, selectable
(e.g. 2-point regulator, 3-point regulator, ...)
Switching point, hysteresis: freely adjustable
Response time: ≤ 25 msec. at normalized signals
≤ 0.5 sec. 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%, 22mA (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 (atandard)
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: $43.0^{+0.5}$ x $90.5^{+0.5}$ mm (H x W)
Electrical connection: via screw-type/plug-in terminals
cable diameters from 0.14 to 1.5 mm².
Protection class: front side IP54, with optional sealing IP65
Electromagnetic immunity (EMC): EN61326 (appendix A, class B)

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*	--
available output options	upcharges					
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						

1) At continuous or analog output or npn-switching output with option voltage supply = 12 VDC or 24 VDC
2) At output type REL3 or HLR3 with option voltage supply = 12 VDC

Further Options:

- **12VDC** voltage supply: 12 VDC (11-14V) 1)
- **24VDC** voltage supply: 24 VDC (22-27V) 1)
- **24VAC** voltage supply: 24 VAC ±5%
- **115VAC** voltage supply: 115 VAC ±5%

Accessories:

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 69)*

Temperature probes **p.r.t. page 123 - 137**
for other accessories p.r.t. page 62, 78/79, 97/98

Front 48 x 96

E.A.S.Y.Bus - Modul

Controller with external predetermined desired value

GIR 2002 / SW
GIR 2002 PID / SW

Applications

- predetermined control
- program control with external set point
- temperature regulation dependent on ambient temperature
- flow rate regulation with set point input via rotary potentiometer
- etc.

General

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 0-10V normalized signals is used as set-point input.

Specification

Measuring input: universal input for
- normalized signals: 4-20 mA, 0-20 mA, 0-1 V, 0-2 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
Display range: -1999 ... 9999 digit, decimal point, initial **and** final values freely selectable
Recommended range: ≤ 2000 digit
Set-point input: 0 ... 10 V, freely scalable (for switching point 1)
Outputs: 1 normally open contact, 1 change-over contact *output options like HLR-control output, analog output or continuous output available - p.r.t. page 67*
Controller states: 5 or 6, selectable (e.g. 2-point-regulator, 3-point-regulator, ...)
Limit values: freely selectable

Miscellaneous:
Display: approx. 13 mm high, 4-digit red LED-display
Operating conditions: -20 ... +50 °C, 0 ... 80 %RH (non condensing)
Voltage supply: 230 V AC, 50/60 Hz, approx. 6 VA
Housing: standard rack type housing **48 x 96 mm** (front frame)
installation depth: approx. 115 mm (incl. screw-type/ plug-in terminals)
Electrical connection: via screw-type/ plug-in terminals: cable diameters from 0.14 to 1.5 mm².
Protection class: front side IP54 (IP65 on request)
Electromagnetic immunity (EMC): EN61326 (appendix A, class B)

for further technical date refer to GIR 2002 (page 71)

Options (upon upcharge)

- **output options** (e.g. HLR.., AAG..., ST...) *see page 71*
- **other voltage supply** *see page 71*

Front 48 x 96

E.A.S.Y.Bus - Modul

2-channel difference controller

GIR 2002 NS / DIF - ... *1

***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

Applications

- difference controller for 2 channels
- detection of leaks
- control of delivery and exit air
- pressure compensation
- etc.

General

The **GIR 2002 NS / DIF** 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.

Specification

Measuring inputs: (2 x) 4-20 mA, (2 x) 0-20 mA or (2 x) 0-10 V
Please state your desired input signal at order transaction!
Display range: -1999 ... 9999 digit, decimal point, initial **and** final values freely selectable
Recommended range: ≤ 2000 digit
Accuracy: < 0.2 % FS ±1 digit (at nominal temperature = 25°C)
Measuring rate: approx. 100 meas. / sec.
Display/regulation: difference: input 1 - input 2
Outputs: 1 normally open contact, 1 change-over contact *output options like HLR-control output, analog output or continuous output available - p.r.t. page 67*
Controller states: 5 or 6, selectable (e.g. 2-point-regulator, 3-point-regulator, ...)
Limit values: freely selectable

Miscellaneous:
Display: approx. 13 mm high, 4-digit red LED-display
Operating conditions: -20 ... +50 °C, 0 ... 80 %RH (non condensing)
Voltage supply: 230 V AC, 50/60 Hz, approx. 6 VA
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: $43{,}0^{+0.5}$ x $90{,}5^{+0.5}$ mm (H x W)
Electrical connection: via screw-type/ plug-in terminals: cable diameters from 0.14 to 1.5 mm².
Protection class: front side IP54 (IP65 on request)
Electromagnetic immunity (EMC): EN61326 (appendix A, class B)

for further technical date refer to GIR 2002 (page 71)

Options (upon upcharge)

- **output for HLR-connection** (HLR1, HLR2) *see page 71*
- **analog output** (AAG.../..) *see page 71*
- **other voltage supply** *see page 71*

Front 48 x 96

Temperature regulator

GIR 2000 Pt cpl. with probe

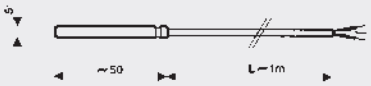
GIR 2000 Pt OF without probe

- measuring input for Pt100 (3-wire)
- temperature probe in scope of supply
- integrated switching output
- extensive self-monitoring and diagnostic system
- min-/max value memory

Specification

Measuring input: Pt100 (3-wire)
Measuring range: -50.0 ... +200.0°C
Resolution: 0.1°C
Measuring rate: approx. 4 meas. / sec.
Accuracy: < 0.3 % FS ±1digit (at nominal temperature = 25°C)

Temperature probe: GTF200 Pt100 / 3-wire
Pt100-probe, DIN class B (±0.3°C at 0°C), V4A-tube Ø5mm 50mm length, approx. 1m silicone cable. (in scope of supply at GIR2000Pt)



Output: voltage free relays output, change-over-contact, switching power: 10A (ohmic load), 250VAC
Controller state: 2-point, min-/max-alarm
Switching point: freely adjustable
Response time: ≤ 0.5 sec.

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 to +50 °C
Relative humidity: 0 to 80 %RH (non condensing)
Storage temperature: -30 to +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: $43.0^{+0.5}$ x $90.5^{+0.5}$ mm (H x W)
Electrical connection: via screw-type/plug-in terminals
cable diameters from 0.14 to 1.5 mm².
Protection class: front side IP54, with optional sealing IP65
Electromagnetic immunity (EMC): EN61326 (appendix A, class B)

Options (upon upcharge)

- **12VDC** voltage supply = 12 VDC (11-14V)
- **24VDC** voltage supply = 24 VDC (22-27V)
- **24VAC** voltage supply = 24 VAC ±5%
- **115VAC** voltage supply = 115 VAC ±5%

Accessories

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 M12x1.5 and M16x1.5

Accessories (probes)

GTF 199 Pt100-probe, 3-wire, -50 ... +400°C
DIN class B, V4A-tube Ø3 x 100mm, approx. 1m silicone cable

GRO 200 Pt100 tube surface probe, -50 ... +200°C
DIN class B, sensor body made of aluminium, approx. 2m silicone cable

additional suitable temperature probes *p.r.t. page 132*

Digital controller for temperature and process values

Autotuned, microprocessor based digital controller
with 2-, 3-point or PID control

R 38 (33 x 75 mm)

Specification:

Measuring input: *Please specify type required on order!*
- Thermocouples: J, K
- Pt100 (2-wire)
- PTC KTY 81-121, NTC 103AT-2
- Pt1000 (2-wire)

Measuring ranges:
Type J: -40...999°C, Type K: -40...999°C, Pt100: -50,0...850°C;
PTC: -50,0...+150°C; NTC: -50,0...+109°C; Pt1000: -50,0...-850°C
Resolution: temperature: 0,1 or 1°C
(Pt100, Pt100, PTC and NTC: autoranging)
Accuracy: ± 0.5 % FS ±1 digit
Display-Refresh-Time: 1 sec.
Display: 3-digit, 16 mm high LED-display
Outputs: 1 or 2 switching outputs
available output versions
- relay output (SPDT, switching power: 8A/3A, 250VAC)
- solid state relay (SSR drive): 10 V DC / 10 mA

Controller state: 2-point, 3-point or PID control.
Autotuning: the autotuning function guarantees the most briefly programming of all requested values.
Housing: 75 x 33 x 64 mm, panel cutout: 71 x 29 mm,
Mounting by means of clamping frame
Protection class: front IP65 (mounted in panel with gasket)
Electric connection: screw-type terminals
Operating conditions: 0 ... +50 °C, 20 ... 85 % RH. (non condensing)
Storage temperature: -30 ... +70 °C
Power supply: 100 V - 240 V (± 10% of nominal value)
Power consumption: max. 5 VA

Implementations, Options:

Power supply:
F: power supply: 12V AC/DC
L: power supply: 24V AC/DC
H: power supply: 90...240V AC

Measuring input:
F: meas. input: Thermocouples
A: meas. input: Pt100
T: meas. input: PTC, NTC, Pt1000

Output 1:
R: relay output
O: SSR drive

Output 2:
R: relay output
O: SSR drive

Orderinformation: **(Attention: measuring input has to be stated!)**

	1.	2.	3.	4.
R 38	☐	☐	☐	☐

R 38 L A RR: R 38 with meas. input Pt100 and 2 outputs (2x relay)

Digital controller for temperature and process values

Autotuned, microprocessor based digital controller
with 2-, 3-point or PID control
and adjustable set point gradient (ramp function)

K 31 (33 x 75 mm)

K 32 (33 x 75 mm)

Specification:

Measuring input:
- Pt100 (3-wire) and thermocouples: J, K, S, R und T
- PTC KTY 81-121, NTC 103AT-2
- normalized signals: 0(4) ... 20 mA
- normalized signals: 0(1) ... 5 Volt and 0(2) ... 10 Volt

Measuring ranges:
Pt100: -200...850°C; PTC: -55...+150°C; NTC: -50...+110°C;
Typ J: -0...1000°C, Typ K: 0...1370°C, Typ S: 0...1760°C
Resolution: temperature: 0.1, 1°C bzw. 0.1, 1°F
normalized signals: scale freely adjustable, -1999...9999 digit
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
available output versions
- relay output (R1 / R2) (change over, switching power: 8A/3A, 250VAC)
- relay output (R3 / R4) (close contact, switching power: 5A/1A, 250VAC)
- solid state relay (SSR drive): 8V DC / 8mA

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: 0 ... +55 °C, 30 ... 95 %RH. (non condensing)
Power supply: standard: 12 VAC ±10%, 50/60Hz a. 12 VDC ±10%
options: 24 VAC/DC ±10% or 90...240 VAC ±10%, 50/60Hz
Power consumption: approx. 4 VA

Implementations, Options:

1. Functions:
-: controller
T: controller + timer
P: controller + programm controller

2. Power supply:
F: power supply: 12V AC/DC
L: power supply: 24V AC/DC
H: power supply: 90...240V AC

3. Measuring input:
C: meas input: Pt100 und Thermoelement
E: meas input: PTC, NTC
I: meas input: current (0-20mA, 4-20mA)
V: meas input: voltage (0-5V, 0-10V, 1-5V, 2-10V)

4. Outputs: **1Rel. 2Rel. 3Rel. 4Rel.**
R: relay-output **Stand.**
O: SSR drive

5. Serial Interface:
S: with serial interface (RS485)

Orderinformation: **(Attention: measuring input has to be stated!)**

	1.	2.	3.	4.	5.
K 3x	☐	☐	☐	☐☐☐☐	☐

K 31 - H E RO-- -: K 31 with meas. input Pt100, 230VAC power supply and 2 outputs (1x relay, 1x SSR drive)

digital controller for temperature and process values

Autotuned, microprocessor based digital controller
with 2-, 3-point or PID control, 3-point motor valve control and
adjustable set point gradient (ramp function)

TLK 43 (48 x 48 mm)

Specification:

Measuring inputs: universal input for
- resistance thermometer: Pt100 (3-wire)
- PTC KTY 81-121, NTC 103AT-2 (2-wire)
- Thermocouples: B, C, E, J, K, L, N, R, S, T
- Normalized signals: 0...20mA, 4...20mA, 0...5V, 0...10V, 1...5V, 2...10V
- mV signals: 0...50mV, 0...60mV, 12...60mV

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
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: 5A/2A, 250VAC)
- solid state relay (SSR drive): 14V DC / 7mA
- normalized signal 0(4) ... 20 mA or 0(2) ... 10 Volt

Please pick the possible combinations from the "Output options"-table.
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: scaleable (normalized signal output necessary)
Interface [option]**:** RS485, optoisolated
Control input [option]**:** digital input that permit the remote commutation of the set point.
Heater break function [option]: the controller is available with a current transformer input for the heater break monetoring
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. 10VA
option: 24 VAC ±10%, 50/60Hz and 24 VDC ±10%

Implementations, Options:

1. Power supply:
L: power supply: 24V AC/DC
H: power supply: 90...240V AC

2. Outputs: **1Rel. 2Rel. 3Rel. 4Rel.**
R: **relay-output** **Stand.**
O: SSR drive
C: Normalized signalsl 0(4)...20mA
V: Normalized signals 0(2)...10V
Limitations: *If RS485 is chosen, OUT4 is not possible.*
OUT3 and OUT4 have to have the same output option.

3. Digital control input and serial interface:
I: with control input and serial interface (RS485)

4. Heater break function:
H: current transformer input

Orderinformation:

	1.	2.	3.	4.
TLK 43	☐	☐☐☐☐	☐	☐

TLK 43 L RROO I -: TLK 43 with serial interface and 4 outputs (2x relay and 2x SSR).

digital controller for temperature and process values

Autotuned, microprocessor based digital controller
with 2-, 3-point or PID control

K 48 (48 x 48 mm)

Specification:

Measuring inputs: universal input for
- resistance thermometer: Pt100 (3-wire)
- PTC KTY 81-121, NTC 103AT-2 (2-wire)
- Thermocouples: J, K, S, R, T, IR
- Normalized signals: 0...20mA, 4...20mA, 0...5V, 0...10V, 1...5V, 2...10V
- mV signals: 0...50mV, 0...60mV, 12...60mV

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
Accuracy: ±0.15 % FS ±1 digit
Measuring rate: approx. 8 measurements / sec.
Display: 4-digit, 12 mm high LED-display
Outputs: up to max. 3 outputs
available output versions (standard = relay-output)
- relay output (R1/R2) (close contact, switching power: 8A/3A, 250VAC)
- relay output (R3) (close contact, switching power: 5A/2A, 250VAC)
- solid state relay (SSR drive): 14V DC / 20mA

Please pick the possible combinations from the "Output options"-table.
Controller state: 2-point, 3-point or PID (single or double action) control
Autotuning: integrated autotuning function
Timer / Programm Controller (optionally): timer realisation / Programm controller function with 8 segments / 4 groups with time and gradient.
Alarm outputs: max. 3 (depending from output configuration)
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.
option: 24 VAC ±10%, 50/60Hz and 24V VDC ±10%

Implementations, Options:

1. Functions:
-: controller
T: controller + timer
P: controller + programm controller

2. Power supply:
L: power supply: 24V AC/DC
H: power supply: 90...240V AC

3. Measuring input:
C: meas input: Pt100 und Thermoelement
E: meas input: PTC, NTC
I: meas input: current (0-20mA, 4-20mA, ...)
V: meas input: voltage (0-5V, 0-10V, 1-5V, 2-10V, ...)

4. Outputs: **1Rel. 2Rel. 3Rel.**
R: relay-output **stand.**
O: SSR drive
D: digital control input **-** **-**
whereas R1 and R2: 8A/3A switching; R3: 5A/2A switching

Orderinformation:

	1.	2.	3.	4.
K 48	☐	☐	☐	☐☐☐

K 48 - L C RR -: K 48 controller with 2x relay.

Self-supplying plug-in display for 4-20 mA measuring transducer

no auxiliary energy source required - device will tap from loop current.

GIA 0420 VO

GIA 0420 VOT

GIA 0420 VO without buttons

GIA 0420 VOT with buttons

GIA 0420 VOT - ex

with Ex-protection for all potentially explosive atmospheres
Ex qualification: Ⓔx II 2G Ex ia/ib IIC/IIB T4
(Further Information please refer to our Homepage www.greisinger.de)

Specification:

Input signal: 4-20 mA (2-wire) (optionally 0 .. 10 V)
Voltage load: approx. 2 V (at ...-ex: approx. 3.5 V)
Accuracy: ±0.2% FS ±1digit (at nominal temperature = 25°C)
Display: 10 mm high LCD
Display range: -1999 up to +9999
Decimal point: any position
Scale: freely adjustable via 3 buttons
(for "VO": accessible after cover has been removed)
Measuring rate: approx. 5 measurements / sec.
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 refering rail will be displayed
Switching outputs: *(only devices with option S1 or S2)*
- 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 to +50°C, 0 to 80 % RH (non-condensing)
Electric connection: special-adapter 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)

- no auxiliary energy source required - device will tap from 4 to 20 mA loop current.
- scale freely adjustable 'on site' within seconds, no auxiliary devices required
- can be turned to any position, fits in any position regardless of transmitter location
- large display range from -1999 to 9999 Digit.
- maximum accuracy and minimum temperature drift
- large, 10 mm high LCD
- plug-in wherever required and device will be ready! The quickest way possible to get an "on site display" for your 4 to 20 mA measuring transducers.
- 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)

Options:

- S1 with 1 electrically isolated switching output
Delivery incl. 1m connecting cable for connection of switching output **(Option S2 just in combination with Ex-device available)**

- S2 with 2 electrically isolated switching outputs
Delivery incl. 1m connecting cable for connection of both switching outputs **(Option S2 not in combination with Ex-device available)**

GIA 0420 WKT

GIA 0420 WKT - ex

with Ex-protection for all potentially explosive atmospheres

Specification:

as GIA 0420 VOT but
Electric connection: connection to any standard signal source (4-20 mA) via 2 m connection cable.
Housing with mounting holes can be mounted to any surface.

Option: Input signal 0 ... 10 V (3-wire)
Display with power supply (12 ... 28 V) power consumption: < 10 mA

Unrivaled High Tech In Miniature Format

GRA 0420 VO

Plug on controller/display needs no auxiliary energy

freely scaleable via 3 keys

- LED-display
- no auxiliary energy source required
- with 1 open collector output
- optional with 2 electrically isolated high current open collector switching outputs (28V / 1A)
- 4 switching functions
- selectable preference state of switching outputs
- fast controlling and supervision (reacting time <20ms)
- alternatively available version: 0-10V (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

Without auxiliary energy, output 4-20mA, 1 electrically isolated switching output.

GRA 010 VO

Output 0-10V, 1 +Ub-switching switching output.

Specification:

	GRA 0420 VO...	GRA 010 VO..
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 Volt
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 ±1digit (at nominal temperature = 25°C)
Measuring rate: > 50 measurements / sec.
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 refering 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 m A (at option ... - S2: 1 A)
Reaction time: ≤ 20 ms

Switching funktions: 2 or 3 point controller, 2 point controller with min-/max-alarm or separate min-/max-alarm
Min./Max. value memory: memorizing of max. and min. values.
Operation, Configuration: via 3 keys.
Working temperature: -25 to +50°C
Relative humidity: 0 to 80 % RH (non-condensing)
Electric connection: special-adapter 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 (28V / 1 A), connection via separate M8 jack
(Delivery incl. 1m 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 by directly accessible for the user)

GRA 0420 WK

Without auxiliary energy, output 4-20mA, 1 electrically isolated switching output.

GRA 010 WK

Output 0-10V, 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.

Housing for surface mounting *for build in of devices with the format 24 x 48 or 48 x 96 mm*

	Ordering type / description	suitable for	price
	**APG-1 *** Housing for surface mounting incl. seal GGD2448 **Dimensions:** 80 x 82 x 95 mm (H x W x D), without elbow-plug **Panel cutout:** for 1 display at the format 24 x 48 **Connection:** elbow-plug in according EN 175301-803/A, 4-pin **Protection class:** IP65	GIA 20 EB GIR 230 ... GIA 0420 GIA 0420 SP GIA 2448 /WE GTH2448/1,2,3	
	**APG-2 *** Housing for surface mounting incl. seal GGD2448 **Dimensions:** 80 x 82 x 95 mm (H x W x D), without screw connections **Panel cutout:** for 1 display at the format 24 x 48 **Cable insert:** 2 x screw connections M12x1.5 **Protection class:** IP65		
	**APG-3 *** Housing for surface mounting incl. seal GGD2448 **Dimensions:** 80 x 82 x 95 mm (H x W x D), without screw connections **Panel cutout:** for 2 displays at the format 24 x 48 **Cable insert:** 2 x screw connections M12x1.5 **Protection class:** IP65		
	**APG-4 *** Housing for surface mounting incl. seal GGD4896 **Dimensions:** 75 x 125 x 126 mm (H x W x D), without screw connections **Panel cutout:** for 1 display at the format 48 x 96 **Cable insert:** screw connections M12x1.5 and M16x1.5 **Protection class:** IP65	GIA 2000, GIR 2000 Pt GIR 2002 ..., GTH 83 EG, GTH 1150 EG	
	**APG-6 *** Housing for surface mounting incl. seal GGD4896 **Dimensions:** 175 x 125 x 126 mm (H x W x D), without screw connections **Panel cutout:** for 2 displays at the format 48 x 96 **Cable insert:** screw connections 2 x M12x1.5 and 2 x M16x1.5 **Protection class:** IP65		

*** 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.

Pre-assembled mounting plate *for even easier mounting of the transmitters and devices in 80 x 82 housing*

	**MP 8082** mounting plate for 80 x 82 housings *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.* **Dimensions:** 80 x 114 x 6 mm (H x W x D)	**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

Switching voltage:	48 ... 530 V AC
Switching current:	max. 50 A
Control voltage:	3 - 32 V DC
Isolation voltage:	4000V
Operating temperature:	-40...+80°C
Dimensions:	approx. 59 x 46 x 35 mm

D53 TP50D 3 phase semiconductor relay
incl. suitable touch-guard protection cap

Switching voltage:	48 ... 530 V AC
Switching current:	max. 50 A
Control voltage:	3 - 32 V DC
Isolation voltage:	4000V
Operating temperature:	-40...+80°C
Dimensions:	approx. 100 x 75 x 35 mm

D53-3P Suitable heat sink for D53TP50D
snap-on mounting on hat rail

RC-element 230 VAC for inductive switching loads
(solenoids, relay, motors etc.)

Power supply

GNG 220 / 2

Power supply device integrated in snap-on housing for top hat rail - for 2 transmitter

Input voltage: 230 V, 50/60 Hz
Output voltage: 2 x 18 V DC ±5%, 25 mA each
Dimensions: 48 x 96 x 52 mm (W x H x D)
Mounting: 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 device integrated in snap-on housing for top hat rail

Input voltage: 230 V, 50/60 Hz
Output voltage: 12 V DC ±5%, 300 mA
Dimensions: 70,4 x 96 x 62 mm (W x H x D)
Mounting: snap-on to top hat rail

GNG 24 / 150

identical to GNG12/300, but with output voltage: 24 V DC ±5%, 150 mA

other voltage upon request

DC/DC-converter

GNG 12 / 24
GNG 24 / 24

DC/DC-converter to electrically isolate 12V or 24V DC-supply voltages

Input voltage: GNG12/24: 10 - 18 V DC
GNG24/24: 19 - 30 V DC
Output voltage: 24 V DC ±5%, max. 80 mA, electrically isolated
Insulating voltage: 500 V
Operating temperature: -20 ... +70° C
Mounting: snap on to top hat rail.
Dimensions: 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

Input voltage: GNG 12 / 2 x 24: 10 - 18 V DC
GNG 24 / 2 x 24: 19 - 30 V DC
Output voltage: 2 x 24V DC ±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.

Input voltage: 230V, 50/60Hz (others upon request)
Output voltage: approx. 11V DC (unregulated) for the supply of a GIA20EB.
18V DC ±5% (regulated), 25 mA for meas. transducer
Relay outputs: 2 volt-free changeover contacts,
switching current: max. 10 A ohmic load.
Connection: screw-type terminal
Dimensions: 48 x 96 x 60 mm (W x H x D)
Mounting: snap on to top hat rail

GR10 Relay module for top-hat rail

for one GIA20EB to mounting to a top-hat rail

Input voltage: 12V DC (others e.g. 24VDC upon request)
Relay outputs: 2 volt-free changeover contacts,
switching current: max. 10 A ohmic load.
Connection: screw-type terminal
Dimensions: 48 x 96 x 60 mm (W x H x D)
Mounting: snap on to top hat rail

DIGITAL-PANEL-MOUNTED DISPLAY MODULES for all applications

- **2 temperature modules (covering temperature ranges from -50 up to +1150° C)**
- **4 pressure modules for barometer, vacuum meter, manometer for absolute pressure, over/under pressure and pressure difference measurements. Pressure range up to 10 bar**
- **one voltmeter module with 3 integrated voltage ranges**

Common specification for all modules:

Display: 3½-digit LCD display, 13mm high (±1999 digit), **scan rate:** 3 meas. per second, **operating temperature:** 0 to 50°C, **atmospheric humidity:** 0 to 85%RH (non-condensing), **storage temperature:** -10 to +70°C, **current supply:** 9 - 12 V DC, **electrical connection:** via soldering pin, **dimensions:** 38 x 76 x 22 mm (H x W x D), **panel-cutout:** $36^{+0.5}$ x $73.2^{+0.5}$mm (H x W), **panel thickness:** max. up to 9.5mm. snap-on frame protruding only 1mm over front plate - professional design, 3mm thick anti-reflex screen

TEMPERATURE

GPT 180

TEMPERATURE MODULE for semiconductor sensor KTY 83-110
Range: -50.0 up to +175.0° C / **Resolution:** 0.1° C
Accuracy: approx. 1% f.s. / **Power consumption**: approx. 1 mA
Suitable sensors KTY 83-110: please refer to pages 128

GPT 1155

TEMPERATURE MODULE for thermocouple NiCr-Ni (type K)
Range: -50 up to +1150° C / **Resolution:** 1° C
Accuracy: (at nominal temperature = 25°C) better than 1 % from -20 up to +550 and from 920 up to 1150° C, 550 up to 920 better than 1.5%
Power consumption: approx. 0.35 mA
Suitable sensors type NiCr-Ni (type K) p.r.t. pages 123 - 127, 132 - 133
GTU 300/152 wire sensor with soldering pin plug

Pressure

GPD 15 ABS

DIGITAL BAROMETER / VACUUM METER MODULE (sensor not included)
Range: 0 to 1100 mbar (hPa) absolute / **Resolution:** 1 mbar
Accuracy module: 1 mbar ±1 digit
Accuracy sensor: (sensor not included in scope of supply):
±0.2% (typical) for linearity and hysteresis, ±0.4% for temperature drift from 0 to 50° C (typ. values for sensors compensated to module)
Power consumption (incl. sensor) approx. 3.5 mA
Suitable sensors: (please order separately)
SCX 15 ANC (pressure sensor, loose)
SCX 15 ANC/G (pressure sensor with housing, 1m connection cable)

GPD 05 REL

DIGITAL MANOMETER for over/under pressure and pressure difference (sensor not included)
Meas. range: -100,0 to +199,9 mbar relative (referring to ambient pressure)
Resolution 0,1 mbar / **Accuracy module** 0,1 mbar ±1 digit
Accuracy sensor and **power consumption** as above
Suitable sensors: (please order separately)
SCX 05 DNC (pressure sensor, loose)
SCX 05 DNC/G (pressure sensor with housing, 1m connection cable)

GPD 30 REL

DIGITAL MANOMETER for over/under pressure and pressure difference (sensor not included)
Meas. range: -1000 to +1999 mbar relative (referring to ambient pressure)
Resolution 1 mbar / **Accuracy module** 1 mbar ±1 digit
Accuracy sensor and **power consumption** as above
Suitable sensors: (please order separately)
SCX 30 DNC (pressure sensor, loose)
SCX 30 DNC/G (pressure sensor with housing, 1m connection cable)

GPD 150 REL

DIGITAL MANOMETER for over/under pressure and pressure difference (sensor not included)
Range: -1.00 up to 10.00 bar relative (referring to ambient pressure)
Resolution 0.01 bar **Accuracy module** 1 mbar ±1 digit
Accuracy sensor and **power consumption** as above
Suitable sensors: (please order separately)
SCX 150 DNC (pressure sensor, loose)
SCX 150 DNC/G (pressure sensor with housing, 1m connection cable)

DIGITAL DISPLAY for all measuring transducers 4 to 20 mA 2-wire, no auxiliary power required

Digital panel module without auxiliary energy

- **for use in 4 to 20 mA output circuits of measuring transducers**
- **WITHOUT EXTERNAL AUXILIARY SUPPLY**
- **high operating reliability**

- **Cost reduction as power supplies and their cables are no longer required**

GTA 0420 (standard range)

Large, high-contrast 3 1/2 digit LCD, 12.7 mm high; to either directly display loop current or convert it into any desired value such as temperature, pressure, fill level, humidity, travel, weight, height, liquid flow, ppm, mg/l, % sat., etc..
Snap-on, industrial panel-mounting type, anti-reflex screen 3 mm thick (not to be compared with unprotected glass covered display as used with cheap modules!)
Minimum size: 38 x 76 x 22 mm (H x W x D). Devices can be stack-mounted at a distance of 38 mm.
Standard printings available, eg. °C, %, V, mbar, bar, otherwise neutral.

Specification:

Input signal: 4 .. 20 mA, 2-wire
Display ranges: 0,0 ... 100,0; 0,0 ... 199,9; -50,0 ... +50,0 (standard); any display range desired against upcharge (p.r.t. options)
Decimal point: any place (soldering jumper)
Fine tuning: starting point at 4 mA and end point at 20 mA can each be shifted by ±50 digits
Display: 3½ digit LCD with ±1999 digits, 13 mm high
Scanning rate: 3 measurements per second
Voltage load: approx. 4,7 V (standard - connection wrong-polarity protected) optional: approx. 3,5 V (without polarity protection) - upon request
Accuracy: (at nominal temperature = 25°C) ±0.1% ±1digit
Temperature coefficient: 100 ppm / K
Operating temperature: 0 to 50 °C
Atmospheric humidity: 0 to 85 %RH (non-condensing)
Storage temperature: -10 to +70°C
Dimensions: 38 x 76 x 22 mm (H x W x D)
Panel cutout: $36^{+0.5}$ x $73.2^{+0.5}$ mm (H x W)
Panel thickness: max. up to 9.5mm.

