Measuring, Controlling, Regulating

Probes, Measuring Transducers, Panel-Mounted Digital Controllers, Display Units, Data Logger, Bus System and Hand-Held Meters for

Temperature, Pressure, Humidity, Level/Fill Level, Flow/Flow rate, pH, Redox, Conductivity, Oxygen etc.

2001
2002

LGA InterCert
Zertifiziertes QM-System
ISO 9001

GREISINGER electronic GmbH
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GREISINGER electronic GmbH

The GREISINGER-electronic GmbH was founded in Regenstauf on January 1, 1980 and has now been existing for over 21 years.

Greisinger electronic plant

Our aim is the development and production of measuring and control equipment including suitable sensors.

Production occupies a working area of approx. 2250 m².

About 50 employees develop and produce out high-quality and yet low-price devices using the most up to date development, production and inspection equipment.

Our EMC test laboratory

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 airconditioned 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 led back to national references and are permanently controlled.

Most of our products also can be ordered with Calibration or DKD Certificates (p.r.t. page 3) to fulfill Your qualitiy requirements according to ISO9000.

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21 years GREISINGER-electronic

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 21 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. 'Just in time' for the new millennium we obtained our ISO 9001 certification documenting to the world the internal quality strategy we followed for our customers.
We would like to express our thanks to all of our customers, especially those who have been with us from the beginning and would be very pleased indeed to be able to include You in the group of our well satisfied customers in the near future.

LGA InterCert
Zertifizierungsgesellschaft mbH
Umweltgutachterorganisation

QM-Zertifikat

Die LGA InterCert Zertifizierungsgesellschaft mbH, nach der europäischen Norm EN 45012 akkreditierte und anerkannte Zertifizierungsstelle für Qualitätsmanagementsysteme, bescheinigt hiermit, daß das Unternehmen

GREISINGER
electronic GmbH

ein

Qualitätsmanagementsystem

nach

DIN EN ISO 9001

Qualitätsmanagementsysteme
Modell zur Qualitätssicherung/QM-Darlegung in Design, Entwicklung, Produktion, Montage und Wartung

eingeführt hat und anwendet.

Durch ein Zertifizierungsaudit der LGA InterCert Zertifizierungsgesellschaft mbH wurde der Nachweis erbracht, daß das QM-System des Unternehmens die Anforderung des obengenannten Standards (Ausgabe: August 1994) erfüllt.

Gültigkeit des Zertifikates bis 11. Januar 2003 — Registriernummer: 1790768

Nürnberg, den 12. Januar 2000

Dr. Herbert Kohl
Hauptgeschäftsführer

TGA-ZO-004/91-00

Andrew Töpfer
Geschäftsführer

Calibration

Calibration, Works Calibration Certificate, DKD Certificate all from one hand

1. **ISO Calibration Certificate (Works Calibration Certificate)**
   For measurings according to the DIN EN ISO 9001 ISO calibration certificates are necessary for the complete measuring chain (instruments plus sensors).
2. **DKD calibration certificat**
   On request You can get a DKD certificate. This gives You absolute security - even at legal arguments.

DKD-certificates / Certificates of calibration - for ISO 9001

(based on demenstic standards)

Certificate of calibration:

Temperature:

Certificate of calibration each measuring point (from -20 to +500°C) **basic price:**

Certificate of calibration WPT2
Calibration with standard values: 0°C / +70°C

Certificate of calibration WPT3
Calibration with standard values: -20°C / 0°C / +70°C

Humidity:

Certificate of calibration WPF4
incl. standard-meas. values (approx. 20% / 40% / 60 / 80% r.h. increasing and decreasing)

Pressure:

Certificate of calibration WPD5
Certificate of calibration for 5 points increase, 5 points decrease

Certificate of calibration WPD10
certificate of calibration for 10 points increase, 10 points decrease

Conductivity:

Certificate of calibration WPL10
10 points from 0.9µS/cm to 197.5 mS/cm

pH:

Certificate of calibration WPP10
10 points from 1.09pH ro 12.92 pH

DKD calibration certificates:

Temperature:

DKD-certificate each measuring point **basic price: as of**

Pressure:

Basic price **as of**
incl. 10 points increase and decrease

We recommend ordering a storage case for each device (description and price see device).

All included:

GTH175/Pt - WPT3 (immersion probe)
incl. certificate of calibration WPT3 and case GKK252. measuring points: -20°C / 0°C / +70°C

GTH175/Pt-E - WPT3 (insertion probe)
incl. certificate of calibration WPT3 and case GKK252. measuring points: -20°C / 0°C / +70°C

GFTH100 - WPF4
incl. certificate of calibration WPF4 and case GKK252. measuring points: ~20% / ~40% / ~60% / ~80%r.h. increasing and decreasing.

GMH3330 incl. TFS0100 - WPF4 (no picture)
incl. certificate of calibration WPF4 and case GKK3500. measuring points: ~20% / ~40% / ~60% / ~80%r.h. increasing and decreasing.

GMH3160-07/-12/-13 - WPD5
incl. certificate of calibration WPD5 and case GKK3000. Measuring points: 5 points increase, 5 points decrease

GMH3160-07/-12/-13 - WPD10
incl. certificate of calibration WPD10 and case GKK3000. Measuring points: 10 points increase, 10 points decrease

Double/difference quick-response thermometer for 5 different thermocouples!

- 2 plug-in probes can be connected and read simultaneously
- Measuring of temperature differences (probe1 - probe 2) 0,1° or 1° resolution possible.
- 5 different thermocouples can be used! (types K, J, N, S, T)
- Temperature differences can also be measured on metal surfaces and in liquid with non volt-free probes!
- Correction of meas. values for surface meas. can be switched on / off
- Serial interface
- Device can be connected to a bus system (up to 5 devices can be connected to one PC interface)
- Min./Max. value memory, Hold function
- Battery and d.c. operation
- Tare/diff-function
- Zero-point offset entry for each probe

GMH 3230 access. not incl.

Digital-precision quick-response thermometer for thermo-couples simultaneous connection of 2 plug-in probes (p.r.t. p. 7, 14, 15, 90/91)

Specification :

Thermocouples: K, J, N, S, T

Measuring ranges:

Type K: (NiCr-Ni) -199,9 ... +999,9°C or -220 ... +1370°C
(-199,9 ... +999,9°F or -364 ... +2498°F)

Type J: (Fe-CuNi) -120,0 ... +700,0°C or -200 ... +1100°C
(-184,0 ... +999,9°F or -328 ... +2012°F)

Type N: (NiCrSi-NiSi) -199,9 ... +999,9°C or -200 ... +1300°C
(-199,9 ... +999,9°F or -328 ... +2372°F)

Type S: (Pt10Rh-Pt) -0,0 ... +999,9°C or -50 ... +1750°C
(32,0 ... +999,9°F or -58 ... +3182°F)

Type T: (Cu-CuNi) -120,0 ... +400,0°C or -200 ... +400°C
(-184,0 ... +752,0°F or -328 ... +752°F)

Resolution: 0,1°C or 1°C (0,1°F or 1°F)

Accuracy: (for thermocouples acc. to DIN EN 60584)
±1digit (at nominal temperature)

Type K: -199,9 ... +999,9°C: ±0,03% of m.v. ±0,05% f.s. (T≥-60°C)
±0,2% of m.v. ±0,05% f.s. (T<-60°C)
-220 ... +1370°C: ±0,08% of m.v. ±0,1% f.s. (T≥-100°C)
±1°C ±0,1% f.s. (T<-100°C)

Type J: -120,0 ... +700,0°C: ±0,03% of m.v. ±0,08% f.s. (T≥-80°C)
±0,2% of m.v. ±0,08% f.s. (T<-80°C)
-200 ... +1100°C: ±0,08% of m.v. ±0,1% f.s. (T≥-150°C)
±1°C ±0.1% f.s. (T<-150°C)

Type N: -199,9 ... +999,9°C: ±0,03% of m.v. ±0,05% f.s. (T°C)
±0,2% of m.v. ±0,05% f.s. (T<-60°C)
-200 ... +1300°C: ±0,08% of m.v. ±0,1% f.s. (T≥-100°C)
±1°C ±0,1% f.s. (T<-100°C)

Type S: 0,0 ... +999,9°C: ±0,05% of m.v. ±0,08% f.s. (T≥200°C)
±1°C ±0,08% f.s. (T<200°C)
-50 ... +1750°C: ±0,1% of m.v. ±0,1% f.s. (T≥200°C)
±1°C ±0.1% f.s. (T<200°C)

Type T: -120,0 ... +400,0°C: ±0,03% of m.v. ±0,1% f.s. (T≥-70°C)
±0,2% of m.v. ±0,1% f.s. (T<-70°C)
-200 ... +400°C: ±1°C (T≥-100°C)
±1°C ±1digit (T<-100°C)

Temperature drift: 0,01%/K

Point of comparison: ±0,3°C

Working temperature: 0 to +50°C

Relative humidity: 0 to +95%r.h. (non-condensing)

Storage temperature: -20 to +70°C

Probe connections: 2 jacks for flat-pin plug

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

Interface: Serial interface (3.5mm jack connector), direct connection to RS232 interface of a PC via electrically isolated interface adapter GRS3100 or GRS3105 (p.r.t. accessories).

Min./Max. value memory: Memorizing of max. and min. values for probe 1, probe 2 and difference.

Hold function: By pressing a button the current values for temperature 1, temperature 2 and difference will be memorized.

Pushbuttons: 6 membrane keys for ON/OFF-switch, selection of thermocouples, 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 10-12V direct voltage supply.
(suitable power supply: GNG10/3000)

Low battery warning: ⚠ and ' bAt '

Power consumption: approx. 2,5 mA

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 between 1 and 120 min.; it can be completely deactivated

Housing 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 for table top or suspended use

Weight: approx. 155 g

Special applications:

- Difference measurements: with a resolution of 0,1° or 1°. Temperature difference probe 1 - probe 2 can be displayed if 2 probes are connected.

- 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.

- Tare/diff-function: Press button to set the difference display 'probe 1 - probe 2' to zero

- Zero-point offset entry:
By entering the offset temperature the parameter can be moved parallel to the calibration graph.

Accessories:

please refer to pages: 8, 14/15, 90/91 and 38, 40

Double/difference quick-response thermometer with integrated alarm and logger function !

Additional features as compared to the GMH 3230:

- 2 different logger functions
  - Manual memorizing of the measuring values by pressing a button (max. 99 data sets - channel 1, channel 2, difference)
  - Continuous memorizing of a max. of 5400 data sets (= 16200 measuring values)
- Min-/Max-alarm
- Alarm sounded via integrated horn
- Real-time clock with date and year

GMH 3250 access. not incl.

Digital-precision quick-response thermometer for thermo-couples simultaneous connection of 2 plug-in probes (p.r.t. p. 7, 14, 15, 90/91)

Specification :

Thermocouples: K, J, N, S, T
Measuring range, resolution, accuracy: p.r.t. GMH3230
Working temperature: 0 to +50°C
Relative humidity: 0 to +95%r.h. (non-condensing)
Probe connections: 2 jacks for flat-pin plug
Display, pushbuttons: p.r.t. GMH3230
Interface: Serial interface (3.5mm jack connector), direct connection to RS232 interface of a PC via electrically isolated interface adapter GRS3100 or GRS3105 (p.r.t. accessories).
Min./max. value memory: Memorizing of max. and min. values for probe 1, probe 2 and difference.
Hold function: By pressing a button the current values for temperature 1, temperature 2 and difference will be memorized.
Power supply: 9V-battery, type IEC 6F22 (included) as well as additional d.c. connector (internal pin Ø 1.9mm) for external 10-12V direct voltage supply.
(suitable power supply: GNG10/3000)
Low battery warning: ⚠ and ' bAt '
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 between 1 and 120 min.; it can be completely deactivated.
Housing dimensions: 142 x 71 x 26 mm (L 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
Weight: approx. 155 g

Special applications:

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
Zero-point offset entry: By entering the offset temperature the parameter can be moved parallel to the calibration graph.
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.

additional features of the GMH 3250 as compared to the GMH 3230:

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 can be selected:
"off" - alarm function not activated
"on" - visual alarm via display, interface alarm, alarm sounded via integrated horn.
"no.So." - visual alarm via display and interface alarm
With the help of the switching module **GAM3000** electric equipment can be switched on/off via the alarm function. (GAM3000 can also be configurated to act as a controller - p.r.t. page 38)
Logger functions: 2 logger functions can be selected:
- Store: Memorizing of temp. values (probe 1, probe 2 and temp. diff.) and of the current time, date by pressing a button. All values can be called up from the memory via keyboard or interface at any time.
Number of memory units: 99 data sets.
- Cycle: Cyclic, continuous memorizing of temp. values (probe 1, probe 2 and temp. difference). cycle time adjustable: 1 sec to 1 hour, freely selectable.
Number of memory units: 5400 data sets (= 16200 meas. values)
Use keyboard or interface to start/stop logger. Comfortable read-out and display software available for data processing (GSOFT3050) under accessories.
Real-time clock: integrated clock with date and year

Accessories:

GKK 3000 case with cut-outs for GMH3xxx

GRS 3100 interface converter, electrically isolated

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

EBS 9M software for transmission, recording and archiving measuring values obtained from one GMH3xxx (p.r.t. page 40).

GSOFT 3050
software for the setting, data read-out and printing of all logger data stored for devices of the GMH3xxx-series. (p.r.t. page 39)

GAM 3000
Switching module for devices of the GMH3xxx-series incl. alarm output

suitable plug-in probes type K **p.r.t. pages 14, 15, 90, 91**
suitable plug-in probes type S (more upon request) **p.r.t. p. 8**

miscellaneous accessories (cases, mains adaptors etc.)
suitable for all GMH3xxx devices **p.r.t. page 38 - 40**

High-precision quick response
TÜV tested thermometer with battery or mains operation and analog output

Manufacturer´s certificate of calibration available!

DIGITAL PRECISION QUICK-RESPONSE THERMOMETER

GTH 1300

For rechargeable battery/battery or mains operation, for plug-in probes, analog output, 1°C or 0,1°C resolution

Application: suitable for all quick-response, high-precision temperature measurements. Maximum unit reliability due to automatic segment test, display switched off in case of low battery voltage, device almost insensitive to changes in the ambient temperature (e.g. when moving unit from room temperature to cooling chamber or vice versa), low-temperature LCD, analog output for recorder connection, battery/rechargeable battery or mains operation.

Specification:

Range: -65,0 ... +199,9 °C (range 1) or
-65 ... +1150 °C (range 2)
Resolution: 0,1°C (range 1) or 1°C (range 2)
Accuracy: better than 0,2% ±0,5°C resp. ±1digit
Temperature drift: ±0,02 °C/K
Working temperature: 0 to 50 °C
Storage temperature: -20 to +70 °C
Probe connection: standard flat-pin plug for NiCr-Ni (type K) - probe not included.
Analog output: 1 mV / °C
Display: 3½ digit LCD, approx. 13mm high
Power supply: 9V battery, type IEC 6F22 (included) Additional dc power connector for 2.5 mm jack connector.
(automatic battery disconnection)
Power consumption: approx. 6,5 mA
Low battery warning: automatic, „BAT“ displayed in case of low voltage
Dimensions: approx. 150 x 86 x 30 mm (H x W x D). impact-resistant ABS plastic case, with integrated pop-up clip for table top or suspended operation, and lateral holders for probe handle.
Weight: approx. 250 g (incl. battery)

Accessories:

approx. 20 different standard NiCr-Ni temperature probes are available (with double-accuracy as compared to DIN standards). Please refer to list of probes on pages 14/15 and 90/91!

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

GNG 10 power supply

GB 9 V spare battery

for additional accessories p.r.t. page 38

Universal precision quick response thermometer, maximum measuring range and resolution, low price

Manufacturer´s certificate of calibration available!

DIGITAL PRECISION QUICK-RESPONSE THERMOMETER

GTH 1200

Battery operation, for plug-in probes, 1°C or 0,1°C resolution

Application: high accuracy and quick-response measurements on surfaces, in liquids, soft media, air/gases, at the smallest objects etc., where even the smallest changes in temperature must be detected quickly and where a resolution of 1°C only is not sufficient. Universal applications due to 2 selectable resolutions: 0,1°C from -50,0 to +199,9°C and 1°C from -50 to 1150°C.

Specification:

Range: -65,0 ... +199,9 °C (range 1) or
-65 ... +1150 °C (range 2)
Resolution: 0,1°C (range 1) or 1°C (range 2)
Accuracy: better than 0,2% ±0,5°C resp. ±1digit
Temperature drift: ±0,02 °C/K
Probe connection: standard flat-pin plug (free of thermo-voltage) suitable for all NiCr-Ni (type K) probes.
Probe is not included. Optimum probe to be ordered separately depending on desired application! Refer to pages 14/15, 90/91
Display: 3½ digit LCD, approx. 13mm high
Working temperature: 0 to 45 °C
Storage temperature: -20 to +70 °C
Power supply: 9V battery type IEC 6F22 (included).
Battery service life: approx. 50 operating h
Low battery warning: „BAT“
Dimensions: approx. 150 x 86 x 30 mm (H x W x D). impact-resistant ABS plastic case, with integrated pop-up clip for table top or suspended operation, and lateral holders for probe handle.
Weight: approx. 235 g (incl. battery)

Accessories:

approx. 20 different standard NiCr-Ni temperature probes are available (with double-accuracy as compared to DIN standards). Please refer to list of probes on pages 14/15 and 90/91!

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

GB 9 V spare battery

for additional accessories p.r.t. page 38

Maximum speed and resolution, universal application, low price

DIGITAL QUICK-RESPONSE POCKET THERMOMETER

GTH 1160

Battery operation, for plug-in probes, 1°C or 0,1°C resolution

Application: quick response measurements on surfaces, in liquids, soft media, air/gases, at the smallest objects etc., where even the smallest changes in temperature must be detected quickly and where a resolution of 1°C only is not sufficient. Universal applications due to 2 selectable resolutions: 0,1°C from -50,0 to +199,9°C and 1°C from -50 to 1150°C.

Specification:

Range: -50,0 ... +199,9 °C (range 1) or
-50 ... +1150 °C (range 2)
Resolution: 0,1°C (range 1) or 1°C (range 2)
Accuracy: (at nominal temperature)
better 1% ± 0,5°C (from -20,0 to +199,9°C) resp. 1% ± 1 digit (from -20 to +550 and 920 to 1150°C).
From 550 to 920°C better 1,5% ±1digit.
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. Optimum probe to be ordered separately depending on desired application! Refer to pages 14/15, 90/91
Display: 3½ digit LCD, approx. 13mm high
Working temperature: 0 to 45 °C
Storage temperature: -20 to +70 °C
Power supply: 9V battery type IEC 6F22 (included).
Battery service life: approx. 300 operating h
Low battery warning: „BAT“
Dimensions: approx. 106 x 67 x 30 mm (H x W x D). impact resistant ABS plastic housing.
Weight: approx. 150 g (incl. battery)

Accessories:

approx. 20 different standard NiCr-Ni temperature probes (type K) as per list of probes or custom designed as per your specification are available. Please refer to pages 14, 15, 90 and 91.

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

GB 9 V spare battery

for additional accessories p.r.t. page 38

Maximum speed, universal application, low price

DIGITAL-QUICK RESPONSE-POCKET THERMOMETER

GTH 1150

Battery 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)
better 1% ± 1 digit (from -20 to +550 and 920 to 1150°C). From 550 to 920°C better 1,5% ±1digit. 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. Optimum probe to be ordered separately depending on desired application! Refer to pages 14/15, 90/91
Display: 3½ digit LCD, approx. 13mm high
Working temperature: 0 to 45 °C
Storage temperature: -20 to +70 °C
Power supply: 9V battery type IEC 6F22 (included).
Battery service life: approx. 700 operating h
Low battery warning: „BAT“
Dimensions: approx. 106 x 67 x 30 mm (H x W x D). impact resistant ABS plastic housing.
Weight: approx. 150 g (incl. battery)

Accessories:

approx. 20 different standard NiCr-Ni temperature probes (type K) as per list of probes or custom designed as per your specification are available. Please refer to pages 14, 15, 90 and 91.

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

miscellaneous accessories p.r.t. page 38

Precision double quick response thermometer, mains-/battery operation, interface, data logger, realtime clock, alarm

DIGITAL DUAL QUICK RESPONSE THERMOMETER WITH DIFFERENCE MEASURING

GMH 3230

Battery / mains operation, for 2 plug-in probes, data hold function, difference measuring

GMH 3250

additional: data logger 16200 values, 2 logger functions, min/max alarm and controller function with add. device (GAM3000)

Application: quick response and simultaneous measurements of 2 temperatures and the difference temperature. min/max memory.

Specification: (extract)

(complete data: p.r.t. page 4 and 5)

Meas. probes: thermocouples type K, J, N, S, T
Measuring ranges: (Auswahl)
NiCr-Ni (type K): -199.9 ... +999.9 °C or
-220 ... +1370 °C
PtRh-Pt (type S): -50 ... +1750 °C
Resolution: 0.1°, 1° or auto range, choice of °C or °F display
Probe connection: two flat pin plugs for the simultaneous connection of two probes.
Probe: please order separately (p.r.t. p. 14,15,90,91)
Display: 2 four digit displays for display of two temperatures at the same time or min/max or hold value or difference temperature.
Accuracy: highest accuracy by means of digital linearization (p.r.t. page 4)
Offset adjustment: each probe adjustable to zero.
Min./Max. value memory, Hold function
Interface: Serial interface for PC connection (device is addressable)
additional functions at GMH3250:

- **min/max alarm:** with integrated buzzer or external alarm with add. device GAM3000
- **two level controller** with GAM3000
- **choice between 2 logger functions:**
  Store up two 99 data sets on keypress
  Cycle: continuously recording of 5400 data sets, cycle time 1s to 1h.

Accessories:

plug-in probes type K p.r.t. p. 14/15, 90/91
plug-in probes type S p.r.t. page 8

miscellaneous accessories p.r.t. page 38

Maximum speed, universal application, low price

DIGITAL-QUICK RESPONSE-THERMOMETER

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)
better 1% ± 1 digit (from -20 to +550 and 920 to 1150°C). From 550 to 920°C better 1,5% ±1digit. 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. Optimum probe to be ordered separately depending on desired application! Refer to pages 14/15, 90/91
Display: 3½ digit LCD, approx. 13mm high
Working temperature: 0 to 45 °C
Storage temperature: -20 to +70 °C
Power supply: 9V battery type IEC 6F22 (included) as well as additional d.c. connector (internal pin Ø 1.9mm) for external 10-12V direct voltage supply. (suitable power supply: GNG10/3000)
Battery service life: approx. 700 operating h
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:

approx. 20 different standard NiCr-Ni temperature probes (type K) as per list of probes or custom designed as per your specification are available. Please refer to pages 14, 15, 90 and 91.

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

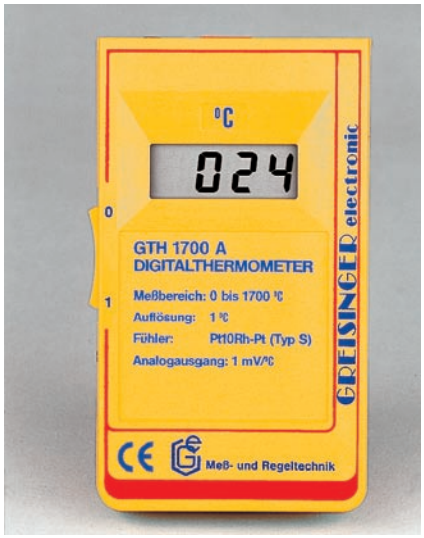
GKK 3000 case
(275 x 229 x 83 mm) with punched lining suitable for all devices of the GMH3xxx-series and GMH1150

GNG 10 / 3000 power supply

GB 9 V spare battery

miscellaneous accessories p.r.t. page 38

for highest temperatures up to 1700°C in furnaces etc. Recorder output, battery or mains operation



DIGITAL PRECISION QUICK-RESPONSE THERMOMETER

GTH 1700 A

Pt10Rh-Pt (type S)
Battery/mains operation, analog output, for plug-in probes, type S

Specification:

Measuring range: 0 ... +1700 °C
Resolution: 1°C
Measuring probe: Pt10Rh-Pt (type S) acc. to IEC584 standard with 2-pin standard flat-pin plug (no thermal e.m.f.). Probe not included - for suitable probes see below.
Accuracy: (at nominal temperature) better 0,2 % ± 2 °C (ranging from 0 ... 70 and from 500 ... 1700°C). From 70 ... 500°C according to correction table
Analog output: 1 mV / °C
Display: 3½ digit LCD, approx. 13mm high
Working temperature: 0 to 45 °C
Nominal temperature: 25 °C
Storage temperature: -20 to +70 °C
Power supply: 9V battery type IEC 6F22 (included). Additional dc power connector for 2.5 mm jack connector. (battery disconnected automatically)
Power consumption: approx. 6,5mA
Low battery warning: „BAT“
Dimensions: approx. 150 x86 x 30 mm (H x W x D). impact resistant ABS plastic case with integrated pop-up clip for table top or suspended operation, and lateral holders for probe handle.
Weight: approx. 230 g (incl. battery)

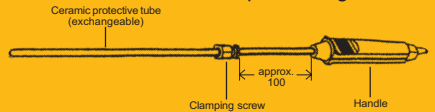
Accessories:

for temperature measuring up to 1750°C (Pt10Rh-Pt)

NST 1700 mini flat-pin plug, type S

GTF 1700 - 500
Type S - probe for air and gas temperature measurements
Meas. range: 0 ... 1500°C (permanent temperature) short-term peaks up to 1800°C
Protective tube: overall probe length 500mm, 6mm Ø, additional plastic handle, 1.3m equalising cable and NST1700 - plug-in type.
Probe supplied in sturdy wooden case.

GTF 1700 - 1000
same as above but overall probe length 1m



miscellaneous accessories p.r.t. page 38

Manufacturer´s certificate of calibration available!

Maximum accuracy and precision for a minimum of price

DIGITAL-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: -70,0 ... +199,9 °C
Resolution: 0,1°C
Accuracy: device: 0,1°C ± 1 digit, 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 1m of highly flexible silicon cable - permanently connected to the device.
Display: 3½ digit LCD, approx. 13mm 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).
Battery service life: approx. 200 operating h
Low battery warning: „BAT“
Dimensions: approx. 150 x86 x 30 mm (H x W x D). impact resistant ABS plastic case
Weight: approx. 190g (incl. battery and probe)

Available types:

GTH 175/Pt

universal application (especially in liquids, air/gases)

GTH 175/Pt - E

as GTH175/Pt however with slim prod for all soft media (core temperature measurements

GTH 175/Pt - K

Core measuring device with small teflon handle and teflon cable; both handle and cable are resistant to air temperature of up to a max. of 250°C and can remain in the oven.

Accessories:

Case, spare battery, etc. - p.r.t. page 38
Spare probes upon request

Manufacturer´s certificate of calibration available!

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

DIGITAL-PRECISION THERMOMETER

GMH 175

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

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

Specification:

Measuring range: -70,0 ... +199,9 °C
Resolution: 0,1°C
Accuracy: device: 0,1°C ± 1 digit
Sensor: Pt1000 acc. to DIN class B.
Probe: Pt1000 probe, 2-wire
Probes not included - please order separately!
porbe connection via 3.5 mm Ø jack connector. For suitable, volt-free sensors see below or refere to page 13.
Display: 3½ digit LCD, approx. 13mm 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 (internal pin Ø 1.9mm) for external 10-12V direct voltage supply. (suitable power supply: GNG10/3000)
Battery service life: approx. 200 operating h
Low battery warning: „BAT“ displayed automatically in case of low voltage
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 13

miscellaneous accessories p.r.t. page 38

Manufacturer's certificate of calibration available!

Reference units for calibrating/checking any thermometer system, highest accuracy and resolution (0,1°C from -199.9 to +650.0°C).
Use any cable length without recalibration

MICROPROCESSOR PRECISION THERMOMETER Pt100 4-wire

GMH 2000 SA GMH 2000

Battery or mains operation, serial interface, for plug-in probes

Application: GMH 2000 SA (with voice output) is used as a reference unit or for highly accurate measurements in liquids, soft media, air/gases or for any application where the visibility is bad (e.g. in darkness, dark rooms, for visually handicapped persons etc.) or where a display cannot be constantly monitored because some other process has to be supervised. Due to the integrated min./max. value memory the unit can also be used for comparative measurements at new installations whithout constant supervision being necessary. GMH 2000 (without voice output) otherwise identical to GMH 2000 SA - a low price reference unit.

Specification:

Measuring range: GMH2000SA: -199,9 ... +650,0 °C
GMH2000: -199,9 ... +650,0 °C resp. -199,9 ... +999,9 °F
Resolution: 0,1 °C (GMH2000SA) resp. 0,1 °C or 0,1 °F (GMH2000)
Linearisation: parameters stored digitally
Accuracy: ≤ 0,03 % f.s. ± 1 digit
Working temperature: 0 to 50 °C
Storage temperature: -20 to +70 °C
Probe: Pt100, 4-wire, (not included - please order separately!) 4-pin miniature DIN-plug.
Switch positions: GMH2000SA 0 = Off
1 = measuring without voice output
2 = measuring with voice output
3 = measuring with voice output and number sequence for record purposes
GMH2000 0 = Off
1 = °C
2 = °F
Display: 3 off 4 digit LCD-displays for simultaneous display of the current value (digits 12.4 mm high) as well as of min./max. values (digit height 7 mm each). Automatic segment test when device is switched on.
Change indicator: for rising or falling temperatures an arrow pointing upwards or downwards is displayed at the left side next to the current value.
Probe damage display: display value disappears and is replaced by dashes.
Min-/max-value memory: activated when device is switched on. Any min. or max. value measured after unit is switched on will be continuously displayed and constantly updated if necessary. These values will be deleted as soon as the unit is switched off.
Serial interface: socket for **external** RS232 compatible serial interface.
suitable interface module: GRS232 - please order separately.
Power supply: 9V-Batterie type IEC 6F22 (included) or regulated power supply 12V DC (type GNG09). Power supply connectors for 2,5 mm jack connector.
(Automatic battery disconnection when connecting power supply.)
Low battery warning: „BAT" is displayed in the top left-hand corner in case of low voltage.
Power consumption: GMH2000 resp. GMH2000SA-switch position 1: < 10 mA
GMH2000SA-position 2/3: approx. 15-35 mA (depending on volume set)
Dimensions: approx. 150 x 86 x 30 mm (H x W x D). Impact resistant ABS plastic case with integrated pop-up clip for table top or suspended operation, and lateral holders for probe handle.
Weight (device only)**:** approx. 250 g (GMH2000), approx. 275 g (GMH2000SA)

Accessories against upcharge - please order separately!:

GRS 232 interface adapter for connection of a GMH2000/SA to an RS232-interface of a PC. (Software GSOFT2000 for recording and display can be downloaded free of charge from our Internet Homepage)

Plug-in Pt100-probe, 4-wire DIN class B (± 0,3°C at 0°C)

GTF 601 immersion/air/gas probe, -200 to +600°C
GTF 401 immersion probe, -50 to +400°C
GES 401 insertion probe for soft media, -50 to +400°C
Sensor with higher accuracy 1/10 DIN (± 0,03°C at 0°C - measuring range: -50 ... +250°C) . . **Upcharge**
GKK 1100 plastic case (340 x 275 x 83 mm) with foam lining
GNG 09 regulated power supply (220/240V, 50/60Hz, 12VDC)

Low price resistance thermometer for Pt100 - plug-in probes,
battery and mains operation possible.

DIGITAL HAND-HELD THERMOMETER

GTH 400

Pt100 (2-wire)
Battery/mains operation for plug-in probes

Applications: accurate measurements in liquids, soft media, air/gases.

Specification:

Measuring range: -50 ... +400 °C
Resolution: 1°C
Accuracy: unit: 0,2% ±1digit
probe: Pt100 acc. to DIN class B standards
Probe: Pt100, 2-wire connection via 3.5 mm jack connector.
For suitable probes, mounted volt-free, please see below or on page 12.
Probes not included - please order separately!
Display: 3½ digit LCD, approx. 13mm high
Working temperature: 0 to 45 °C
Storage temperature: -20 to +70 °C
Power supply: 9V battery type IEC 6F22 (included). Additional dc power connector for 2.5 mm jack connector. (Battery disconnected automatically)
Battery service life: approx. 50 to 100 hours, for permanent use we recommend our power supply GNG10.
Low battery warning: „BAT"
Dimensions: approx. 150 x 86 x 30 mm (H x W x D). impact resistant ABS plastic case with integrated pop-up clip for table top or suspended operation, and lateral holders for probe handle.
Weight: approx. 230 g (incl. battery)

Accessories:

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

GTF 150 immersion probe
for liquids, aggressive or dusty gases

GES 150 insertion probe
for soft material

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

GKK 3500 case
(394 x 294 x 106 mm) with punched foam lining for device and 3 probes with handle, spare batt. etc.

GNG 10 power supply

Please note: for surface measurements we recommend our quick rsponse thermometers NiCr-Ni (type K)

Infrared measuring probe: -18 ... +260°C;
for small sized components
(Measuring zone-Ø 2.5mm)

Photo shows GIM 1826 with GTH1160

INFRARED MEASURING PROBE

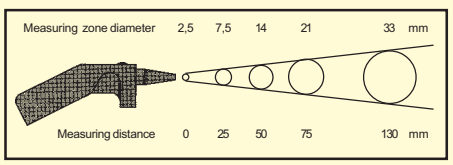
GIM 1826

Specification:

Measuring range: -18 ... +260 °C
Resolution: 0.1°C
Ambient temperature range: 0 ... +65 °C
Accuracy: ± 2 % of measured value or ± 2 °C
Repeat accuracy: ±1% of meas. value or ±1°C
Response time (t_{95}): 1 second
Rate of emission: set permanently to 0,95
Measuring zone-Ø: Ratio measuring zone-Ø : distance approx. 1:4, ie by reducing the distance between unit and measured object the measuring zone Ø is also reduced (eg 50 mm Ø at a distance of 200 mm, 25 mm Ø at a distance of 100mm etc.).
Relative humidity: max. 95% at 30°C, non-condensing.
Storage temperature: -25 to +70 °C
Power supply: 9V-battery type IEC 6F22 (included). Automatic battery disconnection after a few minutes. Automatic battery disconnection switched off for stationary permanent operation and 12 V DC operational voltage.
Battery service life: approx. 50 hours.
Dimensions: approx. 180 x 30 x 50 mm (H x W x D).
Weight: approx. 180 g
Scope of supply: measuring probe with battery, operating manual
Units suitable: for connection to all NiCr-Ni (type K) quick-response thermometers with miniature flat-pin plug.
For stationary permanent operation: additional measuring transducer board GNTP for NiCr-Ni (type K) with output 4 - 20 mA, etc. Available upon request.
Min-/Max-alarm and/or relay outputs: devices for measuring transducer with volt-free relay outputs available upon request.

Accessories:

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
GB 9 V spare battery



Low price infrared technology for non-contact and quick response surface temperature measurements from -32 up to +760°C (ST80).
For high temperature range or stationary application please refer to page 11, 77
all devices with laser pointing appliance

GIM1840-ST20, GIM1840-ST30

GIM1840-ST60, GIM1840-ST80

Examples for application (GIM1826 / GIM1840-ST20/ST30/ST60/ST80)

- **PC board test** (super-heated components)
- **Ventilation/heating/air conditioning/ civil engineering:** (detection of bad insulation, leaking tubes, energy consumption, general service measurements etc.)
- **Electric systems, machines, units:** (detection of hot spots at electric connections, heating up of motors, bearings, pumps, compressors etc.)
- **Food processing and testing:** (temperature of food, storage rooms, processes etc.)
- **Medical technology, biological testing, chemical analyses:** (quick-response non-contact temperature measurements at any object/in any area, trouble-free operation even when handling dangerous, aggressive or other media)
- **Industry, mechanical engineering, craft and trade:** (surface measurements at rotary parts such as rollers, drums, shafts, printing machinery, plastic welding, asphalt, concrete etc.)
- **Communities, road maintenance offices etc.:** eg to determine if road temperature has reached freezing point (use of thawing salt/sand), swimming pools, class rooms etc.

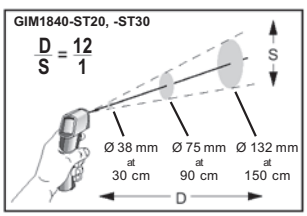
Non-contact infrared digital thermometer (cpl. and ready for operation)

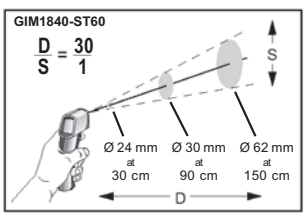
GIM 1840 - ST20
GIM 1840 - ST30
GIM 1840 - ST60
GIM 1840 - ST80

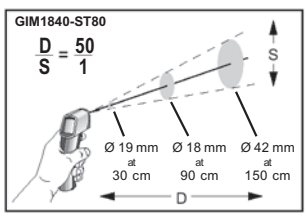
Specification:

	ST20	ST30	ST60	ST80
Measuring ragen:	-32 ... +400 °C	-32 ... +545 °C	-32 ... +600 °C	-32 ... +760 °C
Resolution:	0.2°C	0.2°C	0.1°C	0.1°C
Temperature display:	°C or °F selectable			
Accuracy:	±1% of measured value or ±1°C (at > 23°C); ±2°C (-18...23°C); ±2.5°C (-26...-18°C); ±3°C (-32...-26°C)			
Repeat accuracy:	≤ ±0.5% of measured value or ±1°C			
Response time (t_{95}):	0.5 seconds			
Rate of emission:	permanently set to 0.95		digital settings from 0.30 to 1.00	
Laser pointing appliance:	single ray	laser circle	laser circle	laser circle
Data memory:	--	--	12 measurings	12 measurings
Hi-/Lo-alarm:	--	--	buzzer	buzzer
Probe connection:	--	--	for Pt1000 probes (p.r.t. page 13)	

Max-value memory, hold function: at ST20, ST30
Max-/Min-value memory, DIF/mean value, hold function: at ST60, ST80
Re-call of value measured last: for ST60, ST80 only
Working temperature: 0 ... 50 °C
Power supply: 9V-battery type IEC 6F22 (included)
Display illumination: press key to switch on/off
Dimensions: approx. 135 x 40 x 195 mm
Weight: approx. 320 g
Storage: cpl. device with carrying bag and hand loop







Infrared - hand-held thermometer: -30 ... 900°C (-50 ... 500°C)
(GIM 3090 - MX2 and GIM 3090 - MX4)

- Reliable measurements due to accurate laser circle sight hole, optimum handling and ease of operation
- Measurements from a safe distance due to high-performance optics.
- Low initial costs due to excellent price/ quality ratio.

Standard types: (in stock)

GIM 3090 - MX2

GIM 3090 - MX4

GIM 3090 - MX4/S
(incl. software, RS232 computer cable and case)

Options: (against upcharge, time of delivery)

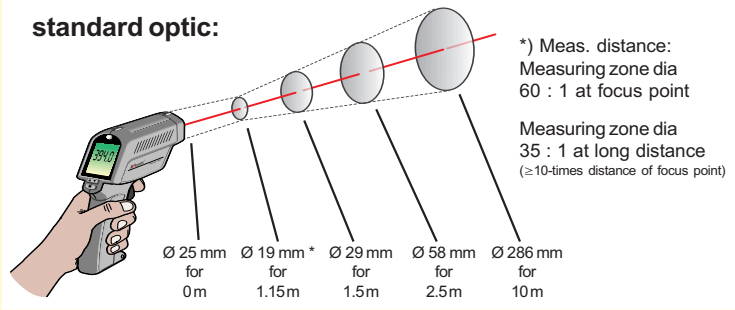
CF close focus optik
(order name: e.g. GIM3090 - MX4CF)

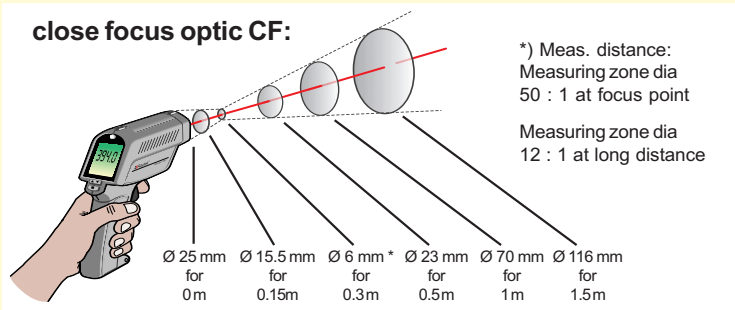
SZ low temperature version
(-50 ... +500°C, order name: e.g. GIM3090 - MX4SZ)

Technical description:

The laser circle sight hole shows the actual measuring zone. The graphic display gives the trend of the last 10 measurements and the max. and min. temperatures determined during measuring. The MX4 is equipped with inputs for thermocouples (types K and J), external power supply, an internal memory for up to 100 meas. values as well as a digital output. In addition the MX4 memory includes a most useful table for emmision rates, listing values for those 30 materials that are most commonly used. In connection with our software and a PC the MX4 is highly suitable for test and routine measuring.

Size of meas. zone and distance with regard to meas. object:





Specification:

Meas. range: -30,0 ... +900,0°C (for "SZ": -50,0 ... +500,0°C)
Resolution: 0,1°C
Accuracy: ±1% of range or ±1°C (-30...0°C = ±2°C)
Consistency: ±0.5% resp. ±1°C (highest value shall be valid)
Response time: t_{95} = 250ms
Spectral sensitivity: 8 - 14 µm
Display: LCD, approx. 35 x 45 mm high, with background illumination
Working temperature: 0 to +50°C (for laser mode: max. 45°C)
Relative humidity: 10 to +95 % r.h. at 30°C (non-condensing)
Storage temperature: -20 to +50°C (batteries not incl.)
Voltage supply: 2x1.5V, type R6 (AA), for MX4 additional d.c. input
Dimensions: 200 x 170 x 50 mm
Weight: 480g

Equipment:

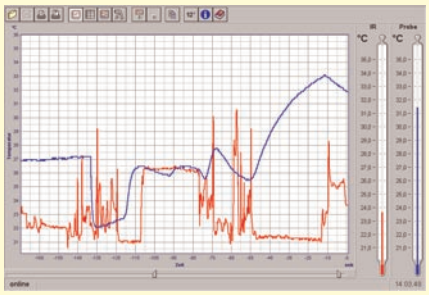
- **Max and min value memory**
- **HI-alarm: accoustic and visual**
- **Laser circle sight hole (laser class 2)**
- **Emission rate adjustable**
- **Graphic display**

Additionally for MX4

- **Difference display**
- **Average value (AVG)**
- **Connection for thermocouples types K and J**
- **LO-alarm: accoustic and visual**
- **Table of materials** (emission rates preset)
- **Internal data memory for 100 measuring values**
- **Data exchange: RS232 or 1mV/°C**

Options and accessories:

Software (compatible to windows)



GNG 09 - 7.5V
plug-in powerpack

Certificate of calibration
(Calibration points: 25, 100 and 200°C)

Certificate of calibration
(Calibration points: 25, 200 and 495°C)

Other calibration points upon request !

Temperature probe type K p.r.t.
pages 14, 15 and 90, 91

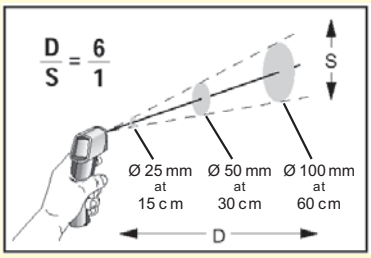
The infrared digital hand-held thermometer to low cost price

GMTL 1826 - MT4 (with laser visor)

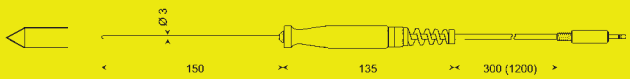
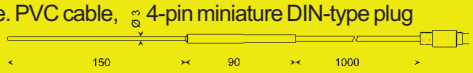
Specification:

Range: -18 ... +260°C (0 ... +500°F)
Resolution: 0.5°C or 1°F
Temperature display: °C or °F selectable
Accuracy: ±2% of m.v. resp. ±2°C (highest value shall be valid) (-18 ... -1°C = ±3°C)
Repeat accuracy: ±2% of m.v. resp. ±2°C
Measuring zone dia: 6 : 1
Response time (t95): 0.5 seconds
Emission rate: set to 0,95
Laser pointing appliance: single ray
Working temperature: 0 ... 50 °C
Storage temperature: -20 ... 65 °C

Power supply: 9V battery type IEC 6F22 (included)
Battery service life: approx. 12 hours
Dimensions: 152 x 101 x 38 mm (H x W x D).
Weight: approx. 227 g



Pt 100 Measuring probe (conforming to DIN class B standard)

Ordering type Range	Application / Dimensions (mm) techn. specification	Response time t_{90}	suitable for	Price
GTF 150 -50 ... +400°C	**Immersion probe for liquids / gases** non-corrosive and acid-resistent stainless steel tube (V4A), plastic handle, coiled cable (approx. 1.2m extended lenght), anti-buckling glanding, 3,5 mm jack connector 	approx. 10 sec.	GTH400	
GES 150 -50 ... +400°C	**Insertion probe for soft media** Specification as for GTF150 but with needle type prod 	approx. 10 sec.	GTH400	
GTF 601 -200 ... +600°C **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, flexible tube, 3mm Ø. (smaller tube diameter upon request) as GTF601 however 1/3 DIN (±0,1°C at 0°C)	approx. 10 sec.	GMH2000SA GMH2000 GMH35xx	
GTF 401 -50 ... +400°C	**Immersion probe for liquids / gases, 4-wire** handle and sensor tube as per GTF150, approx. 1 m 4-wire. PVC cable, 4-pin miniature DIN-type plug	approx. 10 sec.	GMH2000SA GMH2000 GMH35xx	
GES 401 -50 ... +400°C	**Insertion probe for soft media, 4-wire** handle and sensor tube as per GES150, approx. 1 m 4-wire. PVC cable, 4-pin miniature DIN-type plug	approx. 10 sec.	GMH2000SA GMH2000 GMH35xx	
GTF 35 -50 ... +400°C	**Immersion probe for liquids / gases, 4-wire** non-corrosive and acid-resistent stainless steel tube (V4A), approx. 1 m 4-wire. PVC cable, Ø 3 4-pin miniature DIN-type plug 	approx. 10 sec.	GMH35xx	
Upcharge for higher accuracy (valid for all Pt100 probes - as well for customized probes) 1/3 DIN: (±0,1°C at 0°C - measuring range: -50 ... +400°C) as well for Pt1000 1/10 DIN: (±0,03°C at 0°C - measuring range: -50 ... +250°C) only for Pt100				

For Pt100 4-wire measuring probes any probe or cable lenght possible without re-calibration of the device.

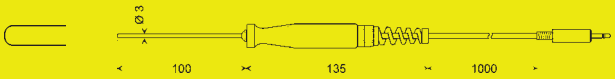
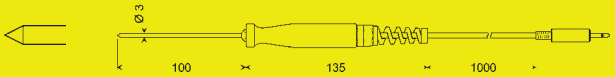
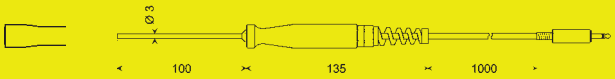
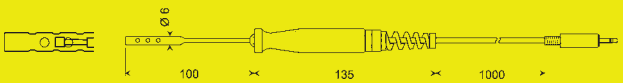
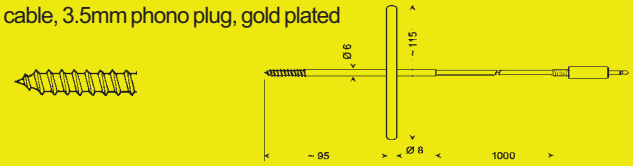
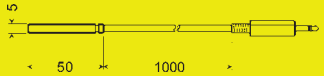
ISO 9000 manufacturer´s certificate of calibration:

Please contact us for other qualifying devices and probes!

Please note: Pt100 probes are **not** suitable for mobile and fast surface measurements. Please make it a rule to use our quick response thermometers NiCr-Ni (type K): GMH1150, GTH1160, GTH1200, GTH1300 or GMH3200-series with suitable surface probe.

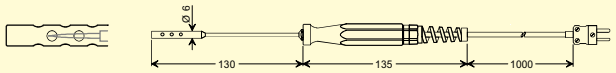
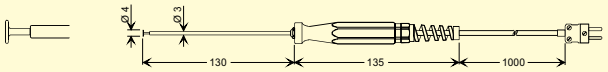
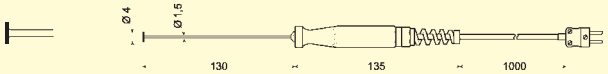
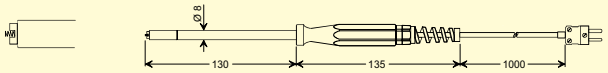
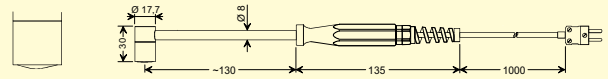
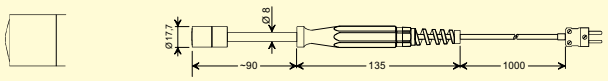
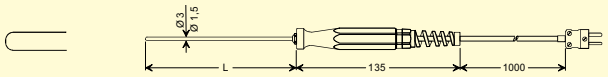
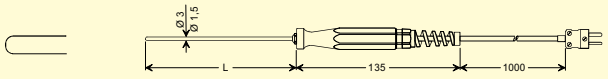
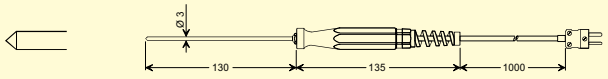
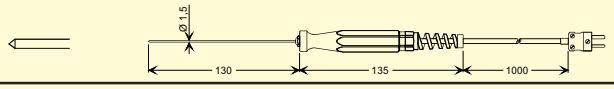
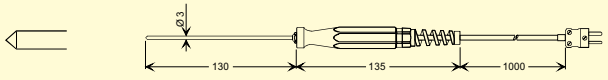
Pt 1000 - Measuring probes, 2-wire (standard class B)

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	Price
GTF 175 -70 ... +200°C Pt1000 class B	**Immersion probe for liquids / gases** non-corrosive and acid-resistent 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 GIM1840-ST60 GIM1840-ST80	
GTF 175 LE	like before but with loose cable ends		GIA10N	
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 GIM1840-ST60 GIM1840-ST80	
GES 175 LE	like before but with loose cable ends		GIA10N	
GOF 175 -70 ... +200°C Pt1000 class B	**Surface probe forsolid surfaces** 2 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 GIM1840-ST60 GIM1840-ST80	
GOF 175 LE	like before but with loose cable ends		GIA10N	
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 GIM1840-ST60 GIM1840-ST80	
GLF 175 LE	like before but with loose cable ends		GIA10N	
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 GIM1840-ST60 GIM1840-ST80	
GTF 2000 -70 ... +200°C Pt1000 classB	**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 GIM1840-ST60 GIM1840-ST80	
GTF 2000 LE	like before but with loose cable ends		GIA10N	
GTF 2000 WD -20 ... +70°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. 70°C!		GMH175 GIM1840-ST60 GIM1840-ST80	
GTF 2000 WD - LE	like before but with loose cable ends		GIA10N	
Upcharge for higher accuracy: 1/3 DIN: (± 0,1°C at 0 °C)				

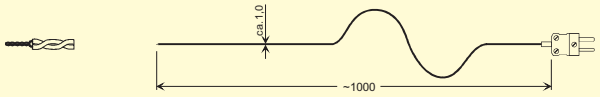
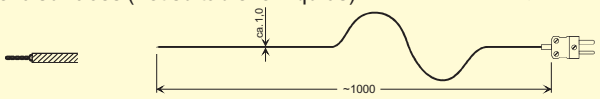
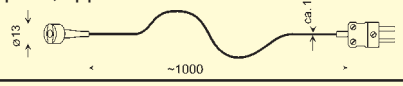
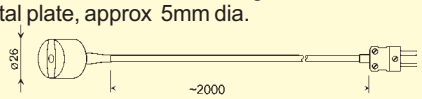
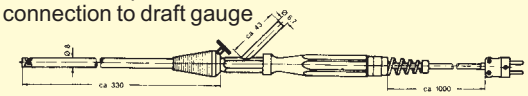
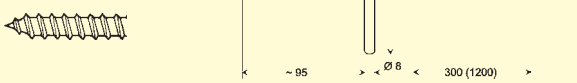
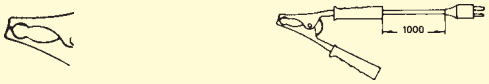
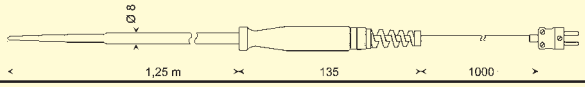
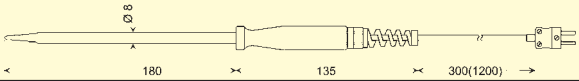
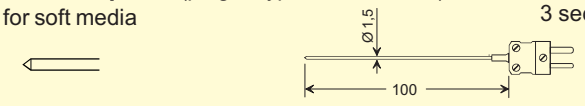
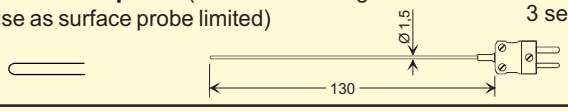
We manufacture all types of probes according to Your special desires - low priced and fast
Please contact us.

NiCr-Ni Standard Measuring Probe "Type K" class 1 = highest precision-class according to DIN

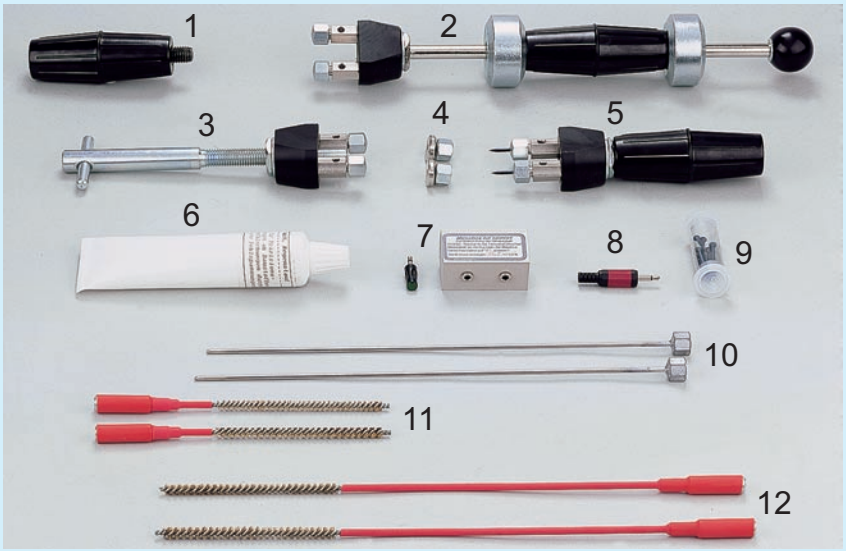
Ordering type	Range °C	Application / Dimensions (mm)	Response time t_{90}	further technical details	Price
GTL 130	-65 ... +600°C	**Air/gas probe** (room temperature, smoke gases etc.) 	approx. 1,5 sec.	Stainless steel (V4A) tube, plastic handle, silicon cable, DIN-type flat-pin plug	
GOF 130CU	-65 ... +500°C	**Surface probe** for straight and solid metal surfaces 	approx. 3 sec.	Spring-loaded copper plate, plastic handle, silicon 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, silicon 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, ceramic tube, plastic handle, silicon cable, DIN-type flat-pin plug	
GOF 130HO	-65 ... +250°C (short-term peaks up to approx. 300°C)	**Surface probe** for solid surfaces, very robust type for measurements in small gaps 	approx. 2 sec.	Small elbow-type resilient NiCr-Ni ribbon, teflon case, aluminium shielding tube, plastic handle, silicon cable, DIN-type flat-pin plug	
GOF 130VE	-65 ... +250°C (short-term peaks up to approx. 300°C)	**Surface probe** for solid surfaces, very robust type for quick-response surface measurements 	approx. 2 sec.	Small straight-type resilient NiCR-Ni ribbon, teflon case, aluminium shielding tube, plastic handle, silicon cable, DIN-type flat-pin plug	
GTF 400 **GTF 900**	-65 ... +550°C -65 ... +1000°C	**Immersion probe** inexpensive, fast, elastic (rigid) **Immersion probe** inexpensive, elastic (rigid) 	approx. 3 sec. approx. 5 sec.	Stainless steel tube, 1.5Ø, L=130mm, silicon cable Stainless steel (V4A) tube, 3Ø, L=130mm, silicon cable (any length against upcharge) each additional 100mm	
GTF 1200 **GTF 1200/300**	-200 ... +1150°C -200 ... +1150°C	**Immersion probe for High-temperature** flexible thermowell **Immersion probe** flexible thermowell 	approx. 3 sec. approx. 5 sec.	Inconel 1.5Ø, L=150mm, silicon cable, DIN-type flat-pin plug, **electrically insulated** Inconel 3Ø, L=300mm, **electrically insulated**	
GES 900	-65 ... +1000°C	**Insertion probe** inexpensive, elastic (rigid) 	approx. 5 sec.	Stainless steel (V4A) tube, 3Ø, L=130mm, plastic handle, silicon cable, DIN-type flat-pin plug	
GES 130	-65 ... +550°C	**Insertion probe** for soft media 	approx. 3 sec.	Flexible stainless steel (V4A) needle, 1.5 mm Ø, plastic handle, silicon 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, plastic handle, silicon cable, DIN-type flat-pin plug	

NiCr-Ni Standard Measuring Probe "Type K" (ctd.)

further probes or customized probes
please refer to pages 88, 90/91

Ordering type	Range °C	Application / Dimensions (mm)	Response time t_{90}	further technical details	Price
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 silicon cable, DIN-type flat-pin plug	
GRS 500	-65 ... +500°C	**Chimney/exhaust probe** - conforming to 1. BImSchV, Combination probe with bypass and cone for simultaneous measurements of temperature and O2/CO/exhaust flow via by-pass connection to draft gauge 		dismountable V4A protection tube 8mm dia. with conical clamp screw and bypass in ~45° angle, plastic handle, silicon 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	
GTZ 300	-65 ... +150°C	**Clip-on probe** for temperature measurements at tube surfaces 	approx. 3 sec.	for tubes up to approx. 1" Ø, PVC 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, silicon cable, DIN-type flat-pin plug	
GAF 200	-65 ... +200°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	
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. 90)	
VKA 1m	Extension cable 1m long, silicon equalising cable (any length upon request). DIN-type flat-pin plug and DIN-type jack.			Upcharge for any lenght	

Wet wood – Wet building sites – Wetness in paper, textiles, insulating material



DIGITAL MOISTURE METER for measuring weight humidity in wood, paper, building and insulating material, textiles

GHH 91KK

(device compl. and ready for use in case)

Scope of supply: measuring device GHH 91 with battery, measuring cable GMK 91, hand-held temperature probe GTF 91, impact electrode GSE 91 with steel pins GST 91, plug for building material GRB91, carrying case GKK 91 - altogether a complete device for a fabulous price!

Moisture measurements in building sites: GRB91 ist included.

Application: precision measurements in cut wood, chip board, veneer, sawdust, wood chips, wood wool, flax, straw, hay, concrete, gas concrete, bricks, wash floor, cast, silica/sand (up to max. 20%), limestone mortar, cement mortar, paper, carton, textiles, insulating material etc.

A measuring device every architect, expert, inspector, building contractor, painter, interior decorator, carpenter, parquet joiner, floor tiler, wood works, timber desiccation plant, building repair company (for damage to floors, walls, wash floors, insulation etc. caused by water), textile industry etc. should have.