Options:

Any measuring range desired (against upcharge)
(no upcharge for orders as of 10 pieces of the same range)

Further displays without auxiliary supply: p.r.t. page 64, 76, 77

VOLTAGE

GPV 220

DIGITAL VOLTMETER, 3 integrated voltage ranges - others can be realised by means of an external voltage divider
Ranges: ±199.9 mV DC, ±1999 mV DC, ±19.99 V DC integrated;
(±199.9 V DC or 1999 V DC can be realised by means of an external voltage divider)
Decimal point: any place selectable
Resolution: up to 100µV / **Input impedance:** 100MΩ resp. 1MΩ
Accuracy: 0.1% ±1 digit / **T.C. value:** 100 ppm/K
Power consumption: approx. 100µA only (approx. 3000 hours with normal 9V-battery)

Data logger / EASYBus

	Measurands										
	Standard Signal	Temperature	Humidity	Pressure	Pulse	State	Carbon monoxide	Carbon dioxide	EASYBus-Load	Description	Page
DATA LOGGER											
EL-USB-2-LCD		✓	✓						-	USB data logger	**82**
EL-USB-TC-LCD		✓							-	USB data logger	**82**
T-Logg 100 ..		✓							-	Stand-Alone logger	**83**
T-Logg 120 ..	✓								-	Stand-Alone logger	**83**
T-Logg 160		✓	✓						-	Stand-Alone logger	**83**
EASYLog 40 K ..		✓							2	EASYBus data logger	**84**
EASYLog 40IMP/ ..					✓				2	EASYBus data logger	**84**
EASYLog 24 RFT ..		✓	✓						2	EASYBus data logger	**85**
EASYLog 40NS ..	✓								2	EASYBus data logger	**85**
EASYLog 40 BIN						✓			2	EASYBus data logger	**86**
EASYLog 80 CL		✓	✓	✓					2	EASYBus data logger	**86**
EASYBus MODULES											
EBHT - ..		✓	✓						1,5	EASYBus sensor modul	**88**
EBT - 2R ..		✓							1,5	EASYBus sensor modul	**89**
EBT - AP ..		✓							1,5	EASYBus sensor modul	**89**
EBT - IF ..		✓							1,5	EASYBus sensor modul	**90**
EBN / ..	✓								2	EASYBus sensor modul	**90**
EBG - CO - 1R							✓		1	EASYBus sensor modul	**91**
EBG - CO2 - 1R								✓	1	EASYBus sensor modul	**91**
EASYBus CONTROLLER											
GIA 20 EB									1	Universal display and controller	**66**
GIA 2000									1	Universal display	**69**
GIR 2002									1	Universal display and controller	**70**
EB 2000 MC									-/14	Display- and monitoring device	**93**
EB 3000									1/30	Display-, controlling- and monitoring device	**92**
EASYBus INTERFACE CONVERTER											
EBW 1									14	Connection to RS 232-interface	**96**
EBW 3									2	Connection to USB-interface	**96**
EBW 64									64	Connection to RS 232-interface	**96**
EBW 240									240	Anschluss an RS 232-Schnittstelle	**96**

USB Data Logger

with Display for external Thermocouples (J, K und T) or Humidity / Temperature and Dew Point

- 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
- IP67
- incl. software

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 und T)

Specification EL-USB-2-LCD:

Measuring Range:	Temperature: -35 ... +80°C Humidty: 0 ... 100% r.h Dew Point via Software
Resolution:	0,5 °C / 0,5% r.h.
Accuracy:	Temperature (typ): ± 1°C Humidty: ± 3,5 %r.F. (in the range 20 till 80 %r.h.) Dew Point: ± 2°C (in the range 40...100%r.h., 25°C)
Memory:	16.382 recordings per humidity and temperature
Logging Interval:	10 sec, 1 min, 5 min, 30 min, 1 h, 6 h, 12 h programmable via software
Serial Interface:	USB
Battery:	3,6V lithium battery, size 1/2 AA, exchangeable
Dimensions:	103 x 26,4 mm (L X W), Ø 27,0mm
Scope of supply:	1 device, 1 lithium battery 3,6V, 1 software, 1 clip 1 protection cap, 1 operating manual (on CD-ROM), 1 clip

Specification EL-USB-TC-LCD:

Measuring Range:	Typ J: -130 ... +900°C, Typ K: -200 ... +1300°C Typ T: -200 ... +350°C
Resolution:	0,5°C
Accuracy (typ.):	± 1,0°C @ 25°C
Thermocouple Connectors :	Thermoelement socket in miniature size, suitable for flat-pin plugs
Memory:	32.000 data
Logging Interval:	1 sec, 10 sec, 1 min, 5 min, 30 min, 1 h, 6 h, 12 h adjustable via software
Operating Temp.:	Range: -10 ... +40°C
Serial Interface:	USB
Battery:	3,6V Lithium battery, size ½AA
Battery Life Time:	6 month @ 25°C and recording intervall 1 min
Dimensions:	118,2 x 26,8 mm (L X W), Ø 27,0mm
Scope of supply:	1 device incl. 3,6V 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 EASYBUS compatible.

TEMPERATURE-LOGGER
for individual programming of recording time

T-Logg 100

T-Logg 100 E

DIN EN 12830

TEMPERATURE DATA LOGGER
(16.000 meas. values) for any application

T-Logg 100
T-Logg 100 E

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 meas. value ±0.5 °C
Sensor:	
T-Logg 100:	integrated in device
T-Logg 100 E:	sensor tube made of stain-less steel, Ø5 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 sec. to 5 h *free programmable via software*
Storage capacity:	16.000 measuring values
Recording time:	166 days (if interval is 15 min.)
Working temperature:	-30 to +60 °C
Storage temperature:	-40 to +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. *The **T-Logg 100** is not suitable for bus operation and is **not** **E.A.S.Y.Bus** compatibel!*
Housing:	48,5 x 48,5 x 35,5 mm (H x W x D). plugs, sensor connection, ... are not included Housing made of shock resistant plastic, transparent front made of polycarbonate, splash waterproof: IP 65 (excl. protection cap at T-Logg 160).
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)

T-Logg - The logger series for stand-alone applications

STANDARD SIGNAL LOGGER
for individual programming of recording time

T-Logg 120 W

T-Logg 120 K

STANDARD SIGNAL DATA LOGGER
(16.000 meas. values) for transducers etc.

T-Logg 120 W - ...
(with elbow type plug)

T-Logg 120 K - ...
(with PG glanding and cable)

Note: please specify standard signal desired when ordering (i.e.: T-Logg 120 K - 0-1V)

Specification

Display range: -1999 ... 9999 digit
freely programmable
Decimal point any position
Input signal: ***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)
Accuracy: ±0,5 % FS (at nom. temperature)
Display : 10 mm high LCD-display
Recording interval: from 2 sec. to 5 h
freely programmable via software
Storage capacity: 16.000 measuring values
Recording time: 166 days
(if interval is 15 min.)
Working temperature: -25 to +60 °C
Storage temperature: -30 to +85 °C
Battery: CR2032, exchangeable
Battery service life: over 3 years
(if recording interval is 15 min.)
Electric connection: (for input signals)
... 120 W - ..: elbow-plug in accordance with EN 175301-803/A for connection to an existing transmitter.
... 120 K - ..: approx. 0.5 m connection cable

HUMIDITY-/TEMPERATURE-LOGGER
for individual programming of recording time

HUMIDITY / TEMPERATURE DATA LOGGER
(16.000 meas. values) for any application

T-Logg 160

Starter kit

T-Logg 160 SET
Complete set with T-Logg 100 and interface converter USB 100 (incl. MINISOFT)

Specification

Measuring ranges, display ranges:
Humidity: 0.0 ... 100.0 %RH
Temperature: -25.0 ... 60.0 °C
Resolution: 0.1 °C / 0.1 %RH
Accuracy (at nominal temperature = 25°C)**:**
Humidity: ≤ ±3 % in range 10 - 90 %
Temperature: ± 0,3 °C ± 0.017 * (T - 25°C)
Sensors: mounted in sensor tube
Sensor tube: approx. Ø15 mm made of polyamide with screw-type plastic protection cap
Display: 10 mm high LCD-display
Recording interval: from 4 sec. to 5 h
freely programmable via software
Storage capacity: 16.000 measuring values each
Recording time: 166 days
(if interval is 15 min.)
Nominal temperature: 25 °C
Working temperature: -25 to +60 °C
Storage temperature: -30 to +85 °C
Battery: CR2032, exchangeable
Battery service life: over 3 years
(if recording interval is 15 min.)

Interface: serial interface, 3-pin miniature integral plug. *The **T-Logg 100** is not suitable for bus operation and is **not** **E.A.S.Y.Bus** compatibel!*
Housing: 48,5 x 48,5 x 35,5 mm (H 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 (excl. protection cap at T-Logg 160).
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)

Software

MINISOFT
Read-out software for the **T-Logg**.

Software is contained at the USB 100 or free available via the internet (www.greisinger.de). We will be pleased to send you a separate CD against a small charge covering our expenses of € 16,00.

*Note: the **T-Logg** can also be controlled by the software GSOFT40K.*

Accessories

USB 100 interface converter,
for direct connection of one T-Logg to the USB-interface of a PC.

GWH 40K Wall suspension with lock against theft (picture: see page 93)
suitable for e.g. T-Logg 100, T-Logg 120 K - ... and T-Logg 160.

GWH 10 Simple wall suspension, made of stainless steel (picture: see page 93)
Mount wall suspension at the monitoring point, logger may now be easily put in.

CR 2032 spare battery for T-logg´s

TEMPERATURE LOGGER

for watching productioning and server-rooms as well as cooling chambers according assignation of frozen food 92/1/EWG

EASYLOG 40K

DIN EN 12830

EASYLOG 40KH

TEMPERATURE DATA LOGGER (48.000 meas. values) for any application.

EASYLOG 40K sensor tube are attached on the device

EASYLOG 40KH sensor tube are connected via 1 m cable

EASYLOG 40KH-E300 tube con. via cable, increased meas. range (0,1°C)

EASYLOG 40KH-E600 tube con. via cable, increased meas. range (1°C)

EASYLOG 40KH-GOF with surface probe for pipe mounting

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))

Specification

Measuring ranges:
- **EASYLOG 40K:** -30.0 ... 60.0 °C
- **EASYLOG 40KH:** -50.0 ... 150.0 °C
- **EASYLOG 40KH-E300:** -50.0 ... 300.0 °C
- **EASYLOG 40KH-E600:** 0 ... 600 °C
- **EASYLOG 40KH-GOF:** -50.0 ... 150.0 °C

For special measuring ranges refer to options

Working range (electronic): -30 ... +60 °C

Resolution display and memory:
0.1°C or 1°C (corresponding type)

Accuracy (at nominal temperature = 25°C):
- **EASYLOG 40K:** ±0.5°C
- **EASYLOG 40KH:** ±0.5°C
- **EASYLOG 40KH-E300:** ±0.5°C ±0.2% of m.v.
- **EASYLOG 40KH-E600:** ±1°C ±0.2% of m.v.
- **EASYLOG 40KH-GOF:** ±0.5°C ±0.2% of m.v.

Sensor: Pt1000 (2-wire)

- **Design 40K:** *(refer upper picture)*
  sensor tube made of plastic, Ø7 mm, approx. 30 mm long, attached on the device.
  (Note: at certificate: stainless steel tube, Ø5 mm, approx. 60 mm long)
- **Design 40KH:** *(refer upper picture)*
  sensor tube made of stainless steel, Ø5 mm, approx. 50 mm long, approx. 1 m silicone cable. Cable with anti-buckling glanding to housing.
- **Design 40KH-E300:** *(probe picture below)*

  sensor tube made of stainless steel, Ø3 mm, approx. 100 mm long, sleeve Ø5 x 50 mm, approx. 1 m glass silk cable. Cable with anti-buckling glanding to housing.
- **Design 40KH-E600:** *(probe picture below)*

  sensor tube made of stainless steel, Ø3 mm, approx. 100 mm long, sleeve Ø5 x 50 mm, flexible coating-element, approx. 1 m silicone cable. Cable with anti-buckling glanding to housing.
- **Design 40KH-GOF:** *(without picture)*
  self-adhesive surface temperature probe with moulded silicone design (type GOF 115 Pt1000 - please refer to page 133)
  approx. 2 m PFA-insulated cable. Cable with anti-buckling glanding to housing.
- **Special design types upon request**

Display: 10 mm high LCD-display

Recording interval: 2 sec. to 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 (electronic): -30 to +60 °C

Storage temperature: -40 to +70 °C

Interface: EASYBus-interface
3-pin mini-integral plug.
Needed connection-cable EBSK01 not included in delivery (see accessories page 93)
Note: With an according interface converter you can connect 120 logger without having any problems.

Housing: 48,5 x 48,5 x 35,5 mm (W x W x D)
sensor and plug not included, IP65.

Noise immunity (EMC): the **EASYLOG** 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%

Approvals: DIN EN 12830

Options (for extra charge)

- **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
- **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

PULSE-LOGGER

for consumption and flow rate measuring, piece counting etc.

PULSE DATA LOGGER
(48000 meas. values) for individual use

EASYLOG 40IMP/S
(type switching contact - with PG-glanding and cable)

EASYLOG 40IMP/T
(type TTL-signal - with PG-glanding and cable)

Specification

Measuring range: 0 ... 30000 pulses/cycle

Resolution: 1 pulse

Cycle: 2 sec. to 5 h,
free programmable via software GSOFT 40K

Display range: -1999 to 9999 Digit
free programmable

Decimal point: any position

Input signals:
- **EASYLOG 40IMP/S:** passive volt-free switching contact
- **EASYLOG 40IMP/T:** active TTL-signal

(input is not isolated for EASYBus)

Resolution display and memory: 1 digit

Accuracy: cycle time ±50 msec

Display: 10 mm high LCD-display

Recording interval: equal to cycle

Storage capacity: 48.000 measuring values

Recording time: 500 days,
(if recording interval is 15 min.)

Battery service life: approx. 6 years (without switching current, at 15 min)

Working temperature: -25 to +60°C

Storage temperature: -30 to +70°C

Interface: EASYBus-interface
3-pin mini-integral plug.
Needed connection-cable EBSK01 not included in delivery (see accessories page 93)

Housing: 48,5 x 48,5 x 35,5 mm (L x B x H)
plug and cable not included, IP65

Electric connection: (for input signals)
approx.. 0.5m connection cable, flying leads

Noise immunity (EMC): the **EASYLOG** 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 (for extra charge)

- **DBK: double battery capacity**
  recommended for high measure-rates
- **ALARM: additional alarm-output**
  open-collector output via 4-pole miniature mounting connector (IP65) including 1m cable. Max. switching power: 28V, 50mA

HUMIDITY-/TEMPERATURE-LOGGER
for museums, greenhouses, medicine technology etc.

EASYLOG 24RFT

EASYLOG 24RFT-E

HUMIDITY / TEMPERATURE DATA LOGGER
(48.000 measuring values each) for climate monitoring.

EASYLOG 24RFT
EASYLOG 24RFT-E

WPF4 - Certificate of calibration humidity (measuring points: approx. 20/40/60/80%)

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: Ø15mm made of polyamide
EASYLOG 24RFT-E: approx. Ø14 x 68mm made of PVDF, connected to logger via 1m teflon cable

Protection cap: screw-type plastic protection cap for quick responses

Display: LCD-display, 10 mm high

Recording interval: 4 sec. to 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 to +60°C

Storage temperature: -30 to +70°C

Interface: EASYBus-interface 3-pin mini-integral plug.
Needed connection-cable EBSK01 not included in delivery (see accessories page 93)

Note: 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 **EASYLOG** 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 (for extra charge)

- **DBK: double battery capacity**
  recommended for high measure-rates
- **ALARM: additional alarm-output**
  open-collector output via 4-pole miniature mounting connector (IP65) including 1m cable. Max. switching power: 28V, 50mA

Accessories (p.r.t. page 76, 78/79)

EBW 1
Level converter for connection of up to 9 EASY-Bus data logger to the RS232-interface of a PC. (Power supply: 230V/50Hz)

EBW 3
Level converter for connection of one EASYBus data logger to the USB-interface of a PC. (Power supply: via USB)

GSOFT 40K incl. EBSK01
(connection cable EBSK01in scope of supply)
Windows software for setting of device, data readout and printing of the stored data.
(for further description p.r.t. page 90)

EBSK 01
Special connector with approx. 1m cable for the connection of one **EASYLOG**.
(note: cable is in scope of supply of the software GSOFT 40K)

STANDARD SIGNAL LOGGER
replaces for expensive recorders

EASYLOG 40NS W

STANDARD SIGNAL DATA LOGGER
(48.000 meas. values) for transducers etc.

EASYLOG 40NS W - ...
(with elbow type plug)

EASYLOG 40NS K - ...
(with PG glanding and cable)

Note: please specify standard signal desired when ordering

Specification

Display range: -1999 to 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 nom. temperature)
Display: 10 mm high LCD-display
Recording interval: 2 sec. to 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 to +60°C
Storage temperature: -30 to +70°C
Interface: EASYBus-interface 3-pin mini-integral plug.
Needed connection-cable EBSK01 not included in delivery (see accessories page 93)
Housing: 48,5 x 48,5 x 35,5 mm (L x B x H) (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 **EASYLOG** 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 (for extra charge)

- **DBK: double battery capacity**
  recommended for high measure-rates
- **ALARM: additional alarm-output**
  open-collector output via 4-pole miniature mounting connector (IP65) including 1m cable. Max. switching power: 28V, 50mA

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. 93 a. 96)

STATE-LOGGER
for state monitoring etc.

STATE DATA LOGGER
(48000 meas. values) for individual use

EASYLOG 40BIN

Specification

Input signal: passive volt-free switching contact
(input is not isolated for EASYBus)
Measuring values:
1 = contact is closed (R < 50 Ohm)
0 = contact is open (R > 20 kOhm)
Cycle: 2 sec. to 5 h, *free programmable via software GSOFT 40K*
Resolution display and memory: 1 digit
Display: 10 mm high LCD-display
Recording interval: equal to cycle
Storage capacity: 48.000 measuring values
Recording time: 500 days, (if recording interval is 15 min.)
Battery service life: approx. 6 years (without switching current, at 15 min)
Working temperature: -25 to +60°C
Storage temperature: -30 to +70°C
Interface: EASYBus-interface 3-pin mini-integral plug.
Needed connection-cable EBSK01 not included in delivery (see accessories page 93)
Note: With an according interface converter you can connect 120 logger without having any problems.
Housing: 48,5 x 48,5 x 35,5 mm (L x B x H) plug and cable not included, IP65
Electric connection: (for input signals) approx.. 0.5m connection cable, flying leads
Noise immunity (EMC): the **EASYLOG** 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 (for extra charge)

- **DBK: double battery capacity** recommended for high measure-rates
- **ALARM: additional alarm-output** open-collector output via 4-pole miniature mounting connector (IP65) including 1m cable. Max. switching power: 28V, 50mA

HUMIDITY-/TEMPERATURE-/AIR PRESSURE LOGGER
for climate monitoring etc.

The new generation of the logger series

- double display (i.e. to display humidity and temperature at the same time)
- 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

HUMIDITY - / TEMPERATURE - / PRESSURE - DATA LOGGER
(each 250.000 measured values) for climatic applications.

EASYLOG 80CL

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)

General

The **EASYLOG 80CL** 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 **EASYLOG 80CL** provides a big variety of additional functions:
- SeaLevel correction: instead of the barometric air pressure the pressure at sea level can be display (input of height above sea level needed).
- Min-/max- value memory: callable by the buttons, the highest and lowest value since the start (or reset) of the logger is saved here.
- Min-/max- alarm function: the exceeding of adjustable min-/max- alarm boundaries by the displayed value is monitored. Optional: alarm output for alarm message of the logger available!

Specification

Measuring range, Display ranges:
Humidity: 0,0 ... 100,0 %RH
Temperature: -25,0 ... +60,0 °C
Air pressure: 300,0 ... 1100,0 hPa
Additional available display ranges:
Wet bulb temperature: -27,0 ... 60,0 °C
Dewpoint temperature: -40,0 ... 60,0 °C
Enthalpy: -25,0 ... 999,9 kJ/kg
Atmospheric humidity: -0,0 ... 640,0 g/kg
Absolute humidity: 0,0 ... 200,0 g/cm³
Resolution display and memory:
0.1 °C, 0,1 %RH and 0,1 hPa or 1 digit
Accuracy:
Humidity: ± 2 % in range 10-90%
Temperature: ± 0,3 °C ± 0.017 * (T - 25°C)
Air pressure: ± 1.0 hPa (typ., at 0 - 60°C)
Sensoren:
Humidity/Temp.: sensor mounted in sensor tube *(sensor is exchangeable)*
Air pressure: sensor integrated in housing
Sensor tube: Ø15 mm made of polyamide
Protection cap: screw-type plastic protection cap for quick responses
Display: two 4½-digit LC-displays
Recording interval: 4 sec. to 5 h
free programmable via buttons on the device or via the software GSOFT 40K
Storage capacity: 250.000 data sets (humidity, temperature, air pressure) in max. 64 recording sequences
Recording time: 7 years (at 15 min. interval)
Battery service life: approx. 5 years (at 15 min)
Working temperature: -25 to +60°C
Storage temperature: -30 to +70°C
Interface: EASYBus-interface 3-pin mini-integral plug.
Needed connection-cable EBSK01 not included in delivery (see accessories page 93)
Note: With an according interface converter you can connect 60 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 **EASYLOG** 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 (for extra charge)

- **ALARM: additional alarm-output** open-collector output via 4-pole miniature mounting connector (IP65) including 1m cable. Max. switching power: 28V, 50mA

Please Note: For trademark reasons we currently do not deliver members of the EASYLOG family to GB and USA. Please order there the constructional identical types: Logger type 40K, Logger type 40RF, ...

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 ca. 1 sec.; but approx. 20 ms by using a local controlling system**

The EASYBus hardware

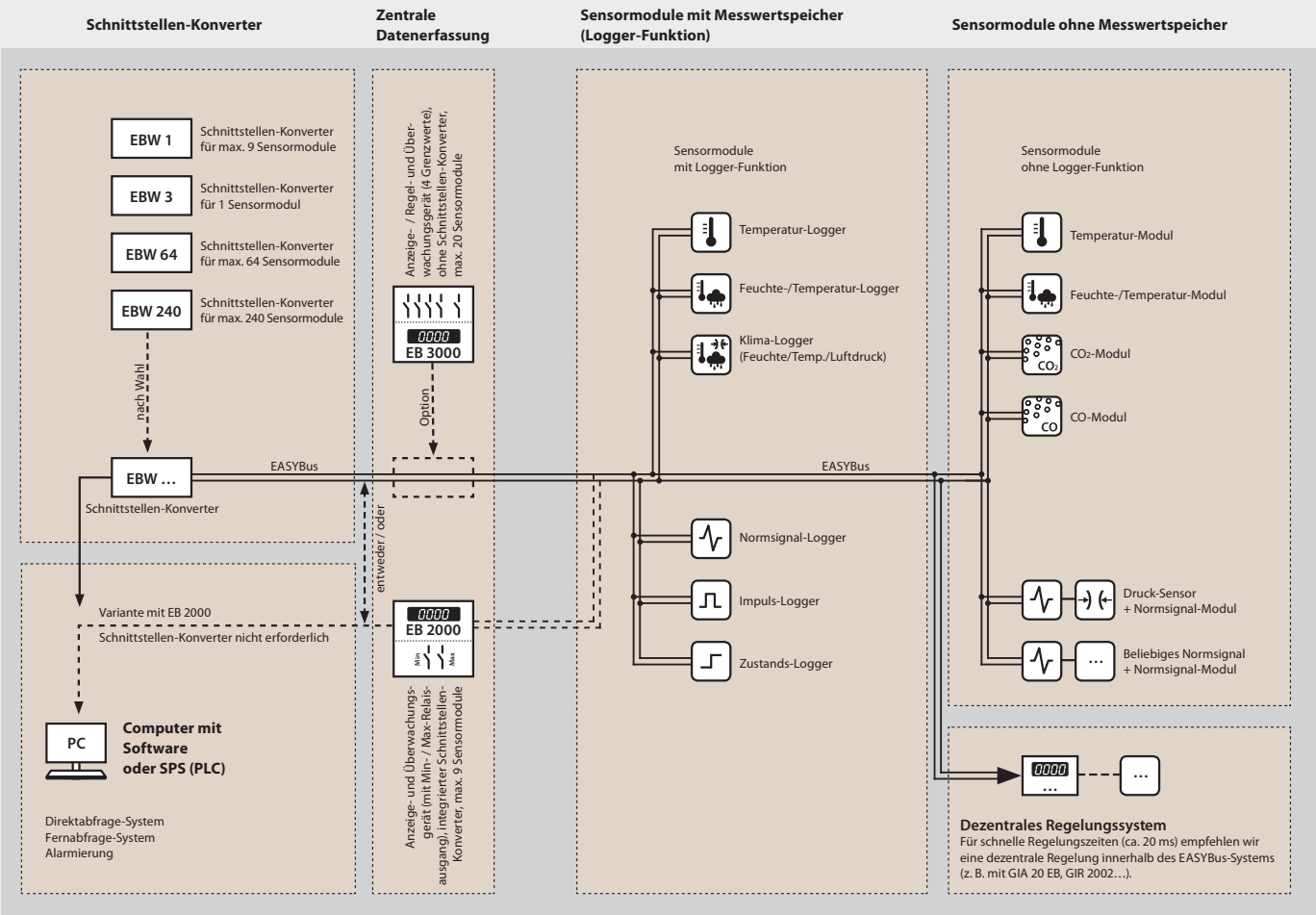
- **2-pin connection line, based on the principle of the ›M-Bus‹**
- **Polarity-free bus connection**
- **Bus system voltage 36 V DC, minimum 24 V DC**
- **Maximum allowable bus power loss: 12 V DC**
- **Master/slave system; data transmission of the slaves only on demand**

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_2 monitoring:
Manufacturing rooms / storage rooms
Office rooms (to condition the air of the room) **Greenhouses**

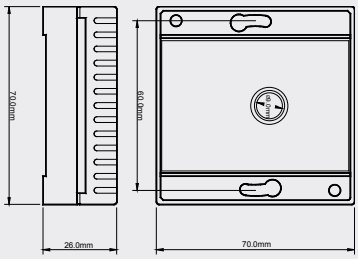
CO monitoring:
Underground garages / Parking garages
Motorcar garage / car repair
Indoor go-kart tracks



EASYBus - sensor modules for humidity/temperature

EBHT - 2R

- **VO**: Option "On-site display"
- **HO**: Option "High-humidity sensor (0...100%)", incl. "encapsulated PCB"
- **UNI**: Option "selectable humidity display unit"

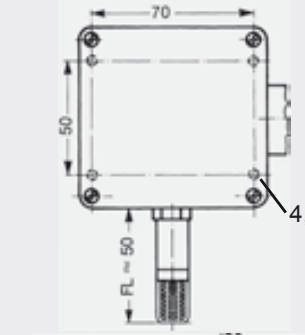


Specification

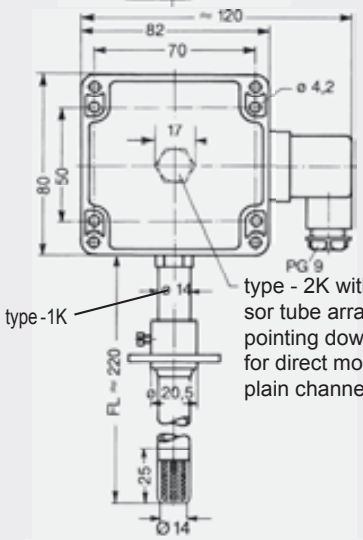
Measuring range:
Humidity: 0.0 ... 100.0 %RH
recommended range (standard): 30 ... 80 %RH
recommended range (option -HO): 5 ... 95 %RH
Temperature: -25,0 ... 70,0°C or -13,0 ... 158,0°F
Display options: refer to below
Resolution: 0,1 %RH or 0,1°C / 0,1°F
Accuracy: (at nominal temperature = 25°C)
Humidity: ±2.5 %RH (at recommended range)
Temperature: ±0.4 % of meas. value ±0.3°C
Electric connection: 2 pin screw-type terminal, no polarity, max. 1,5mm²
Ambient temperature: -25...50°C
Housing: 70 x 70 x 26 mm (L x B x H)
Option Display: 10mm high LCD-display

EBHT - 1R (sensor tube at the side, FL = 50 mm)
EBHT - 1K (sensor tube at the side, FL = 220 mm)
EBHT - 2K (sensor tube pointing downwards, FL = 220 mm)

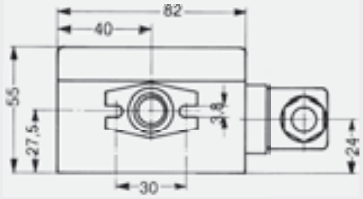
- **VO**: Option "On-site display"
- **HO**: Option "High-humidity sensor (0...100%)"
- **UNI**: Option "selectable humidity display unit"
- **LACK**: Option "Encapsulated PC-board"
- **FL300, FL400, FL500**: Option "Longer probe tube"
- **KABEL**: Option "separated sensor tube", incl. option high-humidty sensor Sensor head (Ø14 x 68 mm) connected to housing via approx. 1m teflon cable.
- **SHUT**: Option "Heat-absorption hat / weather protection shield" Avoids falsification of meas. data due to sun/Rain etc - p.r.t. page 108



EBHT - 1R
incl. option VO



type - 2K with central sensor tube arrangement and pointing downwards (e.g. for direct mounting onto plain channel surfaces)



EBHT - 2K

Specification

Measuring range:
Humidity: 0.0 ... 100.0 %RH
recommended range (standard): 30 ... 80 %RH
recommended range (option -HO): 5 ... 95 %RH
Temperature: -40,0 ... 120,0°C or -40,0 ... 248,0°F
Display options: *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).*
Wet bulb temperature: -27,0 ... 60,0 °C
Dewpoint temperature: -40,0 ... 60,0 °C
Enthalpiy: -25,0 ... 999,9 kJ/kg
Atmospheric humidity: 0,0 ... 640,0 g/kg
absolute humidity: 0,0 ... 200,0 g/m³
Resolution: 0,1 %RH or 0,1°C / 0,1°F
Accuracy: (at nominal temperature = 25°C)
Humidity: ±2.5 %RH (at recommended range)
Temperature: ±0.4 % of meas. value ±0.2°C
Electric connection: elbow-type plug EN 175301-803/A (IP65), output 2-wire connection, max. 1,5mm² each, no polarity
Ambient temperature:
electronic, housing: -25...50°C
sensor (sensor tube): -40...100°C (for short time up to 120°C)
Housing: 82 x 80 x 55 (L x B x H), material: ABS, IP rating: IP65
Sensor tube: tube-Ø 14mm, screwable protection cap with stainless steel gauze (105 µm). Total length approx 50 mm or 220 mm (standard)

Optional extended length 300, 400 or 500 mm available. (please specify upon order!)

Option Display: 10mm 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 104)

Other types upon request !