Specification:

Measuring range: Moisture in wood/textiles 3 to 100% (% of weight)

Range of application: for direct indication of water content, suitable for approx. 135 different types of wood, paper and carton (selector switch for 4 groups A-D).

Temperature compensation: Automatic temperature compensation via integrated sensor resp. via external sensor (included) to be inserted into the object to be measured if wood temperature differs from ambient temperature. (Automatic disconnection of internal sensor)

Measuring range: moisture in building materials: 0,3 to approx. 30%.

Moisture in building sites: Value displayed is proportionate to water content. Water content for each material (% of weight) is obtained from the respective tables giving empirical values or by calculation using the empirical reference values and the value indicated. (Detailed tables attached).
In principle, any material, even if completely unknown, (eg insulating material) can be tested for moisture penetration. The higher the value indicated the more moisture has penetrated. Please do not hesitate to contact us for any special problems you might have!

Display accuracy: ± 0,5 %
To guarantee maximum measuring accuracy a quick-response, plug-in testing adapter (**GPAD91**) is available optionally against upcharge,checking the measuring accuracy after it has simply been plugged in in seconds. Thus any inaccurate measurements (due to penetration of dirt, humidity, etc.) can be detected instantaneously.

Temperature compensation: automatic, via internal sensor from 0 to 60°C or via external sensor from -50 to +95°C.

Perm. working temperature: 0 to 60 °C

Perm. ambient moisture: 0 to 80 % (non-condensing)

Storage temperature: -20 to +70 °C

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

Power supply: 9V battery type IEC 6F22 (included).

Low battery warning: „BAT“ displayed automatically in case of low voltage

Dimensions: approx. 150 x 86 x 30 mm (H x W x D).

Housing: impact resistant ABS plastic case with integrated pop-up clip for table top or suspended use.

Accessories, spare parts:

GEG 91 (picture 1)
handle for retrofit of impact electrode (p.r.t. pos. 3)

GHE 91 (picture 2)
reciprocating piston electrode

GSE 91 (picture 3)
impact electrode

GOK 91 (picture 4)
surfaces-measuring caps (pair)

GSG 91 (picture 5)
retrofitted impact electrode showing front side of impact electrode and handle GEG91

GLP 91 (picture 6)
conducting paste 100 ml for surface measurements and depth indication in walls, wash floors etc. with brush probes

GPAD 91 (picture 7)
testing adapter

GRB 91 (picture 8)
red plug for building material (only required for moisture measurements in building sites - included at GHH91KK)

GST 91 (picture 9)
steel pins, various lengths (price for 3 pieces 12, 16 and 25 mm long) in plastic case

GMS 300/91 (picture 10)
measuring pins 300 mm long (in pairs) for wood chips, wood wool, paper, carton, sand etc.

GBSK 91 (picture 11)
short brush-type probe (in pairs) (for depth down to approx. 300 mm)

GBSL 91 (picture 12)
long brush-type probe (in pairs) (for depth down to approx. 300 mm)

GHH 91 (pic. 13, centre)
device only (no accessories)

GMK 91 (picture 13, right)
measuring cable, approx. 1 m long

GKK 91 (picture 13)
case with foam lining, without contents

GTF 91 (picture 13, left)
external temperature probe for temperature differences between wood and unit

GSR 91 (picture 14)
roller-type sensor for surface measurements on paper or textile webs etc. (on toes, with handle)

GSP 91 (picture 15)
sensor for surface measurements on paper, textiles etc. (cpl. with handle)

GSP 91 ES
spare sensor element for GSP 91

GSF 91 (picture 16)
injection probe 1 m long with handle and cable (for large bales of wood wool, grain and similar materials)

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 measure simply place device on the surface to be measured - no injection into the measuring object required.

Specification:

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

Applications:

for

estate agents for fast control state of buildings
property management
house owners
Architects
Building experts
Building contractors
for mobile homes (moist in insulations)
etc. etc.

an easy to use
but very effective device!

Note: The GMI15 is an indicator for fast the estimation, it does not replace precision instruments like the GHH91KK

HAY TEMPERATURE MEASURING PROBES

(for hay, straw, grain, stack control thermometer)

For **grain silos**: length up to 6 m available

1.) Type electronic 0150

Multi-point hay temperature probe

Measuring range: -20,0 to +150,0 °C
Advantages:

- rods and measuring prod made of stainless steel, non-corrosive.
- 3 measuring points alongside probe, ie measuring of temperature development along probe after only one injection.
- special probe length with prod 3.46 m - extension to approx. 5 m possible using optional extension rod.
- resolution of measuring device 0.1°C, ie. almost any temperature variations can be detected.
- measuring device equipped with 3-selector switch and illuminated display.
- this is the only probe allowing for detection of glowing fire or fire zones along probe without damage to probe.
- special 4-side cutting measuring prod to ensure trouble-free injection into any material.

2.) Type electronic 0120

Low cost hay measuring probe

Measuring range: -20,0 to +120,0 °C
Probe connection: approx. 3m long connection cable with plug
Measuring rod: fibre glass probe, approx. 4m long, approx. 10 mm Ø, 1 measuring point in the tip of the probe
OPTION: fibre glass probe, 6m long
Cutter tip: double-edged screw-type tip with integrated temperature sensor
Anzeige: 3½-digit, 13mm high LCD-display with illumination.
Dimensions (device)**:** 160 x 90 x 45 mm

Special brochures and price list for optional items, accessories and spare parts available upon request!

COMPOST-THERMOMETER

all quick response thermometers (p.r.t. page 4-7) plus compost probe

Digital-Hygro-/Thermometer

GFTH 95
GFTH 100

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: 0 ... 70°C (sensor operational down to -20°C provided ambient temperature for electronic device does not drop below 0°C)
% r.h.: (GFTH 95): 10 ... 95% r.h. - recommended range: 30 ... 80% r. h. (accuracy for this range: ±2% linearity and ±1,5% hysteresis.)
% r.h.: (GFTH 100) 0 ... 100 (99,9) % r.h. - recommended range: 5 ... 98%. (accuracy for this range 5 ... 95%: ±2%linearity, ±1 % hysteresis)
Overflow indication if sensor is subject to condensing.
Resolution: 0,1°C or 0,1% r.h.
Accuracy: (at 20°C)
temperature: same as for Pt1000 DIN class B (at 0°C ±0,3°C)
relative humidity: (please refer to measuring range)
Sensors:
temperature: molybdenum 1000 (similar to Pt 1000)
humidity: capacitive polymer - humidity sensor
Response time:
GFTH 95: T_{90} = 15 seconds
GFTH 100: T_{90} = 10 seconds
Operating temperature: sensors -20 +70°C (before operating at higher or lower temperatures please contact us)
Electronic parts: 0 to 70°C
Temperature dependance: ±0,08% r.h./°C and ±0,04 °C/°C
Ambient conditions relative humidity:
Sensor head: 0 to 100% r.h.
Electronic part: 0 to 80% r.h. (non-condensing)
Display: 3½-digit, 13mm high LCD-display
Voltage supply: 9 V-battery (type IEC 6F22)
Power consumption: max. 5mA (battery service life approx. 60 operating hours)
Low battery warning: „BAT" displayed automatically in case of low battery
Dimensions: 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. 154 g (ready for operation)

Accessories/spare parts (against upcharge):

GKK 252 case
(235 x 185 x 48 mm) with foam lining
Certificate of calibration WPF4
for ISO9000ff **(p.r.t. page 3)**

A new generation of humidity measuring devices!

One single device for humidity, temperature, flow rate

- Double display of humidity and temperature
- Compact probe for humidity and temperature measuring (probe exchange without re-calibration)
- Plug-in flow rate measuring probe
- Calculation of dew point temperature
- Additional NiCr-Ni-socket for surface measurement
- Compensation value for surface meas. can be switched on/off
- Calculation of dew point distance and enthalpy
- 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

GMH 3330 probe not included

Please order probes separately! (p.r.t. page 20)
(No re-calibration required for probe exchange!)

Specification :

Measuring ranges:
Rel. humidity: 0,0 ... 100,0 % r.h.
Ambient temperature: -40,0 ... +120,0°C (depending on TFS-probe)
Surface temperature: -80,0 ... +250,0°C
Flow rate: depending on STS probe
Resolution: 0,1 %r.h.
0,1 °C / 0,1 °F
0,1 m/sec.
Accuracy (device)**:** (±1 digit, at nominal temperature)
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 20)
No calibration required for exchange of humidity/temperature or flow rate probe.
Probe connection: 6-pin screened Mini-DIN-socket
NiCr-Ni-connection: miniature flat-pin plug
Display: 2 four digit LCDs (12.4mm resp. 7mm high) for humidity and temperature (dew point etc.), min./ max. values, hold function, etc. as well as additional functional arrows.
Working temperature: 0 to +50°C
Relative humidity: 0 to +95%r.h. (non-condensing)
Storage temperature: -20 to +70°C
Min-/Max-value memory: memorizing of max. and min. values for humidity, temperature, dew point etc..
Hold function: by pressing a button the current meas. value and the corresponding temperature will be 'frozen'.
Pushbuttons: 6 membrane keys for ON/OFF-switch, selection of measuring range, min- and max-value memory, hold-function, etc.
Interface: serial interface (3.5mm jack connector), direct connection to RS232 interface of a PC via electrically isolated interface adapter GRS3100 or GRS3105 (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 10-12V 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 mA (probe power not incl.)
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
Weight: approx. 160 g (incl. battery)
Calculation of dew point: Dew point temperature calculation based upon current humidity and temperature values.
Adjustment of atmospheric humidity measurements: TFS0100 type probes can be adjusted by means of a humidity normal line to compensate for sensor drift.
NiCr-Ni-temperature measuring: any standard NiCr-Ni-probe can be plugged in. For surface measuring we recommend GOF130VE (p.r.t. page 14).
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 meas. if necessary.
Calculation of dew point distance: The dew point distance between the ambient atmosphere and e.g. a wall surface can be displayed by means of a surface measurement.
Calculation of enthalpy: The enthalpy calculation gives the thermal content h of the air.
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:** as soon as the device has been switched on or the hold-key has been pressed, the device starts averaging for the averaging time set. During measuring the current measuring value will be displayed. As soon as the averaging time has expired the average value will be displayed, the device is in the HOLD mode.
- **selectable averaging time:** 1 ... 30 seconds

Accessories:

for suitable measuring probes for GMH 33xx p.r.t. page 20

GNG 10/3000 plug-in power supply
GB 9 V spare 9V battery, type JEC 6F22
GKK 3000 case with cut-outs for GMH3xxx
GKK 3100 case with foam lining for universal use
GRS 3100 interface converter, electrically isolated
EBS 9M software for transmission, recording and archiving measuring values obtained from one GMH3xxx (p.r.t. page 39).

for additional spares and accessories p.r.t. pages 38

The humidity-/flow-/temperature meter with integrated alarm and logger function!

Additional features as compared to GMH 3330:

- 2 different logger functions
  - Manual memorizing of measuring values by pressing a key (99 data sets max.)
  - Continuous memorizing of 2700 data sets max. (= 16200 measuring values)
- Min-/Max-alarm
- Alarm sounded via integrated horn
- Real-time clock with data and year

GMH 3350 probe not included

Please order probes separately! (p.r.t. page 20)
(No re-calibration required for probe exchange!)

Specification:

Measuring ranges:

Rel. humidity	0,0 ... 100,0 % r.h.
Ambient temperature:	-40,0 ... +120,0°C (depending on TFS-probe)
Surface temperature:	-80,0 ... +250,0°C
Flow rate:	depending on STS probe

Resolution: 0,1 %r.h.
0,1 °C / 0,1 °F
0,1 m/sec.

Accuracy (device)**:** (±1 digit, at nominal temperature)

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 20) No calibration required for exchange of humidity/temperature or flow rate probe.
Probe connection: 6-pin screened Mini-DIN-socket
NiCr-Ni-connection: miniature flat-pin plug
Display elements, pushbuttons: p.r.t. GMH3330
Working temperature: 0 to +50°C
Relative humidity: 0 to +95%r.h. (non-condensing)
Storage temperature: -20 to +70°C
Min-/Max-value memory: memorizing of max. and min. values for humidity, temperature, dew point etc..
Hold function: by pressing a button the current meas. value and the corresponding temperature will be 'frozen'.
Interface: serial interface (3.5mm jack connector), direct connection to RS232 interface of a PC via electrically isolated interface adapter GRS3100 (p.r.t. accessories).
Power supply, power consumption, dimensions of housing, weight etc.: p.r.t. GMH3330
Calculation of dew point: Dew point temperature calculation based upon current humidity and temperature values.
NiCr-Ni-temperature measuring: any standard NiCr-Ni-probe can be plugged in. 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 meas. if necessary.
Calculation of dew point distance: The dew point distance between the ambient temperature and e.g. a wall surface can be displayed by means of a surface measurement.
Calculation of enthalpy: The enthalpy calculation gives the thermal content h of the air.

The GMH 3350 has the following additional features as compared to the GMH 3330:

Min-/Max-alarm: The measuring value of the channel selected (humidity, temperature T1, temperature T2, dew point, dew point distance or enthalpy) is constantly monitored if they remain within the min./max. limits set.
- Alarm: 3 different alarm settings can be selected:
"off" - alarm function not activated
"on" - visual alarm via display, interface alarm, alarm sounded via integrated horn.
"no.So." - visual alarm via display and interface alarm
With the help of the switching module **GAM3000** electric equipment can be switched on/off via the alarm function. (GAM3000 can also be configurated to act as a controller - p.r.t. page 38)
Logger functions: 2 logger functions can be selected:
- Store: Memorizing of meas. values (humidity, temperature T1, temperature T2, dew point temperature, dew point distance and enthalpy) and of the current time, date by pressing a button. All values can be called up from the memory via keyboard or interface at any time. Number of memory units: 99 data sets.
- Cycle: Cyclic, continuous memorizing of meas. values (humidity, temperature T1, temperature T2, dew point temperature, dew point distance and enthalpy).
cycle time adjustable: 1 sec to 1 hour, freely selectable.
Number of memory units: 2700 data sets (= 16200 meas. values)
Use keyboard or interface to start/stop logger. Comfortable read-out and display software available for data processing (GSOFT3050) under accessories.
Real-time clock: integrated clock with date and year

Accessories:

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

GKK 3000 case with cut-outs for GMH3xxx

GRS 3100 interface converter, electrically isolated

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

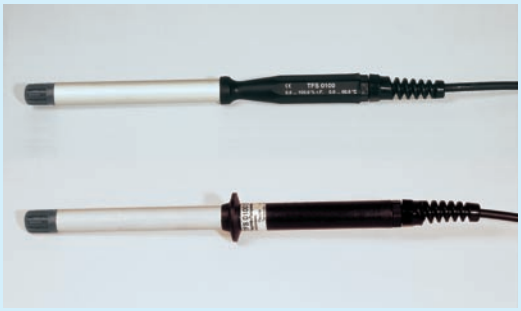
EBS 9M software for transmission, recording and archiving measuring values obtained from one GMH3xxx (p.r.t. page 40).

GSOFT 3050
software for the setting, data read-out and printing of all logger data stored for devices of the GMH3xxx-series. (p.r.t. page 39)

GAM 3000
Switching module for devices of the GMH3xxx-series incl. alarm output

miscellaneous accessories (case, mains adaptors, etc.) suitable for all GMH3xxx devices **p.r.t. p. 38 - 40**

Meas. probes for GMH 33xx for measurements of temperature, relative humidity, dew point etc. as well as flow speed of air, gases and wind velocity



Measuring probes for GMH 3330 and GMH 3350 for measuring of:

- **rel. humidity (dew point, dew point distance etc.)**
- **temperature**

TFS 0100 (0,0 ... 100,0 % r.h.)

Temperature-/humidity probe, calibrated and exchangeable

Specification :

Meas. ranges:
Humidity: 0,0 ... 100,0 % r.h. (rec. range of application: 5...98%r.h.)
Temperature: 0,0 ... 60,0°C
Accuracy:
Humidity: ±2% r.h. linearity, ±1% hysteresis
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 sensor housing
Working temperature: 0 to +60°C
Relative humidity: 0 to +100%r.h.
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.. 100g

TFS 0100 E (0,0 ... 100,0 % r.h.)

Temperature-/humidity probe, calibrated and exchangeable

Specification :

Meas. ranges:
Humidity: 0,0 ... 100,0 % r.h. (recommended range: 5...98%r.h.)
Temperature: -40,0 ... +120,0°C (attention: working temperature of electronics!)
Accuracy:
Humidity: ±2% r.h. linearity, ±1% hysteresis
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: 0 to +60°C (handle and electronics)
-40 to +120°C (sensor head and aluminum tube)
Relative humidity: 0 to +100%r.h.
Dimensions: Probe tube: Ø14 x 119mm, plastic handle: Ø29 x 153 mm, approx. 1m PVC conn. cable with 6-pin Mini-DIN-plug
Weight: approx.. 110g

Measuring probes for GMH 3330 and GMH 3350 to measure:

- **flow rate in water or air**

Water:

STS 005 (0,05 ... 5,00 m/sec.)

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

Specification :

Sensor type: windmill-type anemometer
Meas. range: 0,05 ... 5,0 m/sec.
Accuracy: ±1 % of range ± 3% of meas. value
Permiss. angle flow: ±20°, without additional meas. faults
Working temperature: 0 to +70°C
Relative humidity: 0 to +100%r.h. (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. 75g

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
Permiss. angle flow: ±20°, without additional meas. faults
Working temperature: 0 to +70°C
Relative humidity: 0 to +100%r.h. (non-condensing)
Dimensions: Probe head: Ø 11 x 15mm, tube: Ø 15 mm overall length 165 mm, required insertion opening: Ø 16 mm, approx. 3m PVC connection cable with 6-pin Mini-DIN-plug
Weight: approx. 75g

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 possible!)!

Surface temperature:

GOF 130VE (p.r.t. page 14)

Quick-response surface probes for walls, floors etc.

Measuring devices for flow speed of air, gases, the speed of wind etc.

Volumetric flow anemometer
GVA 0430
cpl. in case, incl. RS232 interface cable and software

low-price meas. device for
- **flow rate**
- **volumetric flow**
- **temperature**

Application:
Ventilation and air conditioning technology, metereology, 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:
Flow rate: 0,01 m/s
Temperature: 0,1 °C
Accuracy:
Flow rate: ±2 % FS
Temperature: ±0,6 °C
Meas. probes:
Flow rate: vane probe, 70mm rotor-Ø
Temperature: 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, meas. value memory, min./max. value memory
Power supply: 9V-batteries, type IEC 6F22 (incl. in scope of supply), battery life with alkaline battery: approx. 100 operating hours.
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)

Thermal anemometer
TA3
incl. case and calibration certificate

Most important features at a glance:
- **measures even small air flows (from 0.01 m/s)**
- **rigid thin sond (8mm Ø) allows measurings even in hardly accessible locations**
- **calibration certificate within scope of supply**
- **large digital display shows velocity and temperature simultaneously**
- **simple 2 keys operation**
- **automatic temperature compensation**
- **high precision: ±3% of measured value**

General:
The TA3 prooves that quality does not necessarily has to be expensive. Precise measuring of the important measurands air velocity and air temperature in ventilation and air conditioning systems isn't a question of the prize anymore.
Its prize and precision makes this instrument interesting for any measuring specialist.
The main sensor of the TA3 is heated to a constant temperature, the ambient air flow cooles it. The cooling is a precise measure for the air velocity.

Specification:
Meas. ranges:
Flow rate: 0,00 m/s to 20,00 m/s
Temperature: 0,0 ... +80,0°C
Resolution:
Flow rate: 0,01 m/s
Temperature: 0,1 °C
Accuracy:
Flow rate: ±3 % v. MW. ±1 digit
Temperature: ±1 °C ±1 digit
Display: 2-line LCD-Display
Power supply: 4 pcs. 1.5V AA batteries (included), battery life with alkaline battery: approx. 15 operating hours.
Low battery warning: autom. display of "LOBAT"
Dimensions: device: 185 x 92 x 30 mm (W x H x D), probe: Ø8 x 175 mm, cable lenght: 1m
Weight: approx. 400g (device and probe)

Hand-held pressure meas. device to set standards!

GMH 3110

One device for any measuring range,

by means of a multitude of plug-in readily calibrated and fully interchangeable probes - no recalibration required.

probes: device is suitable for all GMSD sensors (please refer to page 24/25)

GMH 3110

one single device for:

- overpressure
- underpressure
- pressure difference
- absolute pressure
- air pressure/barometer
- vacuum

Device suitable for connection to bus system (connection of up to 5 devices to one PC interface)

GMH 3110

one device for pressures ranging from

- relative pressure

0,001 mbar to 10,00 bar

- pressure difference

0,001 mbar to 10,00 bar

- absolute pressure

0 ... 1300 mbar to 0,0 ... 400,0 bar

GMH 3110 (probe not incl.)

GMH 3110 - ex (EEx ib IIC T4)

Specification:

Display range: -1999 ... +9999 digit
Meas. range: determined by
Overload: probe currently
Resolution: plugged in
Meas. cycle: 4 meas. / sec.

Pressure units: mbar, bar, Pa, kPa, MPa, mmHg, PSI, can be selected, switch over by pressing the relevant button

Accuracy: (device) ±0,1%FS ±1digit

Probe connection: for GMSD-probes 6-pin screened lockable Mini-DIN-socket. Automatic probe detection and setting of meas. range upon plugging in of probe.

Display: 2 four digit LCD displays (12.4mm high) for current value, and for min./ max values, Hold function, etc. (7 mm high). An additional 11 functional arrows for pressure unit selection, tare etc.

Working temperature: 0 to +50°C
Relative humidity: 0 to +95%r.h. (non-condensing)
Storage temperature: -20 to +70°C

Interface: serial interface, direct connection to RS232 interface of a PC via interface adapter GRS3100 or GRS3105 (p.r.t. accessories).

Tare function: Both the display value as well as the min./max values memorized can be set to zero by means of the tare button. No pressure admission: zero point compensation for the relevant probe.

Min./Max. value memory: memorizing of max. and min. values.

Hold function: by pressing a button the current meas. value will be memorized.

Pushbuttons: 6 membrane keys for ON/ OFF-switch, selection of pressure units, min. and max. value memory, hold-function, tare and/or zero point compens.

Power supply: 9V-battery, type IEC 6F22 (included) as well as additional d.c. connector (internal pin Ø 1.9mm) for external 10-12V direct voltage supply. (suitable power supply: GNG10/3000)

Power consumption: approx. 3 mA (incl external probe)

Low battery warning: ⚠ and ' bAt '

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.

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

Weight: approx. 150 g (incl. batteries)

Special feature: 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")

Changes for Ex type:

(valid for all GMH31xx-ex)

Ex qualification: EEx ib IIC T4

Ref. document: PTB Nr. Ex-00.E.2093 X

The device meets the standards for electric resources in explosion endangered areas according to EN 50 014:1992, EN 50 020:1994

probe: (GMH3110-ex, GMH3150-ex)
All GMSD sensors with option 'Ex type' can be used.

Interface: serial interface, direct connection to RS232 interface of a PC via interface adapter GRS3100 or GRS3105 (p.r.t. accessories)
Please note: The operation of the interface is not allowed within the Ex area!

Power supply: 9V-battery, type IEC 6F22 (included).
Please note: The devive does not have a dc connector for external power supply!

Alarm functionality: (GMH3150-ex, GMH3180-...-ex) the mentioned acoustic alarm is not integrated

Scope of supply: device with associated leather case.

Please note:

(general information for all GMH31xx)

The choice of a specific pressure unit is possible, if its whole measuring range is displayable within the 4-digit display.

Hand-held pressure meas. device to set standards!

GMH 3150

One device for any measuring range, with additional functions such as:

peak value memory (10 msec.), real-time clock, min- / max-alarm and logger function

GMH 3150

one single device for:

- overpressure
- underpressure
- pressure difference
- absolute pressure
- air pressure/barometer
- vacuum

Device suitable for connection to bus system (connection of up to 5 devices to one PC interface)

GMH 3150

one device for pressures ranging from

- relative pressure

0,001 mbar to 10,00 bar

- pressure difference

0,001 mbar to 10,00 bar

- absolute pressure

0 ... 1300 mbar to 0,0 ... 400,0 bar

GMH 3150 **(probe not included)**

GMH 3150 - ex **(EEx ib IIC T4 - probe not included)**

Specification:

Display range: -1999 ... +9999 digit
Meas. range: determined by
Overload: probe currently
Resolution: plugged in
Pressure units: mbar, bar, Pa, kPa, MPa, mmHg, PSI, can be selected, switch over by pressing the relevant button
Accuracy: (device) ±0,1%FS ±1digit
Working temperature: 0 to +50°C
Relative humidity: 0 to +95%r.h. (non-condensing)
Storage temperature: -20 to +70°C
Interface: serial interface, direct connection to RS232 interface of a PC via interface adapter GRS3100 or GRS3105 (p.r.t. accessories).
Sensor connection, display elements, connections, dimensions, device functions (such as tare, min.-max.-value memory, Hold, ...) etc.:
p.r.t. GMH3110
Special feature: when connecting an abs. press. 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")
additional features of GMH3150 as compared to GMH3110:
Measuring cycle: you have a choice between 3 measuring functions:
"slow" = 4 measurements / sec.
"fast" = >100 measurements / sec.
"peak-detekt" = >100 meas. / sec.

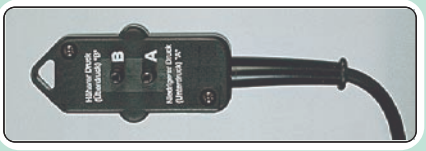
Peak value memory: (peak-detect) Quickest possible measuring frequency is used (100 measurements/sec.), measuring values are not filtered. Therefore, pressure peaks of 10 msec. can be stored in the min./max. value memory.
Low Power mode: for long-term recordings (eg tightness). Only one measurement carried out at the end of the respective logger cycle; thus, battery life is considerably prolonged (can only be activated for measuring cycle "slow")
Logger functions: you have a choice between 2 logger functions:
- Store: memorizing of pressure values (current value, max./min. value) and of the current time and date by pressing a button. Number of memory units: 99 data sets
- Cycle: cyclic, continuous memorizing of pressure values (current or average value, max. and min. value).
adjustable cycle time: 1 sec. to 1h, freely selectable.
Number of memory units: 5400 data sets (= 16200 measuring values)
An average pressure value is memorized as measuring value in the "fast" and "peak detect" modes. The max. and min. values are reset automatically at the beginning of each logger interval so as to allow for the max./min. values of the current logger cycle to be recorded.
Logger start and stop via the keyboard or interface. Comfortable read-out and display software (GSOFT3050) available as additional equipment.
Min.-/Max.-alarm: the measuring value is constantly monitored if they remain within the min./max. limits set.
- Alarm: 3 different alarm settings can be selected:
"off" - alarm function not activated
"on" - visual alarm via display, interface alarm, alarm sounded via integrated horn.
"no.So." - visual alarm via display and interface alarm
With the help of the switching module **GAM3000** electric equipment can be switched on/off via the alarm function. (GAM3000 can also be configurated to act as a controller - p.r.t. page 38)
Real-time clock: integrated clock with date and year

Accessories:

GSOFT 3050
Software for the setting, data read-out and printing of all logger data stored for devices of the GMH3xxx-series. (please refer to page 39)

GAM 3000
Switching module for devices of the GMH3xxx-series incl. alarm output (please refer to page 38)

for miscellaneous accessories p.r.t. pages 24, 25, 38 - 40, 79



Pressure probes:

for GMH3110, GMH3150 and GMH3155

GMSD 2,5 MR

for meas. of over/under pressure and pressure difference.

-1,999 to 2,500 mbar (± 2,500 mbar)

Specification:

Meas. range: -1,999 to 2,500 mbar (-199,9 ... 250,0 Pa)
Overload: max. 250 mbar
Resolution: 0,001 mbar (0,1 Pa)
Accuracy: (0-2,5mbar) (typ. values)
±0,2%FS (hysteresis and linearity)
±1,0%FS (temperature influence from 0-50°C)
Sensor: piezoresistive relative pressure sensor. Suit. for air and non-corrosive, non-ionising gases and liquids.
Pressure connection: 2 connection pins 6 x 1 mm (6mm outer-Ø and 4mm inside-Ø)
Electronics: PC board with amplifier and data memory for sensor data (meas. range/calibration etc.) integrated in sensor housing.
Working temperature: 0 to +50°C
Relative humidity: 0 to +95%r.h. (non-condensing)
Storage temperature: -40 to +85°C
Housing: ABS plastic with suspension eye, dimensions do not incl. conn. pin: 68 x 32,5 x 15 mm (H x W x D), dimensions with conn. pin : 68 x 32,5 x 27,5mm.
Unit connection: 1m PVC conn. cable screened with integral 6-pin Mini-DIN-plug, lockable
Weight: approx. 75g

GMSD 25 MR

for meas. of over/under pressure and pressure difference.

-19,99 to 25,00 mbar (± 25,00 mbar)

Specification:

Meas. range: -19,99 to 25,00 mbar (-1999 ... 2500 Pa)
Overload: max. 350 mbar
Resolution: 0,01 mbar (1 Pa)
Accuracy: (0-25mbar) (typ. values)
±0,2%FS (hysteresis and linearity)
±0,5%FS (temperature influence from 0-50°C)
Other data identical to GMSD 2,5 MR

GMSD 350 MR

for meas. of over/under pressure and pressure difference.

-199,9 to 350,0 mbar (± 350,0 mbar)

Specification:

Meas. range: -199,9 to 350,0 mbar
Overload: max. 1 bar
Resolution: 0,1 mbar
Accuracy: (0-350mbar) (typ. values)
±0,2%FS (hysteresis and linearity)
±0,4%FS (temperature influence from 0-50°C)
Other data identical to GMSD 2,5 MR

GMSD 2 BR

for meas. of over/under pressure and pressure difference.