Spare parts

Spare protection cap
with stainless steel gauze (105µ mesh size)
- for standard and high humidity use

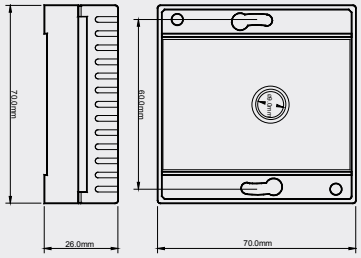
Bronze filter
(not for use in high humidity use)

EASYBus - sensor modules for temperature

EBT - 2R

EBT - 2RE with external sensor for lower or higher temperatures. Sensor: like GTF2000LE on page 122 of catalogue

-VO: Option "On-site display"



Specification

Measuring range:	
EBT - 2R:	-25,0 ... 70,0 °C or -13,0 ... 158,0 °F
EBT - 2RE:	-50,0 ... 150,0 °C or -58,0 ... 302,0 °F
Resolution:	0,1 °C / 0,1 °F
Accuracy:	±0.4% of meas. value ±0.3°C (at nominal temperature = 25°C)
Sensor element:	Pt1000 acc. to DIN IEC 751
Electric connection:	2 pin screw-type terminal, no polarity, max. 1,5mm²
Ambient temperature:	-25...50°C (electronic)
Housing:	stream-lined housing for indoor installation (can be directly mounted on flush-type sockets)
Dimensions:	70 x 70 x 26 mm (H x W x D)
Sensor (EBT-2RE):	V4A-can, 5mm Ø, 50mm long, approx. 1m silicone cable
Option Display:	10 mm high LCD-display

EBT - AP1 (measuring range:: -50,0 ... +150,0°C) *

EBT - AP2 (measuring range:: -50,0 ... +400,0°C) *

EBT - AP3 (measuring range:: -50,0 ... +150,0°C) *

EBT - AP4 (measuring range:: -50,0 ... +150,0°C) *

EBT - AP5 (measuring range:: -199,9 ... +650,0°C)

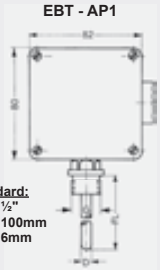
*** observe necessary order information!**

-VO: Option "On-site display" (LCD with 10 mm high digits)

-LACK: Option "Encapsulated PC-board" (for outdoor use)

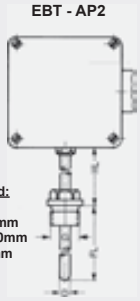
-**FL...** (Longer probe tube); **-HL...** (longer collar tube):
Price incl. up to 100 mm, extended length: price per 100 mm

EBT - AP1



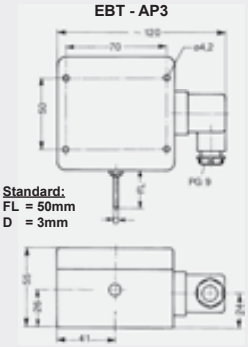
Standard:
G = ½"
FL = 100mm
D = 6mm

EBT - AP2



Standard:
G = ½"
HL = 50mm
FL = 100mm
D = 6mm

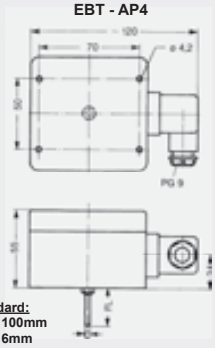
EBT - AP3



Standard:
FL = 50mm
D = 3mm

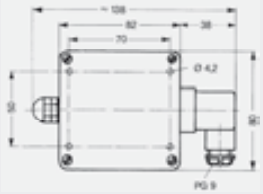
EBT - AP1
water-proof IP65

EBT - AP4



Standard:
FL = 100mm
D = 6mm

EBT - AP5



Design types

Design 1: With threaded pin „G" for direct screw connection.

Design 2: For higher temperatures, threaded pin „G" at a distance from housing. HL = collar tube length.

Design 3: Indoor or outdoor probe for direct wall mounting *(encapsulation of electronics required for outdoor use).*

Design 4: Duct-type probe with probe tube arranged centrally and pointing downwards.

Design 5: 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).

Other design types upon request - please do not hesitate to contact us !

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

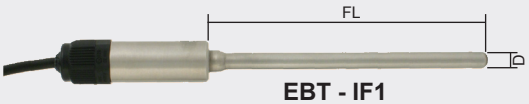
EBT - AP3, FL = 50 mm, D = 3 mm

EBT - AP5

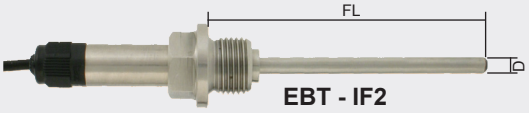
Specification

Measuring range:	
- 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
Sensor element:	Resistance thermometer Pt1000 acc. to DIN IEC 751
Resolution:	0,1 °C / 0,1 °F
Accuracy (electronic):	(at nominal temperature = 25°C) ±0.2% of meas. value ±0.2°C
Sensor accuracy:	(Pt1000)
Standard:	acc. to DIN Kl.B (±0,3°C at 0°C)
Option :	1/3 DIN: ±0,1°C at 0°C *(upcharge p.r.t. page 121)*
Electric connection:	elbow-type plug EN 175301-803/A (IP65), output 2-wire connection, max. 1,5mm² each, no polarity
Sensor connection:	2-wire connection available (e.g. EBT - AP5)
Ambient temperature (electronic):	0...70°C
Temperature coefficient:	0,05%/°C
Storage temperature:	-20...+70°C
Housing:	82 x 80 x 55 (L x B x H), material: ABS, IP rating: IP65
Mounting position:	any
Fixing:	by means of screw-thread or fixing holes in the housing (accessible after top cover has been removed).
Mounting distance:	50 x 70mm
Fixing screws:	max. shaft Ø: 4mm
Sensor mounting:	sensors are electrically insulated as a standard.
Thread sizes "G":	1/2" (standard) material V4A
options :	G1/4", G3/8", G1/2", M5, M6, M8, M10, M12, *other threads upon request!*
Sensor tube:	„D": 3 mm, 4mm, 5 mm, 6 mm and 8 mm - material: V4A
Collar tube:	HL = please specify length desired (for ..-AP2 only) (V4A-tube)
Option Display:	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.*

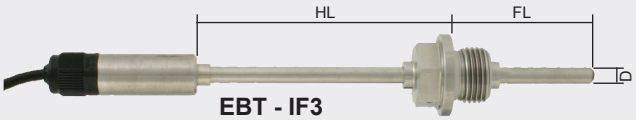
EASYBus - sensor modules for temperature



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")

EBT - IF1
EBT - IF2
EBT - IF3

E.A.S.Y.Bus - Modul

Specification

Meas. 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***

Meas. 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
attatched 2-pole cable, cable-length approx. 1m.
For direct connection to a converter or to the EASYBus.

Operating ambient of electronics (in tube sleeve)**:**
working temperature: -25 to 70 °C
relative air humidity: 0 to 100 %RH

Housing: stainless steel housing

Dimensions: depending on sensor construction
tube sleeve: Ø15 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 M8x1, M10x1, M14x1.5, 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

Options / upcharges

- **FL=...: longer tube,** *each started further 100mm*
- **HL=...: longer collar tube,** *each started further 100mm*
- **D=...: other tube diameter**
- **G=...: other thread**

EASYBus - sensor modules for standardized signals

EBN / W - ...
with elbow-type plug

EBN / K - ...
with connection cable

E.A.S.Y.Bus - Modul

EBN / K - ...[1)]
EBN / W - ...[1)]

[1)] - Please specify desired standardized signal upon order: (e.g. EBN / K - 0..10V)

General

All standard signals (0-2V, 0-10V, 0-20mA, 4-20mA, 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...2V, 0...10V, 0...20mA or 4...20mA.
(input is not isolated for EASYBus)

Measuring range: -1999 to 9999 Digit,
Measuring range and decimal point can be set via EBxKonfig software. (available free on our homepage).

Accuracy: ± 0.5 % (at nominal temperature)

Working temperature: -25 to +60 °C

Storage temperature: -30 to +70 °C

Interface: EASYBus-interface
attached 2-pole cable, cable-length approx. 1m.
For direct connection to a converter or to the EASYBus.

Housing: 48,5 x 48,5 x 35,5 mm (H 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.

Options / upcharges

VO: On-site display

EASYBus - sensor modul for carbon monoxide (CO)

EBG - CO - 1R

Properties

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.

Range of Application:

- underground garages, parking garages
- boiler plant and heating systems
- motorcar garage

Highlights:

- long-lasting electrochemical measuring cell
- automatic zero calibration
- 3 years warranty for the co sensor element

Specification

Measuring range:	0 ... 300 ppm CO (carbon monoxide)
Measuring principle:	electrochemical, permanent measuring
Reproducibility:	< 3 ppm according to VDI 2053
Response Time T_{90}:	< 60 s
Cross sensitivity:	≤ 2% of 300 ppm CO (acc. to VDI 2053)
Linearity error:	≤ 2% of 300 ppm CO (acc. to VDI 2053)
Offset adjustment:	automatically
Interface:	EASYBus-interface
Auxiliary energy:	14 ... 30 V DC, max. 50 mA
Working condition:	-10 ... +40 °C, 15 ... 95 %RH (non-condensing)
Option: on site display	3½-digit LC-display
EMC:	according to EN 50 081-1, EN 50 082-2 B
Electric connection:	elbow-type plug acc. to EN 175301-803/A (IP65), max. wire cross section: 1.5 mm², wire diameter from 4.5 to 7 mm
Housing:	ABS, 82 x 80 x 55 mm (without elbow-type plug)
Mounting:	with fixing holes for wall mounting
Mounting distance:	70 x 50 mm (W x H)
Fixing screws:	max. shaft-Ø
Weight:	approx. 200 g

Options / upcharge

VO: on site display

Accessories

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 ($230V_{AC}$ => $24V_{DC}$/300mA)

additional accessories upon request

EASYBus - sensor modul for carbon dioxide (CO_2)

EBG - CO2 - 1R

Properties

Due to the fact, that CO_2 is an important indicator for the quality of air in rooms, it's super important to measure the CO_2 content.
The recommended CO_2 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_2-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_2-module.

Additionally, there is a local display which shows beside the actual CO_2 concentration, the minimum and maximum values as well as an optical alarm.

Highlights:

- auto-calibration procedure
- auto-calibration procedure
- for surveillance of the recommended CO2 concentration in ambient air

Specification

Meas. range:	standard:	0 ... 2000 ppm CO_2 (carbon dioxide)
	opt. /5000:	0 ... 5000 ppm CO_2 (carbon dioxide)
Measuring principle:		infrared principle (NDIR)
Accuracy:	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)
Interface:		EASYBus-interface
Auxiliary energy:		12 ... 30 V DC, max. 600 mA
Display:		approx. 10 mm high, 4-digit LC-display
Working condition:		-10 ... +50 °C, 5 ... 95 %RH, 850 ... 1100 hPa
Storage condition:		-25 ... +60 °C, 5 ... 95 %RH, 700 ... 1100 hPa
Electric connection:		elbow-type plug acc. to EN 175301-803/A (IP65), max. wire cross section: 1.5mm², wire diameter from 4.5 to 7 mm
Terminal assignment:		2 x EASYBus, no polarity 2 x Auxiliary energy
Housing:		ABS, 82 x 80 x 55 mm (without elbow-type plug)
Mounting:		with fixing holes for wall mounting
Mounting distance:		70 x 50 mm (W x H)
Fixing screws:		max. shaft-Ø 4 mm
Weight:		approx. 225 g
Features:		- min-/max-value memory, - optical alarm, - input of offset and scale for adjusting

Options / upcharges

5000: measuring range: 0 ... 5000 ppm CO_2

Accessories

GSN 24-750 plug-in power supply ($230V_{AC}$ => $24V_{DC}$/750mA)

EASYBus-display and monitoring device for 20 channels

EB 3000

- 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 1000m cable-length possible
- Additional connection of a second EB3000 for enlargement

Specification

Display range: -1999 to +9999 digit
Resolution: depending on sensor module used
Accuracy: depending on sensor module used.
Sensor modules: all intelligent EASYBus sensor modules
Sensor supply: via EB 3000
max. bus load: 30 EASYBus standard loads
meas. channels: 20
perm. cable length: 500 m (depending on type of cable and wiring)
Switching outputs: 4 relay outputs (NO), shared input. Outputs can be as signed to any channel
Switching power: 230VAC, 5A, ohm resistive load
Switching function: 2-point controller, 2-point controller inverting
Switching points and delay for each output freely selectable
Alarm output: 1 relay output (change-over contacts)
Switching power: 230VAC, 5A, ohm resistive load
Alarm function: Common alarm for all sensors.
Configuration: directly on the device or via additional configuration software (supported converter is needed).
Min./Max. value memory: from all connected sensor modules the Max. and Min. value are callable via front-side keypad.
Calculation-functions: 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.
Self diagnosis: permanent self-diagnosis, diagnosis of all connected sensor moduls to ensure trouble-free function.
Display: main display: LED, 4-digit, 13mm
channel display: LED, 2-digit, 7mm
Interface: EASYBus-interface with supported converter (e.g. EBW1) GRS232 compatible, for communication with a PC.

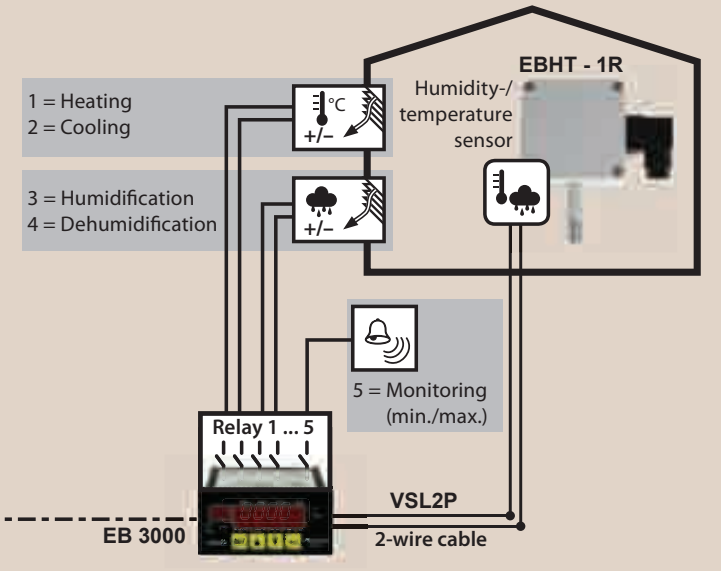
Housing: 48 x 96 x 100 mm (H x W x D)
Panel cutout: 43 x 90,5 mm (H x W)
Front: Transparent membrane keyboard IP65. Sealing for housing for installation according to IP65 will have to be ordered separately.
Connection: 2-wire connection in ring-, tree- or star type. No polarity.
Connection terminals: screw-type/plug-in terminals
Ambient temperature: -25 to 50°C (permissible ambient temperature)
Voltage supply: 230V AC 50/60 Hz
Power consumption: approx. 9 VA

EB 3000 FTR

Set for Moisture / Temperature Controlling

Scope of Supply:

EB 3000: monitoring and controlling device (p.r.t. page 88)
EBHT - 1R: temperature / mumidity modul (p.r.t. page 84)
VSL2P: 10 m twisted pair cable (p.r.t. page 93)



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.

Range of application:
Refrigeration warehouse, green house, storage room, terrarium, etc.

Advantages:
- Simple installation and polarity free 2-wire system
- 4 switching outputs (humidify, dehumidify, heating, cooling) and 1 alarm output
- Easy upgrate to 20 single sensors (temperature, humidity, standard signals etc.)
- Excellent cost-performance-ratio

Note:
For configuration of the EB 3000 and recording / reading of connected EASYBus modules, a serial converter EBW 1 is needed.

Accessories

EBW 1 serial converter EASYBus <=> RS232
further informations p.r.t. p. 92

EBS 20M software for recording and archiving of max. 20 sensor modules (p.r.t. p. 91)

EASYBus-display and monitoring device for 9 channels

EB 2000 MC

- 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 seperate 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 configurated via the EB 2000 MC.

Specification

Measuring range: -1999 to +9999 digit
Resolution: depending on sensor module used.
Accuracy: depending on sensor module used.
Sensor modules: 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: 200m.
Sensor supply: via EB 2000 MC.
Fault messages: sensor damage, sensor short circuit, values above/below permissible area.
Self diagnosis: const. monitoring to ensure trouble-free function.
Interface: RS232 for easy configuration, or as interface converter RS232 - EASYBus.
Min./Max. value memory: for up to 9 different sensor modules, selectable via front side keyboard.
Min./Max. alarm: 2 volt-free relays (make contact), 10A (ohmic load), 250V, 50/60Hz, for min./max. alarm, programmable via front side button or RS232-interface.
Alarm delay: from 0 to 9999 minutes, can be set individually for each channel.
Display: 4-digit, red, 13mm high LED-display. 16 additional LEDs for display and monitoring functions.
Front: Transparent membrane keyboard IP65. Sealing GGD 4896 for housing for installation according to IP65 will have to be ordered separately.
Housing: rack-type housing, 48 x 96 x 100mm (H x W x D).
Panel cutout: 43 x 90,5 mm (H x W).
Connection terminals: screw-type/plug-in terminals
Ambient temperature: 0 to 50°C
Voltage supply: 230V AC 50/60Hz (standard)
Power consumption: approx. 3,5 VA

Options / upcharges

- Voltage supply: 12V AC, 24V AC or 115V AC 50/60Hz (others upon request)

EB 3000 / EB 2000 MC cost savings in all areas !

- 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

APG-4
surface-mounted housing (incl. sealing)

GGD 4896
add. sealing for panel mounting acc. to IP65

EBW 1
interface converter: EASYBus to RS232

GRS 01/9
interface adapter RS232: (adapter cable to 9-pin PC-interface)
(Please note: order Dsub9 -> Dsub25, if required! - GSA 9S-25B)

EBSK 01
connection cable 1m, for **EASYLOG**, EBN

EBSK 03
connection cable 3m, for **EASYLOG**, EBN

VSL 2P
twisted special cable for **EASYBUS**-system, cross section 2 x 0,75 mm²

AKL 1P
special-branch terminal or connection to VSL2P, 2 pieces

EASYBus-Configurator
software for comfortable editing of all EB3000-parameters. *(downloadable from our homepage: Service --> Download)*

Sensor, logger modules
p.r.t. page 83 - 91
for temperature, humidity, norm. signal, frequency, ...

GSOFT 40K (incl. connection cable EBSK01)

Operating software for EASYLOG and T-Logg datalogger

GSOFT40K is the comfortable operation software for the very easy operation of the **EASYLOG**'s and **T-Logg**´s.
The software supports English, German and Czech language and is executable with Windows 98, Me, NT, 2000, XP, Vista and 7.

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

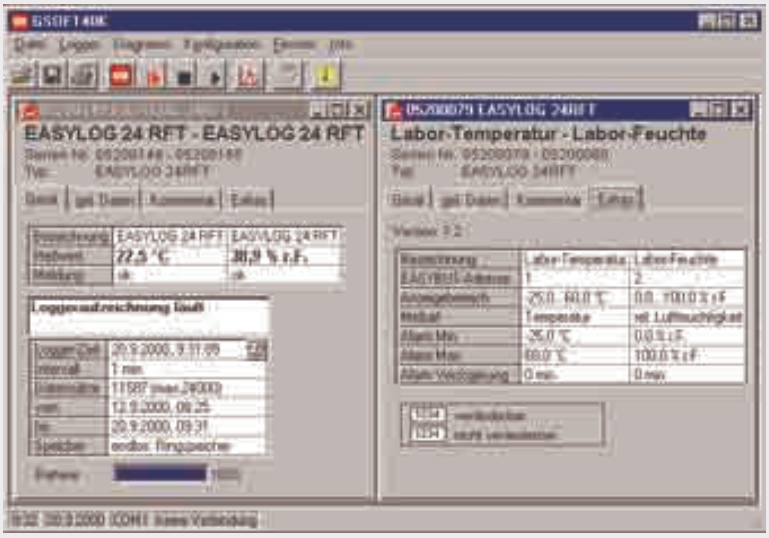
All necessary informations are compressed to a single clearly arranged window for each connected logger.

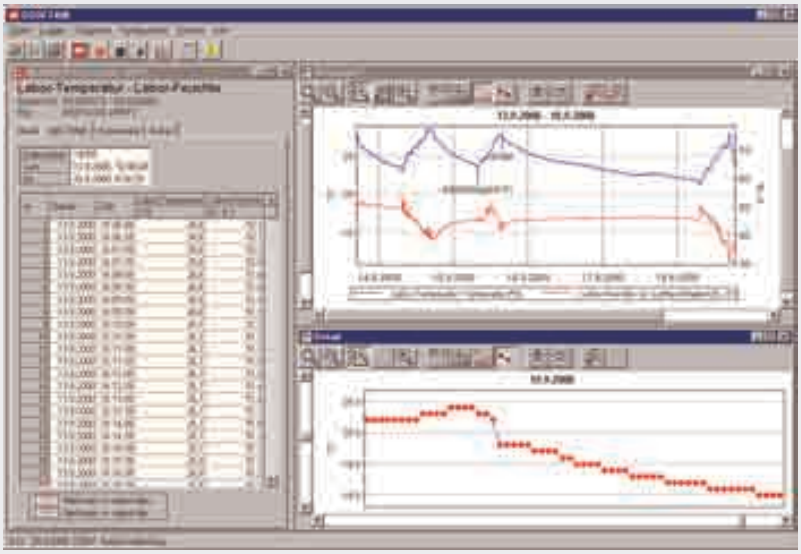
Setting of special functions

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 kilo meters. (p.r.t. page 94)

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 easter.

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.

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)

Hand-held instruments - software

Recording - Monitoring - Displaying - Analysing

EASYControl net

Software solution for recording, monitoring, displaying and analysing of sensor moduls.

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)

Long-time monitoring - Recording - Monitoring

EBS 20M
(20-Channel Measurement Data Logging)

EBS 60M
(60-Channel Measurement Data Logging)

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

Field of 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 scaleable diagrams and alarm limits
- Visualization of actual measurements values
- Trusted data storage via SQL database
- Data export

Moduls:
- 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)

EASYBus-Configurator **free of charge**

Software for initial installation and configuration of EASYBus-systems.

- 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) for free.

EASYBus - interface converter

EBW 1 interface converter
for connection of max. 7 EASYBus-modules to the RS232-interface (9-pin Dsub) of your PC.
Scope of supply: interface converter, 9-pin Dsub extension cable

EBW 3 interface converter
for connection of one EASYBus-module (e.g. **EASYLOG**) to the USB-interface of your PC. (Power supply: via USB)
Scope of supply: interface converter

EBW 64 interface converter
for connection of max. 64 EASYBus-modules to the RS232-interface of your PC.
Scope of supply: interface converter, 9-pin Dsub extension cable

EBW 240 **incl. software EASYControl net**
interface converter for connection of max. 240 EASYBus-modules to the RS232-interface of your PC.
Scope of supply: interface converter, plug-in power adapter, 9-pin Dsub extension cable, software EASYControl net.

Specification:

	EBW 1	EBW 3	EBW 64	EBW 240
Voltage supply:	230 V AC / 50Hz *12/24 V DC on request*	*not necessary*	230 V AC / 50Hz	230 V AC / 50Hz *(over power adapter)*
Power consumption:	approx. 5 W	max. 0.5 W	approx. 15 W	approx. 30 W
Max. permissible sensor modules *:	7	1	64	240
Permissible cable length **:	200 m	10 m	1000 m	1000 m
Baud rate:	4800 Baud			
Serial connection:	RS232	USB	RS232	RS232
Electrical isolated:	yes	yes	yes	yes
Overload display:	no	no	yes	yes
Short-circuit proof:	yes (limited: 30sec.)	no	yes (passiv)	yes (activ)
Operating temperature:	0 ... 50 °C	-25 ... 50 °C	0 ... 50 °C	0 ... 55 °C
Humidity:	20 ... 80 %RH, non-condensing			
Storage temperature:	-20 ...+70 °C	-25 ...+70 °C	-20 ...+70 °C	-20 ...+60 °C
Dimensions (H x W x D):	112 x 80 x 45 mm	56 x 31 x 24 mm	100 x 75 x 110 mm	200 x 240 x 55 mm (without power adapter)
Bit Recovery	no	no	yes	yes

* depending on type of the used sensor modules
** depending on type of cable and wiring

Interface accessories

USB-Adapter for connection of an interface converter (except EBW 3) to the USB-interface of yout PC

GSA 9S-25B connection-adapter: 9-pin Dsub-plug <=> 25-pin Dsub-socket

*Note: the EASYBus-monitoring device **EB2000** can be used as a converter for max. 9 sensor modules.*

EASYBus - components

Sensor modules

Logger module (for temperature, humidity, pressure, norm. signals, frequency) *p.r.t. page 84 - 86*

Sensor module (for temperature, humidity, norm. signals, frequency, ...) *p.r.t. page 88 - 91*

GIA 20 EB EASYBus module for norm. signal and temperature, with 2 switching outputs *p.r.t. page 66*

GIA 2000 EASYBus module for norm. signal and temperature *p.r.t. page 69*

GIR 2002 EASYBus module for norm. signal and temperature, with 2 relay outputs *p.r.t. page 70*

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 input 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 mm²

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 96*

EBW 3 EASYBus interface converter, USB *p.r.t. page 96*

GW 110 PB EASYBus Profibus Gateway NEW *(further information: 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 95*

EASYControl net Windows software for monitoring, recording, displaying *p.r.t. page 95*

GSOFT 40K Windows software to service the **EASYLOG** *p.r.t. page 94*

ProfiLab-Expert Windows software *p.r.t. page 62*

EASYBUS.dll Windows-function library for interface communication EASYBus - PC,
to integrate in your own programmes

EASYBus - components

Alarm monitoring

EBUW 232 A independent alarm monitoring module for EASYBus-modules

The EBUW232A monitores 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 ±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 89*

EB 3000 EASYBus-display, regulating and monitoring device for 20 channels *p.r.t. page 88*

Switching modules

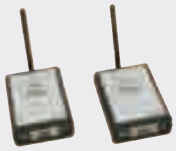
EBB 2 OUT / BP EASYBus switching module, 2 relay, bus-powered
EBB 2 OUT / 12V EASYBus switching module, 2 relay
EBB 4 OUT / BP EASYBus switching module, 4 relay, bus-powered
EBB 4 OUT / 12V EASYBus switching module, 4 relay

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 EBUW232A 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 12V-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)*

	EBB 2 OUT / BP	EBB 4 OUT / BP	EBB 2 OUT / 12V	EBB 4 OUT / 12V
Power supply:	Powered by the EASYBus		12 V DC ±10% / 150 mA	
Switching outputs:	2 changers	4 changers	2 changers	4 changers
Switching reaction:	< 1 seconds	< 2 seconds	< 0.1 seconds	< 0.1 seconds
Switching power:	max. 250 V AC / 16 A ohmic load			
Connection:	screw type terminal			
Dimensions:	96 x 48 x 60 mm	96 x 94 x 60 mm	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: 1x Modem, 1x plug power supply, 1x TAE cable, 1x protocol converter EBUW232, 1x null modem cable, 1x9-pol. DSub connection cable



MODEM 3500 GSM GSM MODEM with alarm input and SMS alarm
for the EASYBus remote data transfer via 900MHz mobile nets (D1, D2, etc.).
Scope of delivery: 1x Modem, 1x. protocol converter EBUW 232, 1x null modem cable, 1x 9-pol. DSub connection cable
Accessories: Antenna GSM (Dual-band industrial antenna with bracket)

DFM 232 SET Wireless data connection, 433MHz, consisting of transmitter and receiver
for wireless data transmission to EASYBus-modules via 433Mhz radio network.
Bi-directional RS232 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

	Measurands													
	Temperature	Air humidity	Air flow	Pressure	Carbon mono-xide / -dioxide	Oxygen	pH / Redox	Conductivity	Rotational speed	Flow	Level	- Protection	Description	Page
TRANSMITTER														
GTMU ..	✓												Wall- or channel-mounted version	**100**
GTP .. / GNTP	✓												Transmitter board / snap-on housing	**102**
GTMU - IF ..	✓												Stainless steel housing	**103**
T03 BU ..	✓												Analog head transmitter	**103**
RT420 ..	✓												Head transmitter	**104**
GITT01 ..	✓											✓	programmable head transmitter	**105**
MU 500 ..	✓											✓	electr. isolated head transmitter, snap-on	**106**
ST 500 ..												✓	Universal isolationg signal converter, snap-on	**106**
IR-CT 20	✓												Infrared Transmitter	**107**
TF1 ..	✓												Temperature Switch	**107**
GRHU .. MP		✓											Wall- or channel-mounted version	**108**
GHTU .. MP	✓	✓											Wand- oder Kanalausführung	**108**
GSMU ..			✓										Wall-mounted or Mini version	**109**
GMUD				✓									Wall moundted version / transmitter board	**110**
A-10 / S-10 .. / S-11 ..				✓									Stainless steel pressure transmitter	**111**
GT1-CO / GT10-CO2-1R					✓								Wall-mounted version	**112**
OXY 36 .. MP						✓							Wall-mounted version	**113**
GPHU .. / GRMU ..							✓						Wall-mounted version	**114**
GLMU .. MP								✓					Wall-mounted version	**115**
EFFI / EFFU									✓				Stainless steel housing	**116**
EFK2 / EFKP / EFKM										✓			Stainless steel housing	**116**
RRI - 0.. / ..										✓			Flow meter (with rotor)	**117**
FCM ..										✓			Flow switch with angle plug	**117**
FHK.. / EPI										✓			Flow meter with NPN-Output	**118**
VISION 2008 / VTH 25 ..										✓			Flow transmitter with Hall-effect sensor	**119**
GBS ..											✓	✓	Water level / well probe	**110**
GNS ..											✓		Level switch with micros-witch / reed contact	**119 / 120**
RWI ..											✓		Float switch	**120**
LC .. / GNS-KIT											✓		Level transmitter	**121**

Freely scaleable temperature transducer

GTMU-MP

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 covered.

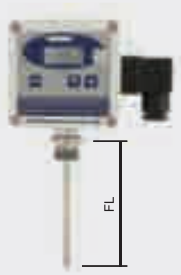
- **on site temperature display**
- **output signal freely scaleable**
- **user-adjustment possible**
- **possible output signals: 4-20 mA, 0-1 V or 0-10 V**

Design types

Design type 1

for direct screw connection

probe with threaded stem "G"



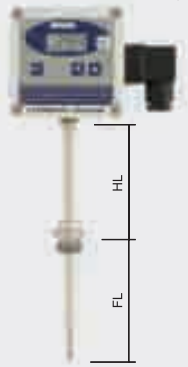
Standard type:

G = ½", 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 = ½", HL = 100 mm,
FL = 100 mm, D = 6 mm

Design type 3

indoor / outdoor probe

for direct wall mounting

Standard type:

FL = 50mm, D = 3 mm

Design type 4

duct probe

centrally mounted sensor tube pointing downwards
(for clamping ring screw connection p.r.t. page 134)

Standard type:

FL = 100 mm, D = 6 mm

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)		
electronic:		±0.4% of meas. value ±0,2°C
output signal:		±0.2% f.s.
Probe:		Pt1000, 2-wire, DIN class B (standard) *optional higher sensor accuracy available (p.r.t. page 121)*
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 ... 30VDC (for output: 0-...V)
Reverse voltage protection:		50 V, permanently
Perm. impedance (at 4-20mA):		RA [Ω] = (Uv [V] - 12V) / 0.02 A
Permissible load (at 0-1(10)V):		RL [Ω] > 3000 Ω
Display:		approx. 10 mm high, 4-digit LCD-display
Working temperature:		-25 to 70 °C (electronic)
Storage temperature:		-25 to 70 °C
Relative humidity (electronic):		0 to 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
Probe length:		for standard length please refer to design type,
	optional:	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 !*
thread "G":		G1/2" (standard),
	optional:	G1/4", G3/8", G3/4", M10, M12, M14, M16
Probe diameter "D":		3, 4, 5, 6 or 8 mm
Electric connection:		elbow-type plug acc. to EN 175301-803/A (IP65)
Mounting:		4 housing holes for wall mounting or by means of plastic tube clamps for duct mounting
Functions:		min-/max-value memory, offset and slope digital adjustable, output signal freely scaleable (without tools)

Prices - temperature transducer

GTMU - MP **design type 1**
GTMU - MP **design type 2**
GTMU - MP **design type 3**
GTMU - MP **design type 4**

Options / upcharges

- **AV01:** **output signal 0-1V**
- **AV10:** **output signal 0-10V**
- **LACK:** **encapsulated PC board**
  (for outdoor application, i.e. applications where condensation is possible)
- **FL=...:** **longer tube,** each started further 100 mm
- **HL=...:** **longer collar tube,** each started further 100 mm
- **D=...:** **other probe diameter**
- **G=...:** **other thread**

Accessories

Clamping ring screw connection **please refer to page 136**

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

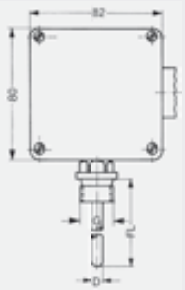
Temperature transducer GTMU

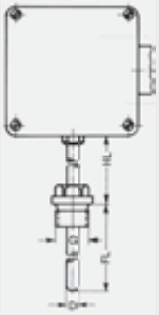
cpl. with Pt100 or NiCr-Ni (type K) sensor

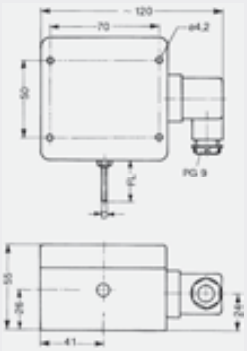
General

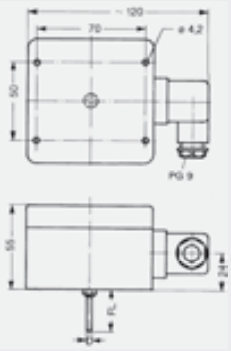
You can choose between 5 design types of the GTMU and 2 sensor types to get an optimised solution for Your needs.
The types 1 - 4 are supplied cpl. with sensor, measuring transducer etc., calibrated and thus ready for use. Type 5 does not include sensor which is either already existing at your works or will have to be ordered separately acc. to your specifications (p.r.t. pages 128-129, 132-133)

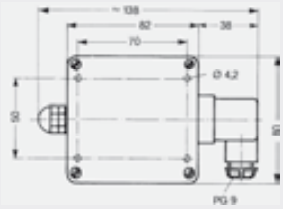
design type 1	design type 2	design type 3	design type 4	design type 5
for direct screw connection	*for high temperatures*	*indoor / outdoor probe*	*duct probe*	*for external probes*











probe with threaded stem "G"

Standard: G = ½",
FL = 100 mm,
D = 6 mm

threaded stem at a distance of HL (collar tube) from housing

Standard: G = ½",
HL = 50 mm
FL = 100 mm,
D = 6 mm

for direct wall mounting

Standard: FL = 50 mm,
D = 3 mm

centrally mounted sensor tube pointing downwards.
(for clamping ring screw connection p.r.t. page 136)

Standard: FL = 100 mm,
D = 6 mm

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).