-1000 to 2000 mbar

Specification:

Meas. range: -1000 to 2000 mbar
Overload: max. 4 bar
Resolution: 1 mbar
Accuracy: (0-2000mbar) (typ. values)
±0,2%FS (hysteresis and linearity)
±0,4%FS (temperatue influence from 0-50°C)
Other data identical to GMSD 2,5 MR

GMSD 10 BR

for meas. of over/under pressure and pressure difference.

-1,00 to 10,00 bar

Specification:

Meas. range: -1,00 to 10,00 bar
Overload: max. 10,34 bar
Resolution: 0,01 bar (10 mbar)
Accuracy: (0-10 bar) (typ. values)
±0,2%FS (hysteresis and linearity)
±0,4%FS (temperature influence from 0-50°C)
Other data identical to GMSD 2,5 MR

GMSD 1,3 BA

for measuring of absolute pressure

0 to 1300 mbar absolute

Specification:

Meas. range: 0 to 1300 mbar absolute
Overload: max. 4 bar absolute
Resolution: 1 mbar
Accuracy: (typ. values)
±0,2%FS (hysteresis and linearity)
±0,4%FS (temperature influence from 0-50°C)
Sensor: piezoresistive absolute pressure sensor. Suit. for air and non-corrosive, non-ionising gases and liquids..
Other data identical to GMSD 2,5 MR

GMSD 2 BA

for measuring of absolute pressure

0 to 2000 mbar absolute

Specification:

Meas. range: 0 to 2000 mbar absolute
Overload: max. 4 bar absolute
Resolution: 1 mbar
Accuracy: (typ. values)
±0,2%FS (hysteresis and linearity)
±0,4%FS (temperature influence from 0-50°C)
Other data identical to GMSD 1,3BA

GMSD 7 BA

for measuring of absolute pressure

0,00 to 7,00 bar absolute

Specification:

Meas. range: 0,00 to 7,00 bar absolute
Overload: max. 10 bar absolute
Resolution: 0,01 bar (10 mbar)
Accuracy: (typ. values)
±0,2%FS (hysteresis and linearity)
±0,4%FS (temperature influence from 0-50°C)
Other data identical to GMSD 1,3 BA

St. steel pressure sensors:

(for aggressive media, water, etc.)

GMSD 350 MRE

for measuring of over pressure (rel. press.)

Specification:

Meas. range: 0,0 to 350,0 mbar
Overload: max. 1,3 bar
Resolution: 0,1 mbar
Accuracy: (typ. values)
±0,2%FS (hysteresis and linearity)
±0,4%FS (temperature influence from 0-50°C)
Sensor: stainless steel relative pressure sensor (parts coming into contact with media). Suitable for aggressive media, water, etc.
Electronics: PC board with amplifier and data memory for sensor data (meas. range/calibration etc.) integrated in sensor housing.
Pressure connection: connection thread G1/4" (other threads or adapter on request). For open ended spanner size: 19 mm
Working temperature: 0 to +70°C
Relative humidity: 0 to +95%r.h. (non-condensing)
Storage temperature: -40 to +80°C
Housing: made of stainless steel, outer Ø approx. 26 mm, length does not incl. anti-buckling glanding approx. 103 mm. Anti-buckling glanding, 1 m PVC connection cable screened with integral 6-pin Mini-DIN-plug, lockable
Weight: approx. 195 g

GMSD 1 BAE

for meas. of over/under and absolute pressure

Meas. range: 0 to 1000 mbar absolute
Overload: max. 2 bar absolute
Resolution: 1 mbar
Accuracy: (typ. values)
±0,2%FS (hysteresis and linearity)
±0,4%FS (temperature influence from 0-50°C)
Sensor: st.steel absolute pressure sensor (parts coming into contact with media), suitable for aggressive media, water etc.
Other data identical to GMSD 350 MRE

GMSD 3,5 BAE

Meas. range: 0 to 3500 mbar absolute
Overload: max. 7 bar absolute
Resolution: 1 mbar
Accuracy: (typ. values)
±0,2%FS (hysteresis and linearity)
±0,4%FS (temperature influence from 0-50°C)
Other data identical to GMSD 1 BAE

GMSD 3,5 BRE

Meas. range: 0 to 3500 mbar
Overload: max. 7 bar
Resolution: 1 mbar
Accuracy: (typ. values)
±0,2%FS (hysteresis and linearity)
±0,4%FS (temperature influence from 0-50°C)
Other data identical to GMSD 350 MRE

GMSD 7 BAE

Measuring range: 0 to 7000 mbar absolute
Overload: max. 13,5 bar absolute
Resolution: 1 mbar
Accuracy: (typ. values)
±0,2%FS (hysteresis and linearity)
±0,4%FS (temperature influence from 0-50°C)
Other data identical to GMSD 1 BAE

GMSD 35 BAE

Measuring range: 0,00 to 35,00 bar absolute
Overload: max. 58 bar absolute
Resolution: 10 mbar
Accuracy: (typ. values)
±0,2%FS (hysteresis and linearity)
±0,4%FS (temperature influence from 0-50°C)
Pressure connection: connection thread G1/4" (other threads or adapter on request). For open ended spanner size: 27 mm
Housing: made of stainless steel, outer dia approx. 26 mm, length not incl. anti-buckling glanding approx. 88 mm. Anti-buckling glanding, 1 m PVC connection cable screened with integral 6-pin Mini-DIN-plug, lockable
Weight: approx. 230 g
Other data identical to GMSD 1 BAE

GMSD 70 BAE

Measuring range: 0,0 to 70,0 bar absolute
Overload: max. 100 bar absolute
Resolution: 0,1 bar
Accuracy: (typ. values)
±0,2%FS (hysteresis and linearity)
±0,4%FS (temperature influence from 0-50°C)
Other data identical to GMSD 35 BAE

GMSD 160 BAE

Measuring range: 0,0 to 160,0 bar absolute
Overload: max. 600 bar abs.
Resolution: 0,1 bar
Accuracy: (typ. values)
±0,2%FS (hysteresis and linearity); ±0,4%FS (temp. influence from 0-50°C)
Other data identical to GMSD 35 BAE

GMSD 250 BAE

Measuring range: 0,0 to 250,0 bar absolute
Overload: max. 600 bar abs.
Resolution: 0,1 bar
Accuracy: (typ. values)
±0,2%FS (hysteresis and linearity); ±0,4%FS (temp. influence from 0-50°C)
Other data identical to GMSD 35 BAE

GMSD 400 BAE

Measuring range: 0,0 to 400,0 bar absolute
Overload: max. 600 bar abs.
Resolution: 0,1 bar
Accuracy: (typ. values)
±0,2%FS (hysteresis and linearity); ±0,4%FS (temp. influence from 0-50°C)
Other data identical to GMSD 35 BAE
other pressure ranges upon request

Options, upcharges:

probes for Ex-protection (EEx ib IIC T4)

Higher probe accuracy
By multi point calibration (additional individual linearisation points are stored in sensor memory) - not possible for GMSD2.5MR and GMSD25MR!

Certificate of calibration WPD5
(f. ISO9000 ff.) incl. several calibration points stored in probe calibration memory permanently, certificate of calibration: 5 point increase, 5 point decrease.

Certificate of calibration WPD10
(f. ISO9000 ff.) incl. several calibration points stored in probe calibration memory permanently, certificate of calibration: 10 point increase, 10 point decrease.

Low priced GMSD sensors for wet applications / gases (tap water and air)

for GMH3110, GMH3150 and GMH3155

Construction: dry measuring cell (ceramic membrane with NBR sealing - Viton or others upon request) integrated in stainless steel housing (1.4305).

Advantages:

- Excellent long time stability
- good value
- high overload range

GMSD 5 BRC

for measuring of over pressure (rel. press.)

Specification:

Meas. range: 0 bis 5000 mbar (5bar) relative
Overload: max. 15 bar
Resolution: 1 mbar
Accuracy: ±0,5%FS (hysteresis and linearity)
Temperature dependency: < ±0,03 % / K
Sensor: relative pressure sensor element of ceramic $AL_2O_3$96% with NBR sealing (Viton or others upon request) integrated in stainless steel housing (1.4305).
Pressure connection: G1/4", spanner width 22mm (st. steel 1.4305)
Measuring media: For measuring of all media which do not harm AL2O396%, NBR or stainless steel 1.4305.
Electronics: PC board with amplifier and data memory for sensor data (meas. range/calibration etc.) integrated in sensor housing.
Working temperature: 0 to +70°C
Relative humidity: 0 to +95%r.F. (non-condensing)
Storage temperature: -40 to +85°C
Housing: rustless metal, outer diameter of cylindrical part approx 20mm; length incl. hexagon head, without threading and cable glanding: approx. 60mm, 1m PVC connection cable screened with integral 6-pin Mini-DIN-plug and lockable.
Weight: approx. 150 g

GMSD 50 BRC

for measuring of over pressure (rel. press.)

Specification:

Meas. range: 0,00 bis 50,00 bar relative
Overload: max. 125 bar
Resolution: 10 mbar
Accuracy: ±0,5%FS (hysteresis and linearity)
Sensor: relative pressure sensor element of ceramic $AL_2O_3$96% with NBR sealing (Viton or others upon request) integrated in stainless steel housing (1.4305).
Other data identical to GMSD 5 BRC

GMSD 400 BRC

for measuring of over pressure (rel. press.)

Specification:

Meas. range: 0,0 bis 400,0 bar relative
Overload: max. 600 bar
Resolution: 100 mbar (0,1 bar)
Accuracy: ±0,5%FS (hysteresis and linearity)
Other data identical to GMSD 5 BRC

Water level / well probe (for GMH3155)
please contact us!

A new series of hand-held measuring devices for new standards

- Compact design (sensor incl in electronics housing) with sturdy metal connection pin
- Interface
- Device suitable for connection to bus system (connection of up to 5 devices to one PC interface)
- Min./Max. memory
- Hold function
- Tare function/zero point offset
- Pressure units selectable
- Ⓔx **- protection (optional)**

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

GMH 3160-01

-100 to 2500 Pa (-2500 ... +2500 Pa)

Device ready for operation incl. sensor, battery or d.c. operation

Specification:

Meas. range: -100 to 2500 Pa (-2500 ... +2500 Pa)
Overload: max. 100 mbar
Resolution: 1 Pa (0.01mbar)
Pressure units: mbar, bar, Pa, kPa, mmHg, PSI, freely selectable, can be chosen by pressing a button.
Accuracy: (typ. values)
±0,5%FS (hysteresis and linearity)
±0,4%FS (temperature-influence from 0-50°C)
Sensor: piezoresistive relative pressure sensor. Suit. for air and non-corrosive, non-ionising gases and liquids.
Sensor connection: 2 metal conn. pins, made of brass, nickel plated, pressure tubes 6x1mm (4mm Inner Ø) can be connected to the front side of the device
Display: 2 four-digit LCD-displays for nominal value (12.4mm high) and for min., max. values, hold-function, etc. (7mm high). Another 11 functional arrows for pressure unit selection and tare etc.
Working temperature: 0 to +50°C
Relative humidity: 0 to +95%r.h. (non-condensing)
Storage temperature: -20 to +70°C
Interface: serial interface can be directly connected to RS232 interface of a PC via interface adapter GRS3100 (see accessories).
Min./Max. memory: both max. and min. values will be memorized.
Hold function: upon pressing a button the nominal value will be memorized.
Tare function: both the value displayed and the min./max. values will be set to zero by means of the tare key. No pressure: zero point offset.

Additional features for GMH3180:

- Peak value memory (<10 ms) 100 measurements/sec.
- min- / max-alarm
- 2 logger functions: manually up to 99 or continuously up to 5400 data sets

Pushbuttons: 6 membrane keys for ON/OFF-switch, selection of pressure units, min- and max-value memory, hold-function, tare and zero point compensation.
Power supply: 9V-battery, type IEC 6F22 (included) as well as additional mains adapter (internal pin Ø 1.9mm) for external 10-12V direct voltage supply.
(suitable power supply: GNG10/3000)
Power consumption: max. 3 mA
Low battery warning: ⚠ and ' bAt '
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., or completely deactivated.
Housing dimensions: (sensor connection pin not. incl) 142 x 71 x 26 mm (H X W x D), sensor pin: approx. 11 mm protruding at front side of device. Impact-resistant ABS plastic housing, membrane keyboard, transp. panel. Front side IP65, integrated pop-up clip for table top or suspended use
Weight: approx. 160 g

Options (upcharges):

Ex-Schutz (EEx ib IIC T4)
(please refer to notes at page 22)

Higher sensor accuracy
By multi point calibration - not possible for GMH3160-01 and GMH3180-01!

Certificate of calibration WPD5
(f. ISO9000 ff.) incl. several calibration points of sensor, certificate of calibration: 5 points increase, 5 points decrease

Certificate of calibration WPD10
(f. ISO9000 ff.) incl. several calibration points of sensor, certificate of calibration: 10 points increase, 10 points decrease

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

GMH 3180-01

-100 to 2500 Pa (-2500 ... +2500 Pa)

Unit ready for operation incl. sensor, battery or d.c. operation

Specification :

Specification identical to GMH3160-01 with the following **additional functions:**

Measuring cycle: 3 meas. functions at an interval of 4 meas. /sec. or >100 meas. /sec.
Peak value memory: (peak-detect) Quickest possible measuring frequency is used (100 measurements/sec.), measuring values are not filtered. Therefore, pressure peaks of 10 msec. can be stored.
Low Power mode: p.r.t. GMH3150
Logger functions: you have a choice between 2 logger functions:
- Store: memorizing of pressure values (current value, max./min. value) and of the current time and date by pressing a button.
Number of memory units: 99 data sets
- Cycle: cyclic, continuous memorizing of pressure values (current or average value, max. and min. value).
adjustable cycle time: 1 sec. to 1h, freely selectable.
Number of memory units: 5400 data sets (= 16200 measuring values)
Logger start and stop via the keyboard or interface. Comfortable read-out and display software (GSOFT3050) available as additional equipment.
Min-/Max-alarm: the measuring value (or the max- or min-values) are constantly monitored if they remain within the min./ max. limits set.
Alarm: via display, interface and integrated horn. With the help of the switching module **GAM3000** electric equipment can be switched on/off via the alarm function.
Real-time clock: int. clock with date and year

for additional information about the functions p.r.t. GMH3150 **(also refer to page 23)**

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

GMH 3160-07
GMH 3180-07

-10.0 to 350.0 mbar (-350,0 ... 350,0 mbar)

Ex-protection: refer options page 26

Specification:

Meas. range: -10,0 to 350,0 Pa
(-350 ... +350,0 Pa)
Overload: max. 1 bar
Resolution: 0,1 mbar
Pressure units: mbar, bar, Pa, kPa, MPa, mmHg, PSI, freely selectable, can be chosen by pressing a button.
Accuracy: (typ. values)
±0,2%FS (hysteresis and linearity)
±0,4%FS (temperature-influence from 0-50°C)
Sensor: integrated piezoresistive relative pressure sensor. Suit. for air and non-corrosive, non-ionising gases and liquids.
Other data identical to GMH3160-01

Additional features for GMH3180-07:
Measuring cycle: 3 meas. functions at an inverval of 4 meas. /sec. or >100 meas. /sec.
Peak value memory: (peak-detect)
Quickest possible meas. frequency is used (100 meas./sec.), meas. values are not filtered.
Low Power mode: p.r.t. GMH3150
Logger functions: you have a choice between 2 logger functions:
- Store: memorizing of pressure values by pressing a button. Values stored can be called up by pressing a button at any time.
Number of memory units: 99 data sets
- Cycle: cyclic, continuous memorizing of pressure values.
adjustable cycle time: 1 sec. to 1h,
Number of memory units:
5400 data sets (= 16200 measuring values)
Min-/Max-alarm: the meas. value (or the max- or min-values) are constantly monitored if they remain within the min./max. limits set.
Alarm: via display, interface and integrated horn.

for additional information about functions p.r.t. GMH3150 (also refer to page 23)

DIGITAL-VACUUM or BAROMETER
for measuring of absolute pressure.

GMH 3160-12
GMH 3180-12

0 to 1300 mbar abs.

Ex-protection: refer options page 26

Specification:

Meas. range: 0 to 1300 mbar absolute
Overload: max. 4 bar abs.
Resolution: 1 mbar
Pressure units: mbar, bar, Pa, kPa, MPa, mmHg, PSI, freely selectable, can be chosen by pressing a button.
Accuracy: (typ. values)
±0,2%FS (hysteresis and linearity)
±0,4%FS (temperature-influence from 0-50°C)
Sensor: integrated piezoresistive absolute pressure sensor. Suitable for air and non-corrosive, non-ionising gases and liquids.
Please note: The barometric air pressure can also be related to sea level "zero". (Correction of air pressure is achieved by entering m above "zero").
Other data identical to GMH3160-01

Additional features for GMH3180-12:
Measuring cycle: 3 meas. functions at an inverval of 4 meas. /sec. or >100 meas. /sec.
Peak value memory: (peak-detect)
Quickest possible meas. frequency is used (100 meas./sec.), meas. values are not filtered.
Low Power mode: p.r.t. GMH3150
Logger functions: 2 logger functions:
- Store: memorizing of pressure values by pressing a button. Values stored can be called up by pressing a button at any time.
Number of memory units: 99 data sets
- Cycle: cyclic, continuous memorizing of pressure values.
adjustable cycle time: 1 sec. to 1h,
Number of memory units:
5400 data sets (= 16200 measuring values)
Min-/Max-alarm: the meas. value (or the max- or min-values) are constantly monitored if they remain within the min./max. limits set.
Alarm: via display, interface and integrated horn.

for additional information about function p.r.t. GMH3150 (also refer to page 23)

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

GMH 3160-13
GMH 3180-13

-100 to 2000 mbar (-2000 ... +2000 mbar)

Ex-protection: refer options page 26

Specification:

Meas. range: -100 to 2000 mbar
(-2000 ... +2000 mbar)
Overload: max. 4 bar abs.
Resolution: 1 mbar
Pressure units: mbar, bar, Pa, kPa, MPa, mmHg, PSI, freely selectable, can be chosen by pressing a button.
Accuracy: (typ. values)
±0,2%FS (hysteresis and linearity)
±0,4%FS (temperature-influence from 0-50°C)
Sensor: integrated piezoresistive relative pressure sensor. Suit. for air and non-corrosive, non-ionising gases and liquids.
Other data identical to GMH3160-01

Additional features for GMH3180-13:
Measuring cycle: 3 meas. functions at an inverval of 4 meas. /sec. or >100 meas. /sec.
Peak value memory: (peak-detect)
Quickest possible meas. frequency is used (100 meas./sec.), meas. values are not filtered.
Low Power mode: p.r.t. GMH3150
Logger functions: you have a choice between 2 logger functions:
- Store: memorizing of pressure values by pressing a button. Values stored can be called up by pressing a button at any time.
Number of memory units: 99 data sets
- Cycle: cyclic, continuous memorizing of pressure values.
adjustable cycle time: 1 sec. to 1h,
Number of dmemory units:
5400 data sets (= 16200 measuring values)
Min.-/Max.-alarm: the meas. value (or the max- or min-values) are constantly monitored if they remain within the min./max. limits set.
Alarm: via display, interface and integrated horn.

for additional information about functions p.r.t. GMH3150 (also refer to page 23)

DIGITAL PRECISION MANOMETER for over/under pressure or pressure difference

GDH 01 AN

Device ready for use incl. sensor and battery, battery and mains operation possible, analog output 0-1 V equiv. 0 to 20 mbar relative, plug-in sensor, approx. 1 m of cable

Specification:

Meas. range: 0 ... 1999 Pa (20 mbar) relative
Overload: max. 10000 Pa (100 mbar) rel. (no destruction or new calibration of sensor)
Resolution: 1 Pa (0.01 mbar)
Accuracy(device)**:** (at nominal temperature = 25°C) 1 Pa ± 1 digit
Temperature drift (device)**:** ±0,01 %/K
Sensor: 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 special 4-pin plug for connection to meter. Sensor suitable for air and non-corrosive and non-ionising gases and liquids.
Sensor accuracy: (typical values)
± 0.5% f.s. (full scale) hysteresis and linearity
± 0.4% f.s. temperature drift from 0 to 50°C
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 - 1V equiv. 0 to 1999 Pa, socket for 3.5 mm Ø jack connector (included)
Dimensions: impact resistant ABS plastic housing, approx. 150 x 86 x 30 mm (H x W x D) with integrated pop-up clip for table-top or suspended use, clips for lateral mounting of probe.
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 probe)

Accessories:

GKK 252 small case (235 x 185 x 48 mm) with foam lining
GNG 10 power supply

Tubes, clamps, adapters, accessories, etc. p.r.t. pages 38, 79

DIGITAL PRECISION MANOMETER for over/under pressure or pressure difference

GDH 07 AN

Device ready for use incl. sensor and battery, battery and mains operation possible, analog output 0-1 V equiv. 0 to 200 mbar relative, plug-in sensor, approx. 1 m of cable

Specification:

Meas. range: 0,0 ... 199.9 mbar relative
Overload: max. 1 bar rel. (no destruction or new calibration of sensor)
Resolution: 0,1 mbar equiv. 1 mm water column
Accuracy (device)**:** (at nominal temp. = 25°C) 0,1 mbar ± 1 digit
Temperature drift (device)**:** ±0,01 %/K
Sensor: 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 special 4-pin plug for connection to meter. Sensor suitable for air and non-corrosive and non-ionising gases and liquids.
Sensor accuracy: (typical values)
± 0.2% f.s. (full scale) hysteresis and linearity
± 0.4% f.s. temperature drift from 0 to 50°C
Option: sensor with double accuracy
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 - 1V equiv. 0 to 199,9 mbar, socket for 3.5 mm Ø jack connector (included)
Dimensions: impact resistant ABS plastic housing, approx. 150 x 86 x 30 mm (H x W x D) with integrated pop-up clip for table-top or suspended use, clips for lateral mounting of probe.
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 probe)

Accessories:

GKK 252 small case (235 x 185 x 48 mm) with foam lining
GNG 10 power supply

Tubes, clamps, adapters, accessories, etc. p.r.t. pages 38, 79

DIGITAL-VACUUM- resp. BARO-METER for absolute pressure measurements

GDH 12 AN

Device ready for use incl. sensor and battery, battery and mains operation possible, analog output 0-1 V equiv. 0 to 200 mbar relative, plug-in sensor, approx. 1 m of cable

Specification:

Meas. range: 0 ... 1300 mbar absolute
Overload: max. 2 bar abs. (no destruction or new calibration of sensor)
Rsolution: 1 mbar
Accuracy (device)**:** (at nominal temp. = 25°C) 1 mbar ± 1 digit
Temperature drift (device)**:** ±0,01 %/K
Sensor: piezoresistive absolute 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 special 4-pin plug for connection to meter. Sensor suitable for air and non-corrosive and non-ionising gases and liquids.
Sensor accuracy: (typical values)
± 0.2% f.s. (full scale) hysteresis and linearity
± 0.4% f.s. temperature drift from 0 to 50°C
Option: sensor with double accuracy
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 - 1V equiv. 0 to 1300 mbar, socket for 3.5 mm Ø mono plug (included)
Dimensions: impact resistant ABS plastic housing, approx. 150 x 86 x 30 mm (H x W x D) with integrated pop-up clip for table-top or suspended use, clips for lateral mounting of probe.
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 probe)

Accessories:

GKK 252 small case (235 x 185 x 48 mm) with foam lining
GNG 10 power supply

Tubes, clamps, adapters, accessories, etc. p.r.t. pages 38, 79

DIGITAL-MANOMETER for over/under pressure and pressure difference

GDH 13 AN

Device ready for use incl. sensor and battery, battery and mains operation possible, analog output 0-1 V equiv. 0 to 2 bar relative, plug-in sensor, approx. 1 m of cable

Specification:

Meas. range: 0 ... 1999 Pa (hPa) relative
Overload: max. 4 bar rel. (no destruction or new calibration of sensor)
Resolution: 1 mbar
Accuracy(device)**:** (at nominal temperature = 25°C) 1 mbar ± 1 digit
Temperature drift (device)**:** ±0,01 %/K
Sensor: 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 special 4-pin plug for connection to meter. Sensor suitable for air and non-corrosive and non-ionising gases and liquids.
Sensor accuracy: (typical values)
± 0.2% f.s. (full scale) hysteresis and linearity
± 0.4% f.s. temperature drift from 0 to 50°C
Option: sensor with double accuracy
Working temperature: 0 to 50°C (device)
-40 to +85°C (sensor)
Temperature in the 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 - 1V equiv. 0 to 1999 mbar, socket for 3.5 mm Ø jack connector (included)
Dimensions: impact resistant ABS plastic housing, approx. 150 x 86 x 30 mm (H x W x D) with integrated pop-up clip for table-top or suspended use, clips for lateral mounting of probe.
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 probe)

Accessories:

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

GNG 10 power supply

Tubes, clamps, adapters, accessories, etc. p.r.t. pages 38, 79

DIGITAL-MANOMETER for over/under pressure and pressure difference

GDH 14 AN

Device ready for use incl. sensor and battery, battery and mains operation possible, analog output 0-1 V equiv. 0 to 10 bar relative, plug-in sensor, approx. 1 m of cable

Specification:

Meas. range: 0,00 ... 10,00 bar relative
Overload: max. 10,34 bar rel. (no destruction or new calibration of sensor)
Resolution: 0,01 bar = 10 mbar
Accuracy (device)**:** (at nominal temperature = 25°C) 10 mbar ± 1 digit
Temperature drift (device)**:** ±0,01 %/K
Sensor: piezoresistive relative pressure sensor, externally mounted in plastic case, 2 connection pins for plastic tube 6 x 1 mm (4 mm iinner Ø), approx. 1 m of 4-wire PVC connecting cable with special 4-pin plug for connection to meter. Sensor suitable for air and non-corrosive and non-ionising gases and liquids.
Sensor accuracy: (typical values)
± 0.2% f.s. (full scale) hysteresis and linearity
± 0.4% f.s. temperature drift from 0 to 50°C
Option: sensor with double accuracy
Working temperature: 0 to 50°C (device)
-40 to +85°C (sensor)
Temperature in the 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 - 1V equiv. 0,00 to 10,00 bar, socket for 3.5 mm Ø jack connector (included)
Dimensions: impact resistant ABS plastic housing, approx. 150 x 86 x 30 mm (H x W x D) with integrated pop-up clip for table-top or suspended use, clips for lateral mounting of probe.
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 probe)

Accessories:

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

GNG 10 power supply

Tubes, clamps, adapters, accessories, etc. p.r.t. pages 38, 79

DIGITAL-PRECISION POCKET BAROMETER

GPB 1300

Device ready for use incl. battery

Specification:

Meas. range: 0 ... 1300 mbar absolute (display range up to 1999 mbar)
Resolution: 1 mbar
Accuracy (device)**:** (at nominal temperature = 25°C) 1 mbar ± 1 digit
Sensor: piezoresistive absolute pressure sensor, integrated in housing
Sensor accuracy: (typical values)
± 0.25% f.s. hysteresis a. linearity (0...1100mbar)
± 1.0% f.s. hysteresis a. linearity (1100...1300mbar)
± 0.5% f.s. temperature drift from 0 to 50° C
Working temperature: 0 to 50°C
Display: 3½ digit LCD display, approx. 13 mm high
Power supply: 9V battery type JEC 6 F 22 (included).
Power consumption: approx. 2 mA
Low battery warning: "BAT", automatic in case of low voltage
Dimensions: impact resistant ABS plastic housing, approx. 106 x 67 x 30 mm (H x W x D).
Weight: approx. 150 g (incl. battery)

Accessories:

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

GB 9 V spare battery

for misc. accessories, etc. p.r.t. page 38

Other scales (e.g. mmHg) / special features upon request !

The New State Of The Art Double Pressure Measuring Instrument!

GMH 3155

One device for any measuring range, with additional functions such as:

peak value memory (10 msec.), real-time clock, min-/max-alarm, logger function and level measuring of water

probes: 2 GMSD sensors to be connected simultaneously (probes p.r.t. page 24/25)

GMH 3155

one single device for:

- overpressure
- underpressure
- pressure difference
- absolute pressure
- air pressure/barometer
- vacuum
- level (water)

Device suitable for connection to bus system (connection of up to 5 devices to one PC interface)

GMH 3155

one device for pressures ranging from

- relative pressure

0,001 mbar to 10,00 bar

- pressure difference

0,001 mbar to 10,00 bar

- absolute pressure

0 ... 1300 mbar to 0,0 ... 400,0 bar

GMH 3155 (probes not included)

Specification:

Display range: -1999 ... +9999 digit
Meas. range: determined by
Overload: probe currently
Resolution: plugged in

Measuring cycle: 3 measuring functions:
"slow" = 4 measurements / sec.
"fast" = >100 measurements / sec.
"peak-detekt" = >100 meas. / sec.

Pressure units: mbar, bar, Pa, kPa, MPa, mmHg, PSI, m can be selected, switch over by pressing the relevant button

Accuracy: (device) ±0,1%FS ±1digit

Probe connection: for 2 GMSD-probes. Automatic probe detection and setting of meas. range upon plugging in of probe.

Display: 2 four digit LCD displays (12.4 and 7mm high) for current value, and for min./ max. value, hold function and 11 additional information arrows.

Pushbuttons: 6 membrane key for On/Off-switch, selection of pressure units, min. and max. value memory, hold function, tara or zero point compensation, logger function, real-time clock, etc.

Working temperature: 0 to +50°C
Relative humidity: 0 to +95%r.h. (non-condensing)
Storage temperature: -20 to +70°C

Interface: serial interface, direct connection to RS232 interface of a PC via interface adapter GRS3100 or GRS3105 (p.r.t. accessories).

Tara function, Min-/Max. value memory, Hold function: please refer to GMH3110

Real-time clock: integrated in device

Peak value memory: (peak-detect) Quickest possible measuring frequency is used (100 measurements/sec.), measuring values are not filtered.
Therefore, pressure peaks of 10 msec. can be stored in the min./max. value memory.