Specification

Practical sensor elements:
- resistance thermometer: Pt100 class B (higher sensor precision p.r.t. page 123)
- thermocouple: NiCr-Ni class 1

Max. measuring ranges: (not available for every design type)
Pt100: -200 ... +800 °C
NiCr-Ni: -200 ... +1372 °C

Standard measurings ranges:
Pt100: 0...100 °C, 0...200 °C, -50...+50 °C, -50...+150 °C
NiCr-Ni: 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:
Standard: 4 - 20 mA (2-wire)
Optional: 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 4-20mA): R_A [Ω]= (Uv [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: Pt100: 0.01 % / °C
NiCr-Ni: 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: Pt100: sensors will be electrically insulated at our works.
NiCr-Ni: sensors are not electrically insulated as a standard (connection between sensor and outer sheathing). Optional electrically insulated design-type available.

Mounting: with holes for wall mounting
Mounting distance: 70 x 50 mm (W x H)
Fixing screws: max. shaft-Ø 4 mm

Electric connection: elbow plug acc. to EN 175301-803/A (IP65)

Sensor connection: (for type 5) 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

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

Prices - temperature transducer

GTMU **design type 1**
GTMU **design type 2**
GTMU **design type 3**
GTMU **design type 4**
GTMU **design type 5**

Upcharge - transducer options

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)

Options / upcharges

- **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.

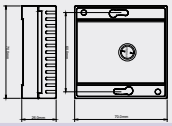
- **LACK:** **encapsulated PC board**
  (for outdoor application, i.e. applications where condensation is possible)
- **POT:** **electrically insulated NiCr-Ni-probe**
- **FL=...:** **longer tube,** each started further 100mm
- **HL=...:** **longer collar tube,** each started further 100mm
- **D=...:** **other probe diameter**
- **G=...:** **other thread**
- **VO:** **on-site display**
  (for output signal 4-20mA, auxiliary energy Uv = 17 ... 30 V DC)

Prices - sensor housing without transducer

We also offer the sensors without the integrated transducer.
The sensor connection then are directly connected to the elbow plug.

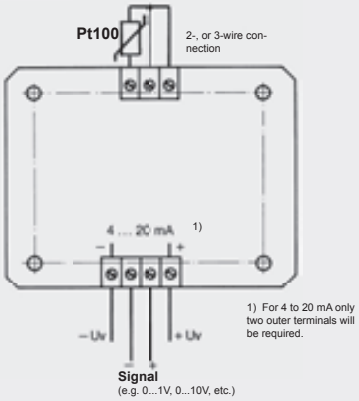
GTMU-OMU **design type 1**
GTMU-OMU **design type 2**
GTMU-OMU **design type 3 or design type 4**
(available sensors: Pt100 (4-wire), Pt1000 (4-wire), NiCr-Ni)

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 PCB for Pt100 or in snap-on housing



GTP PCB

GTP -SG snap-on housing

Design-type: PC board completely ready for operation (sensor not included) with any measuring range and any output. 3-pin connection terminal for Pt 100 in 2 or 3-wire technology. Connection terminal for output in 2-, 3-, or 4-wire technology - depending on type desired.

Specification :

Sensor element: for Pt 100 acc. to DIN IEC 751.
Suitable sensors available (prepared or unprepared) from stock - please refer to pages 130-131
Sensor connection: 2- or 3-wire connection.
Automatic line resistance compensation for 3-wire connection.
Measuring ranges: from -200 to +800 °C
Standard ranges: 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
Output signal: 4 - 20 mA (2-wire)
optionally 0-1 V, 0-2 V, 0-5 V, 0-10 V (3- or 4-wire)
Auxiliary energy: Vs = 12 ... 30 V DC (at 0-10V: Vs = 18 ... 30 V DC)
Reverse voltage protection: 50 V permanent
Permissible impedance (at 4-20mA): R_A [Ω] = (Uv [V] - 12V) / 0.02A
Permissible load (at 0-__Volt): R_L [Ω] > 3000 Ω
Operating temperature electronics: 0 ... +70 °C
Temperature coefficient: 0.01% / °C
Storage temperature: -20 ... +70 °C
Housing: ABS (IP65)
Relative atmospheric humidity: 0 ... 80 % r.h., non-condensing
Option: encapsulated PC board
PC board dimensions: approx. 56,5 x 73 x 20 mm (H x W x D)
Option snap-on housing: for top-hat rail (panel mounting),
Width of housing (pitch) 22,5 mm
Mounting: 4 holes, 3,5 mm Ø each
Mounting distance: 43,5 x 58 mm (W x H)
Miscellaneous: potentiometer for zero point and scale
Electric connection: screw-type terminals with wire protection and drill holes for testing pin, wire Ø max. 1,5 mm².
option: screw-type/plug-in terminal

Order codes (examples):

GTP0100 / LACK, SSK: PCB, 4-20 mA = 0 ... 100 °C, encapsulated PC board, screw-type/plug-in terminals

GTP -SG / AV010, MB: -50...+200 °C: snap-on housing, 0-10 V = -50...+200 °C

options - upcharges:

-AV010: option: output signal 0-10 V

-AV...: option: other output signal
(please state desired voltage)

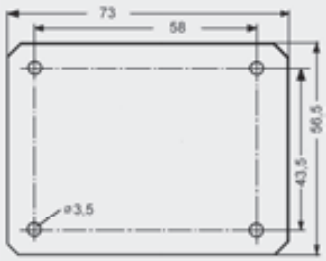
-MB: option: arbitrary measuring range
(please state desired measuring range)
No upcharge for option -AV.., -MB if more than 10 pcs. are ordered

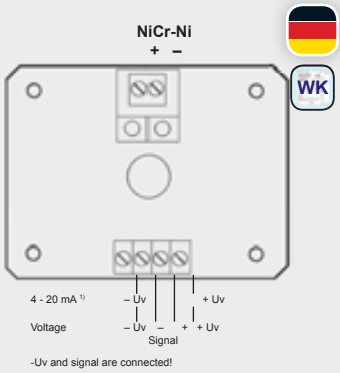
-LACK: option: encapsulated PC board
(for outdoor application, i.e. applications where condensation is possible)

-SSK: option: screw-type/plug-in terminals
(not possible for type snap-on housing)

PC board for measuring transducer mounted in water-proof surface-type housing (IP65) p.r.t. type GTMU design-type 5 (page 101)

Temperature-measuring PCB for NiCr-Ni or in snap-on housing





GNTP PCB

GNTP -SG snap-on housing

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 :

Sensor element: 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 123-127)
Meas. range: from -200 to +1200°C
Standard ranges: 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
Output signal: 4 - 20 mA (2-wire)
optionally available 0-1 V, 0-2 V, 0-5 V, 0-10 V (3- or 4-wire)
Auxiliary energy: Vs = 12 ... 30 V DC (at 0-5/10V: Vs = 18 ... 30 V DC)
Reverse voltage protection: 50 V permanently
Permissible impedance (at 4-20 mA): R_A [Ω] = (Uv [V] - 12V) / 0.02A
Permissible load (at 0-__Volt): R_L [Ω] > 10 kΩ
Operating temperature electronics: 0 ... +70 °C
Accuracy electronics: ±0,2 % FS ±0,5 °C
Temperature coefficient: 0.05% / °C
Storage temperature: -20 ... +70 °C
Relative atmospheric humidity: 0 ... 80 %RH, non-condensing
Option: encapsulated PC board
PC board dimensions: approx. 56,5 x 73 x 20 mm (H x W x D)
Option snap-on housing: for top-hat rail (panel mounting),
Width of housing (pitch) 22,5 mm
Mounting: 4 holes, 3,5 mm Ø each
Mounting distance: 43,5 x 58 mm (W x H)
Miscellaneous: potentiometer for zero point and scale
Electric connection: screw-type terminals with wire protection and drill holes for testing pin, wire Ø max. 1,5 mm².
option: screw-type/plug-in terminal

Order codes (examples):

GNTP / MB: 0...300 °C, LACK, SSK: PCB, 4-20 mA = 0 ... 300 °C, encapsulated PCB board, screw-type/plug-in terminals

GNTP5015-SG / AV: 0-1V: snap-on housing, 0-1 V = -50 ... +150 °C

options - upcharges:

-AV010: option: output signal 0-10V

-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 pcs. are ordered

-LACK: option: encapsulated PC board
(for outdoor application, i.e. applications where condensation is possible)

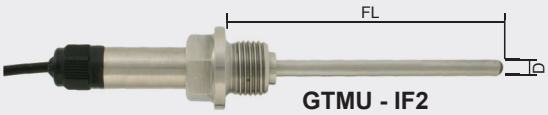
-SSK: option: screw-type/plug-in terminals
(not possible for type snap-on housing)

-TSK: option: DIN type flat-pin jack free form thermo voltage
(not possible for type snap-on housing)

PC board for measuring transducer mounted in water-proof surface-type housing (IP65) p.r.t. type GTMU design-type 5 (page 101)

Temperature transmitter
with digital adjustment

GTMU - IF1
(standard: FL = 100 mm, D = 6 mm)



GTMU - IF2
(standard: FL = 100 mm, D = 6 mm, G1/2")

GTMU - IF3
(standard: HL = 100 mm, FL = 50 mm, D = 6 mm, G1/2")

GTMU - IF1
GTMU - IF2
GTMU - IF3

Specification:

Meas. 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.*

GTMU – IF1 (standard): -30,0 ... +100,0 °C
GTMU – IF2 (standard): -30,0 ... +100,0 °C
GTMU – IF3 (standard): -70,0 ... +400,0 °C
other measuring ranges *(max. -200 ... +500 °C)* ***upon request***

Meas probe: internal Pt1000-sensor

Accuracy: (at nominal temperature = 25 °C)
Electronic: ±0,2 % of meas. value ±0,2 °C
Meßfühler: standard: DIN class B
optionally higher sensor accuracy available

Output signal: 4 …20 mA (2-wire)
Auxiliary energy: Uv = 10 … 30 V DC
Permissible burden: $R_A \leq (U_V - 10\,V) / 0{,}022\,A$ [R_A in Ohm, U_v in V]

Scaling: the transducer can be scaled freely within the measuring ranges via GTMU-IF programming tool.

Operating temperature of electronic (in tube sleeve) **:** -25 to 60 °C

Housing: stainless steel housing
Dimensions: depending on sensor construction
tube sleeve: Ø15 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 M8x1, M10x1, M14x1.5, G1/8", G1/4", G3/8", G1/2", G3/4")

Electric connection: approx. 1 m long 4-pin cable
(2 x current loop, 2 x interface)

Options (upcharges):

- **FL=...: longer tube,** *each started further 100 mm*
- **HL=...: longer collar tube,** *each started further 100 mm*
- **D=...: other tube diameter**
- **G=...: other thread**
- **MB=...: other measuring ranges, set by factory**
- **M12: electric connection: M12 plug**

Accessories:

GTMU-IF - Programming tool
USB-interface adaptor for GTMU-IF, incl. configuration software

Analog Pt100-transmitter
with digital adjustment

T03 BU /WE *1
(transmitter 0-10V, 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:

Measurement input: Pt100 (DIN EN60751)
Range limits: -200 ... +850 °C
Meas. span: 40 to 1050 K
Zero shift: at span < 75K: -40, -20, 0, 20 or 40 °C
at span = 75K: ± 50 °C
at span > 75K: ± (span * 0,2 + 35 °C)
Sensor connection: 2- or 3-wire connection
Meas. current: < 0,5 mA
Max. perm. line resistance (3-wire)**:** 11 Ohm per conductor
Sampling time: continuous because of analog signal path
Output signal: 0…10 Volt, 3-wire technology
Setting time on a temperature change: ≤ 10 ms
Transfer characteristic: linear with temperature
Transfer accuracy: ≤ ±0,2 % FS
Calibration accuracy: ≤ ±0,2 °C or ±0,2 % FS
Supply voltage: U_B 15 … 30 V DC
Supply voltage error: ±0,01 % FS / V
Permissible load R_L**:** $R_L \geq 10$ kOhm
Load error: ≤ ±0,1% FS
Operating temp.: -40 … +85 °C
Relative humidity: 0... 95 %RH (non condensing)
Storage temperature: -40 … +100 °C
Electromagnetic compatibility (EMC):
conforming to CE acc. to DIN EN 61326
Electric connection: via terminals,
cross section of connection terminals max. 1,75 mm²
Housing: PC-housing, suitable for installation in connection head acc. to DIN 43729 form B.
Operating position: unrestricted
Dimensions: Ø 44 mm x 21 mm
IP-rating: housing: IP54, connection terminals: IP00
Weight: approx. 45 g

Accessories:

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 (approx. 1 m long, 9-pin Dsub-plug)

Temperature-measuring transducer 4-20mA, Pt100, 2- / 3- or 4-wire

for head and rail case mounting

Panel-mounted-resistance thermometer with measuring transducer RT420

RT420 - advantages:

- **low-price and robust (complete sealed - no pots, therefore vibration resistant and long time stable)**
- **freely programmable - extreme wide measuring range of -200 to 850 °C (measuring span already from ≥ 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

Rail adapter

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

RT420 with rail adapter

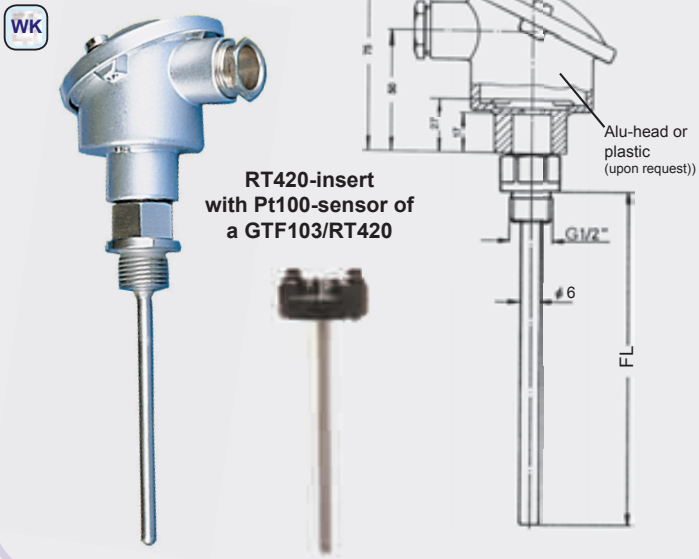
GTF103 / RT420 (p.r.t. page 131)

Panel-mounted resistance thermometer

Pt100 cpl. with measuring transducer RT420 - 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



Specification:

Measuring range:	-200 ... +850 °C, universally programmable
Measuring span:	25 to 1050 K
Zero shift:	-200 ... +825 °C
Resolution:	14 bit
Sensor connection:	2-, 3- or 4-wire connection
Meas. current:	< 0,3 mA
Perm. resistance of connection cable:	max. 20 Ohm / wire
Compensation for cable error:	±0,02 K / Ohm (at 3-wire)
Sensor monitoring:	monitoring for sensor damage and short-circuit
Meas. cycle:	< 700 ms
Linearisation:	linear to temperature acc. to IEC/DIN/EN 60 751-2
Accuracy:	±0.25 °C or ±0.1% of meas. span
Temperature effect:	< ±0,01% / 1K
Analog output:	4…20 mA, 2-wire technology
Accuracy output:	<0.1% of signal span
Auxiliary energy: V_s	8 … 35 V DC (max. ripple factor: 3Vss @ 50/60Hz)
Perm. burden R_A:	$R_A \leq (V_s - 8\,V) / 0{,}023\,A$ [R_A in Ohm, V_s in V]
Effect of aux. energy:	±0,01 % / V
Power-on time:	10 s
Damping:	adjustable from 0 to 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 CE acc. to DIN EN 61326
Housing:	housing suitable for head mounting
Dimensions:	Ø 44 mm x 19 mm
IP rating:	Housing: IP40, connection terminals: IP10
Electric connection:	via screw-type terminals
Weight:	approx. 35 g

Design type ...-SG (snap-on rail housing)

Dimensions:	approx. 22,5 x 78 x 105 mm
Electric connection:	via screw-type terminals
Weight:	approx. 110 g

Accessories:

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)

Programmable, electrically isolated, 4-20 mA universal transmitter GITT01

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)

Accessories:

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 (approx. 1m long, 9-pin Dsub-plug)

- **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 - protection**
- **error messages in case of sensor damage or short-circuit, settings acc. to NAMUR NE43**
- **configuration can be carried out during measuring**

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:		
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:

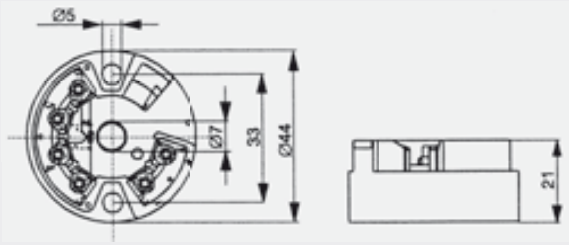
Sensor connection: 2-, 3- or 4-wire connection
Meas. current: ≤ 0,6 mA
Max. perm. line resistance: 11 Ohm / line
Accuracy: Pt100, Ni100: ±0.2°C or ±0.08% of meas. span
Pt500, Ni500: ±0.4°C or ±0.16% of meas. span
Pt1000, Ni1000: ±0.2°C or ±0.08% of meas. span
Temperature effect: Td = ± (15ppm/K * max. meas. range + 50ppm/K * meas. span)

Thermocouples :

Sensor connection: 2-wire connection
Sensor current: < 350 nA
Accuracy (typ.): ±0.5K (types: K, J, E, L, U), ±1.0K (types: N, C, D), ±2.0K (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: V_s 8 … 30 V DC (max.ripple factor: 5Vss for Vs>13V)
Electr. isolation (E/O): Ueff = 2 KV AC
Perm. load R_A: $R_A \leq (V_s - 8\,V) / 0{,}022\,A$ [R_A in Ohm, V_s in V]
Supply effects: ≤ ±0.01% / V deviation from 24V
Load effect: ≤ ±0.02% / 100 Ohm
Digital filter: 0 to 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, cl. 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 mm²
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 suplly set: Ui ≤ 30 V DC, Ii ≤ 100 mA, Pi ≤ 750 mW
Ci, Li = negligibly small
Meas. 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)



Temperature transmitter
(electrically isolated)

MU 500-51-... (Pt100)
MU 500-53-... (Pt1000)
MU 500-Ex-51-... (Pt100)
MU 500-Ex-53-... (Pt1000)

Properties

- **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

Measuring ranges:	selectable via rotary switch
Pt100:	-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
Pt1000:	-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
Offset adjust:	offset: approx. ±8 Ω (≙ 20 °C for Pt100, ≙ 2 °C for Pt1000) span: approx. ±20 %
Sensor connection:	2- or 3-wire connection
Sensor current:	approx. 1 mA (Pt100), approx. 0.25 mA (Pt1000)
Output signal:	0 - 20 mA, 4 - 20 mA, 0 - 10 V or 2 - 10 V *(selectable via DIP switch)*
max. load:	burden ≤1 kΩ (at mA), load: max. 15 mA (at V)
Basic accuracy:	≤0.2 % of measuring range
Temperature coefficient:	≤0.01 %/K
Output accuracy:	≤0.1 % of measuring range
Power supply: ... - 0 - 00	85 ... 265 V AC / 110 ... 125 V DC
... - 5 - 00	10 ... 42 V DC / 10 ... 30 V AC
Power consumption:	max. 2.2 W / 3.3 VA
Isolation voltage:	500 V AC, according to VDE 0110 Gr. 2 between input/output/supply voltage
Test voltage:	4 kV DC between input/output/supply voltage
Working temperature:	-10 .. 60 °C
Electrical connection:	screw-terminals with pressure plates, max. 2.5 mm²
Dimensions:	22,5 x 75 x 110 mm (W x D x H)
Protection:	IP 30 (case), IP 20 (terminals)
Ex-certification:	TÜV 03 ATEX 2283, Ex II (1) G [Ex ia] IIC, II (1) D [Ex iaD]
Connection data:	
MU 500-ex-ia-51-..:	U_0 = 1,3 V, I_0 = <3 mA, P_0 = <3 mW, C_0 = 29 µF, L_0 = 100 mA, C_i = 5 nF, L_i = 0 mH
MU 500-ex-ia-53-..:	U_0 = 4,9 V, I_0 = <3 mA, P_0 = <3 mW, C_0 = 2,2 µF, L_0 = 100 mA, C_i = 5 nF, L_i = 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 (230 V AC)
ST 500-Ex-10-5-00 (10..30 V DC/AC)

Properties

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 oder 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

Measuring ranges:	selectable
Current input:	0 ... 20 mA or 4 ... 20 mA (Ri = 25 Ω, max. 100 mA overload)
Voltage input:	0 ... 10 V or 2 ... 10 V (Ri = ~ 40 kΩ, max. 100 V overload)
Span:	approx. ±20 %, adjustable
Transmitter supply:	approx. 20 V DC, Ri = approx. 300 Ω
Output signal:	0 - 20 mA, 4 - 20 mA, 0 - 10 V or 2 - 10 V *(selectable via DIP switch)*
max. load:	burden ≤1 kΩ (at mA), load: max. 15 mA (at V)
Basic accuracy:	≤0,3 % of measuring range
Temperature coefficient:	≤0,01 %/K
Repeat accuracy:	≤0,1 % of measuring range
Rise time:	T_{90} = < 100 ms
Power supply: ... - 0 - 00	85 ... 253 V AC
... - 5 - 00	10 ... 30 V DC / AC
Power consumption:	max. 3,5 VA
Isolation voltage:	500 V AC, according to VDE 0110 Gr. 2 between input/output/supply voltage
Test voltage:	4 kV DC between input/output/supply voltage
Working temperature:	-10 .. 55 °C
Electrical connection:	screw-terminals with pressure plates, max. 2.5 mm²
Dimensions:	22.5 x 75 x 110 mm (W x D x H)
Protection:	IP 30 (case), IP 20 (terminals)
Ex-certification:	TÜV 97 ATEX 1150, Ex II (1) G [Ex ia] IIC, II (1) D [Ex iaD]
Connection data:	U_0 = 25.2 V, I_0 = 95 mA, P_0 = 600 mW, C_0 / L_0 (ia/IIC) = 47 nF / 2 mH or 107 nF / 0.2 mH, C_0 / L_0 (ia/IIB) = 370 nF / 15 mH or 430 nF / 1 mH, C_i, L_i = 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 375V.**

Infrared - measuring transducer IR-CT 20

non-contact temperature measuring from -50 to 975°C

- **small infrared sensor heads with 20:1 optical resolution**
- **rugged and applicable without cooling up to 180°C ambient**
- **adjustable emission factor**
- **freely scaleable analogue output**
- **illuminated liquid crystal display**
- **Application:**
  - Glass, paper, plastic industries
  - Automotive industry
  - Metal industry
  - Quality assurance / maintenance

Precision infrared transducer

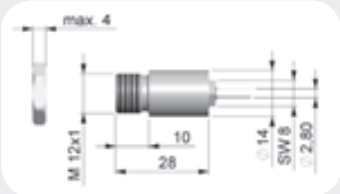
IR-CT 20 **-50 ... +975 °C, optic 20:1**

Scope of supply: electronics-box with LCD, stainless steel sensor head (M12) incl. screw nut, 1m high temperature sensor head cable, manual

Specification

Measuring range:	-50 ... +975 °C freely scaleable via programming keys
Spectral sensitivity:	8 - 14 µm
Optic resolution:	20:1 (precision glass optics)
System accuracy:	± 1 % or ±1 °C (higher value applicable)
Repeat accuracy:	±0,5 % or ±0,5 °C (higher value applicable)
Nominal temperature:	23 ± 5 °C
Temperature coefficient:	0,05 % or 0,05 °C/K (higher value applicable)
Temperature resolution:	0,1 °C
Response time:	150 ms (95 %)
Emission-, transmission factor:	adjustable from 0.100 to 1.100
Output signals:	0-20mA, 4-20mA, 0-5V, 0-10V thermocouple type J or K
Output impedance:	
mA	max. 500Ohm (at 8-36VDC)
V	min. 100 kOhm load resistance
Thermo couple:	20 Ohm
Supply voltage:	8 - 36 VDC
Power consumption:	max. 100 mA
Cable length:	1 m (standard), 3 m, 15 m

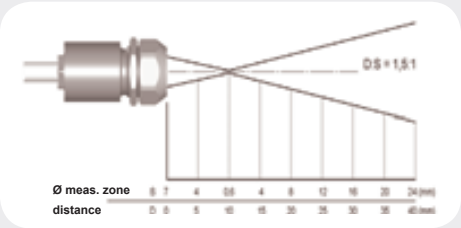
IP rating:	IP65 (NEMA-4)
Ambient temperature:	
Measuring head:	-20 ... +180 °C
Electronic box:	0 ... +65 °C
Storage temperature:	
Measuring head:	-40 ... +180 °C
Electronic box:	-40 ... +85 °C
Relative humidity:	10 - 95 %RH, non condensing
Vibration (meas. head):	
IEC 68-2-6:	3G, 11-200 Hz, each axis
Shock (meas. head):	
IEC 68-2-27:	50G, 11ms, each axis
Weight (meas. head / elec. box):	40g / 420g
Dimensions electronic box:	120 x 70 x 30mm



Further special design types (e.g. for metal processing, or with other optics) up on request

Optic resolution (standard)

Optic resolution (with option CF)



Option

- **CB3** 3m sensor head cable
- **CB15** 15m sensor head cable
- **CF** auxiliary lens for measuring of smallest objects
  measuring zone dia 0,6mm @10mm, in long distance 1,5:1

Calibration

- **WPS** calibration certificate 23 °C, 110 °C, 510 °C

Mechanical accessories

- **MW** mounting bracket, fixed
- **MB** mounting bolts with M12x1 thread
- **MG** mounting fork, adjustable in 2 axis with M12x1 mount
- **FVS** standard blow clear header
- **FVL** laminar blow clear header

Temperature Switch

TF1 ...

General

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 2K/min.

TF1 thermostats just monitor the temperature. A regulation is due to the huge hysteresis not possible.

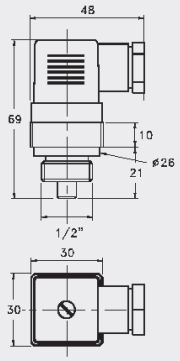
- optional installation
- compact dimensions
- n.o. or n.c. position
- metering substances: water, gas/air, oil

Specifications

Switch value: (declared when placing order)

40°C	**Order Nr.:** TF1 40
50°C	**Order Nr.:** TF1 50
60°C	**Order Nr.:** TF1 60
70°C	**Order Nr.:** TF1 70
80°C	**Order Nr.:** TF1 80
90°C	**Order Nr.:** TF1 90
100°C	**Order Nr.:** TF1 100
110°C	**Order Nr.:** TF1 110
120°C	**Order Nr.:** TF1 120
130°C	**Order Nr.:** TF1 130

Hysteresis:	10 ... 20 K
Accuracy:	±10 K
Media Temp.:	max. switch value +50°C
Connection:	G1/2A male thread socket brass
Pressure (PN):	100 bar
Electr. data:	NO (NC upon request) 250 V AC, 10 A plug EN 175301-803/A
Weight:	120 g
Protection class:	IP65



humidity and humidity/temperature transducer

GRHU ... MP and GHTU ... 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 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).

- **on-site display for humidity and temperature**
- **output ranges freely scaleable**
- **temperature range up to 120 °C**
- **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**

Specification

Measuring ranges:
Humidity: 0,0 ... 100,0 %RH (temperature compensated)
Temperature: -40,0 ... 120,0 °C or -40,0 ... 248 °F

Recommended humidty range: 20,0 ... 80,0 %RH (standard)
5,0 ... 95,0 %RH (with option high humidtiy)

Display options: *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.*

Wet bulb temperature	-27,0 ... 60,0 °C
Dewpoint temperature	-40,0 ... 60,0 °C
Enthalpy	-25,0 ... 999,9 kJ/kg
Atmospheric humidity	0,0 ... 640,0 g/kg
absolute humidity	0,0 ... 200,0 g/m³

Accuracy: (at 25°C and in recommended range)
Display: humidity ±2,5 %RH
temperature: ±0,4 % of meas. value ±0,2 °C
Add. output signal: each ±0,2 % FS

Temperature compensation: automatically

Output signal: **GRHU** 1 x 4-20mA (2-wire), freely scaleable
GHTU 2 x 4-20mA (2-wire), freely scaleable
option: 0-1V, 0-10V (other output signals upon request)

Connection: 4 - 20 mA (2-wire) note for GHTU: output signals are electrically isolated from each other
for option AV01, AV10: 0 - 1 (10) VDC (3-wire) note for GHTU: output signals are not electrically isolated from each other
for option AV01G, AV10G: 0 - 1 (10) VDC (3- or 4-wire) note for GHTU: output signals are electrically isolated from each other

Auxiliary energy: 12 ... 30 VDC or 18 ... 30 VDC (for output 0-10 V)
Reverse voltage protection: 50V, permanently
Perm. impedance (at 4-20mA): RA [Ω] = (Uv [V] - 12V) / 0,02 A
Permissible load (at 0-1(10)V): RL [Ω] > 3000 Ω

Display: approx. 10 mm high, 4-digit LCD-display, alternating humidity and temperature display

Working temperature: -25 to 50 °C (electronics)
Sensor head and tube: -40 to 100 °C - for short time up to 120 °C
Storage temperature: -25 to 70 °C
Relative humidity (electronic): 0 to 95 %RH (non-condensing)
If there is a risk of condensation due to temperature changes, please use our encapsulated or lacquered types (optionally available).

Housing: ABS (IP65)
Sensor tube: tube 14 mm Ø, with screw-type protection cap
Sensor length: 50 mm (...1R) or 220 mm (...1K, ...2K)
option: 300 mm, 400 mm, 500 mm
Electric connection: elbow-type plug acc. to EN 175301-803/A (IP65),
Mounting: 4 housing holes for wall mounting or by means of plastic tube clamps for duct mounting
Functions: min-/max-value memory, offset and slope adjustable, output signal scaleable

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

Design types

Surface mounting	**Duct mounting**	**Duct mounting**
Sensor tube at the side	Sensor tube at the side	Sensor tube downwards
Tube Length: 50mm	Tube Length: 220mm	Tube Length: 220mm
Design type: ...-1R	Design type: ...-1K	Design type: ...-2K

Prices - humidity transducer

GRHU - 1R - MP (sensor tube at the side, FL = 50 mm)
GRHU - 1K - MP (sensor tube at the side, FL = 220 mm)
GRHU - 2K - MP (sensor tube pointing downwards, FL = 220 mm)

Prices - humidity / temperature transducer

GHTU - 1R - MP (sensor tube at the side, FL = 50 mm)
GHTU - 1K - MP (sensor tube at the side, FL = 220 mm)
GHTU - 2K - MP (sensor tube pointing downwards, FL = 220 mm)

Options / upcharges

- **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 0-1V** (note: please refer to connection)
- **AV01G:** **output signal 0-1V** (note: please refer to connection)
- **AV10:** **output signal 0-10V** (note: please refer to connection)
- **AV10G:** **output signal 0-10V** (note: please refer to connection)
- **KABEL:** **with separated sensor tube**
Sensor tube (Ø14x 68mm) connected to device via 1m teflon cable.
Inclusive option high-humidty sensor
(Ordering note: specifying the design type (e.g. -1R) is unnecessary)
- **SHUT:** **heat absorption hat / weather protection shield**
(Ordering note: specifying the design type (e.g. -1R) is unnecessary)

Application:
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.

Design:
Heat absorption hat made of plastic, dia 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.

Spare / accessory parts

Spare protection cap with stainless steel gauze (105µm mesh size) - for standard and high humidity use

Bronze filter (not for use in high humidty)

Air flow measuring transducer

GSMU 1020 B5
GSMU 1020 C5

Properties

- 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)
Measuring range can be set by means of jumper.

Measuring accuracy: (at 20 °C, 45 %RH, 1013 hPa)
GSMU 1020: 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_{90} (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 $\Delta\alpha$ < 10°

Voltage supply: AC / DC ±20%, max. 150 mA

max. load: 500 Ohm

Connection: screw-type terminals up to 1.5 mm²

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.

EMC: Conforming to CE acc. to DIN EN 50081-1 and DIN EN 50082-2

Accessories

GNG 24/150 power supply: 24 VDC, 150 mA

GNT 0520 mains transformer: 230V~ to 24V~,
with mounting clamp and screw-type terminals.
Dimensions approx. 62 x 56 x 32.5 mm

Miniature Air Velocity Transmitter

GSMU 575

Properties

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 Velocity:	at 20°C / 45 % RH, 1013 hPa, at 1...20 m/s 1...20 m/s: ±(0,4 m/s + 6% of m.v.)
Response time: (bei 10m/s T_{90})	typ. 4 s
Power supply:	19...29 V DC
Power consumption:	max. 70 mA bei 20 m/s
Temperature range:	working temperature: -20…60°C storage temperature: -30…60°C
Connection:	0,5 m cabel, PVC 3 x 0,25 mm², wire end ferrule
Electromagnetic Compatibility:	EN61326-1 EN61326-2-3
Housing:	polycarbonate, Lenght: 120 mm, Ø 12 mm
Protection class:	IP20 (measuring head), IP40 (housing)

Accessories

GNG 24/150 power supply: 24 V DC, 150 mA

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 > 30 mbar)
GMUD MP-F (fine pressure range < 25 mbar)

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.

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:

Sensor element: piezoresistive pressure sensor with integrated temperature

Relative fine pressure range:	Measuring range	Overload	Burst pressure
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)		
Relative pressure range:	**Measuring range**	**Overload**	**Burst pressure**
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
Absolute pressure range:	**Measuring range**	**Overload**	**Burst pressure**
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)		

Typ. accuracy: GMUD MP-S: ±0,15 % FS (lin.), ±0,6 % FS (hysteresis and temperature 0 ... 70 °C)
GMUD MP-F: ±0,35 % FS (lin.), ±0,6 % FS (hysteresis and temperature 0 ... 70 °C)
Output signal: 4 ... 20 mA / 0 ... 10 V (selectable in menu)
Auxiliary energy: only needed if 0...10 V output signal is selected (18 ... 30 V DC / 24 V AC)
Permissible burden: (4 ... 20 mA): Ra[Ω] = (Uv [V] - 12 [V]) / 0.02 A
Permissible load: (0 ... 10 V): >= 3000 Ω
Operating temperature: -20 ... +70 °C
Storage temperature: -40 ... +70 °C
Display / operation: 4-digit 7-segment display and 3 buttons
Pressure connection: universal pressure connecting pieces for 6 x 1 mm or 8 x 1 mm plastic tubes (4 or 6 mm inner pipe diameter)
Mounting position: any position (small influence of mounting position for low ranges)
Housing: ABS (IP65), with fixing holes for wall mounting (accessible after cover has been removed)
Electric connection: elbow-type plug acc. to EN 175301-803/A (IP65); max. wire cross section: 1.5 mm2 , wire/cable Ø: 4.5mm to max. 7mm

ordering example: ±700 mbar rel. with switching output: GMUD MP-S/MBS:-700 ... +700 mbar, OUT
0 ... 100 mbar rel. with lacquering and switching output: GMUD MP-S-MR0/LACK, OUT

Options:

LACK: card coated on both sides (for outdoor application)

OUT: switching output (max 28 V, 40 mA), switches if meas. value falls below or exceeds limit value connection via 2nd elbow-type plug

WE: 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)

MBF: option any fine pressure range range < 25 mbar please state desired measuring range

MBS: option any pressure range range > 30 mbar … 5000 mbar please state desired measuring range

Tube and accessories: see page 50 - 51

Water level / well probe Tank contents meas. probe

GBS 01

For simple and inexpensive applications. Suitable for permanent level measuring in tanks, rivers, lakes, drinking-water wells, drilling holes, waste water plants...

GBS 02

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. 0-10V). 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:

Meas. reanges: 0.1 bar (100 mbar) to 25 bar = 1 to 250 m water column
Available ranges:
0.1, 0.25, 0.4, 0.5, 0.6, 1, 1.6, 2.5, 4, 6, 10, 16, 25
Overload (bar):
1 2 2 2 4 5 10 10 17 35 35 80 80
Output signal:
4-20 mA (option: 0-10 V only for GBS02)
Permissible impedance:
4-20 mA: R_A [Ω] ≤ (Vs [V] - 10 V) / 0.02 A
0-10 V: R_A [Ω] > 10 0kOhm
Auxiliary energy: 10...30 V DC (14...30 V DC at 0-10 V), others upon request
Accuracy:
GBS01: accuracy (% of span): ≤ 0,5 (setting of cut-off point) resp. ≤ 0,25 (BFSL)
GBS02: accuracy (% of span): ≤ 0,25 (setting of cut-off point) resp. ≤ 0,125 (BFSL)
(The accuracy of the pressure ranges 0.1 and 0.25bar correspond with the type GBS01)
Hysteresis (% of span): ≤ 0,1
Repeatabilty (% of span): ≤ 0,05
Stability per year (% of span): ≤ 0,2
(at reference conditions)
Operating temperature: -10...+60 °C (GBS01) or -10...+85°C (GBS02)
Temperature coefficient (% of span)**:**
≤ 0,02 / K (for meas. range ≥ 0.4bar)
Filling: KN77, food safe
Housing: chromium-nickel alloy 1.4571.
Male thread G 1/2" accessible after removal of plastic protection cap.
Probe dimensions: Ø 27 mm, length of metal body: approx. 100 mm (GBS01), approx. 147 mm (GBS02), cable Ø approx. 7.5 mm
Electric connection: 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)

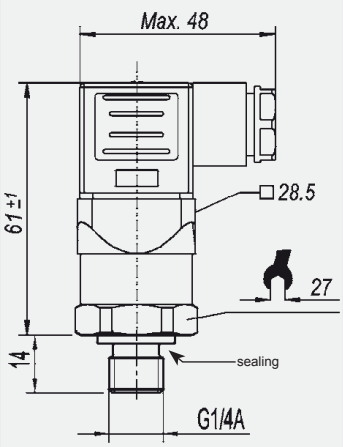
Options GBS01:

extra long connection cable (PUR)
upcharge per m

Optionen GBS02:

extra long con. cable (FEP, teflon)
upcharge per m
lightning protextion upcharge:
output signal 0-10 V upcharge:
Ex-protection **upon request**

Pressure transmitter



A-10

(relative pressure, zero output at atmospheric pressure)

Option: Absolute Pressure

(0...1bar abs. to 0...25bar abs.)

Option: Under Pressure

(-1,0 ... +1,5 bar, -1,0 ... +3,0 bar, -1,0 ... +9,0 bar

General application: Suitable for all applications in machine and systems engineering, automotive technology as well as cooling and air conditioning technology.

Specification:

Measuring range (MR), Overload limit (OL), Burst pressure (BD):

MR:	1,	1.6,	2.5,	4,	6,	10,	16,	25,	40,	60,	100,	160,	250,	400,	600	
OL:	2	3.2	5	8	12	20	32	50	80	120	200	320	500	800	1200	
BD:	5	10	10	17	34	34	100	100	400	550	800	1000	1200	1700	2400	

Output signal: 4-20mA, 2-wire, R_A [Ω] ≤ (Uv [V] - 8V) / 0.02 A
0-10V, 3-wire, R_A ≥ 10 kΩ
(other output signals upon request)

Auxiliary energy: 8 ... 30 VDC (for output 4-20 mA)
14 ... 30 VDC (for output 0-10 V)

Accuracy: * ≤ 1,0 % FS (optional: ≤ 0,5 % FS)

(= including non-linearity, hysteresis, zero point and scale error. Corressponds to error of measurement per IEC 61298-2. Sensor adjusted in vertical mounting position wirh lower pressure connection)*

Non-Linearity: ≤ 0,5 % FS (optional: ≤ 0,25 % FS)
Zero Offset: ≤ 0,5 % FS (typ.), ≤ 0,8 % FS (max.),
(optional: ≤ 0,15 % FS (typ.), ≤ 0,4 % FS (max.))
Hysteresis: ≤ 0,16 % FS
Repeatability: ≤ 0,1 % FS
Long-term drift: ≤ 0,1 % FS (according to IEC 61298-3)

Response time: T_{90} ≤ 4 ms

Perm. temperature of meas. media: 0 ... +80 °C (optional: -30 ... +85 °C)
Ambient temperature: 0 ... +80 °C (optional: -20 ... +80 °C)
Storage temperature: -20 ... +80 °C
Temperature compensated area: 0 ... +80 °C
Temperature error in comp. area: ≤ 1,0 % FS (typ.), ≤ 2,5 % FS (typ.)

Material: Parts coming into contact with pres. media
- Pressure connection: 316 L
- Pressure sensor: 316 L (as of 10bar rel. 13-8 PH)
Housing: 316 L

Pressure connection: G ¼ A, DIN 3852-E with NBR sealing
Protection rating: IP65 resp. IP67 with cable
Electric connection: elbow-type plug acc. to EN 175301-803/A or connection cable, cable length 2m
Electric protections: reverse voltage and short-circuit protection
Weight: approx. 80 g

Options, Accessories:

Higher sensor accuracy (class 0,5)

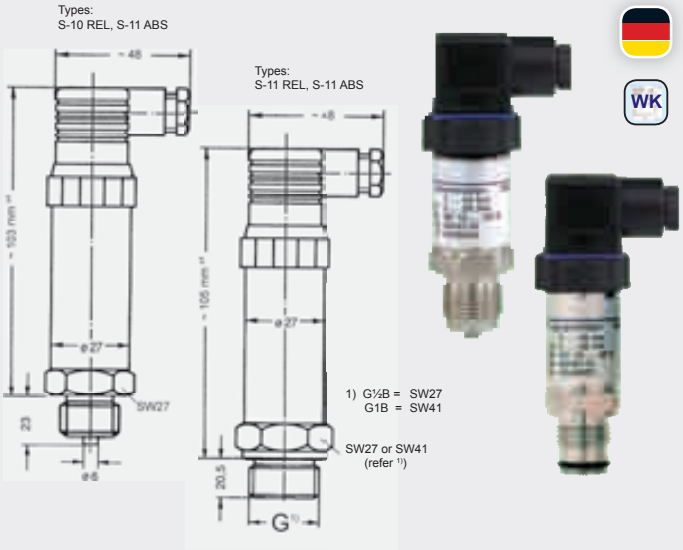
Extended temperature range

Output signal 0-10 V

Fixed connecting cable, 2 m with bend protection (instead of elbow-type plug, IP67)

GWA1214 V4A thread adapter G½" with internal thread G¼" and external thread G½"

Pressure measuring transducer for over/under and absolute pressure



S-10 REL

(Standard, zero output at ambient pressure)

S-11 REL

(Flush, zero output at ambient pressure)

S-10 ABS

(Standard, absolute, zero output at vacuum)

S-11 ABS

(Flush, absolute, zero output at vacuum)

Description: piezoresistive pressure sensor with temperature compensation. Completely welded and stainless steel design, filled food safe (up to 16 bar), thin film strain (above 25 bar).

Specification:

Meas. ranges: in bar (other values upon request)
S-10 REL and S-11REL: 0.1, 0.16, 0.25, 0.4, 0.6, 1, 1.6, 2.5, 4, 6, 10, 16, 25, 40, 60, 100, 160, 250, 400, 600, 1000
S-10 ABS and S-11ABS: 0.25, 0.4, 0.6, 1, 1.6, 2.5, 4, 6, 10, 16

Measuring range (MB), Overload limit (ÜL):

MB (bar):	0.1,	0.16,	0.25,	0.4,	0.6,	1,	1.6,	2.5,	4,	6,	10,	16,	25 ...	600,	1000
ÜL (bar):	1	1.5	2	2	4	5	10	10	17	35	35	80	2x MB		1500

Output signal: 4-20 mA (0-10 V - refer to options; others upon request)
Permissible impedance: R_A [Ω] = (Uv [V] - 10 V) / 0.02 A (for output 4-20 mA)
R_A [Ω] > 10 kOhm (for output 0-10V)
Auxiliary energy: 10...30 V DC (14...30 V DC for output 0-10V)
Accuracy:
deviation from parameter (% of span): ≤ 0,5 (setting of cut-off point)
≤ 0,25 (setting of tolerance band, BFSL)
Repeatability (% of span): ≤ 0,05
Stability / year (% of span): ≤ 0,2 (at reference conditions)
Hysteresis (% of span): ≤ 0,1
Permissible temperature of media: -30 ... +100 °C (refer to options)
Operating temperature ambient: -20...+80 °C
Compensated temperature range: 0...+80 °C
Temperature coefficient: ≤ 0.02% FS / K (or< 0.04 % FS for MB< 0.25 bar)
Filling: KN77, food safe
Housing: stainless steel 1.4435 (IP65)
Pressure connection: (other upon request)
Type S-10... : G ½B
Type S-11... : G 1 B (up to 1.6 bar), G½B (from 2.5 to 600 bar)
Mounting position: any
Electric connection: standard via elbow-type plug EN 175301-803/A
Electric protections: reverse voltage protection, over voltage and short-circuit protection.

Options:

Special measuring range

-40...+125°C (media temperature)

-20...+150°C (media temperature, S-11 only)

Output signal 0-10V (other upon request)

Ex-protection

CO-Transducer

with TÜV certificate acc. to VDI 2053 for
CO surveillance systems in underground garages etc.

GT1 - CO

Properties

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.

Range of Application:

- underground garages, parking garages
- boiler plant and heating systems
- motorcar garage

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

Specification

Measuring range:	0 ... 300 ppm CO (carbon monoxide)
Measuring principle:	electrochemical, permanent measuring
Reproducibility:	< 3 ppm according to VDI 2053
Response Time T_{90}:	< 60 s
Cross sensitivity:	≤ 2% of 300 ppm CO (acc. to VDI 2053)
Linearity error:	≤ 2% of 300 ppm CO (acc. to VDI 2053)
Offset adjustment:	automatically
Output signal:	4 - 20 mA, 2-wire, max. burdon = 500 Ohm
Power supply:	12 - 28 V DC (at option VO: 16 - 28 V DC)
Permissible burdon:	R_A [Ω] = (U_V [V] - 12 V or 16 V) / 0.02 A
Working condition:	-10 ... +40 °C, 15 ... 95 %RH (non-condensing)
Option: on site display	approx. 13 mm high, 3½-digit LC-display
EMC:	according to EN 50 081-1, EN 50 082-2 B
Electric connection:	elbow-type plug acc. to EN 175301-803/A (IP65), max. wire cross section: 1,5 mm², wire diameter from 4,5 to 7 mm
Housing:	ABS, 82 x 80 x 55 mm (without elbow-type plug)
Mounting:	with fixing holes for wall mounting
Mounting distance:	70 x 50 mm (W x H)
Fixing screws:	max. shaft-Ø
Weight:	approx. 190 g

Options / upcharge

VO: on site display

Accessories

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_{AC} => 24 V_{DC}/300 mA)

additional accessories upon request

CO_2-Transducer

GT10 - CO2 - 1R

Properties

Due to the fact, that CO_2 is an important indicator for the quality of air in rooms, it's super important to measure the CO_2 content.
The recommended CO_2 limit value for ambient air is 1000ppm . An exceeding of this limit causes tiredness and a loss of concentration.

The high quality and precise CO_2-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_2 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_2 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_2 concentration in ambient air
- output signal free scaleable

Specification

Meas. range:	standard:	0 ... 2000 ppm CO_2 (carbon dioxide)
	opt. /5000:	0 ... 5000 ppm CO_2 (carbon dioxide)
Measuring principle:		infrared principle (NDIR)
Accuracy:	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)
Output signal:		4 - 20 mA (3-wire), standard 0 - 1 V or 0 - 10 V (3-wire), optional
Output scaling:		free scaleable, by entering display range
Auxiliary energy:		12 ... 30 V DC, max. 600 mA (at option 0-10V: 18 ... 30 V DC, max. 600 mA)
Perm. burdon (at 4-20mA):		R_A < 200 Ω
Perm. load (at 0-...Volt):		R_L > 3000 Ω
Display:		approx. 10 mm high, 4-digit LC-display
Working condition:		-10 ... +50 °C, 5 ... 95 % r.F., 850 ... 1100 hPa
Storage condition:		-25 ... +60 °C, 5 ... 95 % r.F., 700 ... 1100 hPa
Electric connection:		elbow-type plug acc. to EN 175301-803/A (IP65), max. wire cross section: 1,5 mm², wire diameter from 4,5 to 7 mm
Housing:		ABS, 82 x 80 x 55 mm (without elbow-type plug)
Mounting:		with fixing holes for wall mounting
Mounting distance:		70 x 50 mm (W x H)
Fixing screws:		max. shaft-Ø
Weight:		approx. 225 g
Features:		- min-/max-value memory, - optical alarm, - input of offset and scale for adjusting

Options / upcharge

5000:	measuring range: 0 ... 5000 ppm CO_2
AV01:	output signal 0-1V
AV010:	output signal 0-10V

Accessories

GSN 24-750 plug-in power supply (230 V_{AC} => 24 V_{DC}/750 mA)

air oxygen measuring transducer

OXY 3690 MP incl. oxygen sensor GGO370/MU

Specification

Measuring ranges:
oxygen concentration: 0,0 to 100,0 % O_2 (gaseous)
temperature: -20,0 ... 50,0 °C
Accuracy device (at nominal temperature 25 °C):
oxygen: ±0,1 % ± 1 digit
temperature: ±0,1 °C ± 1 digit
Output signal (only 0_2): 4 - 20 mA (2-wire - standard)
0 - 10 V (3-wire - option)
Electric isolation: input electrically isolated
Auxiliary energy: 12 ... 30 V DC (at output 4-20 mA)
18 ... 30 V DC (at output 0-10 V - option)
Perm. impedance (at 4-20mA): R_A [Ω] = (Uv [V] - 12 V) / 0,02 A
Permissible load (at 0-10Volt): R_L > 3000 Ω
Working condition: 0 to +50 °C, 0 to +95 %RH (non-condensing)
Storage temperature: -20 to +70 °C
Reverse voltage protection: 50 V permanently
Display: approx. 10 mm high, 4-digit LCD-display
Housing: ABS (IP65 - with the exception of sensor plug)
Dimensions: 82 x 80 x 55 mm (without elbow-type plug and sensor plug)
Electric connection: elbow-type plug acc. to EN 175301-803/A (IP65), max. wire cross section: 1,5 mm², wire diameter from 4,5 to 7 mm
Sensor connection: 5-pin jack connector, screwable
Calibration: 1-point calibration in atmospheric air.
Air pressure compensation: 500...2000 hPa abs., manually input

Oxygen sensor:
Sensor type: GGO 370 / MU
Measuring range: 0,0 to 100,0 % O_2
Response time T_{90}: <10 sec., depending on temperature
Warranty: 12 months *(assuming appropriate usage according to the manual)*
Application area: suitable for air and pure oxygen, suitable for high CO_2-concentrations
Temperature compensation: integrated in oxygen sensor
Connection cable: approx. 1,3 m, with 5-pin plug, screwable
Operating pressure: 500 ... 2000 hPa (static).
For air and gas-stream use the oxygen sensor GOO.../MU.
Working condition: -5 to +50 °C, 0 to +95 %RH (non-condensing)
Storage temperature: -15 to +60 °C
Dimensions of housing: 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)
Weight: approx. 135 g

Options / upcharge

-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. 43)
-KL10: sensor connection cable 10 m
-LO: design type for fast measurements of low oxygen contents (0-25%) with sensor element GOEL 380

Accessories / spare parts

GOEL 370 spare sensor element for GGO 370 / MU

oxygen measuring transducer for dissolved oxygen in liquids

OXY 3610 MP incl. oxygen sensor

Specification

Measuring ranges:
oxygen concentration: 0,00 to 25,00 mg/l (dissolved)
temperature: 0,0 ... 50,0 °C
Accuracy device (at nominal temperature 25°C):
oxygen: ±1,5 % of m.v. ± 0,2 mg/l
temperature: ±0,1 °C ± 1 digit
Output signal (only 0_2): 4 - 20 mA (2-wire - standard)
0 - 10 V (3-wire - option)
Electric isolation: input electrically isolated
Auxiliary energy: 12 ... 30 V DC (at output 4-20mA)
18 ... 30 V DC (at output 0-10V - option)
Perm. impedance (at 4-20mA): R_A [Ω] = (Uv [V] - 12 V) / 0,02 A
Permissible load (at 0-10Volt): R_L > 3000 Ω
Working condition: 0 to +50 °C, 0 to +95 %RH (non-condensing)
Storage temperature: -20 to +70 °C
Reverse voltage protection: 50 V permanently
Display: approx. 10 mm high, 4-digit LCD-display
Housing: ABS (IP65 - with the exception of sensor plug)
Dimensions: 82 x 80 x 55 mm (without elbow-type plug and sensor plug)
Electric connection: elbow-type plug acc. to EN 175301-803/A (IP65), max. wire cross section: 1,5 mm², wire diameter from 4,5 to 7 mm
Sensor connection: 5-pin jack connector, screwable
Calibration: 1-point calibration: simple quick calibration in atmospheric air.

oxygen sensor (GWO3600MU):
Electrode: active membrane type, with integrated NTC-resistor
Response time: 95% in 10 sec., depending on temperature
Operation life: 3 years or more, depending on maintenance
Operating pressure: max. 3 bar.
Flow rate: min. 30 cm/sec.
Build in diameter: Ø 12,0 ±0,2 mm (suitable for ½" screw connection)
Overall length: approx. 220 mm (with anti-buckling glanding)
Build in length: approx. 110 mm
Connection cable: approx. 4 m, with 5-pin plug, screwable
Warranty: 12 months
Working temperature: 0 to +40 °C
Scope of supply: device incl. electrode, GWOK01 and KOH100

Options / upcharge

AV010: output signal 0-10V

Accessories / spare parts

GWO 3600 MU Spare electrode with 4 m cable
Upcharge for electrode with 10m cable length
Upcharge for electrode with 30m cable length
GSKA 3600 protection cap for depth measuring
GAS 3600 working set (consisting of 3 spare diaphragm heads and 100ml KOH-electrolyte)
GWOK 01 spare diaphragm head
KOH 100 spare electrolyte KOH 100 ml-bottle

pH-measuring transducer
with on site display and electrically isolation

GPHU 014 MP / BNC without electrode
GPHU 014 MP / Cinch without electr.

Properties

- automatically and manually temperatur compensation
- external Pt1000-temperature probe connectable
- sensor input electrically isolated
- 2-point calibration

Specification

Measuring range:	0,00 to 14,00 pH
Accuracy:	0,02 pH ±1 digit (at nominal temperature = 25°C)
Output signal:	4 - 20 mA (2-wire), standard 0 - 10 V (3-wire), optional
Electric isolation:	input electrically isolated
Auxiliary energy:	12 ... 30 V DC (for option 0-10V: 18 ... 30 V DC)
Perm. impedance (at 4-20mA):	R_A [Ω] = (Uv [V] - 12V) / 0,02 A
Permissible load (at 0-10Volt):	R_L > 3000 Ω
Electrode:	any standard pH electrode is suitable. (ph electrode not included in scope of supply)
Input resistance:	10^{12} Ohm
Electrode socket:	BNC-socket or Cinch-socket
Temperature compensation:	-30 ... 150°C, manually via 3 keys or automatically via external Pt1000 sensor.
Adjustment:	via 3 keys and integrated LCD
Temp. sensor socket:	2x banana socket Ø4mm, for Pt1000 probe.
Display:	approx. 10 mm high, 4-digit LCD-display
Working temperature:	0 ... +50 °C (electronic)
Storage temperature:	-20 ... +70 °C
Electric connection:	elbow-type plug acc. to EN 175301-803/A (IP65)
Housing:	ABS
IP rating:	IP65, with the exception of electrode and temp. connection sockets. (cpl. IP65 upon request)
Dimensions:	82 x 80 x 55 mm (H x W x D)
Mounting:	with fixing holes for wall mounting
Mounting distance:	70 x 50 mm (W x H)
Fixing screws:	max. shaft-Ø

Options / upcharge

AV010: output signal 0 - 10 V

MB...: limited measuring range (please state the desired range) (i.e.: 2,00 ... 10,00 pH)

Ordering example

GPHU 014 MP / BNC, AV010:
pH-transmitter with BNC electrode socket and 0-10V output signal

Accessories / 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 124, 132-133*

GE 100 standard electrode, cinch-plug

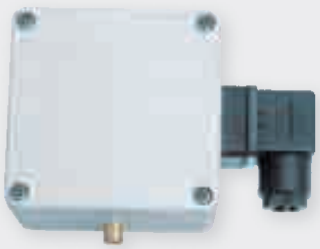
GE 117 pH electrode with integrated Pt1000-sensor 1 x BNC-plug and 1 x banana plug Ø 4mm, thread PG13,5, pressure resistant up to 6bar

PG 13,5 plug on thread adapter for pressureless use

GAK 1400 working and calibration set (p.r.t. page 37)

for additional electrodes and accessories p.r.t. page 37, 124, 132-133

Redox-measuring transducer
with electrically isolation



GRMU 2000 MP without electrode

Specification

Measuring range:	±2000 mV or special limited measuring ranges acc. to customer specification!
Accuracy:	0,2 % FS (at nominal temperature = 25°C)
Output signal:	4 - 20 mA (2-wire), standard 0 - 10 V (3-wire), optional
Electric isolation:	input electrically isolated
Auxiliary energy:	12 ... 30 V DC (for option 0-10V: 18 ... 30 V DC)
Perm. impedance (at 4-20mA):	R_A [Ω] = (Uv [V] - 12V) / 0,02 A
Permissible load (at 0-10Volt):	R_L > 3000 Ω
Electrode:	redox electrode GE105 (electrode not included in scope of supply!)
Input resistance:	10^{12} Ohm
Electrode socket:	Cinch-socket (standard) BNC-socket with upcharge
Option: on site display	approx. 10 mm high, 4-digit LCD-display
Working temperature:	0 ... +50 °C (electronic)
Storage temperature:	-20 ... +70 °C
Electric connection:	elbow-type plug acc. to EN 175301-803/A (IP65)
Housing:	ABS (IP65) with the exception of electrode con-nection sockets. (cpl. IP65 upon request)
Dimensions:	82 x 80 x 55 mm (H x W x D)
Mounting:	with fixing holes for wall mounting (accessible after removal of cover) Mounting distance: 70 x 50 mm (W x H) Fixing screws: max. schaft-Ø 4 mm

Options / upcharge

VO: on site display

AV010: output signal 0-10V

BNC: electrode socket: BNC

MB...: limited measuring range (please state the desired range)

Ordering example

GRMU 2000 MP / BNC, VO:
GRMU2000MP with BNC electrode socket and on site display

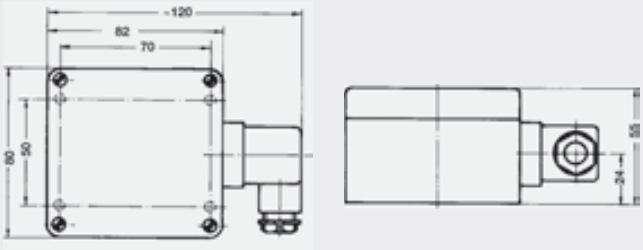
Accessories / spare parts

GE 105 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 37

Dimensioned sketch GPHU / GRMU



Conductivity measuring transducer

GLMU 200 MP incl. 2-pol meas.cell

Application area

- Easy, low-cost conductivity measurement
- Drink water monitoring
- Fish farming / water monitoring
- Fresh and sea water aquaristics

Properties

- 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

GLMU 400 MP incl. 4-pol meas.cell

Application area

- Higher saline concentrations (e.g. brine measuring)
- Measurements in polluted solutions / waste water
- Control of neutralization
- Heavily polluted liquids

Properties

- 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

Specification

Specification	GLMU 200 MP	GLMU 400 MP
Measuring range:	*(free selectable by user)*	
Conductivity:	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
specific resistance:	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
TDS:	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/
Salinity:	0.0 ... 70.0	0.0 ... 70.0
Temperature meas.:	-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)
Measuring cell:	2-pole measuring cell	4-pole measuring cell
Standard meas. cell:	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, Ø12 mm, length of shaft 120 mm, approx. 1 m connection cable. *For pressureless applications use the slip-on thread adapter PG13.5. For pressures up to 6 bar order cell with fixed PG13.5 thread (optionally).*	

Accuracy: (at nominal temperature = 25°C)
Conductivity: ±0.5% of meas. value ±0.3% FS
Temperature meas.: ±0.2°C ±1 digit

Meas. cell connection: 7-pole diode connector

Cell constant: K = 0,30 ... 1,20, freely adjustable

Temperature compensation: *(selectable by user)*
off: no compensation
Lin: linear compensation (from 0.3 ... 3.0 %/K)
nLF: non-linear function of natural water according to EN27888 (DIN 38404)

Display: approx. 10 mm high, 4-digit LC-display

Output signal: 4 - 20 mA (2-wire), standard
0 - 1 V or 0 - 10 V (3-wire), with upcharge

Electric isolation: input electrically isolated

Auxiliary energy: 12 ... 30 V DC (for option 0-10 Volt: 18 ... 30 V DC)

Reverse voltage protection: 50 V permanent

Perm. impedance (at 4-20 mA): R_A [Ω] = (U_V [V] - 12V) / 0.02 A

Permissible load (at 0-10 Volt): R_L > 3000 Ω

Working temperature: -25 ... +50 °C (transducer)
0 ... +80 °C (standard meas. 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: 148 x 50 mm (W x H)

Option / upcharge

- LTG
for organic matter (alcohol, petrol, diesel)
up to max. 1000 µS/cm
with glass shaft, unplatinized,
1,35 m PUR-cable

- PG electrode with thread PG13.5 (for use up to 6 bar)

Option / upcharge

- **AV010:** output signal 0-10V
- **AV01:** output signal 0-1V
- **KL=..:** longer meas. cell cable (recommended max. 5m)

Accessories / 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
EFFU

Properties

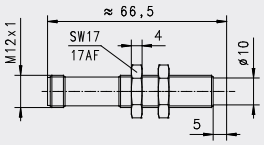
The EFFI and EFFU combine a proximity switch with the signal processing to standard signals in one device.

he 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

Measuring principle:	hall-sensor
Sensing distance:	4 mm
Measuring range:	1 ... 4095 Hz
Output signal:	EFFI: 4 - 20 mA (3-wire) EFFU: 0 - 10 V (3-wire)
Sampling interval:	periods measurement, output update 50 ms
Output accuracy:	±0,25 % of full scale
Auxiliary energy:	10 ... 30 V DC (at EFFU: 15 ... 30 V DC)
Idle current:	max. 20 mA (without load)
Electrical connection:	4-pole locking plug M12 x 1 *(connection cable see below)*
Working temperature:	0 .. 70 °C
Protection class:	IP 67
Housing materials:	nickel plated brass, PA66
Dimensions:	~ Ø 10 x 66,5 mm
Weight:	approx. 25 g



M12 - connection cable

Screened PUR-connection cable with moulded M12x1-connector (and loose ends). Available in straight and angular design.