2 Logger functions:

- Store: Storage of the pressure values (actual, min and max value for both sensors and their difference) and of the time and date upon key press.
The stored values can be recalled via keys or interface at any time.
Number of memory units: 99 Data sets

- Cycle: cyclic, continuous memorizing of pressure values (current or average value, max. and min. value).
adjustable cycle time: 1 sec. to 1h., freely selectable.
Number of memory units: 1800 date sets (= 16200 Meßwerte) containing of:
Sensor 1: actual, min and max value
Sensor 2: actual, min and max value
Difference: actual, min and max value
An average pressure value is memorized as measuring value in the "fast" and "peak detect" modes. The max. and min. values are reset automatically at the beginning of each logger interval so as to allow for the max./min. values of the current logger cycle to be recorded.
Logger start and stop via the keyboard or interface. Comfortable read-out and display software (GSOFT3050) available as additional equipment.

Low power mode: for long-term recordings (eg. tightness). Only one measurement carried out at the end of the respective logger cycle; thus, battery life is condiderably prolonged. (can only be activated for measuring cycle "slow")

Level measuring in water: with suitable pressure sensors the level can be displayed in [m].

min/max alarm: the chosen meas. signal (sensor 1, sensor 2, sensor 1 & 2, differnce or Sensor 1 & 2 & Dif) is observed permanently for the preset min and max alarm rails.

- Alarm: 3 different alarm settings can be selected:
"off" - alarm function not activated
"on" - alarm via display, interface and via integrated horn
"no.So." - alarm via display and interface
With the help of the switching module **GAM3000** electric equipment can be switched on/off via the alarm function. (p.r.t. page 38)

Power supply: 9V-battery, type IEC 6F22, as well as additional d.c. connector for external 10-12V direct voltage supply. (suitable power supply: GNG10/3000)

Power consumption: up to 5 mA

Low battery warning: ⚠ and ' bAt '

Power-Off-function: The device switches automatically off after 1-120 minutes of no operation.

Housing dimensions: 142 x 71 x 26 mm impact-resistant ABS plastic housing, membrane keyboard, transparent panel. Front side IP65, integrated pop-up clip for table top or suspended use.

Weight: approx. 150 g

Special feature: with abs. pressure probe the barom. air pressure can be displayed corrected to sea level "zero". (Air pressure comp. achieved by entering the meters above sea level "zero")

Our new generation of conductivity meas. 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)
- Automatic temperature compensation
- Setting of different temperature coefficients
- Extremely small measuring probe (dimensions as for pH-probe)
- Serial interface
- Min./Max. value memory
- Hold function
- Battery and d.c. operation

GMH 3410
GMH 3430

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 (GMH3410)**:** 0,0 ... +85,0°C
(GMH3430)**:** -5,0 ... +100,0°C

Resistance: (GMH3430) 0,005 ... 100,0 kOhm

Salinity: (GMH3430) 0,0 ... 70,0

TDS: (GMH3430) 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)

Conductivity: ±0,5% of m.v. ±0,3% FS

Temperaturer: ±0,2% of m.v. ±0,3K

Cell constant: adjustable from 0.8 ... 1.2 cm^{-1}

Temp. compensation: automatic or off (GMH3430).

Compensation coefficient:

- nLF: non-linear function of natural water according to EN27888 (DIN38404).
- Lin: linear compensation from 0,3 ... 3,0 %/K. (GMH3430 only)
- off: no compensation. (GMH3430 only)

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: two-electrode-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.

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%r.h. (non-condensing)

Storage temperature: -20 to +70°C

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

Hold function: by pressing a button the current meas. value and the corresponding temperature will be 'frozen'.

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

Difference between GMH 3430 and GMH 3410:

Additional features of GMH 3430:

- Determination of resistance, salinity and TDS.
- The following temperature coefficients are freely selectable: natural waters, linear compensation or to be deactivated.
- Increased temperature measuring range
- Reference temperature for temperature comp. selectable (20°C/25°C)

Interface: serial interface (3.5mm jack connector), direct connection to RS232 interface of a PC via electrically isolated interface adapter GRS3100 (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 10-12V 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. 5 mA (meas. power not incl.)

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. 120mm long, Ø approx. 12mm, 1m 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 (25°C, or adjustable for GMH3430 20°C /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 (GMH3430 only)**:** 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) (GMH3430 only)**:** The dry residue of filtrate is understood to be the concentration of substances dissolved in a liquid. Reading in mg/l.

Accessories:

GKL 200 200ml conductivity control solution
(2 x 100ml bottles with 1413 µS/cm. (pursuant to DIN EN 2788)
- others upon request)

miscellaneous accessories (case, power supply, etc.) suitable for all GMH3xxx devices p.r.t. p. 38 and 40

The new generation of pH-/redox-/temperature meas. 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
- Automatic detection of measuring value stability
- rH-measurements
- Min/Max value memory, Hold function
- Evaluation of probe quality
- Battery and d.c. operation
- Serial interface, device can be connected to bus system (up to 5 devices can be connected to one PC interface)
- Device can be used as thermometer, too

GMH 3530 without accessories

pH-probe, temperature probe, redox probe, calibration access., etc. please order separately or as additional set.

GMH 35 ES additional set

consisting of: 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
rH:	0,0 ... 70,0 rH

Accuracy: (device) (±1 digit) (at nominal temperature)

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 connection possible)
pH, Redox:	BNC-socket

Input resistance: (pH, Redox) 10^{12} Ohm

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

Working temperature: 0 to +50°C

Relative humidity: 0 to +95%r.h. (non-condensing)

Storage temperature: -20 to +70°C

Interface: serial interface (3.5mm jack connector), direct connection to RS232 interface of a PC via electrically isolated interface adapter GRS3100 or GRS3105 (p.r.t. accessories).

Min/Max-value memory: max. and min. values will be memorized.

Hold function: by pressing a button the current meas. value will be memorized

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

Power supply: 9V-battery, type IEC 6F22 (included) as well as additional d.c. connector (internal pin Ø 1.9mm) for external 10-12V 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 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

Weight: approx. 155 g

Automatic temperature compensation: Automatic temp. comp. (ATC) if temperature probe is plugged in and operating mode is "pH". 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:

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

GKK 3500 large case with punched lining suitable for device and accessories

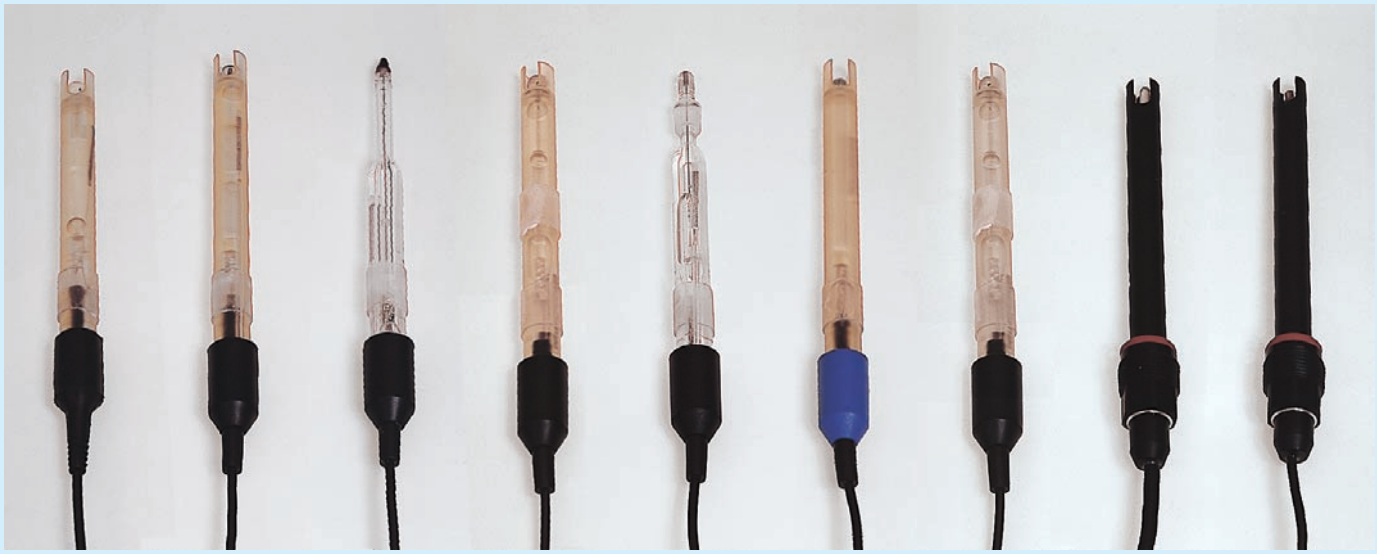
GRS 3100 interface converter, electrically isolated

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

EBS 9M software for transmission, recording and archiving measuring values obtained from one GMH3xxx (p.r.t. page 40).

miscellaneous accessories (case, mains adaptors, etc.) suitable for all GMH3xxx devicesp.r.t. p. 38 - 40

pH-electrodes, redox electrodes and accessories



Low cost pH-electrode	Standard-electrode	Injection electrode	Double chamber electrode	Special-facetted electrode	Redox-electrode	pH-electrode for VE-waters	Electrode with integr. Pt1000	pH-electrode with thread
GE 014	**GE 100**	**GE 101**	**GE 103**	**GE 104**	**GE 105**	**GE 106**	**GE 107**	**GE 108**
2 - 12 pH 5 - 45 °C	0 - 14 pH 0 - 80 °C	0 - 14 pH 0 - 80 °C	0 - 14 pH 0 - 80 °C	0 - 14 pH 0 - 80 °C	0 - 80 °C	0 - 14 pH 0 - 80 °C	0 - 14 pH 0 - 80 °C resistant to pressure up to 6 bar	0 - 14 pH 0 - 80 °C resistant to pressure up to 6 bar

Note: all electrodes equipped with 1 m of fixed cable (exception GE107 and GE108: 2m)

All electrodes (exception GE107: DIN-plug plus banana plug) are available with 2 different plugs/sockets:

- Cinch (for GPH014, GPRT1400A) and
- BNC (for the units of the GMH3500-series)

=> make sure to order correct electrode or use suitable adapter

Extra cable length, electrode with thread, etc.: upon request

For all pH-meters we recommend:

GAK 1400 working and calibration set containing 5 x buffer capsules pH4,0, pH7,0 and pH10,0, 3 x 100ml-plastic bottles **GPF100**, 1 x 3 mol KCl-electrolyte **KCL 3 M** and 1 x Pepsin-cleaning solution **GRL 100**.

pH-electrodes, accessories, etc.:

GE 014 LowCost pH-electrode, Cinch-plug
GE 014 BNC LowCost pH-electrode, BNC-plug
GE 100 Standard-electrode, Cinch-plug
GE 100 BNC Standard-electrode, BNC-plug
GE 101 Injection electrode, Cinch-plug
GE 101 BNC Injection electrode, BNC-plug
GE 103 Double-chamber electrode, Cinch-plug
GE 103 BNC Double-chamber electrode, BNC-plug
GE 104 Special facetted electrode, Cinch-plug
GE 104 BNC Special facetted electrode, BNC-plug
GE 105 Redox-electrode, Cinch-plug
GE 105 BNC Redox-electrode, BNC-plug
GE 106 pH-electrode for VE water, Cinch-plug
GE 106 BNC as above but with BNC-Stecker
GE 107 Electrode with integr. Pt1000 and thread PG13.5 DIN-plug and banana plug (suitable for GPHU014)
GE 108 pH-electrode with thread PG13.5, Cinch-plug
GE 108 BNC as above but with BNC-plug
GE 109 as GE107, however with Pt100 and without thread, BNC-plug and MiniDIN-plug (suitable for GMH3530)

Cable extension for pH-electrode upcharge
(for max. length please contact us)

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.
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
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.
GPF 100 Plastic bottle with wide neck, 100ml
GPF 200 Plastic injection bottle, 200ml
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
KCL 3 MG as above but with 200ml-inj. bottle
KNO3 1M 1 mol KNO_3-elektrolyte - 100ml-injection bottle, eg for GE103
GRL 100 Pepsin-cleaning agent, 100ml

automatic temperature compensation

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, 5 to 45° 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 low 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 0-14pH, 0-80°C
GE 106 pH-electrode for low-ion water (as of 100 µS/cm)
GKK 252 Case (235 x 185 x 48 mm) with foam lining
GKK 1100 Case (340 x 275 x 83 mm) with foam lining
GB 9 V Spare battery

for additional accessories p.r.t. p. 33, 38

DIGITAL-pH-/mV-/Thermometer

GPRT 1400 A

Device ready for use incl. pH-electrode GE100, buffer capsules pH4 and pH7, two 100ml-plastic bottles as well as temperature probe GTF1400. 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: -20 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 014 with refillable 3 mol-KCl electrolyte 0-14pH, 0-80°C
Attention! *The pH-electrode does not allow for redox-measurements! - Please order redox electrode GE105 separately, if required (p.r.t. accessories - page 36)*
Temperature probe (type: GTF1400): silicon temperature probe (KTY 87-205), electr. insulated in V4A-pipe, 5mm Ø, approx. 100mm length, approx. 1m silicon cable with 3.5mm Ø jack connector for connection to front-side socket. Exchange tolerance of probe: 1°C from 0 to 100°C
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. (suitable 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 1400A GL loose device
GTF 1400 spare temperature probe

for additional accessories p.r.t. p. 33, 38

Digital-Oxygen Meter

GOX 20

Device ready for use incl. oxygen probe and battery.

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 nominal temperature) ±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. 2m permanently connected to device.
Response time: 95% in 10sec., depending on temperature.
Operation life: 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
Relative humidity: 0 to 95 % r.F. (non condensing)
Storage temperature: -5 to 70 °C
Power supply: 9V-battery type IEC 6F22 (inlcuded).
Power consumption: max. 1 mA
Low battery warning: automatic; "BAT" displayed in case of low voltage
Dimensions: 106 x 67 x 30 mm, impact resistant ABS plastic housing
Weight: approx. 250 g (ready for use)

Accessories:

GAS 3600 Working set (consisting of 3 spare diaphragm heads and 100ml KOH-electrolyte)
GWOK 01 Spare diaphragm head
KOH 100 100 ml-bottle Spare electrolyte KOH
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

for additional accessories p.r.t. p. 38

The new generation of oxygen meas. devices!

(für 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 temperature compensation
- Automatic air pressure compensation by means of integrated pressure sensor
- Salinity correction
- 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
- Simple calibration in atmospheric air

GMH 3610

GMH 3630

Specification :

Measuring ranges:

O_2-concentration: GMH3610: 0,0 ... 25,0 mg/l
GMH3630: 0,0 ... 70,0 mg/l *or* 0,00 ... 25,00 mg/l

O_2-saturation: GMH3610: 0 ... 300 %
GMH3630: 0 ... 600 % *or* 0,0 ... 250,0 %

O_2-partial press.: GMH3630: 0,0 ... 570,0 hPa or 0 ... 1200 hPa (0,0 ... 427,5 mmHg or 0 ... 900 mmHg)

Temperature: GMH3610: 0,0 ... 50,0 °C
GMH3630: -5,0 ... 50,0 °C

Pressure: GMH3630 500 ... 1100 hPa abs.

Accuracy: (at nominal temperature)

Oxygen: GMH3610: ±1,5% of m.v. ±0.2 mg/l
GMH3630: ±1,5% of m.v. ±0.2 mg/l (0...25mg/l) or ±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, 4m connection cable with Mini-DIN-plug.

Response time: 95% in 10sec., depending on temperature.

Operation life: 3 years or more, depending on maintenance

Working temperature: 0 to +40°C

Working pressure: max. 3 bar

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

Working temperature: 0 to +50°C

Relative humidity: 0 to +95%r.h. (non-condensing)

Storage temperature: -20 to +70°C (Electrode: 0 to 60°C)

Interface: serial interface (3.5mm jack connector), direct connection to RS232 interface of a PC via electrically isolated interface adapter GRS3100 or GRS3105 (p.r.t. accessories).

Min-/Max-value memory: max. and min.values will be memorized.

Hold function: by pressing a button the current meas. value will be memorized.

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

Power supply: 9V-battery, type IEC 6F22 (included) as well as additional d.c. connector (internal pin Ø 1.9mm) for external 10-12V direct voltage supply. (suitable power pack: GNG10/3000)

Difference between GMH3630 and GMH3610:

Additional features of GMH3630:

- Measuring of air pressure by means of integrated pressure sensor
- Ext. meas. range for O_2 and temperature
- O_2-partial pressure measurement
- Correction of salinity

Low battery warning: ⚠ and ' bAt '

Power consumption: approx. 3 mA

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. or deactivated.

Housing 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 for table top or suspended use

Weight: approx. 300 g (complete with battery and probe)

Temperature compensation: automatic via temperature sensor integrated in electrode.

Air pressure compensation:
GMH3610: enter current air pressure by means of keys
GMH3630: automatic via integrated pressure sensor. Display of current air pressure.

Correction of salinity (GMH3630): automatic
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).

Upcharges, accessories:

GWO 3600 Spare electrode with 4 m cable

Upcharge for electrode with 10 m cable

Upcharge for electrode with 30 m cable

GSKA 3600 protection cap for depth measuring

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)

GWOK 01 spare diaphragm head per piece

KOH 100 spare electrolyte KOH 100 ml-bottle

for add. spare parts and accessories p.r.t. pages 38, 40

Air oxygen measuring device

- Double display for oxygen and temperature
- Meas. units: O_2-concentration O_2-partial pressure (GMH3691)
- Alarm detector with integrated horn
- Automatic temperature compensation
- Wide range of application: e.g. bio chemistry, medicine and food technology, safety at work, air conditioning and ventilation technology, sports etc.
- 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
- Most simple calibration in atmospheric air

GMH 3690 GL

Sensor not included - please order separately!

GMH 3691 GL

Sensor not included - please order separately!

Specification :

Measuring ranges:
Oxygen concentration: 0,0 ... 100,0 % O_2 (gaseous)
Partial oxygen pressure (GMH3691)**:** 0 ... 1100 hPa O_2
Temperature: -20,0 ... 50,0 °C

Accuracy: (device) ±0.1% ±1digit (O_2-concentration)
±1 hPa ±1digit (O_2-partial pressure)
±0.1°C ±1digit (temperature)

Oxygen electrode: for suitable sensores p.r.t. page 37

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

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

Working temperature: 0 to +50°C

Relative humidity: 0 to +95%r.h. (non-condensing)

Storage temperature: -20 to +70°C

Interface: serial interface (3.5mm jack connector), direct connection to RS232 interface of a PC via electrically isolated interface adapter GRS3100 or GRS3105 (p.r.t. accessories).

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.

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

Power supply: 9V-battery, type IEC 6F22 (included) as well as additional d.c. adapter (internal pin Ø 1.9mm) for external 10-12V 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. or deactivated.

Power consumption: approx. 1.5 mA

Low battery warning: ⚠ and ' bAt '

Housing 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 for table top or suspended use.

Weight: approx. 315 g (cpl with battery and probe)

Temperature compensation: automatic via temperature sensor integrated in probe housing.

Difference between GMH3691 and GMH3690:

Additional features of the GMH3691:

- O_2-partial pressure measuring
- Compensation of atmospheric pressure by entering the atmospheric pressure
- 1-point or 2-point calibration

Calibration: 1-point calibration: extremely simple quick calibration in atmospheric air. (press button to compensate unit to 20.9%). 2-point calibration (GMH3691 only): first point at atmospheric air (20.9%), second point freely selectable

Air pressure compensation (GMH3691 only)**:** The O_2 concentration will be compensated according to the abs. atmospheric pressure set (500...2000hPa).

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.

- Safety technology, safety at work: Oxygen monitoring in mines/ pits, underground parking lots, wine cellars, cooling chambers, greenhouses or stores. Oxygen monitoring or alarm in case of danger of suffocation when working in tanks, wells etc.

- 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!

Upcharge, accessories:

Suitable sensores **p.r.t page 37**

GKK 3000 case with punched lining GMH3xxx

GRS 3100 interface adapter, electr. isolated

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

EBS 9M software for transmission, recording and archiving measuring values obtained from one GMH3xxx (p.r.t. page 40).

for additional spares and accessories p.r.t. pages 38, 40

Atmospheric oxygen sensores
for devices of the GMH369x series

GGO 369
closed sensor type

GOO 369
open sensor type

Specification:

Measuring range:
Partial oxygen pressure: 0 ... 1100 hPa O_2
Oxygen concentration: 0,0 ... 100,0 % O_2 (gaseous)
Temperature: -5,0 ... 50,0 °C (temperartur sensor integrated to sensor housing)
Sensor: integrated oxygen sensor element
Cross sensitivities: signal of <0.1 % O_2
15% CO_2 in N_2 , 10% CO in N_2 , 3000ppm NO in N_2 ,
3000ppm C_3H_8 in N_2 , 500ppm H_2S in N_2 , 500ppm SO_2 in N_2 ,
1000ppm Benzene in N_2.
The sensor element meets the requirements of PTB-A18.10 of precision class 1 for automotive exhaust measuring instruments.
Response time: 90% in <10sec., depending on temperature.
Operation life: Warranty for sensor element: 12 months (assuming appropriate usage according to the manual)
Operating pressure: 0.5 to 2.0 bar abs.
Connection: approx. 1m cable with Mini-DIN-plug.
Working temperature: -5 to +50°C (sensor)
Relative humidity: 0 to +95%r.h. (non-condensing)
Storage temperature: -15 to +60°C
Dimensions of housing: Ø approx. 38 mm, housing with M16X1-screw thread (sensor can be connected to line tubes by means of an additional adapter piece), length: GGO369: approx. 95 mm (150 mm), GOO369: approx. 105 mm (160 mm incl. anti-buckling glanding)
Weight: approx. 155 g
Application: GGO369 (closed sensor)
After making a screw connection via the sensor thread, the oxygen sensor is connected impermeable to this measuring system. For applications with a low or known pressure.
GOO369 (open sensor):
By making a screw connection via the sensor thread, the sensor and measuring device do not form a tightly sealed system. The measuring gas flows out into the air through the holes passing by the sensor.
Advantage: Almost no pressure at all at the sensor, therefore, no incorrect measuring results. Measuring gas escaping into the air.

Accessories:

GOEL 369
spare sensor element (for replacement by user)

Phonometer
backlight display, interface, analog output and dc connector

GSH 8922
cpl. in case, for battery and mains operation, analog output, backlight display, interface

Description:

The digital phonometer is equipped with six measuring ranges, ie from 30 dB to 130 dB, at a resolution of 0.1 dB, which can be selected automatically or manually.
The device conforms to ANSI S1.4 and IEC 651-2.
We would like to point out one of the device's special features, ie the possibility to compensate the background noise by simply pressing a button so that only the noise sources in the foreground can be measured. In accordance with IEC standards the noise level can be evaluated by means of 2 evaluation filters (A and C). It is also possible to determine the max. and min. values throughout a certain measuring time. The device is equipped with plugs and sockets for the supply of external components.

Specification:

Measuring range: 30 - 130 dB (divided into 6 ranges)
Meas. 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 (under identical conditions)
Frequency rate weighted: 31,5 Hz - 8 kHz
Evaluation weight filter: you have a choice between 2 evaluation filters:
Type A (meas. range 30 - 130 dB): evaluation of the spectrum in accordance with the perceptive faculties of the human ear.
Type C (meas. range 35 - 130 dB): linear evaluation of spectrum
Weight of time factor: fast or slow
Microphone: 6mm Electret condensator microphone
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%r.h. (non-condensing)
Storage temperature: -20 to +60° C
Interface: serial interface RS232
Power supply: 9V-batteries, type IEC 6F22 (incl. in scope of supply), or via external 9V power supply, (d.c. connector for GNG8922)
Battery life with alkaline battery: approx. 20 operating hours.
Housing dimensions: 256 x 80 x 38 mm (H x W x D)
Weight: approx. 240g (meas. device)

Accessories:

GNG 8922 power supply, 9V/300mA

GSOFT 8922 software incl. interface cable RS232

For mains-independent recordings: In connection with the **EASYLOG 40NS** 0-2V, plus GSOFT40K and EBW1 (p.r.t. page 63, 65-66) this device makes a cpl. mains-independent long-term recording system.

Accessories for all GMH3xxx-devices: (software p.r.t. page 39 and 40)

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

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

GKK 1300 large case (450 x 361 x 140 mm) with punched lining suitable for one unit, probe, power supply etc.

GKK 1420 large case (450 x 361 x 140 mm) with punched lining for two units, probe, power supply, etc.

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

GKK 3500 large case (394 x 294 x 106 mm) with punched lining suitable for all devices of the GMH3xxx-series

GKK 3600 large case (394 x 294 x 106 mm) with punched lining for universal use

GKK 3700 large case (450 x 361 x 140 mm) with punched lining for universal use

GMH 1300 magnetic holder for suspension of devices with integrated suspension clip

GB 9 V spare 9V battery, type JEC 6F22

GAK 9 V 9V accu

GLG 1300 accu charger for charging of 2 9V accus at the same time

GNG 09 plug-in power supply (220/240V, 50/60Hz), output voltage 12V stabilised, max 300mA, with 2.5 mm jack connector

GNG 10 plug-in power supply
output voltage 10V/10mA, suitable for devices with a 2.5 mm jack connector

GNG 10 / 3000 plug-in power supply, output voltage 10V/10mA.
suitable for devices with power supply socket

GRS 3100 interface converter GMH3xxx <=> PC,
for electrically isolated connection of a GMH3xxx device to the RS232-interface (25-pin DSub-plug) of your PC´s. (Converter supplying from PC interface))
(Please note: DSub9 -> DSub25 has to be ordered separately if required - GSA 9S-25B)

GRS 3105 5-point interface converter GMH3xxx <=> PC,
for electrically isolated connection of up to 5 GMH3xxx devices to the RS232-interface (9-pin Dsub-Stecker) of your PC. (Converter current supply achieved via permanently connected power supply) (Unit delivered with 9-pin DSub-extension cable and 5 connecting cables VEKA3105 for connection of the GMH´s to the converter)
(Please note: DSub9 -> DSub25 has to be ordered separately if required - GSA 9S-25B)
Please note: We expect that the devices GMH3410 and GMH3430 can be combined with any other device at time.

VEKA 3105 spare connecting cable GMH3xxx <=> GRS3105

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)

GAM 3000 switching module for the GMH3xxx-series

General description: The GAM3000 is an alarm or control output for the devices of the GMH3xxx-series with alarm functions. The GAM3000 is controlled via the serial interface of the GMH3xxx. The setting of the alarm/switching limits are carried out as usual via the GMH3xxx. You have a choice between 2 different switching modes:

- **Alarm output:** relay switches when the measuring value is no longer within the min./max alarm values set or an error state is displayed at the channel set (eg. Err.1, Err.2, Err.7, Err.9, Er.11).
- **Control output:** In this case the min./max. values are not used as alarm points but as switching points for the on/off switching point. In case of an error state being fulfilled the relay will switch in its preferred state 'off'.

The various functions can be selected via an externally accessible miniature switch.

Power supply: 220/240V, 50/60Hz

Switching output: controlled socket, selector switch to select switching state normally-open or normally-closed

Switching power: 10A (ohmic load)

GMH-connection: interface cable permanently connected to the device via cable, approx. 1 m, additional power supply 10.5V/10mA permanently connected via cable, approx. 1 m with power supply plug.

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

Software for the GMH3xxx-series

GSOFT 3050

Windows-software for the setting, data read-out and printing of all data (diagrams and tables) stored by devices of the GMH3xxx-series with logger function.

General:

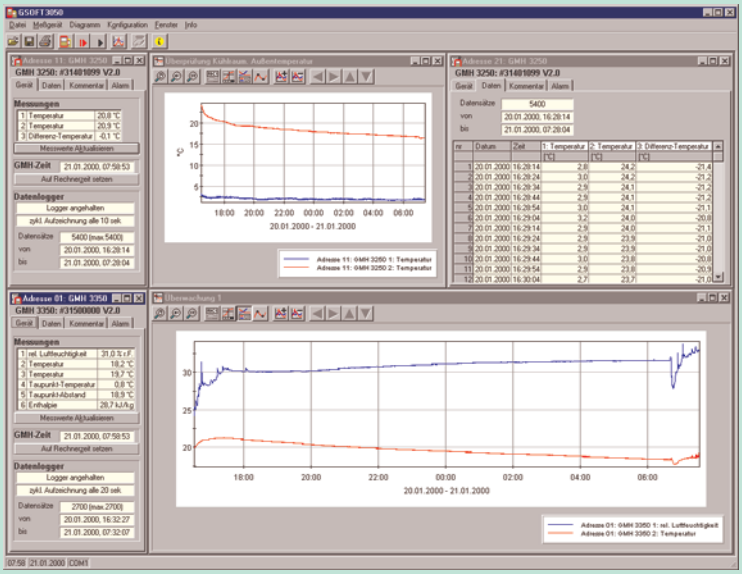
With GSOFT3050 you are able to operate the logger function of the GMH3000-hand-held series. The logger recordings can be started , stopped, read in and displayed. It is also possible to operate several instruments simultaneously and to display their data in mutual diagrams.

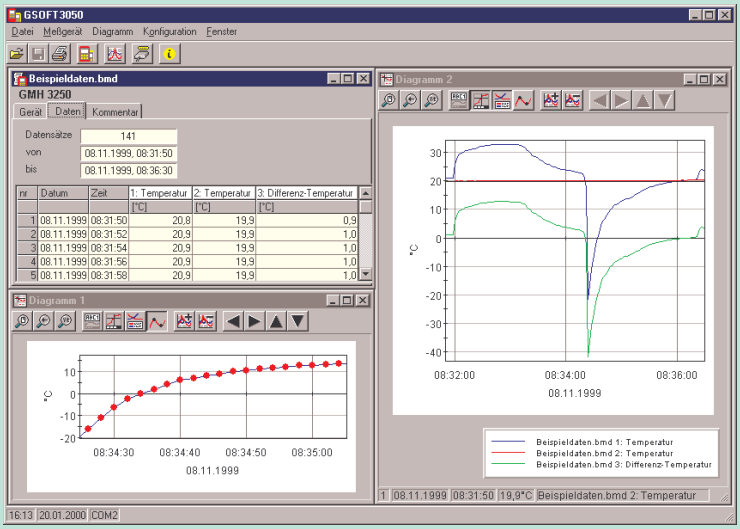
Data will be read via the serial interfaces ‘COM 1´, ‘COM 2´, 'COM 3' or 'COM 4' of your PC – a PC slot need not be used.