Versions

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

Caloric flow controller

EFK2
EFKP
EFKM

Properties

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)

Area of 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

Measuring principle:		calorimetric
Operating range:		2 ... 150 cm/s (for water)
Display:	EFK2	2-colour LED (red < threshold, green > threshold)
	EFKP, EFKM	9 LEDs (red - threshold, green 1-8 - flow)
Switch-point adjustment:		via potentiometer
Output:	EFK2	relay contact (max. 30 V / 2 A) NO (open = no flow)
Optional:		NPN-transistor output (max. 24 V / 100 mA)
		PNP-transistor output (max. 24 V / 100 mA)
Output:	EFKP, EFKM	NPN-transistor output (max. 24 V / 200 mA)
Optional:		PNP-transistor output (max. 24 V / 200 mA)
Auxiliary energy:		24 V DC ±10 %
Power consumption:		max. 70 mA
Electrical connection:		4-pole locking plug M12 x 1 *(connection cable see left)*
Working pressure:		max. 100 bar
Working temperature:		15 .. 70 °C
Mounting position:		arbitrary
Protection class:		IP 65 (EFK2), IP 60 (EFKP), IP 67 (EFKM)
Mech. connections:		screw-in threat G1/2A
Option:		screw-in threat G1/4A
Probe length:		approx. 29 mm (incl. threat)
Materials:		
Probe:		stainless steel 1.4571
Housing:	EFK2:	stainless steel 1.4305
	EFKP:	PA6.6
	EFKM:	brass, nickel plated
Dimensions: *(without M12-plug)*		EFK2: Ø 35 x 97 mm (W x H x D)
		EFKP: 50 x 50 x 95 mm (W x H x D)
		EFKM: Ø 73 x 81 mm (W x H x D)

Options / upcharges

G1/4A:	device connection G1/4A
PNP:	output: PNP
NPN:	output: NPN

Flow meter (rotor)

RRI - 010 / ... (DN10, G3/8)
RRI - 025 / ... (DN25, G1)

Properties

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

Area of application

Sensors suitable for: Water, oil (viscosity up to 10 mm²/s (10 cSt.))

Specification

Measuring principle:	rotor (inductive sensor)		
Designs:	bore	measuring range	pulse rate*1
RRI-010 / 020:	2 mm	(0,1) 0,5 ... 1.5 l/min.	ca. 10200 Imp. / l
RRI-010 / 050:	5 mm	(0,2) 2,0 ... 10 l/min.	ca. 3345 Imp. / l
RRI-010 / 070:	7 mm	(0,4) 2,0 ... 12 l/min.	ca. 1755 Imp. / l
RRI-025 / 080:	8 mm	(2) 3 ... 30 l/min.	ca. 1216 Imp. / l
RRI-025 / 120:	12 mm	(3) 5 ... 60 l/min.	ca. 607 Imp. / l
RRI-025 / 160:	16 mm	(4) 6 ... 100 l/min.	ca. 252 Imp. / l
Accuracy:	±3 % of meas. value (in spec. meas. range)		
Repeatabiliy:	±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 ... 30V DC, max. 10mA (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		
Mech. connection:	nominal bore	threat	
RRI-010..:	DN 10	G 3/8, female thread *2	
RRI-025..:	DN 25	G 1, female thread *2	
Mounting position:	horizontal or ascending direction of flow		
Materials:			
Housing:	Questra (DN25) / PPS (DN10)		
Connection *2, rotor:	PVDF		
Bearing:	Iglidur X		
Axis:	ceramics Zr02-TZP		
Seal:	viton		
Dimensions:	84 x 29 x 88 mm (RRI-010...), 110 x 73 x 103 mm (RRI-025...)		

**1 precise value on type plate, max. variability within a batch: ±10 %*

**2 other threat types (male thread, ...) or materials for connectors upon request*

Options / upcharges

PNP: output signal PNP

M12: Electr. connection = plug M12 x 1

Flow switch incl. DIN plug

FCM - 6 (2,5 l/min)
Flow switch incl. DIN plug

FCM - 3 (6 l/min)
Flow switch incl. DIN plug

Properties

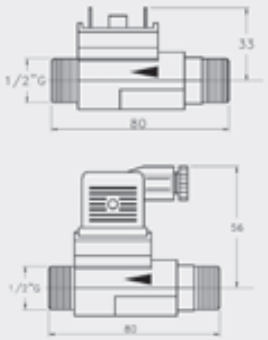
FCM flow switch has been designed to offer a very simple and safety control against the missing flow passage. The electrical components are separated from the mechanical parts and the reed contact is magnetically actuated. The switch head is fixed to the body by a fast self locking system and can be 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

Body	Brass		
Process connection	G ½"		
Sensing element (Piston)	Polypropylen		
Accuracy	± 15%		
Temperature max.	90 °C		
Pressure loss	0,5 bar at max. flow rate		
Flow rate max.	25 l/min, for all settings		
Weight	170 g		
Reed contact	N.O. / No flow condition		
Contact rating	300 V, 70 VA, 0,5 A		
Wiring	Angle plug		
Protection class	IP65		
Mounting	Horizontal and Vertical		
Set point l/min	Nominal	ON	OFF
FCM - 6	2,5	2,8	1,7
FCM - 3	6	6,3	4,1

Dimensions



Flow meter for a wide range of applications

(Suitable evaluation devices: GIA20EB, GIR230FR, GIA2000, GIR2002)

FHK

Advantages

- exact measurings of fluid volumes
- long life

Application

alcoholic and non alcoholic drinks, chemicals, water, wine etc.

Specification

Meas. range: approx. 0,03 - 0,58 l/min (other ranges upon request)
Nozzle: D=1 mm.
Pulse rate: approx. 2223 imp./l
Pressure range: max. 20 bar (at 20°C)
Viscosity of media: < 50 cSt.
Meas. accuracy: ±2%
Repetitive accuracy: <0,25%
Power supply: 5-24 V DC; max. 13 mA
Output signal: open collector, NPN
Flow connections: 2 x G¼" IG parallel
Operating temperature: -10 to 100 °C
Dimensions: approx. 55 x 40 x 66 mm incl. plug
Material of housing: ARNITE, turbine: PVDF, sealings: Viton

FH-Messing

Advantages

- sturdy metal housing
- high temperature range
- high operating pressure

Application

Measuring of low-viscous media in beverage and chemical industry etc., such as petrol, fuel etc.

Specification

Meas. range: approx. 0,09 - 1,26 l/min (other ranges upon request)
Nozzle: D=1.5 mm.
Pulse rate: approx. 1450 imp./l
Pressure range: max. 20 bar (at 20°C)
Viscosity of media: < 50 cSt.
Meas. accuracy: ±2%
Repetitive accuracy: <0,25%
Power supply: 5-24 V DC; max. 13 mA
Output signal: open collector, NPN
Flow connections: 2 x G¼" IG parallel
Operating temperature: -10 to 100 °C
Dimensions: approx. 55 x 40 x 66 mm incl. plug.
Material of housing: brass chemically nickel plated, sealings: Viton, nozzle: V2A

Scope of supply: cpl. with 2 tube screw-type glandings for internal tube Ø 8mm.

FHK-PVDF

Advantages

- all parts coming into contact with media are plastic
- suitable for chemical and aggressive media

Application

Chemical industry: products containing tensides, alkaline products, acids.
Industry: Monitoring of cooling media circuit at machines, dosing and consumption quantity measurements

Specification

Meas. range: approx. 0,25 - 5 l/min (other ranges upon request)
Nozzle: D=3,3 mm.
Pulse rate: approx. 1033 imp./l
Pressure range: max. 20 bar (at 20 °C)
Viscosity of media: < 50 cSt.
Meas. accuracy: ±2%
Repetitive accuracy: <0.25%
Power supply: 5-24 V DC; max. 13 mA
Output signal: open collector, NPN
Flow connections: 2 x G¼" IG parallel
Operating temperature: -10 to 100 °C
Dimensions: approx. 54 x 40 x 66 mm incl. plug.
Material of housing: PVDF, sealings: Viton, nozzle: PTFE, axis: PCTFE

EPI

Advantages

- suitable for higher viscous media
- calibratable

Application

chemicals, oil, sirup, liquid soap, catchup, mayonnaise, cleaning agent concentrate, for standardization use

Specification

Meas. range: 0,06 - 5,35 l/min (depending on viscosity)
Nozzle: D=7 mm
Pulse rate: approx. 462 imp./l
Pressure range: max. 10 bar (at 20°C)
Viscosity of media: approx. 5 - 8000 cSt.
Meas. accuracy: ±1 % (depending on viscosity)
Repetitive accuracy: < 0,25 %
Power supply: 5-24 V DC; max. 13 mA
Output signal: open collector, NPN
Flow connections: 2 x G¼" IG
Operating temperature: -10 to 65 °C
Dimensions: approx. 88 x 68 x 57 incl. plug.
Material of housing: PEEK, sealing: viton

FHKU

Advantages

- suitable for large flow
- low pressure drop
- standard thread connection

Application

Water, acetone, alcohol, ammonia, benzene, vinegar, dilution bases, wine, whiskey, Dosing, and other

Specification

Meas. range: approx. 3 - 26,7 l/min
Nozzle: D=10 mm
Pulse rate: approx. 65 imp./l
Pressure range: max. 20 bar (at 20°C)
Viscosity of media: < 50 cSt.
Meas. accuracy: ±2 %
Repetitive accuracy: <0,25 %
Power supply: 5-24 V DC; max. 13 mA
Output signal: open collector, NPN
Flow connections: 2 x G1/2" A
Operating temperature: -10 to 100 °C
Dimensions: approx. 75 x 43 x 67 incl. plug.
Material of housing: Ryton, sealing: viton

FHKSC

Advantages

- compact device
- measuring of very small quantities
- highly suitable for sucking operations

Application

Beverage industry: wine, spirits, mineral water etc.
and chemically slightly aggressive media

Specification

Meas. range: approx. 0,08 - 0,57 l/min.
Nozzle: D=1.2 mm
Pulse rate: approx. 1925 imp./l
Pressure range: -1...+0,3 bar (at 20°C)
Viscosity of media: < 50 cSt.
Meas. accuracy: ±2 %
Repetitive accuracy: <0,25 %
Power supply: 3.8-20 V DC; <8 mA
Output signal: open collector, NPN
Flow connections: 2 x 6 mm tube connection
Operating temperature: -10 to 65 °C
Dimensions: approx. 55 x 40 x 55 mm.
Material of housing: ARNITE, sealing: silicone.

Flow measuring transducer with Hall-effect sensor

for low viscose, non aggressive liquids

VISION 2008

incl. elbow-type plug

Specification

- minimum size, maximum accuracy
- easy installation,
- installation in any position possible
- optimum-quality due to high-quality materials used
- no maintenance

Area of 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

Rotor-position scanning:	Hall-Sensor
Measuring range:	1.5 - 25 l/min
Resolution:	approx. 1000 pulses/l
Measuring agent:	clean liquids, we recommend filtering with approx. 20 to 40 micron
Viscosity:	up to approx. 15 cSt.
Accuracy:	±3% ranging from 10 - 100%
Repeatability:	≤ 0.5%
Working temperature:	-20 to +100°C
Operating pressure:	25 bar
Electric connection:	elbow-type plug acc. EN 175301-803/A, type C industrial
Auxiliary energy:	5 - 24 V DC, approx. 8 mA
Multiplier (R):	1 - 2.2 kOhm
Output signal:	frequency 5 - 416 Hz, open collector NPN
Output current:	max. 20 mA
Dimensions:	approx. 55 x 17 x 30 mm
Material:	
Housing:	Grilamid TR55 (PA12)
Rotor:	Grilamid (PA12 Ferrit)
Bearings:	PTFE 15% graphite
Delivery connection:	G 3/8" thread
DN:	8 mm
Weight:	approx. 15 g

Axial turbine flow sensor for liquids

VTH 25 MS - 180

cpl. with 2 m of cable, ready for plug-in.

General

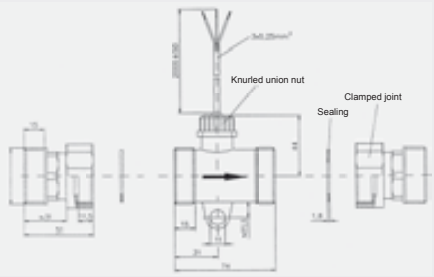
The flow sensor VTH25MS-180 is a measuring transducer used for measuring the volume flow or for dosing. It is suitable for a wide range of applications due to its compact design, large measuring range and high measuring accuracy.

Area of application

- cooling water measurements, tapping installations, dosing units
- medical technology, plastics industry, laboratory
- solar systems, heating application, heat quantity measurement
- backery machines, kitchen machines
- machine tools

Specification

Sensor:	Hall-effect-sensor
Measuring range:	4 - 160 l / min, max. 80 l/min with continuous operation (signal emission as of 1 l / min)
Resolution:	approx. 65 pulses / litre
Measuring agent:	liquids
Max. particle size:	0.5 mm
Measuring accuracy:	±3% of measured value
Repeatability:	±0.5%
Working temperature:	Tmax = 85°C
Max. operating pressure:	10 bar
Auxiliary energy:	10 - 30 V DC
Output signal:	frequency, open collector NPN
Output current:	max. 20 mA
Material:	
Duct:	brass
Turbine cage:	PPO Noryl GFN 3V 960
Rotor:	PPO Noryl GFN 2V 73701, with solenoids
Bearings:	saphire / PA
Shaft:	CrNi-steel (1.4436)
Delivery connection:	R 1¼" - outer thread
Nominal width:	DN 25



Dimensions in mm

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 garanular.

- Sealed
- No moving parts

Area of application

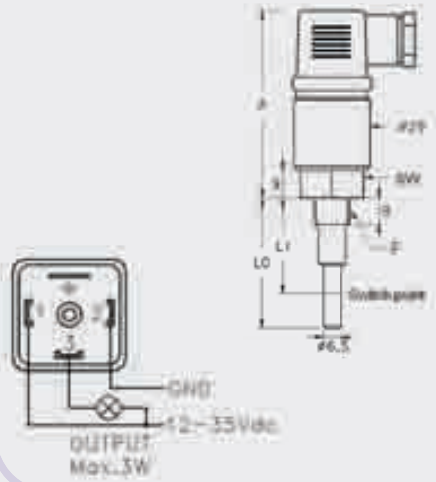
- Application for
  - Water
  - Oil
  - Gasoline
  - Solid products as powder or granular

Specification

Power supply:	12 ... 35 V DC / 5 mA
Electrical output:	NPN no-active / max. 3 W
Electrical connection:	Plug EN 175301-803/A
Process connection:	1/4" NPT, Brass
Switch delay:	4 sec.
Electrode:	Cu-Zn
Electrode coating:	PTFE
Electrode length:	50 mm
Switch point:	
40 mm ± 2 mm	vertical mounting
on the axis of SCV	horizontal mounting
Pressure max.:	25 bar
Temperature max.:	-30 ... +125 °C

Dimensions [mm]:

SW	A	B	L0	L1
24	74	10	50	40 ± 2



Level Switch

GNS-C1 (with 1 microswitch)
GNS-C2 (with 2 microswitches)

Properties

These level switches offer the most reliable solution for liquid level control were side mounting system is required. The small outlines, the materials and the mounting versatility make this unit one of the level switches more required by the market. The GNS are also suitable for use with process temperature up to 180 °C.

- Switch head magnetically actuated
- 1 or 2 microswitches
- Adjustable stem length
- Brass or AISI-316 construction

Specification

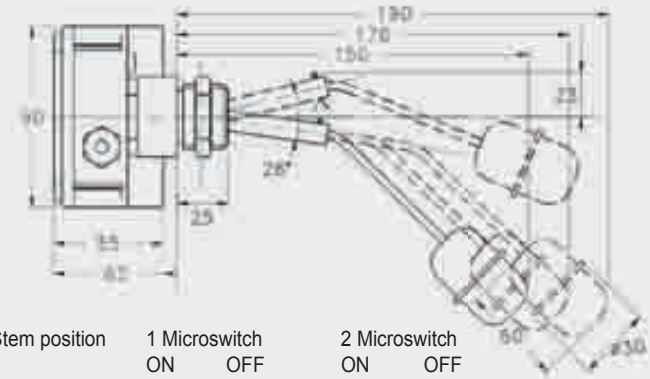
Processconnection:	G1"
Float - S50 (S.G.):	> 0,7 g/cm³
Pressure max.:	25 bar
Temperature max.:	180°C
Working ambient temperature:	-30/+55°C / RH 90%
Hysteresis max.:	20 mm
Weight:	440 g
Male threads:	Gas parallel UNI 228/1
Body materials:	Natural Brass or Stainless steal (AISI-316)
Float material:	Stainless steal (AISI-316)
Microswitch:	1x or 2x SPDT
Voltage:	250 V AC / 48 V DC
Current:	3A AC / 3A DC
Electr. Connection:	via screw terminals
Wiring:	Independent micro switches separately wired SPDT
Protection Class:	IP65 Housing

Order Example

GNS-C2-O: Level switch with 1 microswitch, Body material Brass

Body Materials

- O Natural Brass
- S 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 (polypropylene)
RWI-016PVK (PVDF)
RW-015HKL (stainless steel)

Properties

Mechanical level controller for liquids. A magnet-equipped float triggers a pre-fixed reed switch.

- wall mounting
- reliable
- good repeatabilty
- stainless steel design for high temperatures

Area of application

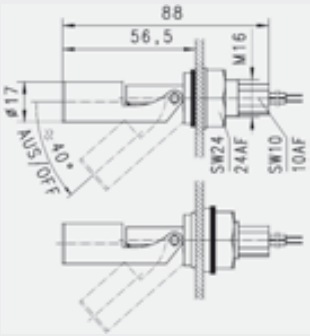
Sensor suitable for: Water, oil,

Specification	RWI-016PPK	RWI-016PVK	RW-015HKL
Measuring principle:	reed switch	reed switch	reed switch
Switch type:	*n.c. or n.o depending on installation position*		
Switching power:	250 V AC, 0,5 A, 50 VA	250 V AC, 0,5 A, 50 VA	220 V AC, 0,28 A, 30 VA
Density medium:	>0,6 g/cm³	>0,75 g/cm³	>0,70 g/cm³
Working temperature:	max. 90 °C	max. 130 °C	max. 200 °C
Working pressure:	PN = 3 bar	PN = 6 bar	PN = 5 bar
Mounting position:	horizontal	horizontal	horizontal
Protection class:	IP 65	IP 65	IP 65
Electrical connection:	~ 50 cm cable	~ 50 cm cable	~ 60 cm strand
Materials:			
Body:	PP	PVDF	stainl. steel 1.4571
Float:	PP	PVDF	stainl. steel 1.4571
Seal:	viton	viton	
Weight:	approx. 75 g	approx. 75 g	approx. 120 g

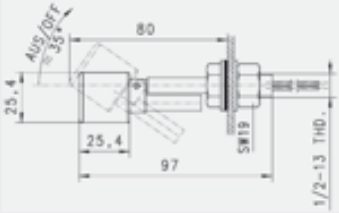
Dimensions: RWI-016...

Assembly internally:
Hole diameter Ø 16,5 mm

Assembly externally:
Hole diameter Ø 23 mm



Dimensions: RW-015HKL



Level transmitter

LC-S45M... (brass)
LC-S44M... (brass)
LC-K52K... (stainless steel)

Final prices depend on type, see price table below

Properties

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)

Area of 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... :				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/cm³ (LC-S45..), >0,44 g/cm³ (LC-S44..), >0,66 g/cm³ (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 threat:	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

Prices of design types

tube lenght:	**..0250**	**..0500**	**..0750**	**..1000**	**..1500**	**..2000**
LC-S45M...						
LC-S44M...						
LC-K52K...						

Options / upcharges

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)

Properties

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

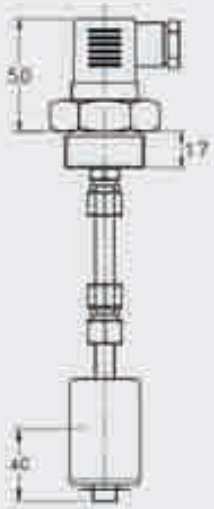
Specification

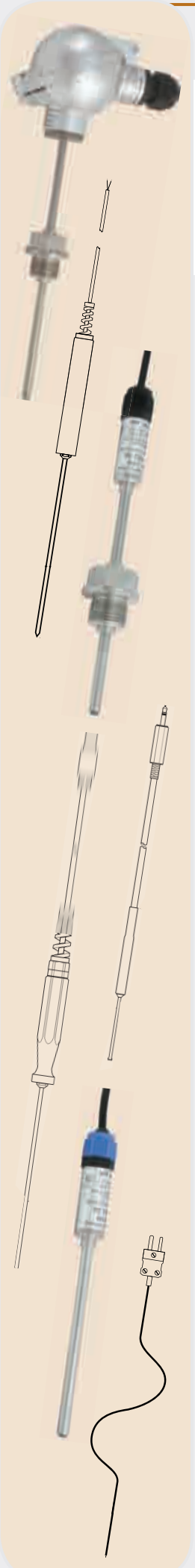
Float-contact unit:	Nickel plated brass
Density:	> 0.35 g/cm³
Pressure max.:	20 bar
Temperature max:	105°C
Connection:	1/8"
Reed-contact:	SPDT: 230 V, 60 VA, 1.0 A
Process connection:	Thread G1", Brass
Electrical connecton:	Plug EN 175301-803/A
Protection Class:	IP65
Seal:	NBR, oil resistant
Rod-tube:	Ø 8 mm, Brass

Rod-tube (state when ordering)

Rod-tube lenght: FL = 500 mm
FL =1000 mm
FL = 1500 mm

Order example: GNS-KIT 1000





Temperature probes

	Connection							
	4-pole Mini-DIN-plug	3,5 mm Ø jack connection	Miniature flat-pin plug	Loose ends	Sensor head	Ex - Protection	Description	Page
Pt100								
GTF ..	✓			✓			Immersion probe for liquids / gases	123
GES ..	✓			✓			Insertion probe for soft media	123
GLF 401 Mini	✓			✓			Probe for measurement of ambient air	123
GOF 401 Mini	✓			✓			Surface probe for solid surfaces	123
Pt1000								
GTF ..		✓		✓			Immersion probe for liquids / gases	124
GES ..		✓		✓			Insertion probe for soft media	124
GOF ..		✓		✓			Surface probe for solid surfaces	124
GLF ..		✓		✓			Probe for measurement of ambient air	124
GGF ..		✓		✓			Probe for deep-frozen products	124
NiCr-Ni (type K)								
GOF ..			✓	✓			Surface probe for solid surfaces	125
GTZ ..			✓	✓			Clip-on probe	125
GTF ..			✓	✓			Immersion probe for liquids / gases	126
GES ..			✓	✓			Insertion probe for soft media	126
GKF ..			✓	✓			Probe for compost grain	126
GAF ..			✓	✓			Aspalt probe	126
GTF 300 ..			✓	✓			Wire probe	127
GMF ..			✓	✓			Magnetic surface probe	127
GGF ..			✓	✓			Probe for deep-frozen products	127
GRF ..			✓	✓			Tire probe	127
GKF			✓	✓			Cable lug probe	127
GLS ..			✓	✓			Soldering tip probe	127
GTT ..			✓	✓			Thermo elements	128
GTF 101 ..			✓	✓			Thermo elements	129
Rt10Rh-Pt (type S)								
GTF ..			✓	✓	✓		Probe for burning kilns	130
NiCrSi-NiSi (type N)								
GTF ..			✓	✓	✓		Probe for permanent high temperatures	130
Silicium (KTY ..)								
GTF ..		✓		✓			Immersion probe	130
GMF ..				✓			Immersion, touching, air probe	130
Freely customized probes (Pt100 / Pt1000 / NiCr-Ni)								
GTF 101 ..			✓	✓		✓	Industrial probes, process connection without thread	131/132
GTF 102 ..			✓	✓		✓	Industrial probes, process connection with thread	131/132
GTF 103 ..					✓	✓	Industrial probes, process connection with / without thread	131/132
GTF 104 ..					✓		Probe with angle plug	133
TF 101 ..			✓	✓			Hermetically sealed probe	134
GOF 1xx ..			✓	✓			Self-adhesive probes	135

Temperature probes

Accuracy:

Pt100 / Pt1000: sensor accuracy acc. to DIN EN 60751

DIN cl. B:	(area of validity: -50 ... +500 °C)	±0,3°C at 0°C
DIN cl. A:	(area of validity: -30 ... +300 °C)	±0,15°C at 0°C
DIN cl. AA = 1/3 DIN cl. B:	(0 ... +150 °C)	±0,1°C at 0°C
1/10 DIN Kl. B:		±0,03°C at 0°C

Thermocouples: sensor accuracy acc. to DIN EN 60584-2

class 1 für **Typ K**:	±1,5°C at range -40...+375°C
class 1 für **Typ N**:	±1,5°C at range -40...+375°C
class 1 für **Typ S**:	±1°C at range 0...1100°C

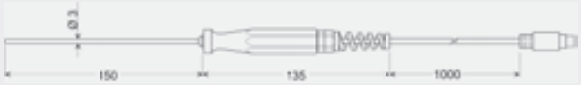
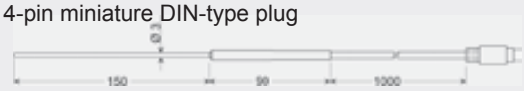
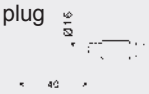
Special designs (Upcharges):

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. 137**
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 Kl. B, for Pt100 and Pt1000, tolerances: 0,1°C at 0°C
higher sensor accuracy: 1/10 DIN Kl. B, for Pt100-probes, tolerances: 0,03°C at 0°C

Please note:

customized probes have to be ordered in writing!
return or exchange are not possible!

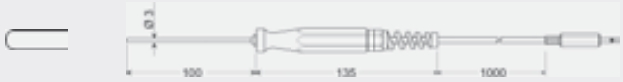
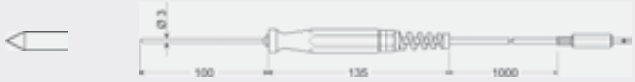
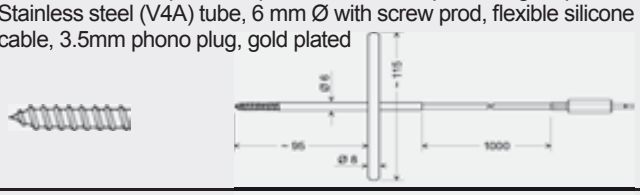
Pt100 Measuring probe

Ordering type Range / DIN Class	Application / Dimensions (mm) techn. specification	Response time T_{90}	suitable for	
GTF 401 -50 ... +400°C DIN cl. B **GTF 401 1/3 DIN *** -50 ... +400°C **GTF 401 1/10 DIN *** -50 ... +400°C	**Immersion probe for liquids / gases** non-corrosive stainless steel tube (V4A), plastic handle, approx. 1 m 4-wire PVC cable, anti-buckling glanding, 4-pin miniature DIN-type plug  as GTF401 however 1/3 DIN class B (±0,1°C at 0°C) as GTF401 however 1/10 DIN class B (±0,03°C at 0°C) and flexible jacket tube, Ø 3mm	approx. 10 sec. air approx. 40 sec.	GMH2000(SA) GMH35xx GMH3710 GMH3750	
GES 401 -50 ... +400°C DIN cl. B **GES 401 1/3 DIN *** -50 ... +600°C	**Insertion probe for soft media** Specification as for GTF401 but with needle type prod  as GES401 however 1/3 DIN class B (±0,1°C at 0°C)	approx. 10 sec.	GMH2000(SA) GMH35xx GMH3710 GMH3750	
GTF 601 -200 ... +600°C DIN cl. B **GTF 601 1/3 DIN *** -200 ... +600°C	**Immersion probe for liquids / gases, 4-wire** handle as per GTF150, approx. 1 m 4-wire PVC cable, 4-pin miniature DIN-type plug, flecible jacket tube, 3mm Ø. (smaller tube diameter upon request) as GTF601 however 1/3 DIN class B (±0,1°C at 0°C)	approx. 10 sec.	GMH2000(SA) GMH35xx GMH3710 GMH3750	
GTF 35 -50 ... +400°C DIN cl. B	**Immersion probe for liquids / gases, 4-wire** non-corrosive stainless steel tube (V4A), approx. 1 m 4-wire PVC cable, 4-pin miniature DIN-type plug 	approx. 10 sec.	GMH35xx GMH3710 GMH3750	
GLF 401 Mini -25 ... +70°C DIN cl. A **GOF 401 Mini** -50 ... +200°C DIN cl. B	**Fast and accurate Measurement of ambient air** Ø 1,6 mm, FL = ca. 40 mm, 4-pin mini. DIN-type plug  **Surface probe for solid surfaces, fast** 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 	approx. 15 sec. approx. 15 sec.	GMH35xx GMH3710 GMH3750 GMH35xx GMH3710 GMH3750	

* *Please note the area of validity for the class of accuracy given above.*

Pt1000 - Measuring probes, 2-wire

All types of probes also available for Pt100 2- / 3- or 4-wire connection

Ordering type Range	Application / Dimensions (mm) techn. specification	Response time T_{90}	suitable for	
GTF 175 -70 ... +200°C Pt1000 class B	**Immersion probe for liquids / gases** non-corrosive stainless steel tube (V4A), plastic handle, anti-buckling glanding, 1m highly flexible silicone cable, 3.5 mm gold plated jack connector 	fluid approx. 10 sec. air approx. 40 sec.	GMH175 GFTH200	
GTF 175 LE	like before but with loose cable ends		GIA20EB	
GTF 175 / 1.6 -70 ... +200°C Pt1000 class B	**Immersion probe for liquids / gases** probe tube: jacket element Ø1.6mm, flexible, other data p.r.t. GTF175	fluid approx. 4 sec. air approx. 25 sec.	GMH175 GFTH200 ST60, ST80	
GTF 175 / 1.6 - LE	like before but with loose cable ends		GIA20EB	
GES 175 -70 ... +200°C Pt1000 class B	**Insertion probe for soft media** stainless steel tube (V4A) with slim insertion tip, other data p.r.t. GTF175 	approx. 10 sec.	GMH175 GFTH200	
GES 175 LE	like before but with loose cable ends		GIA20EB	
GOF 175 -70 ... +200°C Pt1000 class B	**Surface probe for solid surfaces** S2 x 2.3mm ceramic Pt1000 sensor mounted at the tip. V4A tube, quadratic 3 x 3 mm at the tip, other data p.r.t. GTF175 	approx. 60 sec.	GMH175	
GOF 175 LE	like before but with loose cable ends		GIA20EB	
GOF 175 Mini -70 ... +200°C Pt1000 class B	**Surface probe for solid surfaces, fast** S2 x 2.3mm ceramic Pt1000 sensor mounted at the tip, V4A tube, 1m silicone cable, 3.5 mm gold plated jack connector 	approx. 15 sec.	GMH175 GFTH200	
GLF 175 -70 ... +200°C Pt1000 class B	**Air/gas probe** for clean media (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 	approx. 15 sec.	GMH175 GFTH200	
GLF 175 LE	like before but with loose cable ends		GIA20EB	
GGF 175 -70 ... +200°C Pt1000 class B	**Probe for deep-frozen products** to screw into deep-frozen products, etc. no predrilling required. Stainless steel (V4A) tube, 6 mm Ø with screw prod, flexible silicone cable, 3.5mm phono plug, gold plated 	approx. 15 sec.	GMH175 GFTH200	
GTF 2000 -50 ... +200°C Pt1000 class B	**Air- / tube mounting probe** Probe for diving tube. Tube of stainless steel, highly flexible silicone cable 2 x 0.25², 3.5mm gold plated phono plug  Customized cable lengths (1m standard), each beginning meter		GMH175 GFTH200	
GTF 2000 LE	like before but with loose cable ends		GIA20EB	
GTF 2000 WD -20 ... +105°C Pt1000 class B	**Air- / tube mounting probe** - water proof type Construction like described before, but cable of PVC and tube enclosed water proof, max. 105°C!		GMH175 GFTH200	
GTF 2000 WD - LE	like before but with loose cable ends		GIA20EB	

We manufacture all types of probes according to Your special desires - low priced and fast. Please contact us.

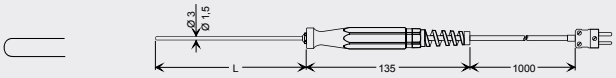
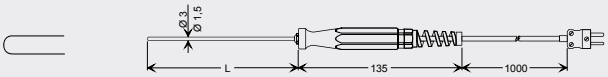
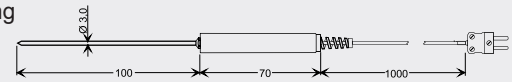
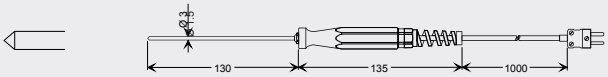
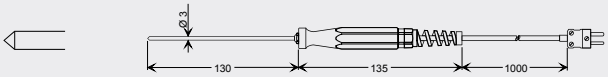
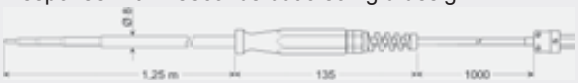
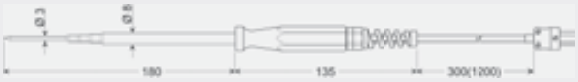
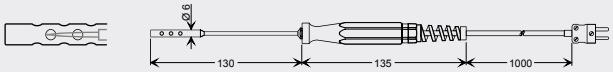
NiCr-Ni (Type K) - Measuring Probe

class 1 = highest precision-class according to DIN

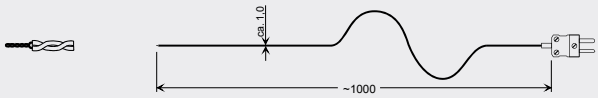
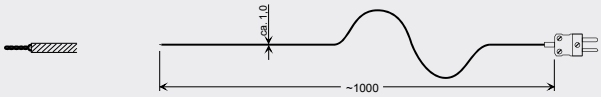
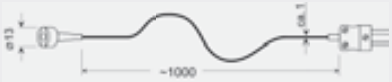
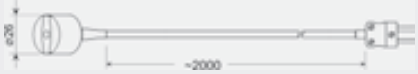
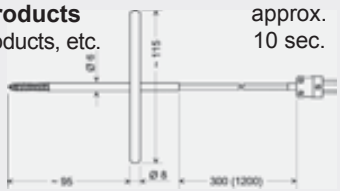
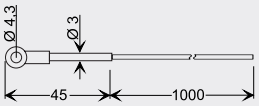
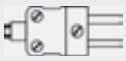
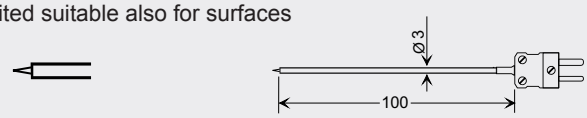
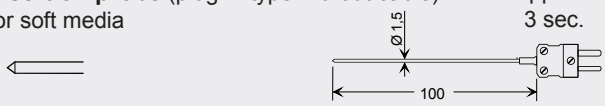
Ordering type	Range °C	Application / Dimensions (mm)	Response time T_{90}	further technical details	
GOF 130CU	-65 ... +500°C	**Surface probe** for straight and solid metal surfaces	approx. 3 sec.	Spring-loaded copper plate, plastic handle, silicone cable, DIN-type flat-pin plug	
GOF 500	-65 ... +500°C	**Surface, immersion, air, gas probe** for any solid surface	approx. 5 sec.	Solid copper plate, plastic handle, silicone cable, DIN-type flat-pin plug	
GOF 130	-65 ... +900°C	**Surface probe** for any solid surface	approx. 2 sec.	2 laser welded NiCr-Ni resilient springs, V4A-tube, plastic handle, silicone cable, DIN-type flat-pin plug	
GOF 200HO	-65 ... +400°C	**Surface probe** for fastest measurements in small gaps	approx. 2 sec.	Small elbow-type, flexible thermocouple tapes, plastic handle, silicone cable, DIN-type plug	
GOF 400HO	-65 ... +400°C	**Surface probe** for fastest measurements	approx. 2 sec.	Flexible thermocouple tapes, plastic handle, silicone cable, DIN-type plug	
GOF 400VE	-65 ... +400°C	**Surface probe** for fastest measurements	approx. 2 sec.	Flexible thermocouple tapes, plastic handle, silicone cable, DIN-type plug **Accessories MH 400VE:** magnet holder, heat resistant up to 100 °C	
GOF 500 HO	-200 ... +500°C	**Surface probe** for fastest measurements Ø 1,5 MTE (K) Inconel 600	approx. 5 sec.	Solid copper plate, plastic handle, silicone cable, DIN-type flat-pin plug	
GOF 900 HO	-65 ... +900°C	**Surface probe** for any solid surface	approx. 2 sec.	2 laser welded NiCr-Ni resilient springs, V4A-tube, plastic handle, silicone cable, DIN-type flat-pin plug	
GTZ 300	-65 ... +150°C	**Clip-on probe** for temperature measurements at tube surfaces	approx. 3 sec.	for tubes up to approx. 1" Ø, silicone cable, DIN-type flat-pin plug	

NiCr-Ni Standard Measuring Probe "Type K" (ctd.)

Probes as Pt100 or Pt1000 upon request

Ordering type	Range °C	Application / Dimensions (mm)	Response time T_{90}	further technical details	
GTF 400	-65 ... +550°C	**Immersion probe** inexpensive, fast, elastic (rigid)	approx. 3 sec.	Stainless steel tube, 1.5Ø, L=130mm, silicone cable	
GTF 900	-65 ... +1000°C	**Immersion probe** inexpensive, elastic (rigid) 	approx. 5 sec.	Stainless steel tube, 3Ø, L=130mm, silicone cable (any length against upcharge) each additional 100mm	
GTF 1200	-200 ... +1150°C	**Immersion probe for High-temperature** flexible thermowell 	approx. 3 sec.	Inconel 1.5Ø, L=150mm, silicone cable, DIN-type flat-pin plug, **electrically insulated**	
GTF 1200/300	-200 ... +1150°C	**Immersion probe** flexible thermowell	approx. 5 sec.	Inconel 3Ø, L=300mm, **electrically insulated**	
GTF 1000 AL	-200 ... +1000°C	**Immersion probe** for aluminium melt, non-ferrous metal, etc. 	approx. 30 sec.	V4A tube Ø6x1,4 mm, L=1000mm rigid, plastic handle, 1m silicone cable, DIN-type flat-pin plug, add. internal jacket TC, high lifetime	
GES 21K	-50 ... +250°C	**Core temperature- / food probe** big white teflon handle water- and steam-tight, stainless steal anti-buckling 		1 m teflon calbe, DIN-type flat-pin plug, teflon handle Use for canteen kitchen, backeries, butcher´s shops, etc.	
GES 130	-65 ... +550°C	**Insertion probe** for soft media 	approx. 3 sec.	Flexible stainless steel (V4A) needle, 1.5 mm Ø, plastic handle, silicone cable, DIN-type flat-pin plug	
GES 500	-65 ... +550°C	**Insertion probe** for soft media	approx. 5 sec.	Flexible stainless steel (V4A) needle, 3 mm Ø, ...	
GES 900	-65 ... +1000°C	**Insertion probe** inexpensive, elastic (rigid) 	approx. 5 sec.	Stainless steel (V4A) tube, 3Ø, L=130mm, plastic handle, silicone cable, DIN-type flat-pin plug	
GKF 125	-65 ... +200°C	**Probe for compost, grain** etc, quick response within seconds but also rigid design 	approx. 6 sec.	V4A tube 8mm dia. reduced to 3 mm, plastic handle, silicone cable, DIN-type flat-pin plug	
GAF 200	-65 ... +550°C	**Injection or aspalt probe** for liquid or soft media etc. 	approx. 6 sec.	V4A tube 8mm dia. reduced to 3 mm, plastic handle, spiral cable stretchable to 1.2m, DIN-type flat-pin plug Upcharge for other probe length	
GTL 130	-65 ... +600°C	**Air/gas probe** (room temperature, smoke gases etc.) 	approx. 1,5 sec.	Stainless steel (V4A) tube, plastic handle, silicone cable, DIN-type flat-pin plug	

NiCr-Ni Standard Measuring Probe "Type K" (ctd.)

Ordering type	Range °C	Application / Dimensions (mm)	Response time T_{90}	further technical details	
GTF 300	-65 ... +300°C	Quick-response measurements in air, liquids, for very small surfaces 	approx. 0,3 sec.	Twisted pair of teflon insulated thermowell wires, 0,2 mm Ø each, welded measuring prod, very flexible, DIN-type flat-pin plug. Any length (up to 50m) against upcharge.	
GTF 300 GS	-65 ... +400°C	For high temperatures in gases, air and for solid surfaces (not suitable for liquids) 	approx. 0,3 sec.	Pair of glass fibre insulated thermowell wires, 0,2 mm Ø each, DIN-type flat-pin plug. Upcharge for special length of probe	
GMF 250	-65 ... +250°C	**Magnetic surface probe** sticks at magnetic materials, resilient measuring probe with small metal plate, approx 5mm dia. 	approx. 5 sec.	approx. 1m of twisted teflon insulated wire, DIN-type flat-pin plug	
GMF 200	-65 ... +200°C	**Magnetic surface probe** sticks at magnetic materials, resilient measuring probe with small metal plate, approx 5mm dia. 	approx. 5 sec.	extended type (higher magnetic force), rigid 2m silicone cable, DIN-type flat-pin plug	
GGF 200	-65 ... +200°C	**Probe for deep-frozen products** to screw into deep-frozen products, etc. no predrilling required  	approx. 10 sec.	Stainless steel (V4A) tube, 6 mm Ø with screw prod, spiral cable (approx. 1.2 m drawn out), DIN-type flat-pin plug	
GRF 200	-50 ... +200°C	**Tire probe** fast response insertion probe with stop screw (needle adjustable 0 to 14 mm). Suitable for measuring temperature of tires and other soft media. 	approx. 5 sec.	plastic handle, spiral cable (approx. 1.2m drawn out), DIN-type flat-pin plug	
GKF 250	-50 ... +250°C	**Cable lug probe** 		1 m teflon cable, loose ends	
GLS 500	-50 ... +500°C	**Soldering tip probe** for direct connection to instrument 	approx. 2 sec.	thermo couple springs (~5mm) with laser welded meas. point (wires 0.3 Ø), ceramic tube approx. 6 Ø, DIN-type flat-pin plug	
GTO 130 OK	-65 ... +400°C	**Air-/Gas probe** (changeable probe without cable) limited suitable also for surfaces 		NiCr-Ni-wire 0,5 Ø, welded and grinded flat, V4A-tube, DIN-type flat-pin plug, rigid connection	
GTE 130 OK	-65 ... +400°C	**Insertion probe** (plug-in type without cable) for soft media 	approx. 3 sec.	Flexible stainless steel (V4A) needle, 1.5 mm Ø, DIN-type flat-pin plug, rigid connection	
GTT 1150 OK	-200 ... +1150°C	**Immersion probe** (also suitable for gases/air - use as surface probe limited) 	approx. 3 sec.	Thermowell, Inconel 1.5 mm Ø, **electrically insulated**, flexible, DIN-type flat-pin plug, rigid connection (other length or Ø p.r.t. p. 126)	

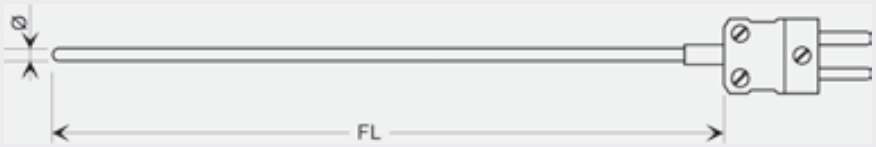
Customized jacket thermo elements NiCr-Ni,
low price standard lengths available from stock

(Delivery on short notice from stock or within 1 or 2 working days) - please do not hesitate to contact us !)

1. Jacket thermo elements NiCr-Ni (type K) complete with miniature flat-pin plug NST1200 (free from thermal e.m.f.)

Specification:

Jacket material: Inconel 600, flexible - other materials upon request
Insulation: highly compressed pure MgO
Thermo wires: NiCr-Ni, DIN IEC 584, welding insulated (volt-free)
Accuracy: 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)
Temperature application range: -220 ... +1150°C (Probe tip and front part; wire outlet: max. 200°C)
(Accuracy class 1 applicable from -40 ... +1000°C)



Upon request:

Miniature flat-pin coupling free from thermal voltage. (Please order separately)
Type NKU 1200

Integral U-coupling (for installation in front panels)
Type NKU 1200 O

Advantages of the flat-pin plug free from thermal e.m.f.:

- 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 to 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		Type	Ø mm	FL mm ±10mm	
GTT05150	0,5	160		GTT30150	3,0	145	
GTT05250		260		GTT30250		245	
GTT05500		510		GTT30500		495	
GTT051000		1010		GTT301000		995	
GTT051500		1510		GTT301500		1495	
GTT10150	1,0	145		GTT60150	6,0	145	
GTT10250		245		GTT60250		245	
GTT10500		495		GTT60500		495	
GTT101000		995		GTT601000		995	
GTT101500		1495		GTT601500		1495	
GTT15150	1,5	145					
GTT15250		245					
GTT15500		495					
GTT151000		995					
GTT151500		1495					

Accessories:

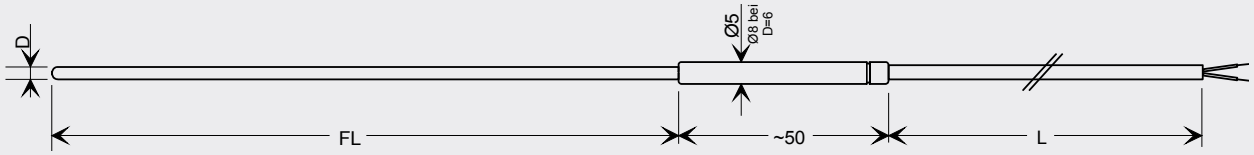
NKU1200	(coupling free from thermal e.m.f.)
NKU1200O	(U-coupling free from thermal e.m.f.)
NST1200	(plug free from thermal e.m.f.)
AGL1	(silicone compensation line)
VKA-1m	plug-in extension cable (each additional meter)

All thermo elements accuracy class 1 (Almost double accuracy than class 2!)

2. Jacket thermo elements NiCr-Ni (type K) complete with cable sleeve and 1m silicone cable (compensation line), loose wire ends

Specification:

Jacket material: Inconel 600, flexible - other materials upon request and against upcharge
Insulation: highly compressed pure MgO
Thermo wires: NiCr-Ni, DIN IEC 584, welding insulated (volt-free)
Accuracy: 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)
Connecting cable: silicone compensation line, 1m long (max. 200°C), loose ends. (Longer line or other material against upcharge)
Temperature application range: -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)



L = 1m, for other cable length or other accessories p.r.t. accessories

Advantages:

- 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))
- Optimum accuracy acc. to DIN IEC584 class 1
- Potential-free (thermoelement wires have no connection to the outer jacket)

Accessories: (against upcharge)

- Additional clamping screw-type connection for Ø 1.5, 3.0 and 6.0 (stainless steel). Design with st. steel clamping piece (for high temperatures) or with teflon clamping piece (up to +250°C - can be removed). Various thread diameters available (p.r.t. page 134-135)
- Extended or other cable (please specify upon order): silicone cable (up to 200°C) or glass silk cable (up to 400°C).
- Internal flat-pin plug (NST1200)

Type	Ø mm	FL mm -20mm		Type	Ø mm	FL mm -20mm	
GTF101-5/05150	0,5	150		GTF101-5/30150	3,0	130	
GTF101-5/05250		250		GTF101-5/30250		230	
GTF101-5/05500		500		GTF101-5/30500		480	
GTF101-5/051000		1000		GTF101-5/301000		980	
GTF101-5/051500		1500		GTF101-5/301500		1480	
GTF101-5/10150	1,0	130		GTF101-5/60150	6,0	130	
GTF101-5/10250		230		GTF101-5/60250		230	
GTF101-5/10500		480		GTF101-5/60500		480	
GTF101-5/101000		980		GTF101-5/601000		980	
GTF101-5/101500		1480		GTF101-5/601500		1480	
GTF101-5/15150	1,5	130		**Accessories:**			
GTF101-5/15250		230		Clamping screw conn. Ø1.5, 3.0 or 6.0			
GTF101-5/15500		480		Silicone cable (up to 200°C)			
GTF101-5/151000		980		Glass silk cable (up to 400°C)			
GTF101-5/151500		1480		Internal flat-pin plug (NST1200)			
				Other accessories see pages 128, 136 and 137.			

Accuracy class 1 for all thermo elements (almost double accuracy than class 2!)

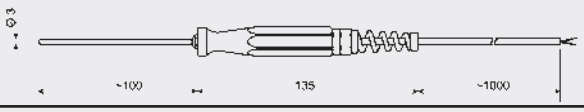
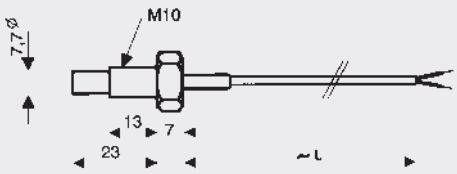
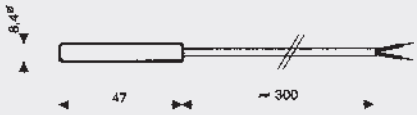
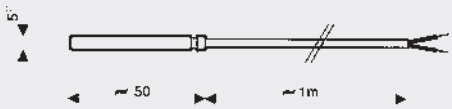
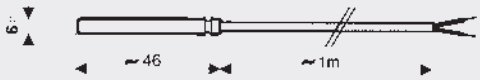
Pt10Rh-Pt (Typ S) - measuring probes (class 1) *for highest temperatures*

Ordering type Measuring range	Application / Dimensions (mm)	Response time T_{90}	further technical details	
GBF 1550 +50 ... +1550°C	**Bunsen burner probe** Probe tip can be directly exposed to the flame. type S - wire 0.5 Ø 	approx. 2 sec.	stainless steel tube Ø8mm, with reduced ceramic tube Ø5.5mm, plastic handle, silicone cable, DIN-type flat-pin plug type "S"	

NiCrSi-NiSi (Typ N) - meas. probes (class 1) *low cost measuring of high temperatures (permanent up to 1300°C)*

GTF101-N03250 -50 ... +1300°C (short-term peaks up to 1330°C)	**Probe for permanent high temperatures** *Mantle material: special steel with extraordinary resistivity against oxidation at high temperatures and excellent corrosion resistance in chlorine and ammoniacial environments (Protective layer emerges at temperatures above 980°C)*	approx. 5 sec.	stainless steel tube (FL=250mm), 1m silicone cable, loose cable ends upcharge for any cable length	
GTF101-N03500			as above, however FL = 500mm	
GTF101-N031000			as above, however FL = 1000mm	
other probes (Typ N) please refer to pages 126 / 127				

Silizium - Messfühler (Sensor: KTY ...)

GTF 1400 B Sensor: KTY 81-210 -20 ... +110°C Replacement for KTY 11-6	**Temperature probe for GPRT1400AN**  **OPTION: teflon covered probe tube** (for use in salt water)	**Sensor tube:** made of V4A, with shrinkable sleeve at cable outlet **Cable:** approx. 1 m of highly flexible silicone cable with Ø 3.5 mm plug	
GMF 11/180 Sensor: KTY 83-110 -50 ... +175°C	**Screw-type sensor M10** 	**Sensor tube:** V4A **Handle:** polyamide **Cable:** approx. 1m of highly flexible cable (2 x 0.25²)	
GMF 15/81 Sensor: KTY 81-121 -50 ... +60°C **GMF 15/180** Sensor: KTY 83-110 -50 ... +60°C	**Immersion/touching/air sensor** 	**Sensor tube:** V4A **Cable:** flexible silicone cable (2 x 0.25²), approx. 1m long	
GMF 30/180 Sensor: KTY 83-110 -50 ... +60°C **GMF 30/210 *** Sensor: KTY 81-210 -50 ... +60°C	 * Replacement for KTY 11-6 in the range -20 ... +60°C	**Sensor tube:** aluminium head, Ø 8.4 mm **Cable:** flexible silicone cable (2 x 0.25²), approx. 30 cm long upcharge per m of silicone cable	
GMF 30/180 V4A Sensor: KTY 83-110 -50 ... +175°C		**Sensor tube:** V4A-head, Ø5 mm **Cable:** approx. 1 m of highly flexible silicone cable.	
GMF 30/81 V4A Sensor: KTY 81-121 -50 ... +150°C		**Sensor tube:** V4A-head, Ø 6 x 46 mm **Cable:** approx. 1 m of silicone cable.	

Probs with Pt100, Pt1000 or KTY 84 upon request.

Accessories p.r.t. page 136-137

Industrial temperature probes (ATEX 100)

For all potentially explosive atmospheres of the equipment-group II with the protection (i) or (e)

GTF 101-Ex

-200°C ... +100°C (without neck tube)
-200°C ... +900°C (with neck tube)

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.


without neck tube, for temperatures ≤100°C


with neck tube, for temperatures >100°C

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 100mm**
Neck tube length: without (without upcharge) **upcharge per starting 100mm**
Probe diameter: 3mm, 4mm, 5mm, 6mm or 8mm
Cable: silicone cable, standard lenght 1m **upcharge per further starting m cable**
Ambient temperature: -20...+60°C (protection type "e") resp. -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 3mm, 6mm or 8mm. Please refer to page 136

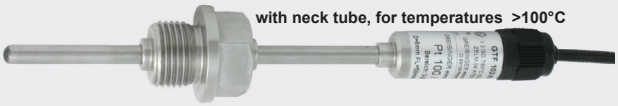
To determine exact order name ask for our type list. Download via homepage possible (Products -->Ex-Protection-->Temperature probes).

GTF 102-Ex

-200°C ... +100°C (without neck tube)
-200°C ... +900°C (with neck tube)

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.


without neck tube, for temp. ≤100°C


with neck tube, for temperatures >100°C

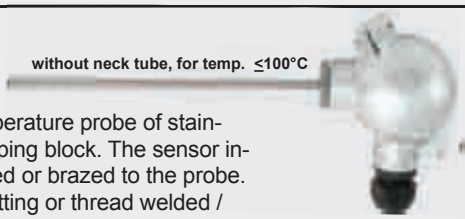
Sensors: Pt100, Pt1000, mineral insulated element, 4-wire: meas. range: -200°C ... +100°C (600°C - with neck tube), DIN cl. B
type K or N, mineral insulated thermocouple: meas. range: -200°C ... +100°C (900°C - with neck tube), class 1
Probe length: up to 100mm (without upcharge) **upcharge per further starting 100mm**
Neck tube length: without (without upcharge) **upcharge per starting 100mm**
Probe diameter: 3mm, 4mm, 5mm, 6mm or 8mm
Thread: G1/2" (standard)
G1/8", G1/4", G3/8", G3/4", M8x1, M10x1
Cable: silicone cable, standard lenght 1m **upcharge per further starting m cable**
Ambient temperature: -20...+60°C (protection type "e") resp. -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

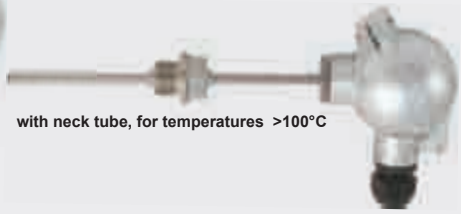
To determine exact order name ask for our type list. Download via homepage possible (Products -->Ex-Protection-->Temperature probes).

GTF 103-Ex

-200°C ... +100°C (without neck tube)
-200°C ... +900°C (with neck tube)

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.


without neck tube, for temp. ≤100°C


with neck tube, for temperatures >100°C

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 (the sensor inset is **not** exchangeable)
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") resp. -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 105), output signal 4-20 mA, measuring range on customers demands
protection type "i" intrinsic safety. For suitable active Ex-barrier please refer to page 106
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 136

To determine exact order name ask for our type list. Download via homepage possible (Products -->Ex-Protection-->Temperature probes).

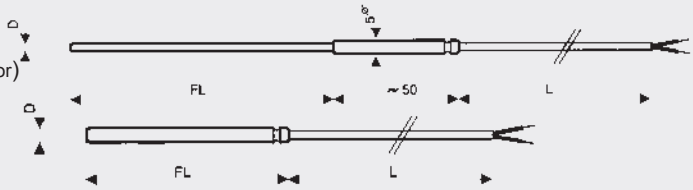
Industrial temperature probes

customized products can only be ordered written and can generally not be exchanged!

GTF 101

-200 ... +1150°C (depending on sensor)

pre-assembled according to customer specification



for Ø3mm, FL=100, L=1m of silicone cable

Final price can only be determined after receipt of customer specification!

Please contact us to find out which dias are available for our various sensors.

Available sensors: Pt100 (2-/ 3- or 4-wire), NiCr-Ni, Pt1000 and others - please contact us!
Measuring range: Pt100/Pt1000: -50 ... +400°C (others upon upcharge), NiCr-Ni: -200 ... +1150°C
Tube material: V4A

FL= please specify probe length upon order (in mm)
Basic price valid up to = 100mm, upcharge each started additional 100mm

D = Ø 0.5 mm to Ø 8.0 mm. - please specify Ø upon order (available Ø: 0.5, 1.0, 1.5, 2.2, 3.0, 4.0, 5.0, 6.0, 6.7, 8.0, 10.0)
At probe diameters below 4 mm an additional sleeve of Ø 5 mm and 50 mm length is mounted.
Basic price valid for D>3mm. Dias < 3mm upon request

L = desired cable length, cable screening (e.g. PVC, silicon, teflon, glass silk etc.) and wire quantity (e.g. 2-, 3- or 4-wire) to be specified on order. *Basic price valid for silicone cable, 1m.*

for upcharge p.r.t. page 137

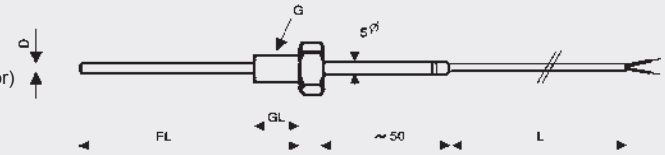
Additional specification: a) temperature range
b) ambient temperature
c) plug or other cable connection

Please note: depending on tube diameter the sensor design may deviate from figure.

GTF 102

-200 ... +1150°C (depending on sensor)

pre-assembled according to customer specification



Final price can only be determined after receipt of customer specification!

Please contact us to find out which dias are available for our various sensors.

Available sensors: Pt100 (2-/ 3- or 4-wire), NiCr-Ni, Pt1000 and others - please contact us!
Measuring range: Pt100/Pt1000: -50 ... +400°C (others upon upcharge), NiCr-Ni: -200 ... +1150°C
Tube material: V4A

FL= please specify probe length upon order (in mm)
Basic price valid up to = 100mm, upcharge each started additional 100mm

D = Ø 0.5 mm to Ø 8.0 mm. - please specify Ø upon order (available Ø: 0.5, 1.0, 1.5, 2.2, 3.0, 4.0, 5.0, 6.0, 6.7, 8.0, 10.0)
Basic price valid for D>3mm. Dias < 3mm upon request

L = desired cable length, cable screening (e.g. PVC, silicon, teflon, glass silk etc.) and wire quantity (e.g. 2-, 3- or 4-wire) to be specified on order. *Basic price valid for silicone cable, 1m.*

for upcharge p.r.t. page 137

G = please specify thread desired: e.g. M5 or G½" etc. **Material:** stainless steel
(Available threads: M5, M6, M8, M10, M12, G1/4", G3/8", G1/2", G3/4", M10x1, M12x1.5, M14x1.5). *Basic price vaild for all threads*

GL = specification only required if max. lengths must not be exceeded; unless this is the case glandings acc. to DIN910 are used; for smaller threads certain standard lengths are used. *Basic price valid for all threads certain*

Additional specification: temperature range, ambient temperature, plug or other cable connection

Ordering example:

GTF102, Pt100, -50...400 °C, FL=100 mm, D=3 mm, KL=1 m, teflon cable, 4-wire
GTF102, NiCr-Ni (type K), -50...1150 °C, FL=300 mm, D=3 mm, KL=2 m, silicone cable

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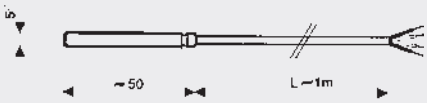
GTF 200 Pt100

-50 ... +200°C, Pt100, 4-wire
Sensor: Pt100, DIN cl.B (±0,3°C at 0°C)



Sensor sleeve made of st. steel
Cable: silicone (4 x 0.14²), approx. 1m
suitable for 2-/ 3- or 4-wire probe

GTF 200 Pt100 WD

-20 ... +105°C, Pt100, 4-wire
tube enclosed water proof!
Sensor: Pt100, DIN cl.B (±0,3 °C at 0 °C)

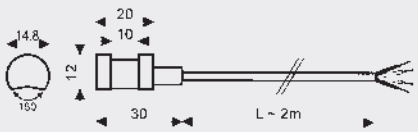
Sensor sleeve made of st. steel
Cable: PVC (4 x 0.14²), approx. 1m
suitable for 2-/ 3- or 4-wire probe

GRO 200 Pt100
GRO 200 Pt1000

-50 ... +200°C, DIN cl.B, 4-wire

GRO 200 K

-50 ... +200°C, **NiCr-Ni (type K)**

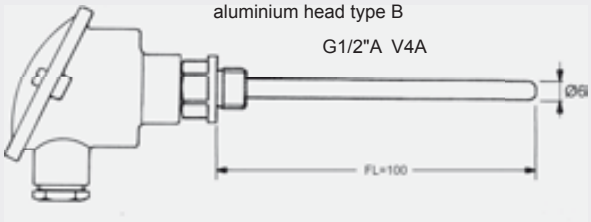


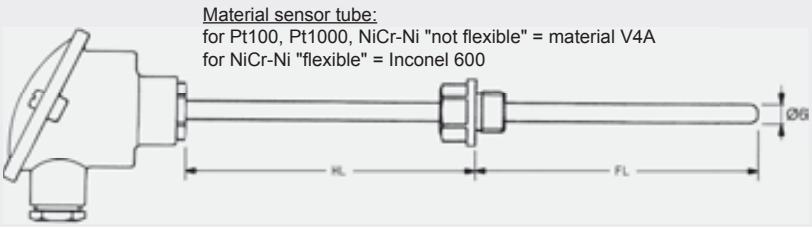
Sensor body made of aluminium
Cable: silicone, approx. 2 m
Probe can be mounted with cable clamp or similar constructions to pipes
For faster heat exchange we suggest our heat-conductive paste **GWL10G**

Industrial temperature probes

customized products can only be ordered written and can generally not be exchanged!
(Del. time from stock or 1 to 2 working days)

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 class B
- -50 ... + 600°C, DIN cl. 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

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", G⅜" (V4A)
- other thread

Tube length: (Pt100/1000 and NiCr-Ni)
- Probe length "FL" up to 100mm
- 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)

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 mmm)

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 4-20mA, measuring ranges p.r.t. page 100
(to be stated on order!)