Software is bilingual (german/english), the language can be selected simply in the programme.

The GSOFT3050 software offers, among others, the following functions:

- **Display of the GMH-information**
  Both the GMH-time and the logger information will be constantly displayed in the GMH-information window; current measuring values can be called up by clicking a button.
- **Setting of the alarm function**
  simple alarm function setting for GMH3xxx 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.
- **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'. When reloading a 'view' the window setup will be restored.





System preconditions: As of Pentium 100, 32 MB RAM, approx. 20 MB empty space on the hard disk memory, CD-ROM-drive, VGA-graphics card with a resolution of 800 x 600 or more, MS-Windows 95, 98, NT4.0 or better, free serial interface, interface converter GRS3100 or GRS3105, mouse (recommended)

Update GSOFT 3050

(for registered users with declaration of serial number of original version)

GMH 3000.DLL

Windows-functional library for interface communication GMH3xxx - PC, to write your own programs.

Recording - long-time monitoring - large-digit display

EBS 9M (nine channels)

new !! With remote operation via telephone nets

Update (for registered users with declaration of serial number of original version)

In connection with a PC this software makes up a low-price and comfortable multi-channel acquisition program for measuring data. The software supports the following measuring systems, level converter and measuring components.

Meas. system	Level converter	Components
EASYBUS	EBW1, EBW64 EBW240, EB2000MC	**EASYLOG**, EBT, EBH, EBN
GRS485	GRS485	GIA10, GIA1000..., GIR1002...
GMH-series	GRS3100, GRS3105	GMH3xxx

A combination of the various measuring systems is not possible.

General advise:

Data are read via the serial interfaces 'COM 1', 'COM 2', 'COM 3' or 'COM 4' of your personal computer - no module slot at the PC required!

In combination with a standard modem and an **EASYBUS** modem (MODEM1000. MODEM2000HS or MODEM3000GSM) a remote application can be set up.
(analog to **EASYLOG** remote operation system, p.r.t. page 67)

Our EBS 9M software includes 2 functional modules for "recording/ large digit display" and "data memory" as well as a SETUP programm to select the language (german or english) required.

Module „Recording/large-digit display"

Measuring values displayed as y/t-diagram or digital indication

adjustable scan rate: 0.5s, 1s, 2s, 5s, 10s, 30s, 1min, 2min, 5min, 10min, 30min, 1h, 2h, 5h.

t-axis (time):
- display in minutes, hours or days
- automatic scaling
- scrolling function

y-axis (meas. value):
- automatic scaling
- adjustable display range
- axis identification possible

Miscellaneous:
- switch over from y/t-diagram to digital display
- entering of a comment line
- automatic system initialisation
- individual legend for each diagram
- storing of measuring values - recording time up to several years
- adjustable start and stop conditions

Module „data display"

Loading of stored measuring values and display as y/t-diagram

t-axis (time):
- automatic scaling can be switched on/off
- display range freely selectable
- grid selectable

y-axis (meas. value):
- automatic scaling can be switched on/off
- display range freely selectable
- grid selectable

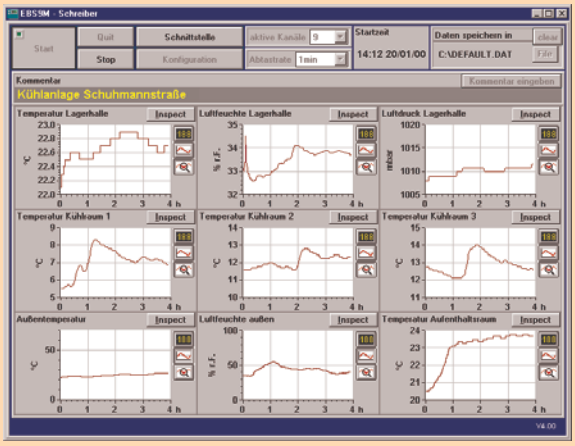
Miscellaneous:
- line width and colour freely selectable
- identification of meas. points can be selected

Output to printer:

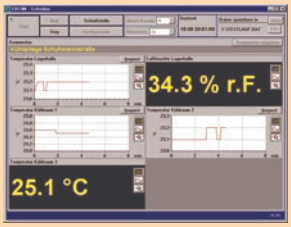
The "data display" module can be used together with the modules "large digit display/recorder". Therefore, it is possible any time to check the measuring values already stored without having to interrupt the on-going recording process. The EBS 9M stores all settings and measuring values in the ASCII code so that they can be read and processed by almost all standard software programmes (eg. Excel).

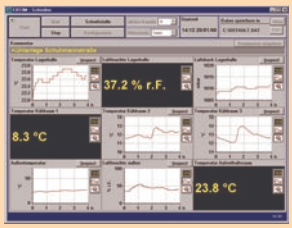
System requirements: as of Pentium 100
8 MB RAM, approx. 7 MB free on hard disk, CD-ROM drive, VGA graphics card with resolution 800 x 600 or better, Windows 95, Windows 98, NT4.0 or better, serial interface, mouse

Recorder function

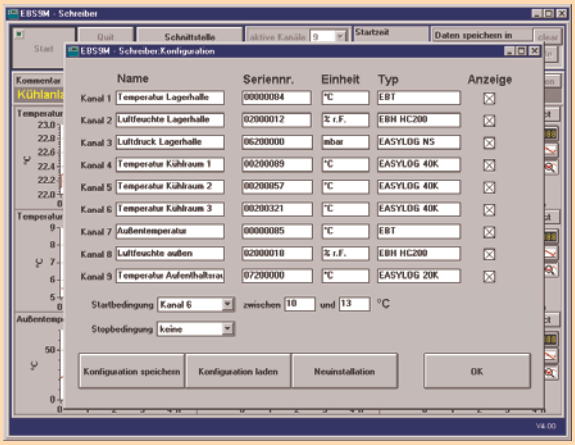


configuration as large-digit display resp. combined recorder/large-digit display also possible

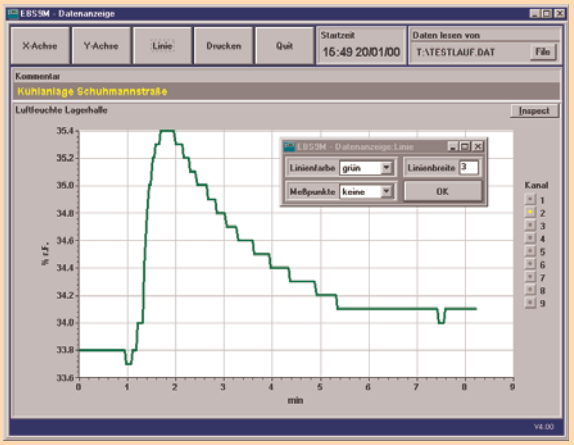




Configuration of connected devices



Data display



Microprocessor-digital thermometer

In accordance with EN50081-1 and EN50082-2 for unrestricted use in residential and industrial areas

Micro processor-digital display for standard signals

Microprocessor-digital thermometer Pt 100 4-wire, min./max. value memory, RS 485 interface

GIA 1000 Pt100

Specification:

Measuring range: -199,9 ... +650,0 °C (standard)
-199,9 ... +999,9 °F (please specify when ordering)
Resolution: 0,1 °C
Accuracy: ≤ 0,03 % FS ± 1 digit
Measuring rate: approx 3 measurements / sec.
Linearisation: parameter memorized digitally
Sensor: not included (please order separately) see page 88
Pt 100, 4-wire (any probe or cable length possible wihout recalibration). Probes fully interchangeable (any Pt 100 sensor in 2 or 3-wire design existing at customers' can also be connected, as GIA 1000 Pt 100 is equipped with a digital zero-offset adjustment)
Filter: plausibility check of value indicated and input signal allowing fault elimination (indication delay approx. 1.5 sec). If you do not want this feature but require faster indication (3 to 4 measurements per second), please make your selection accordingly.
Min./Max. value memory: both the highest and lowest value recorded during operation can be called up by pressing a button. Deleting of min./max. values memorized and beginning of new memory recordings by pressing min./max value button for a few seconds.
Fault indication: probe damage, probe short-circuit, values no longer within measuring range.
Self-diagnosis: permanent self-diagnosis of device to ensure trouble-free operation by means of integrated precision reference resistor
Interface: compatible to RS 485 (up to 16 devices linkable via one 2-wire interface). Connection to RS 232 by means of optional GRS485.
Software: for long-term monitoring, recorder, large-digit display, data memory (p.r.t. special accessories on page 40).
Display: 4 digit red LED, 13 mm high
Analog output [optional]**:** 4-20mA, 0-20mA or 0-10V, scale to be selected individually, electrically isolated.
Front: membrane keyboard IP65. Additional sealing for panel-mounting (optional)
Housing: standard rack type housing 48 x 96 x 100 mm (H x W x D)
Panel cutout: 43 x 90.5 mm (H x W)
Clamping terminals: screw-type/plug-in terminals
Working temperature: 0 to 50° C (permissible ambient temperature for operation of GIA 1000 Pt 100). If temperatures fall below 0°C, device may however be used for permanent operation (please contact us).
Storage temperature: -20 to +70°C
Power supply: standard 230 V AC 50/60 Hz (standard, others available against upcharge)
Power input: approx. 3 VA

Options - against upcharge:

12VDC: Power supply: 12VDC [1)]
24VDC: Power supply: 24VDC [1)]
12VAC: Power supply: 12VAC
24VAC: Power supply: 24VAC
115VAC: Power supply: 115VAC
AAG020: Analog output 0-20mA [1)]
(scale freely adjustable), electr. isolated
AAG420: Analog output 4-20mA [1)]
(scale freely adjustable), electr. isolated
AAG010: Analog output 0-10V [1)]
(scale freely adjustable), electr. isolated
1) For analog output with option 12VDC o. 24VDC add. upcharge
TARA: Tare function (only for GIA1000NS)

Accessories: p.r.t. GIA1000NS

Suitable temperature probe: eg.
GTF 1002 Pt100, 4-wire (p.r.t. p. 88)

Freely adjustable digital display for any type of meas. transducer, min./max. value memory, tare function, RS 485 interface

GIA 1000 NS

Specification:

Measuring range: -1999 ... +9999 digit
Scale for first and last value freely adjustable
Resolution: any decimal point possible
Accuracy: ± 0.1% FS ± 1 digit
Measuring rate: approx 3 measurements / sec.
Standard signal input: (freely selectable)
0 to 20 mA (Ri=50 Ohm) 0 to 1 V (Ri=30 kOhm)
4 to 20 mA (Ri=50 Ohm) 0 to 10 V (Ri=300 kOhm)
2-, 3- or 4-wire.
Other input values or extra high Ri upon request.
Power supply for sensor: integrated, electrically isolated power supply unit for measuring transducer: 18 V DC +/-5 %, 20 mA.
Filter: plausibility check of value indicated and input signal allowing fault elimination (indication delay approx. 1.5 sec). If you do not want this property but require faster indication (3 to 4 measurements per second), please select accordingly.
Min./Max. value memory: both the highest and lowest value recorded during operation can be called up by pressing a button. Deleting of min./max. values memorized and beginning of new memory recordings by pressing min./max value button for a few seconds.
Tare function: (upon request): by pressing a front-side button, the value indicated can be set to zero, process reversible, ie nominal value can be called up again. Please specify when ordering.
Fault indication: probe damage, probe short-circuit, values no longer within measuring range.
Self-diagnosis: permanent self-diagnosis of unit for trouble-free operation
Interface: compatible to RS 485 (up to 16 devices linkable via one 2-wire interface). Connection to RS 232 by means of optional GRS485.
Software: for long-term monitoring, recorder, large-digit display, data memory (p.r.t. special accessories on page 40).
Display: 4 digit red LED, 13 mm high
Analog output [optional]**:** 4-20mA, 0-20mA or 0-10V, scale to be selected individually, electrically isolated.
Front: membrane keyboard IP65. Additional sealing for panel-mounting (optional)
Housing: standard rack type housing 48 x 96 x 100 mm (H x W x D)
Panel cutout: 43 x 90.5 mm (H x W)
Clamping terminals: screw-type/plug in terminals,
Working temperature: 0 to 50° C (permissible ambient temperature for operation of GIA 1000 NS). If temperatures fall below 0°C, device may however be used for permanent operation (please contact us).
Storage temperature: -20 to +70°C
Power supply: standard 230 V AC 50/60 Hz (standard, others available against upcharge)
Power input: approx. 3 VA

Options - against upcharge: p.r.t. GIA1000Pt

Accessories:

GRS 485 interface converter
converting RS485 to RS232 (p.r.t. page 47)

GRS 485 ISO galv. getrennter interface converter
RS485 to RS232 - mit Datenflußrichungserkennung (p.r.t. page 47)
(Für die Erstellung von eigenen Programmen sollte der GRS485ISO verwendet werden)

EBS 9M Windows-software 9-channel (p.r.t. p. 40)

EASYControl Windows-software for recording, monitoring and archiving of values obtained from up to 15 GIA/GIR devices (p.r.t. p. 68)

GGD 4896 additional sealing for panel mounting IP65

2-level digital temperature controller Pt 100

In accordance with EN50081-1 and EN50082-2 for unrestricted use in residential and industrial areas

Microprocessor-2-level controller, Pt 100, 4-wire, cpl. incl. sensor

GIR 200 Pt100 cpl. with probe
GIR 200 Pt100 OF without probe

Specification:

Measuring range: -50,0 ... +199,9 °C
Resolution: 0,1 °C (standard)
Accuracy: ≤ 0,03 % FS ± 1 digit
Linearisation: parameter memorized digitally
Sensor: Pt 100, 4-wire (any probe or cable length possible wihout recalibration). Probes fully interchangeable (any Pt 100 sensors in 2 or 3-wire design existing at customers' can also be connected, as GIR200Pt100 is equipped with a digital zero-offset adjustment)
Temperature probe GTF200 Pt100: (included) -50 +200° C, Pt 100 4-wire, DIN standard class B (+/-0.3 °C at 0 °C), stainless steel (V4A) tube, Ø 5 mm, length 50 mm. Silicon cabling 4-wire, length 1 m (p.r.t. page 88)
Fault indication: probe damage, probe short-circuit, values no longer within measuring range.
Self-diagnosis: permanent self-diagnosis of device to ensure trouble-free operation by means of integrated precision reference resistor
Setting of set-point value: via front-sided buttons
Hysteresis: digital, any value can be set. (depending by switch on / switch off values set) Minimum hysteresis: 0.1°C
Relay: 1 volt-free change over relay 10 A (ohmic load) 250 V 50/60 Hz.
Preferred state of relay in case of fault (e.g. sensor damaged) relay contact broken.
Display: 4 digit red LED, 13 mm high
Front: membrane keyboard IP65. Additional sealing for panel-mounting (optional)
Housing: standard rack type housing 48 x 96 x 100 mm (H x W x D)
Panel cutout: 43 x 90.5 mm (H x W)
Clamping terminals: screw-type/plug-in terminals
Working temperature: 0 to 50 °C (permissible ambient temperature)
Power supply: standard 230 V AC 50/60 Hz, approx. 3 VA

Options - against upcharge

12VDC: Power supply: 12VDC
24VDC: Power supply: 24VDC
12VAC: Power supply: 12VAC
24VAC: Power supply: 24VAC
115VAC: Power supply: 115VAC
GGD 4896 additional sealing for panel-mounting IP65

2-level digital controller for standard signals

2-level controller for standard signal and scale freely adjustable

GIR 600 NS

Specification:

Display range: -1999 ... +9999 digit
first and last value freely adjustable
Resolution: any decimal point possible
Accuracy: ± 0.1% FS ± 1 digit
Standard signal input: (freely selectable)
0 to 20 mA (Ri=50 Ohm) 0 to 1 V (Ri=30 kOhm)
4 to 20 mA (Ri=50 Ohm) 0 to 10 V (Ri=300 kOhm)
2-, 3- or 4-wire, Other input values or extra high Ri upon request.
Power supply for sensor: integrated, electrically isolated power supply unit for measuring transducer: 18 V DC +/-5 %, 20 mA.
Fault indication: probe damage, probe short-circuit, values no longer within measuring range.
Self-diagnosis: permanent self-diagnosis of device to ensure trouble-free operation by means of integrated precision reference resistor
Setting of set-point value: via front-sided buttons
Hysteresis: digital, any value can be set (depending by switch on / switch off values set). Minimum hysteresis: 0.1° C
Relay: 1 volt-free change over relay 10 A (ohmic load) 250 V 50/60 Hz.
Preferred state of relay in case of fault (e.g. sensor damaged) relay contact broken.
Display: 4 digit red LED, 13 mm high
Front: membrane keyboard IP65. Additional sealing for panel-mounting (optional)
Housing: standard rack type housing 48 x 96 x 100 mm (H x W x D)
Panel cutout: 43 x 90.5 mm (H x W)
Clamping terminals: screw-type/plug-in terminals
Working temperature: 0 to 50 °C (permissible ambient temperature)
Power supply: standard 230 V AC 50/60 Hz, approx. 3 VA

Options - against upcharge

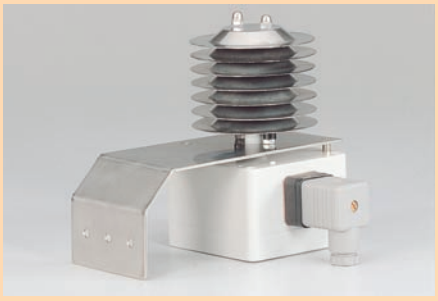
12VDC: Power supply: 12VDC
24VDC: Power supply: 24VDC
12VAC: Power supply: 12VAC
24VAC: Power supply: 24VAC
115VAC: Power supply: 115VAC
GGD 4896 additional sealing for panel-mounting IP65

FINERY HOUSING

Price:
finery housing IP65 upcharge to ref. device:
suitable for all GIA and GIR of format 48 x 96.
(device will be delivered with mounted GIR/GIA)

Design:
Dimensions: approx. 75 x 125 x 127 mm (H x W x D)
cable openings: cable glandings M12x1.5 and M16x1.5

HEAT ABSORPTION HAT



Price:
Heat absorption hat completely mounted on base
Above price does not include prices for sensors, measuring transducers etc.

Application:
The heat absorption hat is especially designed for high-precision 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 stainless steel, dia 78 mm, approx. 70 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. 150 mm.

Digital temperature controller with 2 relays

In accordance with EN50081-1 and EN50082-2 for unrestricted use in residential and industrial areas

Digital controller for standard signals with 2 relays

Microprocessor-2-level controller Pt 100, with min./max. alarm 3-level controller, min./max. value memory, RS485 interface

GIR 1002 Pt100

Specification:

Measuring range: -199,9 ... +650,0 °C (standard)
-199,9 ... +999,9 °F (please specify when ordering)
Resolution: 0,1 °C
Accuracy: ≤ 0,03 % FS ± 1 digit
Measuring rate: approx 3 measurements / sec.
Linearisation: parameter memorized digitally
Sensor: not included (please order separately) see page 88
Pt 100, 4-wire (any probe or cable length possible wihout recalibration). Probes fully interchangeable (any Pt 100 sensors in 2 or 3-wire design existing at customers' can also be connected, as GIR1002Pt100 is equipped with a digital zero-offset adjustment)
Self-diagnosis: permanent self-diagnosis of device to ensure trouble-free operation by means of integrated precision reference resistor.

Freely adjustable 2-level controller for standard signal with min./max. alarm, 3-level contr., min./max. value memory, RS485 interface

GIR 1002 NS

Specification:

Measuring range: -1999 ... +9999 digit, first and last value freely adjustable
Resolution: any decimal point possible
Measuring rate: approx 3 measurements / sec. (at .../FAST: 40 meas. / sec.)
Accuracy: ± 0.1% FS ± 1 digit (at .../FAST: ± 0,5 % FS ± 1 digit)
Standard signal input: (freely selectable)
0 to 20 mA (Ri=50 Ohm) 0 to 1 V (Ri=30 kOhm)
4 to 20 mA (Ri=50 Ohm) 0 to 10 V (Ri=300 kOhm)
2-, 3- or 4-wire. Other input values or extra high Ri upon request.
Power supply for sensor: integrated isolated power supply for measuring transducer: 18 V DC ±5 %, 20 mA.
Tare function: (upon request). Please specify when ordering.
Self-diagnosis: permanent self-diagnosis of device to ensure trouble-free operation.

Filter: software filter to suppress interference signal. Delay in display approx. 1.5 s. If necessary, filter can be switched off.
Min./Max. value memory: both the highest and lowest value recorded during operation can be called up by pressing a button.
Fault indication: probe damage, probe short-circuit, values no longer within measuring range.
Interface: compatible to RS 485 (up to 16 devices linkable via one 2-wire interface). Connection to RS 232 by means of optional GRS485.
Analog output [optional]**:** 4-20mA, 0-20mA or 0-10V, scale to be selected individually, electrically isolated.
Controller configuration: (freely selectable - 9 different types available):

Type 0: display
Type 1: 3-level controller
Type 2: 2-level controller with min./max. alarm self-clearing
Type 3: same as type 2, alarm has to be cleared manually
Type 4: 2-level controller with pre-selectable hysteresis
Type 5: same as type 4, in addition min./max. alarm, automatically following set-point value, alarm self-clearing
Type 6: same as type 5, alarm has to be cleared manually
Type 7: 2-level controller
Type 8: 3-level controller with pre-selectable hysteresis
Type 9: special type, to customer's specifications - no adjustments

OPTION: additional Min/Max alarm relay: max. 42VDC/AC, 0.5A
Setting of set-point value: via front side keyboard (lockable upon request)
Control range: can be limited by manufacturer upon request
Setting of alarm: via front side keyboard or automatically following
Alarm delay: 0 to 99 min., pre-programmed by manufacturer (if you want to set yourself, please specify, too)
Hysteresis: digital setting of any value (depending on switch on / switch off values set). Minimum hysteresis: 0.1 °C resp. 1 digit.
Relay: 2 volt-free relays , 1 changeover contact and 1 normally-open contact, switching output: 10 A (ohmic load) 250 V 50/60 Hz. (optional 2 changeover contact available). Please specify preferred relay fault position (eg sensor not working): open (standard) or closed. The second relay is principally energised (eg for type 2); in case of alarm (i.e. values above/below min./max. value set) the contact will be broken.
Semiconductor relay: (optionally - against upcharge - please order separately) if desired, one or two relays can be taken out to allow control of one or two external semiconductor relays (eg 25A). Control voltage 12 V DC for external semiconductor relay will then be provided. (refer to options)
Display: 4 digit red LED, 13 mm high
Front: membrane keyboard IP65. Add. sealing for panel-mounting (option)
Housing: standard rack type housing 48 x 96 x 100 mm (H x W x D)
Panel cutout: 43 x 90.5 mm (H x W)
Clamping terminals: screw-type/plug-in terminals
Working temperature: 0 to 50°C (permissible ambient temperature for operation of GIR1002...). If temperatures fall below 0°C, device may however be used for permanent operation (please contact us).
Power supply: standard 230 V AC 50/60 Hz, approx. 3 VA, for other voltages please refer to options.

Options - against upcharge:

FAST: **fast sampling** (only for GIR1002NS)
12VDC: **Power supply: 12VDC** 1)
24VDC: **Power supply: 24VDC** 1)
12VAC: **Power supply: 12VAC**
24VAC: **Power supply: 24VAC**
115VAC: **Power supply: 115VAC**
AAG020: **Analog output 0-20mA** 1)
(scale freely adjustable), electr. isolated
AAG420: **Analog output 4-20mA** 1)
(scale freely adjustable), electr. isolated
AAG010: **Analog output 0-10V** 1)
(scale freely adjustable), electr. isolated
1) For analog output with option 12VDC o. 24VDC add. upcharge
ALR: **additional alarm relais:** (for 3-level controllers with alarm)
(not possible in addition with analog output or fast measuring option)
HLR1: **control output for external semiconductor relais** 12VDC (instead of relais 1)
HLR2: **control output for external semiconductor relais** 12VDC (instead of relais 1 and 2)
2WREL: 2 Changer (1 x Contact additional fed out as stranded wire)
TARA: **Tare function** (only for GIR1002NS)
SWV: **Setting of set-point value locked**
AVE: **Alarm delay selectable**

Accessories:

HLR 25A External semiconductor relay, 25A (p.r.t. page 56)

GRS 485 interface converter
converting RS485 to RS232 (p.r.t. page 47)

GRS 485 ISO optically isolated interface converter
RS485 to RS232 - with data direction detection (p.r.t. page 47)
(for programming your own software we recommend to use the GRS485ISO instead of GRS485)

EBS 9M Windows-software 9-channel (p.r.t. page 40)

EASYControl Windows-software for recording, monitoring and archiving of values obtained from up to 15 GIA/GIR devices (p.r.t. p. 68)

GGD 4896 additional sealing for panel mounting IP65

Suitable temperature probe for GIR1002Pt1000: eg.

GTF 1002 Pt100, 4-wire (p.r.t. page 88)

Ordering examples:

GIR1002Pt100 / 24VDC, AAG420, SWV: GIR1002Pt100 with 24VDC supply, analog output 4-20mA, set value locked

GIR1002NS / FAST, 12VAC, ALR, HLR2: GIR1002NS fast measuring option with 12VAC supply, additional alarm relais and two semiconductor relais connections.

Clocking or signal actuating temperature controller

In accordance with EN50081-1 and EN50082-2 for unrestricted use in residential and industrial areas

Clocking or signal actuating controller for standard signals

Clocking or signal actuating temperature controller (open - neutral - closed) with PWM (pulse-width modulation) output, Pt 100, 4-wire, with min./max. value memory, RS485 interface

GIR 1002 Pt100 - S/T

Specification:

Measuring range: -199,9 ... +650,0 °C (standard)
-199,9 ... +999,9 °F (please specify when ordering)
Resolution: 0,1 °C
Accuracy: ≤ 0,03 % FS ± 1 digit
Measuring rate: approx 3 measurements / sec.
Linearisation: parameter memorized digitally
Sensor: not included (please order separately) see page 88
Pt 100, 4-wire (any probe or cable length possible wihout recalibration). Probes fully interchangeable (any Pt 100 sensors in 2 or 3-wire design existing at customers' can also be connected, as GIR1002Pt100 is equipped with a digital zero-offset adjustment)
Self-diagnosis: permanent self-diagnosis of device to ensure trouble-free operation by means of integrated precision reference resistor.

Clocking or signal actuating controller (open - neutral - closed) with PWM output, scale freely adjustable for standard signals, with min./max. value memory, tare function, RS485 interface

GIR 1002 NS - S/T

Specification:

Measuring range: -1999 ... +9999 digit, first and last value freely adjustable
Resolution: any decimal point possible
Measuring rate: approx 3 measurements / sec.
Accuracy: ± 0.1% FS ± 1 digit
Standard signal input: (freely selectable)
0 to 20 mA (Ri=50 Ohm) 0 to 1 V (Ri=30 kOhm)
4 to 20 mA (Ri=50 Ohm) 0 to 10 V (Ri=300 kOhm)
2-, 3- or 4-wire. Other input values or extra high Ri upon request.
Power supply for sensor: integrated isolated power supply for measuring transducer: 18 V DC ±5 %, 20 mA.
Tare function: (upon request). Please specify when ordering. The value indicated can be set to zero, process reversible, ie. nominal value can be called up again.
Self-diagnosis: permanent self-diagnosis of device.

Filter: software filter to suppress interference signal. Delay in display approx. 1.5 s. If necessary, filter can be switched off.
Min./Max. value memory: both the highest and lowest value recorded during operation can be called up by pressing a button.
Fault indication: probe damage, probe short-circuit, values no longer within measuring range.
Interface: compatible to RS 485 (up to 16 devices linkable via one 2-wire interface). Connection to RS 232 by means of optional GRS485.
Analog output [optional]**:** 4-20mA, 0-20mA or 0-10V, scale to be selected individually, electrically isolated.
Controller types: (freely selectable):
- Type S: open - neutral - closed (for control of flaps, motor valves etc.) **Control response:** P, PD.
Relay 1 triggering the "open" command, relay 2 triggering the "closed" command.
- Type T: Control response: clocking P, PI, PD, PID controller.
Relay 1 controlling the set-point value set (control response depending on control parameters set), relay 2 is the alarm relay for Min-/Max-alarm
Set-point value (SP=set point): freely adjustable within range of indication (can be limited by manufacturer upon request)
Proportional band Xp: 1 digit to 1500 digit (types S and T) **Set time Tv:** 1 sec up to 200 sec (types S and T)
Period Tz: 1 sec up to 15 min (types S and T) **Reset time Tn:** 1 sec up to 30 min (type T)
Setting of **Xp**, **Tn**, **Tv** and **Tz** via keyboard or button at back side of device or after release by pressing button at back side of the device (can be set by manufacturer).
Setting of alarm: (type S) via front side keyboard or automatically following
Alarm delay: (type S) 0 to 99 min., pre-programmed by manufacturer (if you want to set yourself, please specify, too)
Relay: 2 volt-free relays , 1 changeover contact and 1 normally-open contact, switching output: 10 A (ohmic load) 250 V 50/60 Hz. (optional 2 changeover contact available). Please specify preferred relay fault position (eg sensor not working): open (standard) or closed.
Semiconductor relay: (optionally - against upcharge - please order separately) if desired, one or two relays can be taken out to allow control of one or two external semiconductor relays (eg 25A). Control voltage 12 V DC for external semiconductor relay will then be provided. (refer to options)
Display: 4 digit red LED, 13 mm high
Front: membrane keyboard IP65. Add. sealing for panel-mounting (option)
Housing: standard rack type housing 48 x 96 x 100 mm (H x W x D) **Panel cutout:** 43 x 90.5 mm (H x W)
Clamping terminals: screw-type/plug-in terminals
Working temperature: 0 to 50°C (permissible ambient temperature for operation of GIR1002...). If temperatures fall below 0°C, device may however be used for permanent operation (please contact us).
Power supply: standard 230 V AC 50/60 Hz, approx. 3 VA, for other voltages please refer to options.