... / T03 BU with transducer for Pt100,
Output signal 0-10V, measuring ranges p.r.t. page 99
(to be stated on order!)

... / GITT with electrically isolated transducer
for Pt100/1000, NiCr-Ni, output signal 4-20mA, measuring range to be stated on order! (p.r.t. page 105)

other design types upon request

Probe with elbow-type plug

GTF 104 ...
Please state probe length (FL) at order

- **protection tube made of stainless steel**
- **different length available**
- **applicable for**
  - refrigeration engineering
  - heating installations / furnace construction
  - apparatus construction

GKV
Clamping ring screw connection (p.r.t.p. 134)

Specifications:
Sensor:

Pt100:	4-wire, sheath element Measuring range: -50 ... +600 °C
NiCr-Ni:	type K, class 1, sheath element Measuring range: -50 ... +1150 °C
Pt1000:	upon request
Diameter:	D = 6 mm
Probe length:	FL = 50 / 100 / 200 / 400 mm
Electric connection:	type plug acc. to DIN EN 175301-803 (max. 70°C)

GTF 104 Pt100

FL	50 mm	100 mm	200 mm	400 mm

GTF 104 K (NiCr-Ni, type K)

FL	50 mm	100 mm	200 mm	400 mm

water proof, hermetically sealed temperature probes

for use in aggressive environments and tight places

Advantages:

- highly resilient to chemicals and oils
- sealed against moisture and corrosion
- easily cleaned and sterilised
- food safe
- 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.

Design type Pt100

TF101P-1m Pt100, cable length 1 m
TF101P-2m Pt100, cable length 2 m
TF101P-3m Pt100, cable length 3 m

- flexible sealed PFA Pt100 sensor
- 4-wire-connection (4 x 0.14 mm², nickel-plated copper)
- nominal diameter: 2.1 mm
- accuracy according to DIN class A
- measuring range: -60 ... +250 °C
- also available with Pt1000

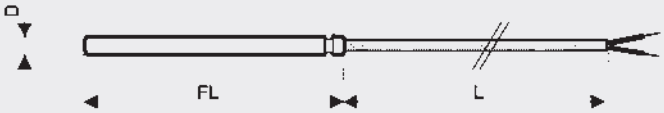
Design type NiCr-Ni (type K)

TF101K-1m NiCr-Ni, cable length 1 m
TF101K-2m NiCr-Ni, cable length 2 m
TF101K-3m NiCr-Ni, cable length 3 m

- 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 mm²)
- nominal cross section: 1.6 mm x 2.5 mm
- measuring range: -270 ... +250 °C
- IP68 seal-welded tip
- electrically-insulated junction
- also available with thermocouples type J, T and E

Option:

- Water proof probe with robust V4A protective tube
Ø 3 mm, FL = 50 mm



Average temperature probe

MWF 100 Pt100 (2-, 3- or 4-wire)

General description

The bendable average temperature probes are measuring the average temperature over the whole length of the probe and not like the standard probes only on the sensor tip.
There are short probe length of a little centimetres as well as length of any metres (e.g. 30 m) feasible.

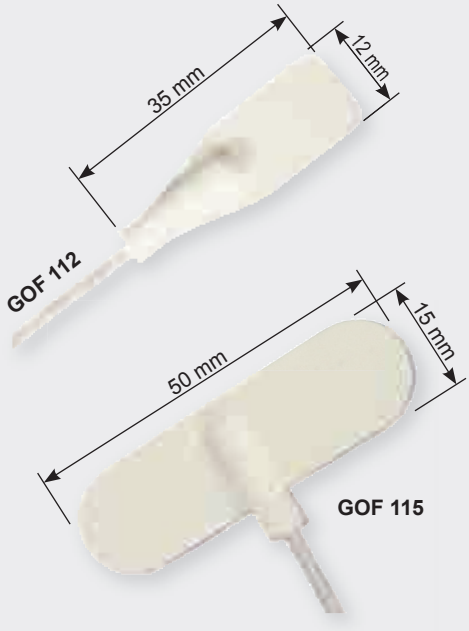
Application area: Measuring of the average value at long heating or cooling elements, air ducts etc.

Tell us your requested application. We will offer you the an individual sensor construction !

Self-adhesive temperature probes

with moulded silicone design for surface measurement on curved and flat surfaces

GOF 112 Pt Pt100, 35 x 12 mm, cable length 2 m, white
GOF 112 K NiCr-Ni, 35 x 12 mm, cable length 2 m, green
GOF 115 Pt Pt100, 15 x 50 mm, cable length 2 m, white
GOF 115 K NiCr-Ni, 15 x 50 mm, cable length 2 m, green



Advantages:

- 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

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 mm²)
- temperature range: -50 ... +200 °C
- also available with thermocouples type J, T and E

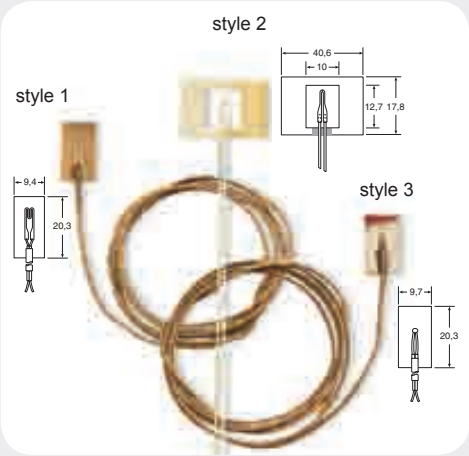
"Cement-On" thermocouples

General description

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 courved 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.



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)

Highlights:

- ultra fast response time
  (style 1: t_{63} = approx. 20 ms, style 2: approx. 5 ms, style 3: approx. 300 ms)
- very low thermal inertia
- also available with thermocouples type J (only design 3), T and E
- style 1 and 3 optionally available with other lengths

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 GHM Industrial probes brochure.

GTL ...

Probes according to customer specification

Measuring range:	-40 ... +200°C (depending on probe construction)
Sensor:	Pt 100
Process connection:	M12 / G1/2" / without thread
Probe head:	probe head Ø 59 mm probe head Ø 18 mm Long (with transmitter) probe head Ø 18 mm Short (without transmitter)
Material:	sensor head: V2A, protection tube and peak: V4A
Probe length:	according to customer specification (in mm)
Diameter:	Ø 6 mm without contraction Ø 4 mm without contraction Ø 6 mm with offset probe peak Ø 3 mm
Response Time:	Peak Ø 6 mm: $T_{90} \leq 8{,}0$ s Peak Ø 4 mm: $T_{90} \leq 6{,}5$ s Peak Ø 3 mm: $T_{90} \leq 1{,}5$ s
Protection class:	IP69K / IP67
Options:	Neck tube Electr. connection: fixed cable (PG) or M12-plug Integrated transmitter Higher accuracy (1/3 DIN Kl. B or 1/10 DIN Kl. B) Display

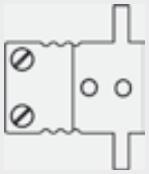
Accessories

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			st. steel	
GKV3		3,0 mm	Teflon	
GKV4			st. steel	
GKV5	G1/4"	1,5 mm	Teflon	
GKV6			st. steel	
GKV7		3,0 mm	Teflon	
GKV8			st. steel	
GKV11		6,0 mm	Teflon	
GKV12			st. steel	
GKV9	G1/2"	6,0 mm	Teflon	
GKV10			st. steel	
GKV13		8,0 mm	Teflon	
GKV14			st. steel	
GKV15		14,0 mm	Teflon	
GKV16	M10x1	6,0 mm	st. 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

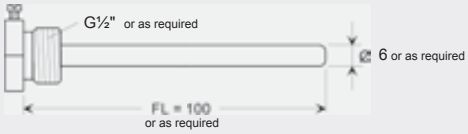
NKU 1200
NKU 1700

NST 1200 "K"
NKU 1200 "K"
NKU 1200 O "K" (max. 120°C)
NST 1300 "N"
NST 1700 "S"
NKU 1700 "S"

For higher temperatures use ceramic plug and coupling - price upon request.

3. Immersion sleeve of stainless steel

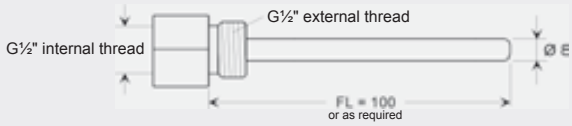
3.1. Immersion sleeve EST01 for all probes without thread .



Basic price for 100mm

standard: G1/2", FL=100mm, outside-Ø = 6mm
for probes with 5mm 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.



Basic price for 100mm

standard: G1/2" (internal/external), FL=100mm,
outside-Ø = 8mm for probes with 6mm 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

4. Cables and lines

4.1. Silicone cable (max. 200°C) with teflon screened wires

S2P: silicone cable, 2-pole (2 x 0.25 mm²), highly flexible
S4P: silicone cable, 4-pole, 4 x 0.14² cross section (insulation 2 x blue, 2 x white)
(can also used as 3-wire)

4.2. Glass silk insulated cable (max. 400°C) with stainless steel braiding

G2P: glass silk insulated cable, 2-pole (2 x 0.22 mm²)
G3P: glass silk insulated cable, 3-pole (3 x 0.22 mm²)
G4P: glass silk insulated cable, 4-pole (4 x 0.22 mm²)

4.3. Teflon insulated cable (max. 250°C) with individual teflon insulated wires

T2P: teflon insulated cable, 2-pole (2 x 0.14 mm²)
T3P: teflon insulated cable, 3-pole (3 x 0.14 mm²), with additional cable screen
T4P: teflon insulated cable, 4-pole (4 x 0.14 mm²), with additional cable screen

4.4. PVC-lines (max. 70°C)

P2P: PVC cable, 2-pole (2 x 0.14 mm²)
P3P: PVC cable, 3-pole (3 x 0.14 mm²)
P4P: PVC cable, 4-pole (4 x 0.14 mm²)

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 mm²) (max. 200°C)
AGL3: Thermo wire (can also be used as thermo couple) glass silk (2 x 0.5 mm²) (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 mm²) (max. 250°C)

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/... and GTF 103HT-S)

GMFL: acc. DIN 43734, adjustable, to clamp to 15mm stainless steel pipes, sliding

6. Sensor elements (Pt100/1000, NTC´s, PTC´s) NiCr-Ni p.r.t. pages 126-127

Type:	Description, dimensions	meas. range	tolerance
Pt100/1	Ceramic lamina, 2 x 2.3 x 0.6 mm	-50 ... +500°C	B
Pt100/2	Ceramic lamina, 2.5 x 2.0 x 1.3 mm	-50 ... +500°C	1/3 DIN
Pt100/3	Ceramic lamina, 2 x 5 x 0.9 mm	-196 ... +500°C	B
Pt100/4	Wound design, Ø2 x 20 mm	-200 ... +600°C	B
Pt100/5	TO92-housing	-50 ... +150°C	B
Pt100/6	Ceramic lamina, 1 x 3 x 0.6 mm	-50 ... +500°C	B
Pt1000/1	Ceramic lamina, 2 x 4 x 0.9 mm	-50 ... +400°C	B
Pt1000/2	TO92-housing	-50 ... +150°C	B
Pt1000/3	Ceramic lamina, 1 x 3 x 0.6 mm	-50 ... +500°C	B
KTY 81-210	Replacement for KTY 11-6	-20 ... +110°C	
KTY 81-121	1kOhm (25°C), TO92-housing	-50 ... +150°C	
KTY 83-110	1kOhm (25°C), DO-34-housing	-50 ... +175°C	
KTY 84-130	1kOhm (100°C), DO-34-housing	-40 ... +300°C	

Other sensors upon request

Alarm and Protection Devices

	Application								
	Universal Application	Level controler	Water leak detector	Electrodes incl.	Alarm buzzer	Switching output	Water supply is switched of	Description	Page
ALARM DEVICE									
MINAL 182	✓		✓		✓			Miniature alarm device (Battery operation)	139
MINAL 282 BN	✓		✓		✓			Miniature alarm device (Battery / mains operation)	139
ALARM AND PROTECTION DEVICE (Home- and Handicraft)									
ALSCHU 480	✓		✓		✓	✓		Alarm and protection device (switching output via SCHUKO socket)	140
ALSCHU 480 P	✓		✓		✓	✓		Alarm and protection device(potential-free switching output and SCHUKO socket is current-carrying)	140
ALSCHU 485		✓		✓	✓	✓		Electrode control device incl. two 2-pin electrodes	140
ALSCHU 485 OE		✓			✓	✓		Electrode control device with connection for two 2-pin electrodes	140
ALSCHU 485 OE / 3P		✓			✓	✓		Electrode control device with connection for two 3-pin electrodes	140
GEWAS 181 A			✓	✓	✓	✓	✓	Water leak detector with ½" brass solenoid valve with ¾" connections for switch-off	141
GEWAS 183 A			✓	✓	✓	✓	✓	Water leak detector without solenoid valve, with switch-off	141
GEWAS 181 A - ½"			✓	✓	✓	✓	✓	Water leak detector with ½" brass solenoid valve and switch-off	141
GEWAS 181 A - ¾"			✓	✓	✓	✓	✓	Water leak detector with ¾" brass solenoid valve and switch-off	141
GEWAS 181 A - 1"			✓	✓	✓	✓	✓	Water leak detector with 1" brass solenoid valve and switch-off	141
GEWAS 191 N			✓	✓	✓		✓	Water leak detector with ¾" solenoid valve	142
GEWAS 191 AN			✓	✓	✓	✓	✓	Water leak detector with ¾" solenoid valve and switch-off	142
ALARM AND PROTECTION DEVICE (Industry)									
GEWAS 200	✓					✓		Alarm and protection device for panel mounting	142
GEWAS 300 SG	✓					✓		Alarm and protection device for panel mounting	143
GEWAS 300 FG	✓				✓	✓		Alarm and protection device in field housing	143
ALSCHU 300 SG	✓	✓				✓		Alarm and protection device for panel mounting	139
ALSCHU 300 FG	✓	✓				✓		Alarm and protection device im field housing	139
LEVEL MONITOR									
GMNV-1C								Level module (- detector)	144
GNS 20E - 200								Limit detector	144
GNS 20E - 500								Active output	144
GNS-3P-SLV								Level monitor with micro-switch / reed contact	145
GNS-3P-SLK								Level monitor with micro-switch / reed contact	145
GNS-3P-SLE								Level monitor with micro-switch / reed contact	145
GNS-3P								Level monitor with micro-switch / reed contact	145
GSS-F25								Level monitor with micro-switch / reed contact	145

Miniature alarm device for universal application battery or mains operation

MINIATURE ALARM DEVICE
for universal application

MINAL 182
Battery operation

MINAL 282 BN
Battery/mains operation

Devices without sensors

Application: extra loud alarm (more than 100 dB at 1 m distance), hence suitable for decentralised use (eg 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. 105 g (incl. battery - without sensor)

Accessories:

GNG 09 - 3.5KS power supply

GWF-1S plug-in water sensor, 2m

GWF-1S / 5m plug-in water sensor, 5m

GWF-1S / 10m plug-in water sensor, 10m

GAZ-1 branch adapter (required for each additional water sensor)

VEKA 2 extension cable 2m

VEKA 5 extension cable 5m

VEKA 10 extension cable 10m

Electrode controller with two signal inputs in 2 different mounting forms

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

Applications:

Automatic control of drainage pumps and waste-water 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.

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". 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.

Specifications:

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:	connection 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:

GNS-3P (p.r.t. page 117)
3-pole level probe

GNS-3P-S.. (p.r.t. p. 117)
3-pole level probe with coating

GSS-1 level sensor, 2m 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

Protection device for universal application with switching output for any purpose Available as plug-in

ALARM PROTECTION DEVICE with or without alarm transmitter and relay switching output (changeover contact)

ALSCHU 480

plug-in for 230V~ (with grounding contact adapter plug)

ALSCHU 480 P

as above, but with volt-free switching output

Description:

The ALSCHU 480(P) is a versatile alarm and protection device. Its universal input (3.5mm jack bush) allows a lot of different external sensors to be connected. That includes sensors with a switching threshold <100kOhm 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:

Power supply:	220/240V 50/60Hz
Power consumption:	approx. 1 VA
Sensor input:	3.5mm jack bush
Switching threshold:	input resistance <100kOhm
Switching output:	
480:	via isolated ground receptacle (Schuko)
480P:	potential-free normally open/closed contact via 2-pole cable, brought out 0.5m
Switching function:	
I:	switching out put current-carrying in alarm condition
II:	switching output currentless in alarm condition
Switching power:	
480, 480P:	250VAC, 10A (ohmic load), max. 2400VA
480P:	120VDC, 2 A (ohmic load), max. 240W
Controlling device:	
dimensions:	112 x 71 x 48mm (L x W x H),
Working conditions:	-20…50°C / 0…80% RH

LED for operation display, device-on/off, selector switch I / II for switching function

Accessories:

GWF-1S plug-in water sensor, 2m

GSAS-1S plug-in, self-adhesive magnetic contact

Plug-in level controller no moving parts at all

ELECTRODE CONTROL DEVICE for filling or emptying

ALSCHU 485

ALSCHU 485 OE

(as above, but without electrodes - connect. for two 2-pin. electrodes)

ALSCHU 485 OE / 3P

(as above, but without electrodes - connection for 3-pin electrode)

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. etc..

Specification:

Control device:	housing 112 x 71 x 48 mm. Flashing LED indicating control state. Selector switch for emptying or filling. Plug-in socket for electrodes.
Power supply:	control device 230 V 50 Hz approx. 1 VA, automatic by connecting grounded adaptor plug.
Control output:	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.
Electrodes:	standard design: plug-in, stainless steel pins, plastic body and 2 m of PVC cable (any lengths against upcharge)

Please note: for media leaving residues (such as salt water, sewage etc.) we recommend a 3-pin electrode.

Accessories:

GNS-3P level probe 3-pin
standard length: 15 cm,
switching distance: 1cm, 2m cable
further information p.r.t. page 145

No more water damage !

GEWAS 181 A

leak-water detector with ½" brass solenoid valve with ¾" connections for hand installation, water sensor, alarm buzzer and switch-off of connected units 16A, 230V~

GEWAS 183 A

leak water detector without solenoid valve, with water sensor, alarm buzzer and switchoff of connected devices 16A, 230V~

GEWAS 181 A - ½"

leak water detector with ½" brass solenoid valve (flow quantity: approx. 20 l/Min, instal-lation length approx. 55mm) for installation in the line, water sensor, alarm buzzer and switch-off of connected devices 16A, 230V~. Device is capable to drive more valves.

GEWAS 181 A - ¾"

leak water detector with ¾" brass solenoid valve (flow quantity: approx. 91.5 l/Min, installation length approx. 80mm) for installation in the line, water sensor, alarm buzzer and switch-off of connected devices 16A, 230V~

GEWAS 181 A - 1"

leak water detector with 1" brass solenoid valve (flow quantity: approx. 141.5 l/Min, installation length approx. 95mm) for installation in the line, water sensor, alarm buzzer and switch-off of connected devices 16A, 230V~

Application:

Any devices or machines with water connection. For direct mounting of solenoid valve in pipelines.

Electric specification:

Solenoid:
100 V DC, approx. 2 W. Full load of approx. 8 watt available when start button is pressed at approx. 200 V DC. 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.

Water sensor:
Highly sensitive, plug-in water sensor, 2 m of cable, alarm triggered as of ½ 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.

Alarm triggering:
Solenoid closing in case of alarm, buzzer sounding and machine connected will turned off by means of a single-pole one-way switch.

Control device:
112 x 71 x 48 mm (H x W x D) with suspension hook. Operating lamps, double-pole switch, start button, alarm buzzer, approx. 1 m of connecting cable with earthing pin plug and socket. Socket (16 A 230 V~) is alarm triggered, i.e. the device plugged-in will be disconnected in case of alarm.

Power consumption:
Approx. 3 W only due to energy-saving circuit of solenoid valve.

Specification:

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 ½", 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).

Spare or additional solenoid valves:

GMV-½" L	spare solenoid valve ½" for direct cable connection, approx. 1m cable, loose ends
GMV-½" H	spare solenoid valve ¾" manual mounting, approx. 1m cable, loose ends
GMV-¾"	spare solenoid valve ¾" for direct cable connection, approx. 1m cable, loose ends
GMV-1"	spare solenoid valve 1" for direct cable connection, approx. 1m cable, loose ends
GMV-½" EZL	add. solenoid valve 1/2" for direct cable connection, with power saving connector, approx. 2W, for direct connection to 230VAC, suitable for GEWAS183A or mains operation
GMV-½" EZH	like before, but ¾" valve for manual mounting
GMV-¾" EZ	like before, but ¾" valve for direct cable connection
GMV-1" EZ	like before, but 1" valve for direct cable connection

Accessories:

Plug-in water sensor, socket outlet adapter, extension cable p.r.t. GEWAS 191

No more water damage !

24-hour supervision of your washing machine and/or dish washer or any other devices using water.

WATER LEAK DETECTOR WITH SOLENOID VALVE

GEWAS 191 N

cpl. and ready for use incl. controller, water probe, solenoid, signal buzzer

GEWAS 191 AN

cpl. as above but equipped with switch-off mechanism for supervised device in case of alarm (up to 16A, 220 V 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.)

Installation:
easy to install - even for unskilled persons - in two minutes without any additional parts or tools being required.

Solenoid valve:
glass-fibre reinforced polyamide (also used for washing machines). Extra low voltage for safety 12 V DC. Screw connections 3/4" for direct mounting to water tap or any other standard washing machine or dish washer connecting tube 1/2 " with 3/4" wing/union nut at valve outlet. Valve closes automatically in case of power failure. (Min. pressure difference between inlet and outlet: feed pressure min. 0.5 bar over discharge pressure)

Water sensor:
highly sensitive plug-in water probe, 2 m cable. Alarm triggered as of 1/2 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.

Alarm triggering:
in case of an alarm the valve closes, the signal buzzer is sounding and the device connected is switched off (only for GEWAS 191 AN - single pole one-way switch)

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, i.e. up to 16 A (ohmic load) and 220 V 50 Hz will be switched off in case of alarm.

Power consumption: approx. 3 W only using energy-saving circuitry.

Accessories and spare parts:

GMV191 spare solenoid
GWF-1S plug-in water sensor, 2m
GWF-1S / 5m plug-in water sensor, 5m
GWF-1S / 10m plug-in water sensor, 10m
GAZ-1 branch adapter (required for each additional water sensor)
VEKA 2 extension cable 2m
VEKA 5 extension cable 5m
VEKA 10 extension cable 10m

Protection device for universal application with switching output for any purpose panel mounted device

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

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 <100kOhm 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:	220/240V 50/60Hz
Power consumption:	approx. 3 VA
Sensor input:	2-pole screw terminal
Switching threshold:	input resistance <100kOhm
Switching output:	potential-free change-over contact
Switching power:	250VAC, 10A (ohmic load), max 2400VA 150VDC, 2A (ohmic load), max 240W
Controlling device:	dimensions: 49 x 96 x 59mm (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

Options:

- 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, 2m
GSS-1 level probe (plug-in float switch) 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 in 2 different mounting forms

GEWAS 300 FG Water monitor in **field frame** for wall mounting – device without sensor

GEWAS 300 SP 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 kOhm 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 of 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:

Power supply: 18 V … 250 V AC/DC
wide-range power supply
Power consumption: < 2 VA

1 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)

external alarm output:
only GEWAS 300 FG: 8 V, 3 kHz, ≤ 5 mA

Protection class:
ALSCHU 300 SP: IP20
ALSCHU 300 FG: IP65

Electric connection:
GEWAS 300 SP: connection via screw-type terminal
GEWAS 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:
GEWAS 300 SP: snap-on housing for DIN rail mounting 22.5 x 75 x 110 mm (W x H x D)
GEWAS 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, status of battery
Acoustic alarm: internal alarm buzzer with battery back-up (only for GEWAS 300 FG)
Battery back-up: Monitoring and acoustic alarm are ensured even e.g. during power failures (only for GEWAS 300 FG)
Alarm reset: alarm reset by
GEWAS 300 SP: connection for external push-button
GEWAS 300 FG: push-button at front side

Accessories:

GWF-1 water sensor without plug, 2m cable

GWF-1/5m water sensor without plug, 5m cable

GWF-1/10m water sensor without plug, 10m cable

GSS-1 level sensor, 2m 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

Level module conductive

Figure with option rail adapter

GMNV-1C

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:

Electrode connection:	2-wire
Sensitivity:	0.1, 1, 10, 100 kOhm (selectable by jumpers)
Auxiliary voltage:	15 … 36 V DC
Output:	active output
Output voltage:	auxiliary voltage - 10%
Max. output current:	50 mA (short-circuit proof)
Switching function:	full / empty detector (selectable by jumpers)
Delay:	0.5 seconds
Working conditions:	-10 … + 60 °C 0 … 95 % r.F. (non-condensing)
Storage temperature:	-20 … + 60 °C
Electric connection:	via screw-type terminals
max. wire diameter:	2.5 mm²
Housing:	plastic
Dimensions:	Ø 44 x 20 mm (incl terminals)
Mounting hole:	Ø 4.5 mm
Mounting distance:	~ 33 mm (suitable for DIN B head)
Weight:	35 g
Options:	rail adapter

Limit detector conductive

GNS 20E-200
GNS 20E-500

Available from second quarter of 2013

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
- overfill protection
- protection against dry running

Specifications:

Sensitivity:	0.1, 1, 10, 100 kOhm (selectable by jumpers)
Auxiliary voltage:	15 … 36 V DC
Output:	active output
Output voltage:	auxiliary voltage - 10%
Max. output current:	50 mA (short-circuit proof)
Switching function:	full / empty detector (selectable by jumpers)
Delay:	0.5 seconds
Working conditions:	-10 … + 60 °C 0 … 95 % r.F. (non-condensing)
Storage temperature:	-20 … + 60 °C
Electric connection:	via screw-type terminals
max. wire diameter:	2.5 mm²
Cable feedthrough:	for cables with diameter 5 – 14 mm
Connection head:	aluminum DIN B head
Dimensions:	approx. 70 x 80 x 100 mm
Thread:	G ½ “ (stainless steel)
Protection class:	IP67
Electrode:	stainless steel
Dimensions:	…-200: Ø 3 x 185 mm …-500: Ø 3 x 485 mm
Total length:	…-200: approx. 220 mm (till thread end) …-500: approx. 520 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
- EN 175301-803/A plug
- For all industrial, beverage and food applications
- Alarm or level regulation or dosage of liquids
- Protection class IP65
- Combined with control electronics (ALSCHU 300, ALSCHU 485 OE / 3P or MINAL) an accurate liquids level control system

Specification

Number of electrodes:	3 Piece
Lenght of electrodes:	1000 mm Probes can be cutted to needed lenght.
Electrical connection:	EN 175301-803/A Plug
Process connection:	G 1", Polypropylen
Pressure max.:	6 bar
Temperature max.:	+100 °C
Protection class:	IP65

Dimensions:

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

Please note: 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

Number of electrodes:	3 Piece
Lenght of electrodes:	150 mm, other length upon request, probes can be cutted to needed lenght.
Electrical connection:	2 m cable
Switching distance:	10 mm

Options:

other length available
Upcharge each beginning 10cm

Teflon covered staffs
only tip is uncovered (for electrodes used in salt water, ...)

Dimensions:

Elektrodenlänge:	150 mm
Elektrodendurchmesser:	3 mm
Elektronikbox:	55 x 35 mm (B x H)

Accessories

ALSCHU 485 OE / 3P
(p.r.t.p. 137) Electrode control device connection for 3-pin electrode

ALSCHU 300 ...
(p.r.t.p. 137) Electrode controller in 2 different mounting forms: field frame or snap-on housing

Level Switch

Standard Unit

GSS-F25

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.

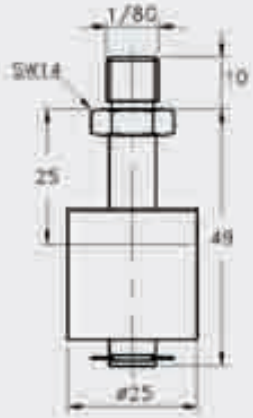
The working principle is based on the movement of the magnetic float which drives the reed switch inside the level-stem. The cable and switch are epoxy sealed inside the stem and the sealing process is produced by a temperature controlled heating system.

A rugged and free of maintenance product.

- Constructions up to 180°C working temperature on request
- Protection class IP65
- Constructions ATEX on request

Specification

Float	PVDF
Density (S.G.)	≥ 0,65 g/cm³
Stem	PVDF
Pressure max.	6 bar
Temperature max.	130 °C
Contact	SPST (NO)
Power:	70 VA / 50 W
Voltage:	300 V AC / 300 V DC
Current:	0,5 A AC / 0,7 A DC
Cable	3,0 m
Connection	1/8"
Switching difference:	25 mm
Accuracy Switching point:	±3 mm
Working ambient temp.:	-30/+55°C / RH 90%



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 ...

GHM MESSTECHNIK

GREISINGER electronic · HONSBERG INSTRUMENTS · Martens Elektronik · IMTRON Messtechnik

Following the merger of the companies GREISINGER electronic, Honsberg Instruments and Martens Elektronik in 2009, GHM Messtechnik was established, thus providing enhanced competence for all aspects of measurement and industrial electronics. In March 2010, Imtron Messtechnik was integrated as fourth company into the GHM group.

With approx. 200 employees and more than 30 developers at the four locations Regenstauf, Remscheid, Barsbüttel and Owingen, we are offering an extensive product portfolio for the requirements of the following segments:

Laboratory Measurement
Industrial Electronics
Process Engineering
Industrial Measurement
Test Bench Measurement

www.ghm-messtechnik.de

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GREISINGER
electronic

GREISINGER electronic GmbH
D - 93128 Regenstauf • Hans-Sachs-Straße 26
☏ +49 (0) 94 02 / 93 83 - 0 www.greisinger.de
+49 (0) 94 02 / 93 83 - 33 info@greisinger.de

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