Options - against upcharge:

12VDC: **Power supply: 12VDC** [1)]
24VDC: **Power supply: 24VDC** [1)]
12VAC: **Power supply: 12VAC**
24VAC: **Power supply: 24VAC**
115VAC: **Power supply: 115VAC**
AAG020: **Analog output 0-20mA** [1)]
(scale freely adjustable), electr. isolated
AAG420: **Analog output 4-20mA** [1)]
(scale freely adjustable), electr. isolated
AAG010: **Analog output 0-10V** [1)]
(scale freely adjustable), electr. isolated
1) For analog output with option 12VDC o. 24VDC add. upcharge
HLR1: **Control output for external semiconductor relais** 12VDC (instead of relais 1)
HLR2: **Control output for external semiconductor relais** 12VDC (instead of relais 1 and 2)
2WREL: 2 Changer (1 x Contact additional fed out as stranded wire)
TARA: **Tare function** (only for GIR1002NS)
SWV: **Setting of set-point value locked**
AVE: **Alarm delay selectable**

Accessories:

HLR 25A External semiconductor relay, 25A (p.r.t. page 56)
GRS 485 interface converter converting RS485 to RS232 (p.r.t. page 47)
GRS 485 ISO optically isolated interface converter RS485 to RS232 - with data direction detection (p.r.t. page 47)
(for programming your own software we recommend to use the GRS485ISO instead of GRS485)
EBS 9M Windows-software 9-channel (p.r.t. page 40)
EASYControl Windows-software for recording, monitoring and archiving of values obtained from up to 15 GIA/GIR devices (p.r.t. p. 68)
GGD 4896 additional sealing for panel mounting IP65

Suitable temperature probe for GIR1002Pt1000: eg.

GTF 1002 Pt100, 4-wire (p.r.t. page 88)

Ordering examples:

GIR1002Pt100-S/T / 24VDC, AAG420: GIR1002Pt100-S/T with 24VDC supply, analog output 4-20mA
GIR1002NS-S/T / 12VAC, HLR2, SWV: GIR1002NS-S/T with 12VAC supply, two semiconductor relais connections and set value locked.

Display for frequency output encoders

e.g. flow, throughput, speed etc.

In accordance with EN50081-1 and EN50082-2 for unrestricted use in residential and industrial areas

Controller for frequency output encoder (2 relays)

Digital display with freely adjustable scale with frequency input, min/max. value memory, RS485 interface

GIA 1000 FR

Application: measuring of flow speeds, throughput, revolutional speed or display for encoder with frequency output.

Specification:

Measuring range: -1999 ... +9999 digit, first and last value freely adjustable
Resolution: any decimal point possible
Accuracy: ± 0.1 % FS ± 1 digit
Frequency input: 0 to 9999 Hz
Input sensitivity: 50 mVss, 300 mVss, 2Vss, TTL (freely selectable)
Sensor supply: integrated electrically isolated power supply unit for frequency encoder: 18 V DC +/-5 %, 20 mA.
Min./Max. value memory: both the highest and lowest value will be recorded
Tare function: (upon request). Please specify when ordering.
Fault indication: probe damage, probe short-circuit, values no longer within measuring range.
Self-diagnosis: permanent self-diagnosis of device
Interface: compatible to RS 485 (up to 16 devices linkable via one 2-wire interface). Connection of RS 232 by means of optional GRS485.
Analog output: (optional) analog output 4 to 20 mA (or 0 to 20mA, 0-10V) with scale freely selectable, electrically isolated.
Display: 4 digit red LED, 13 mm high
Front: membrane keyboard IP65. Additional sealing for panel-mounting (optional)
Housing: standard rack type housing 48 x 96 x 100 mm (H x W x D)
Panel cutout: 43 x 90.5 mm (H x W)
Clamping terminals: screw-type/plug-in terminals
Working temperature: 0 to 50° C (permissible ambient temperature)
Power supply: 230VAC, 50/60Hz (standard - others available against upcharge)
Power input: approx. 3VA

Options - against upcharge:

12VDC: **Power supply: 12VDC** [1)]
24VDC: **Power supply: 24VDC** [1)]
12VAC: **Power supply: 12VAC**
24VAC: **Power supply: 24VAC**
115VAC: **Power supply: 115VAC**
Analog output 0-20mA, 4-20mA o. 0-10V - please refer to GIR1002NS
TARA: **Tara function**

Optionen - gegen against upcharge: (only for GIR1002FR)

HLR1: **control output for external semiconductor relais** 12VDC (instead of relais 1)
HLR2: **control output for external semiconductor relais** 12VDC (instead of relais 1 and 2)
2WREL: 2 Changer (1 x Contact additional fed out as stranded wire)
SWV: **Setting of set-point value locked**
AVE: **Alarm delay selectable**

Accessories: please refer to GIR1002NS-S/T

Freely adjustable 2-level controller with frequency input with min./max. alarm, 3-level controller, min./max. value memory, RS485 interface

GIR 1002 FR

Application: measuring and monitoring of flow speed, throughput, rev. speed or control and monitoring device for encoder with frequency output.

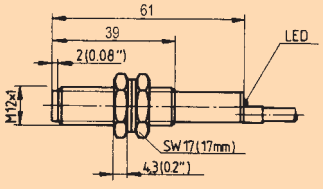
Specification:

Measuring range: -1999 ... +9999 digit, first and last value freely adjustable
Resolution: any decimal point possible
Accuracy: ± 0.1 % FS ± 1 digit
Frequency input: 0 to 9999 Hz
Input sensitivity: 50 mVss, 300 mVss, 2Vss, TTL (freely selectable)
Encoder supply: integrated electrically isolated power supply unit for frequency encoder: 18 V DC ± 5 %, 20 mA.
Min./Max. value memory: both the highest and lowest value will be recorded
Tare function: (upon request). Please specify when ordering.
Fault indication: probe damage, probe short-circuit, values no longer within measuring range.
Self-diagnosis: permanent self-diagnosis of device.
Interface: compatible to RS 485 (up to 16 devices linkable via one 2-wire interface). Connection of RS 232 by means of optional GRS485.
Controller configuration: (freely selectable - 9 different types available)
Type 0: display Type 1: 3-level controller
Type 2: 2-level controller with min./max. alarm self-clearing
Type 3: same as type 2, alarm has to be cleared manually
Type 4: 2-level controller with pre-selectable hysteresis
Type 5: same as type 4, in addition min./max. alarm, automatically following set-point value, alarm self-clearing
Type 6: same as type 5, alarm has to be cleared manually
Type 7: 2-level controller
Type 8: 3-level controller with pre-selectable hysteresis
Type 9: special type, to customer's specifications - no adjustments
Setting of set-point value: via front side keyboard (lockable upon request)
Control range: can be limited by manufacturer upon request (please specify when ordering)
Setting of alarm: via front side keyboard or automatically following
Alarm delay: 0 to 99 min., pre-programmed by manufacturer.
Hysteresis: digital setting of any value (depending on switch on / switch off values set). Minimum hysteresi : 1 digit.
Relay: 2 volt-free relays , 1 changeover contact and 1 normally-open contact, switching output: 10 A (ohmic load) 250 V 50/60 Hz.
Please specify preferred relay fault position (sensor not working): open (standard) or closed. The second relay is principally energised (eg for type 2); in case of alarm (i.e. values above/below min./max. value set) the contact will be broken.
Semiconductor relay: if desired, one or two relays can be taken out to allow control of one or two external semiconductor relays (eg 25A). Control voltage 12 V DC for external semiconductor relay will then be provided. (refer to options)
Display: 4 digit red LED, 13 mm high
Front: membrane keyboard IP65. Additional sealing for panel-mounting (optional)
Housing: standard rack type housing 48 x 96 x 100 mm (H x W x D)
Panel cutout: 43 x 90.5 mm (H x W)
Clamping terminals: screw-type/plug-in terminals
Working temperature: 0 to 50° C (permissible ambient temperature)
Power supply: standard 230 V AC 50/60 Hz, approx. 3 VA,

Options against upcharge: please refer to GIA1000FR

Suitable sensors:

GDS 01 rotational speed sensor



Switching distance: 2 mm (front-panel installation possible)
Supply: 10 - 30 V DC
Switching frequency: max. 800 Hz
Cable: 6 m PVC-cable 3 x 0.14²

VISION 2008 Flow measuring transducer

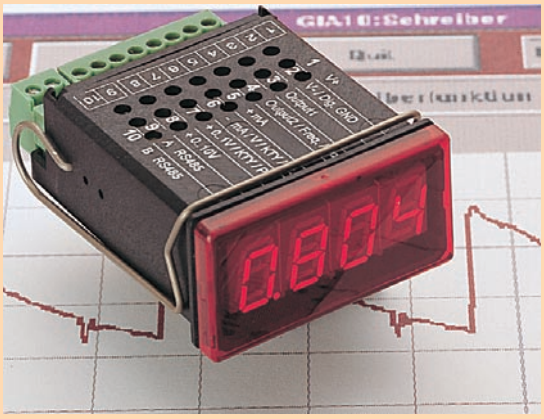
cpl. with 1m of cable. (for more technical data p.r.t. page 85)

Rotor-position scanning: hall effect sensor
Measuring range: 0,5 - 25 l/min
Resolution: approx. 1000 pulses/l
Measuring agent: clean liquids, we recommend filtering with approx. 20 to 40 micron.

GIA 10 N

unequalled top-quality miniature-format technology 24 x 48 mm

- scale freely adjustable
- self diagnosis (permanently active) and self-calibration
- probe damage or probe short-circuit detection, detection in case values are no longer within min./ max range
- inexpensive software EBS9M. Together with a personal computer the GIA10N is a combination of recorder, data memory, long-term monitoring, and large digit display unit so far unrivalled in price and versatility.
- simultaneous recording of up to 9 channels with EBS9M
- top-quality for an extraordinarily low price
- 9 different inputs selectable
- standard RS485 interface



In accordance with EN50081-1 and EN50082-2 for unrestricted use in residential and industrial areas

- easy to operate
- utmost precision
- filter can be switched on/off
- high interference immunity
- 2 switching outputs with 6 different output responses for measuring, control and monitoring functions
- probe damage, probe short-circuit monitoring, monitoring if values are within meas. range
- adjustable alarm delay
- prescaler can be connected for frequency or counter function
- wide range of supply voltages: 9 to 28 V DC

GIA 10 N • Minimum size! • Maximum performance !

Specification GIA10N:

Display range: -1999 up to 9999 digits (recommended range of indication for standard signal: max. 2000 digit)
-40.0 up to 110.0°C (for KTY 87-205)
-50 up to +600°C (for Pt 1000)

Display range limit monitoring: you have a choice between: "LI 1": max. value must not be exceeded or "LI 0": values below/above min./max. values permissible within the working range of the A/D converter.

Scaling: scale freely adjustable (start value, end value and decimal point)
Setting up via keyboard (keys accessible underneath removeable front cover) or via standard interface RS 485

Accuracy: ±0.5% ±1 digit (standard signals, resistance and frequency inputs). Transmission of counter signals immediately and without faults.

Sensor inputs: selection via keyboard or interface

1. Standard signals
   4 to 20 mA; Ri = 50 Ohm
   0 to 20 mA; Ri = 50 Ohm
   0 to 1 V; Ri = 30 kOhm
   0 to 10 V; Ri = 300 kOhm
2. Resistance input:
   for temperature measurements (2-wire). Two sensor characteristics implemented. You hava a choice between:
   KTY87-205 (-40...110.0 °C) resolution: 0.1°C,
   Pt 1000 (-50...600 °C) resolution: 1°C
   digital zero offset via front side keyboard
   Please note: connection of any temperature probe with measuring transducer (Pt 100, NiCr-Ni, PtRh-Pt etc.) can be realised by means of standard signal input
3. Frequency input: 0 to 9999 Hz, resolution 1Hz. Max. frequency and corresponding max. value indicated (scale) freely adjustable.
   Application: eg. frequency measurements, flow, flow rate (current values), revolutional speed, velocity etc..
4. Counter input: display max. 9999, up-counter/down- counter up to max. 32000 pulses, scaling by entering number of pulses to be indicated. Prescaler can be switched on (programmable from 1 to 255) Pulse frequency up to 20 pulses/sec., for max. prescaler up to 5100 pulses/sec.. Cascadability of 2 or more GIA10N, thus, an unlimited counting range can be realised (extension 4 digits per device).
   Application for e.g.flow rate (total quantity counter), piece counter, pulse counter, distance counter/meter, sum counter etc.)

Filter: (selectable via keyboard or interface)
0 = no interference rejection (approx. 2 to 3 measurements/sec)
1 = interference rejection filter active (approx. 1.5 sec delay)
2 = interference rejection filter active (same as 1, in addition, indication of fault code in case of permanent measurement interference).

Interface: RS 485 interface supplied as standard. Networking of up to 16 devices via this 2-wire interface (devices no. 0 to 15 can be addressed directly via front-side keyboard or via interface).
Connection to RS 232 interface: via interface adapter GRS 485.
Please note: request for interface interrupts frequency measurement. In case of counter input no interface supported.

Switching outputs: 2 separate open collector outputs (GND switching). Switching current approx. 50 mA, switching voltage max. 30 V.

Configurations: display, 2-level controller, 2-level controller with min./max. alarm, 3-level controller, min./max. alarm detector (separate signals), counter with selector switch

Alarm delay: settings from 0 to 99 minutes

Limitation of set point value: automatic to display range on scale

Monitoring functions: permanent self-diagnosis (integrated reference and permanent supervision for trouble-free operation)
Automatic monitoring of sensor damage, short-circuit in probe, values no longer within range (position LI 1).

Segment test: automatic as soon as device is switched on.

Data memory: without power supply connection, all values programmed are stored for at least 10 years (EEPROM).

Power supply: 9 to 28 V DC

Power consumption: max. 60 mA at 12 V DC (without interface)

Housing: glass-fibre reinforced noryl, dimensions: 24 x 48 mm (dimensions of front frame). Mounting depth: approx. 65 mm (incl. screw-type/plug-in terminals)

Panel mounting: using stainless steel spring clip, panel thickness: from 1 to approx. 10 mm. Panel cut-out $21.7^{+0.5}$ x $45^{+0.5}$ mm (H x W)

Electric connection: standard via screw-type/plug-in terminal: 2-pin plug for interface and 9-pin plug for other connections, wire diameters from 0.14^2 to 1.5^2

Working temperature: 0 to 50°C

Protection rating: front side IP54 with O-rings as option, IP65 as option

Accessories:

Power supply with switching relay GNR 10.
Interface converter GRS 485.
Software EBS 9 M.

GGD2448SET
IP65-O-rings (2 pieces)

Temperature probes for GIA10N:

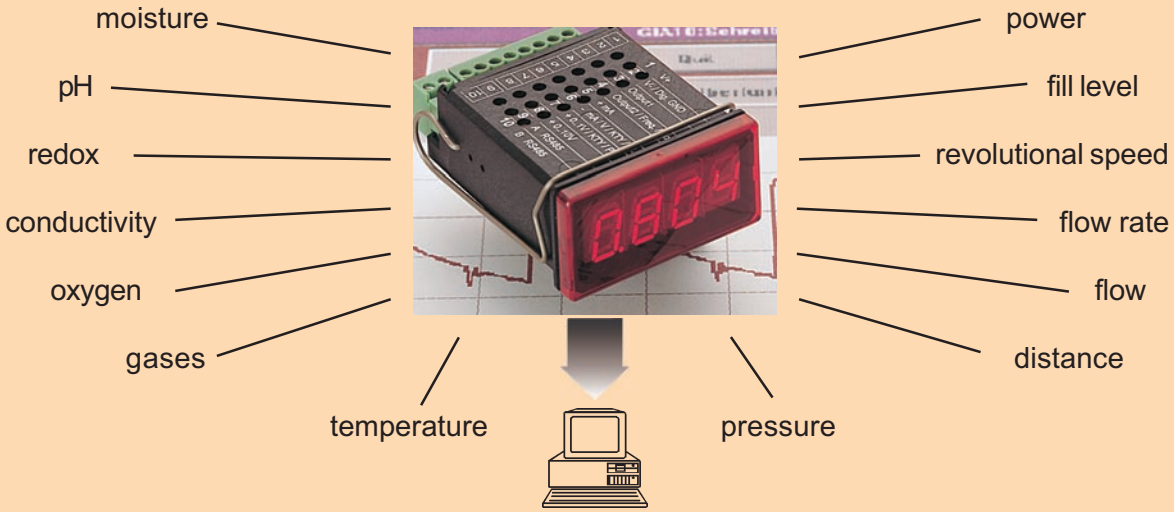
GTF 10 (KTY 87)
–40 … +110 °C

GTF 10 - Pt1000
–50 … +400 °C

further probes: please refer to page 13
For custom-designed temperature probes p.r.t. p. 88, 92

GIA 10 N

Measuring value display - controlling - monitoring - counting recording - large-digit display - long-time monitoring - data memory (in connection with a PC and our EBS9M software)



GIA10N The very device for **display - controlling - monitoring - counting - recording**

- **Measuring/display:** of temperature, pressure, power, moisture, flow, fill level, distance, flow rate, pH, redox, oxygen, conductivity, any concentration of gas, in short: any parameter.
- **Controlling, monitoring:** two-level controller, three-level controller, two-level controller with min./max. alarm, min./max. alarm supervisions (1 output or 2 separate outputs).
- **Counting, controlling** of: pieces, quantities, revolutional speed, frequency, pulses, events.
- **Analog-digital converter:** digitalisation of analog sensor data and transmission to PC by means of RS 485 interface (supplied as standard). Communication of up to 16 sensors resp. GIA10N via a 2-wire interface.
- **Long-time monitoring/recording:** recording, analysing and monitoring of any parameter during a long-time operation comfortably and in one process using a PC in connection with our software.

picture without power supply device

GRS 485

Interface converter RS232 / RS485

When using the RS 485 2-wire interface (e.g. connected to GIA10N) distances of approx. 1 km or more can be bridged. By means of the GRS485 up to 16 GIA10N´s can be connected to the serial interface (25 pol. Dsub) of your PC.

(Please order Dsub25 -> Dsub9 adapter if required - GSA 25S-9B)

The GRS 485 scope of supply includes a power supply.

GRS 485 ISO

optically isolated interface converter RS232 to RS485

This converter is equipped with an automatic data direction detection. Therefore it is not necessary to set the direction by RS232 handshake lines.

Power supply is integrated: 230V/50Hz

Housing: approx. 112x80x45mm (plus connectors a. cables)

(9 pole DSUB cable included in scope of supply)

(if needed order adapter DSUB9 - DSUB25: GSA9S-25B)

Software

EBS 9M (p.r.t. p. 40)

Software (WINDOWS) for 9 GIA10N´s to be used as recorder, large-digit display, ...

Power supply units with relay output

GNR 10

Power supply and relay module for GIA10N can be snapped onto top-hat rail

Input: 230V, 50/60Hz (others upon request)

Outputs: ~11V DC (unregulated) for the supply of the GIA10N.
18V DC ±5% (regulated) 25mA for meas. transducer (electrically isolated)

Relay outputs: 2 volt-free changeover contacts, switching current max. 10A ohmic load

Connection: screw-type terminal

Dimensions: 96 x 61 x 60 mm (HxWxD)

GR 10

Relay module for 1 GIA10N can be snapped onto top-hat rail

Input: 12V DC (others e.g. 24VDC upon request)

Relay outputs: 2 volt-free changeover contacts, max. 10A ohmic load, 250V 50/60Hz.

Connection: screw-type terminal

Dimensions: 96 x 61 x 60 mm (HxWxD)

Power supplies

(integrated and plug-in devices)

GNG 12 - LE

plug-in power supply (regulated), 12V DC 300 mA for one or several GIA10N´s

Input: 230 V 50/60 Hz

Output: 12 V DC regulated, 300 mA

GNG 220

Power supply in snap-on housing for 1 GIA10N

Input: 230V, 50/60Hz

Output: 1 x 12V DC, unregulated

Connection: screw-type terminal

Dimensions: 96 x 48 x 52 mm (HxWxD)

for additional power supplies, etc. p.r.t. p. 56

Customized constructions

fig. shows a GIA10N in water-proof finery housing 80x82x95mm .

Housing

incl. elbow-type plug and mounting.

Universal LowCost-LED-Display for Standard Signals and Temperature

Digitaldisplay
for standard signals

CE

conforming to EN 50081-1 and EN 50082-2 requirements for unrestricted use in residential and industrial areas.

Digital thermometer
for NiCr-Ni or Pt100

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: 0-20V, 0-10V, 0-2V, 0-1V, 0-200mV, 0-20mA and 4-20mA. (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% ±1digit (at nominal temperature)
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 % r.h. (non-condensing)
Storage temperature: -20 to 85°C
Voltage supply: 8 - 20 V DC or 18 - 29 V DC (set via soldering jumper)
Current supply: max. 30 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
Noise immunity (EMC): meets EN50081-1 and EN50082-2 requirements, additional fault: <1%
IP rating: front side IP54 (with optional O-rings IP65).

Accessories:

GNG 220/2-12V power supply for GIA2448 and GTH2448 (Input: 230VAC ; output: 2 x 12VDC regulated, 30mA each)
GNG 12/24 power supply (Input: 12VDC ; output: 24VDC electrically isolated)
GNG 24/24 power supply (Input: 24VDC ; output: 24VDC electrically isolated)

for additional accessories, transmitter and probes p.r.t. pages 56, 72 -93

GTH 2448/1 (NiCr-Ni)
GTH 2448/2 (Pt100, 1°C)
GTH 2448/3 (Pt100, 0.1°C)

Specification:

Measuring ranges:
GTH2448/1: -50 ... +1150°C (NiCr-Ni)
GTH2448/2: -200 ... +650°C (Pt100, 2-wire)
GTH2448/3: -60,0 ... 199.9°C (Pt100, 2-wire)
Resolution:
GTH2448/1, GTH2448/2: 1°C
GTH2448/3: 0.1°C
Accuracy:
NiCr-Ni: ±1% ±1digit (from -20...+550°C and 920...1150°C)
±1.5% ±1digit (from 550... 920°C)
Pt100: ±0.5°C ±1digit
Offset compensation: (for Pt100 - GTH2448/2 and GTH2448/3 only) 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 % r.h. (non-condensing)
Storage temperature: -20 to 85°C
Voltage supply: 8 - 20 V DC or 18 - 29 V DC (set via soldering jumper)
Current supply: max. 30 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
Noise immunity (EMC):
GTH2448/1: meets EN50081-1 und EN50082-1 requirements
GTH2448/2. GTH2448/3: meets EN50081-1 und EN50082-2 requirements, additional fault: <1%
IP rating: front side IP54 (with optional O-rings IP65).

Accessories:

GGD 2448 SET optional O-rings for IP65 (2 pieces)

for additional accessories and probes p.r.t. pages 12, 14, 15, 56, 88, 90-93

conforming to EN 50081-1 and EN50082-2 requirements for unlimited use in residential and industrial areas

Digital thermometer (silicon sensor)
KTY 10-6

GTH 87 EG - KTY10-6

-50,0 up to +150,0 °C

Specifications:

Measuring range: -50.0 to 150.0°C
Resolution: 0.1°C
Sensor: KTY 10-6 (please order separately)
Additional zero point offset possible via spindle trimmer at back side of device.
Accuracy (display device): ≤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 bis 50°C
Relative humidity: 0 to 80% r.h. (non-condensing)
Storage temperature: -20 to 85°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 1.5mm²
Noise immunity (EMC):
The GTH87EG-KTY10 is conforming to the regulations determined by the Council for the Approximation of the Legislation amongst the Member Countries concerning EMC (89/336/EWG). 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 11/152 immersion probe
GMF 21/152 injection probe
GMF 15/152 screw-type probe

Weitere KTY10-6 - Fühler oder Fühler nach Maß möglich (siehe Seite 89).

Digital thermometer (thermocouple)
NiCr-Ni (type "K")

GTH 1150 EG

-50 up to +1150 °C

Specifications:

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):
< 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 bis 50°C
Relative humidity: 0 to 80% r.h. (non-condensing)
Storage temperature: -20 to 85°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 1.5mm²
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 (89/336/EWG). 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 14, 15, 90, 91)
Custom-built sensors available. (p.r.t. pages 88 and 92)

µP-display with freely adjustable scale and without auxiliary energy for all 4 ... 20 mA 2-wire measuring transducers

GIA 0420
GIA 0420 Ex

In accordance with EN50081-1 and EN50082-2 for unrestricted use in residential and industrial areas

GIA 0420
Display

GIA 0420 SP
Display with additional (electrically isolated switching output open collector) - can be configurated as MIN-/MAX alarm.

GIA 0420 Ex
Ex-protection EEx ib IIC T4 (PTB Nr. Ex - 97.D.2042)

- 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
- large LCD display, approx. 10 mm high
- smallest housing dimensions possible
- very low voltage load at approx. 3 V
- 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)
- simple installation by means of pole-free connection (plus and minus exchangeable)
- additional monitoring function (GIA 0420 SP)

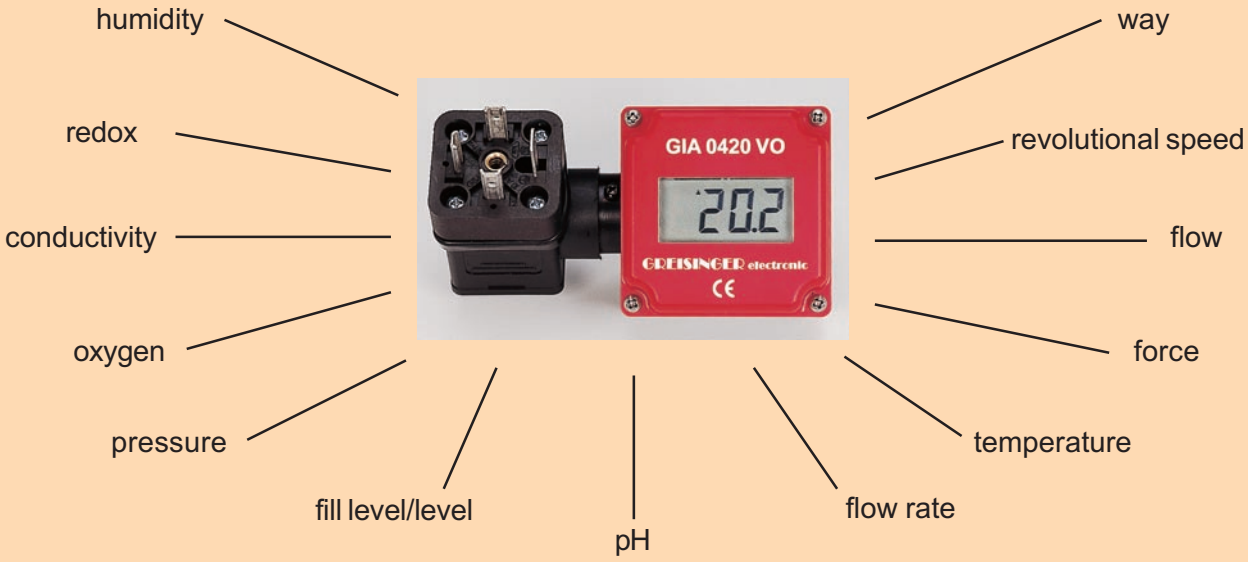
Specification:

Input signal: 4 ... 20 mA
Reverse voltage protection: pole-free connection
Voltage load: approx. 3 Volt
Accuracy: ± 0.2 %
Temperature drift: 100 ppm
Meas. rate: approx. 3 measurements / sec.
Filter: 3 stages, can be switched on and off
Display: LCD display, approx. 10 mm high
Display range: -1999 to 9999
Decimal point: any position selectable
Scaling: scale freely adjustable via 3 keys at the back side of the unit
Limit: LI 0 Values above/below range permissible
LI 1 Values above/below range not permissible
Working temperature: 0 to 50°C
Storage temperature: -20 to 85°C
Electric connection: 2-pin screw-type/plug-in terminal max. terminal range up to 1.5 mm²
(for GIA0420SP): 2 x 2-pin 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 (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 silicon O-rings, **GGD2448SET**)
Switching output: (only for GIA 0420 SP) electrically isolated open collector switching output
Switching capacity: 24 V DC 3 mA

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

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

GIA 0420 VO
GIA 0420 VO Ex



GIA 0420 VO
GIA 0420 VO Ex

Ex-protection EEx ib IIC T4
(PTB no. Ex - 97.D.2042)

Specification:

Input signal: 4-20mA
Polarity: no polarity needs to be observed for installation
Voltage load: approx. 3V
Accuracy: ± 0.2%
Display: 10mm high LCD
Display range: -1999 up to +9999
Decimal point: any position
Scale: freely adjustable via 3 buttons (accessible after cover has been removed)
Measuring rate: approx. 3 measurements / sec.
Filter: can be switched on in 3 stages
Limit: LI 0: Values above/below range permissible
LI1: Values above/below range not permissible
Electric connection: special-adapter design for cubic plug DIN 43650 for simple plug-in wherever required. 2 screws (68 and 75 mm) included in scope of supply.
Housing: 48.5 x 48.5 x 35.5 (H x W x D)
maximum dimensions by means of special adapter: 50.5 x 90 x 39.5 (H x W x D), housing made of ABS (impact resistant plastic), transparent panel made of polycarbonate, (splash water-proof IP65)
Working temperature: 0 to 50°C
Temperature drift: 100 ppm

CE in accordance with EN 50081-1 and EN 50082-2 for unrestricted use in residential and industrial areas.

- no polarity
- 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 20mA 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)
- state of the art micro processor technology
- voltage load approx. 3 Volt only
- meets even strictest CE requirements. (EN50082-2 a. EN50081-1)

GIA 0420 WK

Specification:

as GIA 0420 VO however
Electric connection: connection to any standard signal source (4-20mA) via 0.5m connection cable. Housing with mounting holes can be mounted to any surface whatsoever.

DIGITAL-PANEL-MOUNTED DISPLAY MODULES for all applications

- **2 temperature modules (covering temperature ranges from -50 up to +1150° C)**
- **3 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%r.h. (non-condensing), **storage temperature:** -10 to +70°C, **current supply:** 9 - 12 V DC, **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 89 and 93

GPT 1155

TEMPERATURE MODULE for thermocouple NiCr-Ni (type K)
Range: -50 up to +1150° C **/ Resolution:** 1° C
Accuracy: 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 14,15 and 90,91
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)
Upcharge for double accuracy

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)
Upcharge for double accuracy

GPD 150 REL

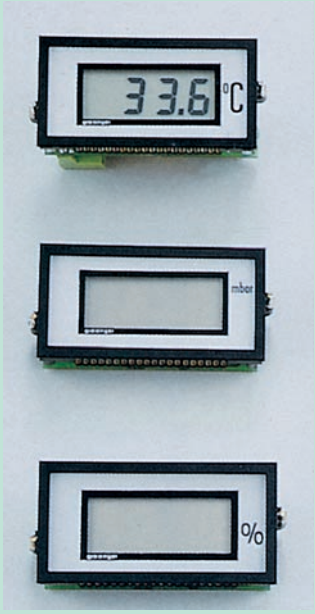
DIGITAL MANOMETER for over/under pressure and pressure difference (sensor not included)
Range: -1.00 up to 10.00 bar relative (referring to ambient pressure)
Resolution 0.01 bar **Accuracy module** 1 mbar ±1 digit
Accuracy sensor and **power consumption** as above
Suitable sensors: (please order separately)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

VOLTAGE

GPV 220

DIGITAL VOLTMETER, 3 integrated voltage ranges - others can be realised by means of an external voltage divider (eg for mains voltage 230 V etc.)
Ranges: ±199.9 mV, ±1999 mV, ±19.99 V integrated; (±199.9V or 1999V 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)

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
Accuracy: ±0.1% ±1digit
Temperatue coefficient: 100 ppm / K
Operating temperature: 0 to 50°C
Atmospheric humidity: 0 to 85%r.h. (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:

freely scaleable display for control panel mounting (24 x 48 mm)
GIA0420 - p.r.t. page 50

freely scaleable plug on display
GIA0420VO - p.r.t. page 51

freely scaleable display for surface or wall mounting
GIA0420WK - p.r.t. page 51

The new program controller - the temperature-set-point value shaping up

Extremly comfortable operation is the main advantage of the program controller **grado 964**: as a standard all program parameters and sections can be adjusted via an integrated interface from your PC.

grado 964

- **DIN-format 48 x 48 mm program controller**
- **4 programs, each program with up to 16 segments**
- **PC-configurator**
- **For temperature and time control**
- **RaPID Fuzzy Logic**
  time controlled event contact for output 2 or 3
- **Program repeat can be set from 1 to 9999 and endless**
- **Timer for program start delay up to a max. of 99 h 59 min.**
- **Time basis for each program to be set in**
  hours (up to 99 h 59 min., each segment)
  minutes (up to 99 min. 59 sec., each segment)
- **External START / HOLD function**
- **Separate locking code (for program and control parameters**

Specification:

Inputs: universal input for
- Pt100 (3-wire)
- Thermocouples: J, K, R, S, T, B, L, N
- DC linear mA: 0-20mA, 4-20mA
- DC mV: 0-50, 10-50mV, 0-5, 1-5, 0-10, 2-10V

(Please specify type desired on your order)

Meas. range: Pt100: -200...800°C;
Thermocouples type K: -200...1373°C,
Type J: 0...761°C, type R and S: 0...1649°C,
Type T: -200...262°C, type L: 0...762°C
Type B: 100...1824°C, type N: 0...1399°C

Resolution: temperature: 0.1, 1°C or 0.1, 1°F
Standard signals: scale freely adjustable -1999...9999.

Accuracy: ± 0.25 % or ±1digit

Meas. rate: 4 measurements / sec.

Display: two lines, 4-digit LED-display, nominal value: 10mm high, red, set-point value: 8mm, green.

Outputs: (type: switching)
Output 1: relay output
(changeover, switching power: 2A, 240VAC)
or logic output *(please specify on your order)*

Output 2, 3 [optional]: relay output, logic output or linear (4-20mA, 0-20mA, 0-5V or 0-10V) *(please specify type desired on your order)*

Controller state: 2-level- or 3-level-controller

Outputs: (type: continuous)
Output 1: linear output (4-20mA, 0-20mA, 0-5V oder 0-10V
(please specify type desired on your order)
Output 2, 3 [optional]: relay-output, logic output or linear (4-20mA, 0-20mA, 0-5V or 0-10V)

Controller state: continuous control

Control parameter: manual (P, PI, PD or PID-controller) or automatic by means of preliminary adjustment or indirect acting.

Alarm types: process alarm (high und low), alarm in case of deviations, band loss alarm

Interface [option]**:** serial, RS485,
Baud rate: 9600, 4800, 2400, 1200

Housing: 48 x 48 x 110 mm (W x H x D)
Panel cutout: 45 x 45 mm
Mounting: by means of clamping frame

IP rating: front side IP65, connections IP20

Electric connection: screw-type terminals

Operating temperature: 0 ... +55 °C

Storage temperature: -20 ... +80 °C

Noise immunity (EMC): conforming to EN50082-2 and EN50081-2

Voltage supply:
90...264 VAC 50/60Hz.
Option: 20...50VAC; 22...65VDC (upcharge)

Power input: approx. 4 Watt

Options:

Cont. control response

add. output (relay)

add. output (logic)

add. output (linear)

RS485-interface

Power supply: 22-50VAC/DC

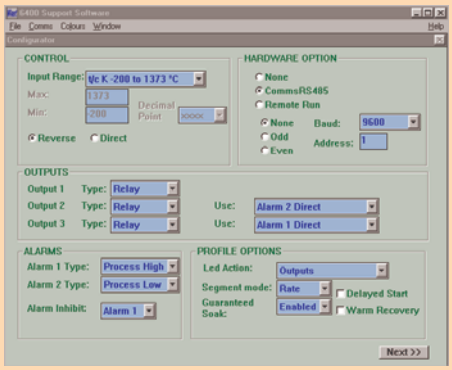
Start-/Hold-function

PC-software:
Configuration- and program-software incl. RS232-adapter cable

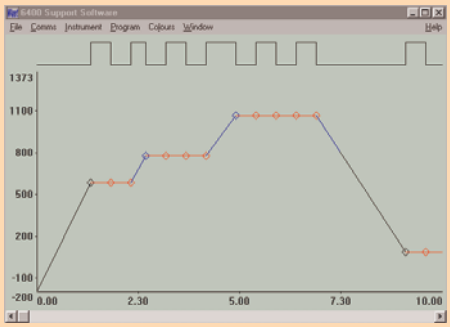
PC-software:

The PC software is installed under Windows. A special adapter cable - RS232/485 is used to connect the PC and program controller. By clicking on the preset parameters these values will be taken over into the program. Parameters may also be entered directly via the keyboard. Switching over from the program level to the configuration level is possible. You may also open both windows to appear simultaneously on your screen and thus be able to constantly monitor the configuration of the controller.

Configuration-software



Program-software



Self-optimizing P-/PI-/PD-/PID-controller

INDUSTRIAL CONTROLLER available as two, three level or continuous action controller

grado 901 (48x48) (with switching output)
grado 911 (48x96) (with switching output)
grado 921 (96x96) (with switching output)

- available as two, three level or continuous action controller
- two line highly illuminated LED display for permanent display of set-point and current value
- simple adjustment of PID controller parameters by automatic pre and self-adjustment
- max. 3 outputs for control, as linear output for set-point or current value or as analog output
- 2 externally variable set-points
- comfortable configuration via PC by means of optional interface

Specification:

Inputs: universal input for
- Pt100 (3-wire)
- thermocouples: J, K, R, S, T, B, L, N
- DC linear mA: 0-20mA, 4-20mA
- DC mV: 0-50, 10-50mV, 0-1, 0.2-1, 0-5, 1-5V
(Please specify type required on order!)
Option: variable set-point (volt-free contact or TTL-logic signal).
Meas. ranges: Pt100: -200...800°C; thermocouples type K: -200...1373°C, type J: 0...761°C, type R u. S: 0...1649°C, type T: -200...262°C, type L: 0...762°C type B: 100...1824°C, type N: 0...1399°C
Resolution: temperature: 0.1, 1°C or 0.1, 1°F standard signal, freely adjust. -1999...9999.
Accuracy: ± 0.25 % or ±1digit
Meas. rate: 4 measurements / sec.
Display: two line, 4-digit LED display, Current value: 10mm (for type 921: 13mm) high, red, set-point value: 8mm (for type 921: 10mm) high, green.
Outputs: (type: variable)
Output 1: relay output (change-over contact, switching power: 2A, 240VAC) or logic output *(please specify upon order).*
Outputs 2, 3 [optional]: relay output, logic output or linear (4-20mA, 0-20mA, 0-5V or 0-10V) *(please specify upon order)*
Controller state: 2-level- or 3-level controller
Outputs: (type: continuous action)
Output 1: linear output (4-20mA, 0-20mA, 0-5V or 0-10V *(please specify upon order).*
Outputs 2, 3 [optional]: relay output, logic output or linear (4-20mA, 0-20mA, 0-5V or 0-10V)
Controller state: continuous action
Controller parameter: manual (P, PI, PD or PID-Regler) or automatic by pre or self adjustment
Alarm types: absolute alarm, alarm in case of deviation, band loss alarm, controller circuit alarm
Interface [option]**:** serial, RS485, Baud rate: 9600, 4800, 2400, 1200
Housing: (W x H x D)
48 x 48 x 110 mm (type 901), 48 x 96 x 100 mm (type 911), 96 x 96 x 100 mm (type 921), panel cut-out: 45 x 45 (type 901), 45 x 92 (type 911), 92 x 92 mm (type 921), mounting by means of clamping frame
IP rating: front side IP66, connections IP20
Electric connection: screw-type terminals
Operating temperature: 0 ... +55 °C
Storage temperature: -20 ... +80 °C
Noise immunity: (EMC)
conforming to EN50082-2 and EN50081-2
Voltage supply:
90...264 VAC 50/60Hz.
Option: 20...50VAC; 22...65VDC (upcharge)
Power input: approx. 4 Watt

Options:

Cont. action controller
add. output (relay)
add. output (logic)
add. output (linear)
RS485-interface
Power supply: 22-50VAC/DC
PC-software:
Configuration-software incl. RS232-adapter cable

THREE LEVEL STEP CONTROLLER

grado 902 (48x48)
grado 912 (48x96)
grado 922 (96x96)

Specification:

Inputs: universal input for
- Pt100 (3-wire)
- thermocouples: J, K, R, S, T, B, L, N
- DC linear mA: 0-20mA, 4-20mA
- DC mV: 0-50, 10-50mV, 0-1, 0.2-1, 0-5, 1-5V
(Please specify type required on order!)
Option: variable set-point (contact or TTL)
Meas. ranges: Pt100: -200...800°C; thermocouples type K: -200...1373°C, type J: 0...761°C, type R and S: 0...1649°C, type T: -200...262°C, type L: 0...762°C type B: 100...1824°C, type N: 0...1399°C
Resolution: temperature: 0.1, 1°C or 0.1, 1°F standard signal, freely adjust. -1999...9999.
Accuracy: ± 0.25 % or ±1digit
Meas. rate: 4 measurements / sec.
Display: two 4-digit LED displays, Current value: 10mm (type 922: 13mm) high, red, set-point v.: 8mm (type 922: 10mm) high, green.
Outputs:
Outputs 1,2: relay output (change-over, switching output: 2A, 240VAC)
Output 3 [optional]: relay output, logic output or linear (4-20mA, 0-20mA, 0-5V or 0-10V)
Controller state: 3 state step controller
Housing: (W x H x D) 48 x 48 x 110 mm (type 902), 48 x 96 x 100 mm (type 912), 96 x 96 x 100 mm (type 922), panel cut-out: 45 x 45, 45 x 92 or 92 x 92 mm, front side IP66, connections IP20
Electric connection: screw-type terminals
Operating temperature: 0 ... +55 °C
Storage temperature: -20 ... +80 °C
Voltage supply:
90...264 VAC 50/60Hz.
Option: 20...50VAC; 22...65VDC (upcharge)
Power input: approx. 4 Watt

Options:

add. output (relay)
add. output (logic)
add. output (linear)
RS485-interface
Power supply: 22-50VAC/DC

Self-optimizing PID-controller

TEMPERATURE CONTROLLER

grado 905

Specification :

Inputs: 2 input versions available:
- thermocouples: J, K, L, N
- Pt100 (3-wire)

(Please specify type upon order)

Meas. ranges: can be configurated to
- thermocouples: 0 ... 200/300/400/500/ 600/760°C or 0 ... 400/500/600/999°F
- Pt100: 0 ... 200/300/400/800°C and -50...+50/-20...+80/0,0...50,0/0,0...99,9°C or 0...200/400/600/800 and 0...99,9°F

Resolution:
thermocouple inputs: 1°C or 1°F, Pt100-input: 1°C, 0.1°C or 1°F, 0.1°F

Accuracy: ± 0.25 % or ±1digit

Meas. rate: 4 measurements / sec.

Display: 3-digit, 10mm high red LED-display

Output: relay output (change-over contact, switching power: 2A, 240VAC) or logic output (e.g. for semiconductor relay control) *(Please specify type upon ordering!)*

Controller state: 2-level controller, PID-controller with automatic tuning

Alarm output: (option)
relay-output (change-over contact, switching output: 2A, 240VAC)

Alarm functions: absolute alarm, alarm in case of deviation, band loss alarm

Housing: 48 x 48 x 110 mm (W x H x D), panel cut-out: 45 x 45, front side IP66, connections IP20

Electric connection: screw-type terminals

Operating temperature: 0 ... +55 °C

Storage temperature: -20 ... +80 °C

Voltage supply:
90...264 VAC 50/60Hz.
Option: 20...50VAC; 22...65VDC (upcharge)

Power input: approx. 4 Watt

Noise immunity: (EMC)
conforming to EN50082-2 and EN50081-2

Options:

Alarm output

Power supply: 22-50VAC/DC

with Fuzzy-logic-support

RaPID-INDUSTRIAL CONTROLLER

grado 913 (48x96)
grado 923 (96x96)

Specification:

Inputs: universal input for
- Pt100 (3-wire)
- thermocouples: J, K, R, S, T, B, L, N
- DC linear mA: 0-20mA, 4-20mA
- DC mV: 0-100mV, 0-5, 1-5, 0-10, 2-10V

(Please specify type upon order)
Input options: variable set-point value, external set-point value (DC linear or potentiometer).

Meas. ranges: Pt100: -200...800°C; thermocouples type K: -200...1373°C, type J: 0...761°C, type R and S: 0...1649°C, type T: -200...262°C, type L: 0...762°C type B: 100...1824°C, type N: 0...1399°C

Resolution: temperature: 0.1, 1°C or 0.1, 1°F standard signal, freely adjust. -1999...9999.

Accuracy: ± 0.25 % or ±1digit

Meas. rate: 4 measurements / sec.

Display: two 4-digit LED displays, Current value: 10mm (for type 923: 13mm) high, red, set-point value: 8mm (for type 923: 10mm) high, green.

Outputs:
Output 1: relay output (change-over, switching power: 2A, 240VAC) or logic output (e.g. for semiconductor relay control) *(please specify type upon ordering)*
Outputs 2, 3 [optional]: relay output, logic output or linear (4-20mA, 0-20mA, 0-5V or 0-10V)

Controller state: RaPID-controller with Fuzzy-logic support for low overshoot and reduced start-up times.

Housing: (W x H x D) 48 x 96 x 100 mm (type 913), 96 x 96 x 100 mm (type 923), panel cut-out: 45 x 92 or 92 x 92 mm, front side IP66, connections IP20

Electric connection: screw-type terminals

Operating temperature: 0 ... +55 °C

Storage temperature: -20 ... +80 °C

Voltage supply:
90...264 VAC 50/60Hz.
Option: 20...50VAC; 22...65VDC (upcharge)

Power input: approx. 4 Watt

Options:

add. output (relay)

add. output (linear)

RS485-interface

Power supply: 22-50VAC/DC

Max. output and min. dimensions
2-level / 3-level / PID, self- optimizing

MINI-Industrial controller and display unit

grado 932

Specification:

Display range: -1999 to 9999 digit

Inputs: universal input for
- Pt100 (3-wire)
- thermocouples: J, K, R, S, T, B, L, N
- DC linear mA: 0-20mA, 4-20mA
- DC mV: 0-5V, 0-10V

Meas. ranges: Pt100: -200...800°C; thermocouples type K: -240...1372°C, types J and L: --200...1200°C, types R and S: 0...1760°C, type T:-240...400°C, type B:100...1824°C, type N:0...1399°C

Resolution: temperature: 0.1, 1°C or 0.1, 1°F standard signal, freely adjustable. Any decimal point position.

Accuracy: ± 0.25 % or ±1digit

Meas. rate: 4 measurements / sec.

Display: two 4-digit LED displays, 10 mm high in red or green *(Please specify colour upon order)*

Outputs:
Output 1: logic output for controller output or alarm.
Output 2: relay output for controller or alarm (switching power: 2A, 120/240VAC)
Output 3 [optional]: relay output for alarm 2 or serial interface RS485

Controller state: 2-level, 3-level, PID-controller with automatic tuning

Housing: 48 x 25 x 100 mm (W x H x D), panel cut-out: 22,5 x 45 mm
front side IP65

Electric connection: screw-type terminals

Operating temperature: 0 ... +55 °C

Storage temperature: -20 ... +80 °C

Voltage supply:
90...264 VAC 50/60Hz.
Option: 24VAC or 12...30VDC (upcharge)

Power input: approx. 4 Watt

Noise immunityt: conforming to EN50082-1 / 2 and EN50081 - 1 / 2

Options:

RS485-interface

Alarm output 2

Power supply: 24VAC/DC

Power supply devices for input 230 V ~

GNG 220 / 2

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

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

GNG 220 / 1 - 12V

identical to GNG220/2, but with output voltage: 1 x 12V DC, 40mA

GNG 220 / 2 - 12V

identical to GNG220/2, but with output voltage 2 x 12V DC, 30mA each

GNG 12 / 300

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

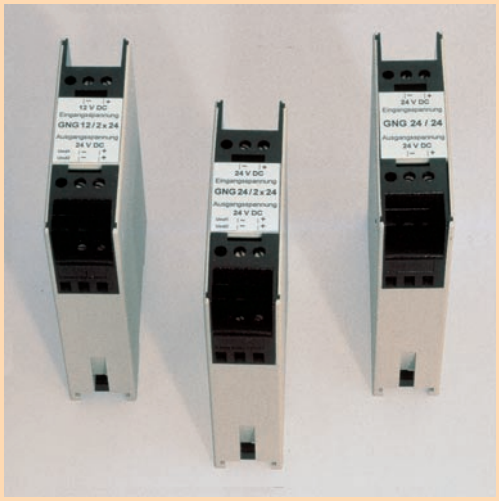
Input voltage: 230V, 50/60Hz
Output voltage: 12V DC ±5%, 300mA
Dimensions: 70,4 x 96 x 62 mm (W x H x D)
Mounting: snap-on to top hat rail

GNG 24 / 150

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

other voltage upon request

DC/DC-converter for input 10 - 18 V DC resp. 19 - 30 V DC



GNG 12 / 24
GNG 24 / 24

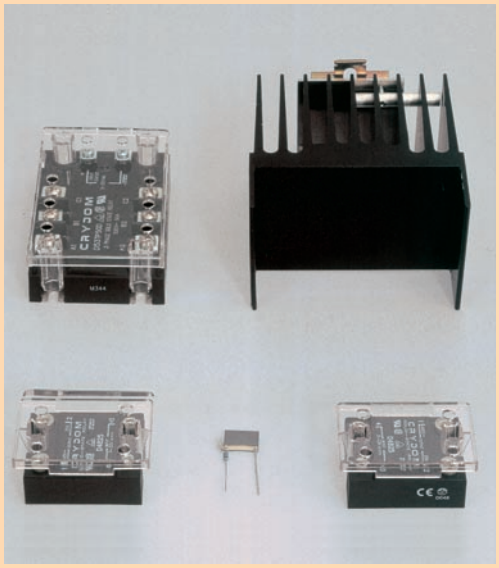
DC/DC-converter to electrically isolate 12V or 24V DC-supply voltages

Input voltage: GNG12/24: 10 - 18 V DC
GNG24/24: 19 - 30 V DC
Output voltage: 24V DC ±5%, max. 80mA, 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. 80mA each, electrically isolated
other data identical to GNG12/24 resp. GNG24/24

Semiconductor Relais



HLR 25A semiconductor relais incl. protection cap

HLR 50A semiconductor relais
incl. suitable touch-guard protection cap

Switching voltage: 24 ... 280 V AC (HLR25A) or 48 ... 480 V AC (HLR50A)
Switching current: max. 25 A (HLR25A) or max. 50 A (HLR50A)
Control voltage: 3 - 30 V DC
Isolation voltage: 4000V
Operating temperature: -20...+70°C
Dimensions: approx. 57 x 44 x 35 mm

D53 TP50D 3 phase semiconductor relais
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: -20...+70°C
Dimensions: approx. 100 x 75 x 35 mm

D53-M3 Suitable heat sink for D53TP50D
snap-on mounting on hat rail

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

EASYBUS - the cost-effective way

Advantages of EASYBUS in comparison to other systems

- no complicated and time-consuming planning phase
- simple installation by means of polarity-free 2-wire system in either bus or tree-design
- low-cost, twisted pair cables, 1 km or longer for simultaneous current supply and signal transfer
- up to 240 sensor modules can be connected
- optimum cost-performance ratio

EASYBUS application areas

Wherever

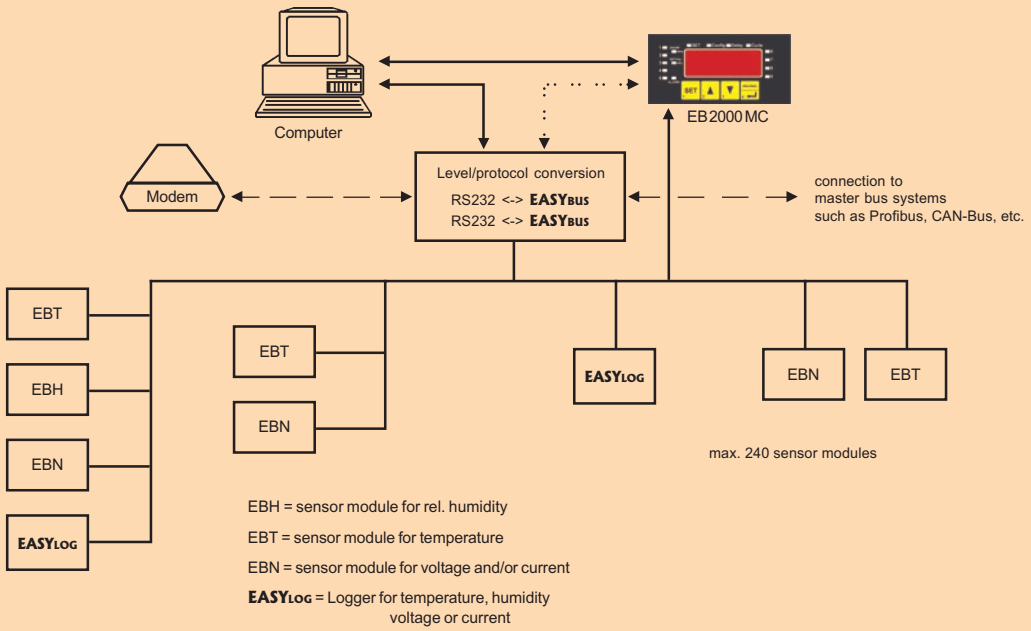
- more than 1 sensor is required for measuring, controlling, monitoring or long-time recording;
- flexibility for future applications, expansion etc. is a key factor;
- centralised data collection is required;
- the latest state of the art is required to ensure a reliable installation for the future

What's new about EASYBUS?

As compared to standard systems (e.g. current loops of 4 to 20mA) **EASYBUS** requires only one 2-wire cable to which up to 240 sensors can be connected, whilst 240 lines would be required in a 4 to 20mA system. Its cost and time effectiveness when it comes to wiring is one of the main advantages of the new **EASYBUS** system.
In addition we have made sure that the prices for the sensor modules developed by us for temperature, humidity, voltage and current are comparable to those available for 4 to 20mA measuring transducers so that no additional costs are accrueing for the user (as is normally the case with other expensive bus systems).

Technical specification

- connection of up to 240 sensor modules (measuring points)
- any cable installation desired (looming, spur lines - any length possible, ring feeder etc.)
- bus length up to approx. 1000 m
- connection via 2-wire twisted pair cables
- polarity must not be observed when connecting
- sensor module supply via bus cable or externally (battery, 24 V DC, 230 V AC etc.)
- interface supply via bus cable standard
- bus functions maintained even in case of sensor module faults (short circuit of coupling module: 1 sensor module for all other faults: any number of sensor module)
- minimum planning required
- fully automatic start-up installation via software possible
- new sensor module will be automatically detected
- sensor module may be changed, removed or added during operation
- scan time approx. 55ms per sensor module
- optimum transmission reliability by means of 'cyclacy redundancy check' (CRC byte after every second data byte)

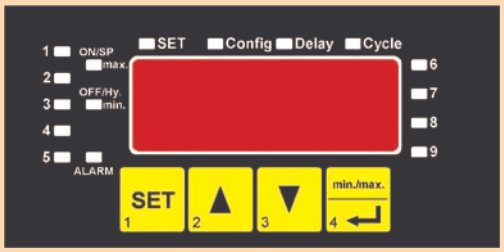


Data recordings with remote control, remote reading, min./max.alarm etc.

Application: e.g. for cooling chambers or other store rooms, cooling cells etc. where recording and monitoring is mandatory

Up to 9 sensor modules / loggers can be connected via only one 2-wire line.

EB 2000 MC



RS232
(GRS 01/9)

(EBSK01)

e.g. temperature logger

(EBSK01)

e.g. humidity logger

EASYBUS (2-pin connection line: VSL 2P)

special-branch terminal: AKL1P

(VSL2P)

(EBSK01)

e.g. standardized signal logger for any sensor

e.g.. **EASYBUS** sensor module (EBT.., EBH.., EBN..)

Advantages:

- Remote control and monitoring e.g. in your office of up to 9 rooms.
- Both current and min. and max. values will be stored and are accessible for each channel.
- Alarm monitoring for any sensor module / logger by means of the EB 2000 MC.
- Min./Max. alarm can be programmed individually for each sensor module / logger
- Remote read out possible for each logger connected.

For any questions, please do not hesitate to call us.

EASYBUS-display and monitoring device for 9 channels

EB 2000 MC

Specification:

Measuring range: -1999 to +9999 digit
Resolution: automatic detection of resolution of connected sensor modules. Automatic positioning of decimal point.
Accuracy: depending on sensor module used. The EB2000MC transfers this value digitally without any additional fault.
Sensor modules: (not included in scope of supply)
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 lenght: 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 level 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 can be deleted automatically or acknowledged (whichever, can be set manually).
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 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 bis 50°C (permissible ambient temperature)
Voltage supply: 230V AC 50/60Hz (standard)
Power consumption: approx. 3,5 VA

Options (against upcharge): Please specify upon order!

Voltage supply:
12V AC, 24V AC or 115V AC 50/60Hz (others upon request)

Accessories:

GGD 4896 (add. sealing for panel mounting acc. to IP65)

GRS 01/9 interface adapter RS232:
(adapter cable to 9-pin PC-interface, one adapter 9/25-pin for connection to the 25-pin PC-interface incl. in scope of supply)

GRS 01/9 - NM interface adapter RS232:
for connection to a modem (for remote data transfer of data to PC).

EBSK 01 (connection cable for **EASYLOG**, EBN, ...)

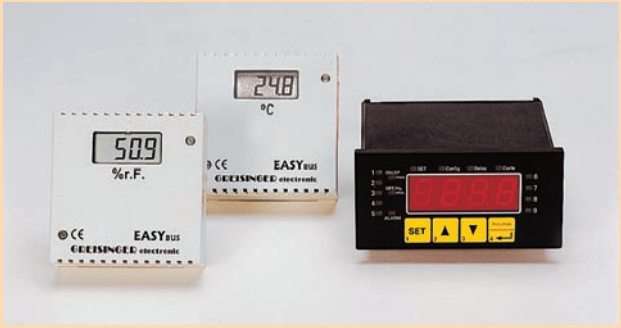
VSL 2P (twisted special cable for **EASYBUS**-system, cross section 2 x 0,75 mm²) **per m**

AKL 1P (special-branch terminal for connection to VSL2P, 2 pieces)

- The EB 2000 MC is able to display and monitor up to 9 sensor modules or loggers.
- The EB 2000 MC automatically detects the number and type of sensor modules connected (e.g. temperature, humidity, pressure sensors etc.). Neither sensor adjustment nor re-configuration are required. The display will always be in the correct dimension.
- Sensor module and logger supply as well as data transfer are carried out via one single 2-wire line. No additional voltage supply for sensor modules required.
- The EB 2000 MC monitors all sensor and logger functions as well as cable and sensor damage etc. and will pass an alarm message in case of fault.
- The EB 2000 MC is equipped with 2 volt-free relay outputs (make contact) for min./max. alarm.
- The EB 2000 MC is equipped with a min./max. value memory for 9 channels.
- Its standard RS232-interface ensures easy configuration.
- In addition the EB 2000 MC can be used as a level converter RS232 - **EASYBUS** so that all **EASYLOGS** connected can be read via the EB 2000 MC. (Software required: GSOFT40K)

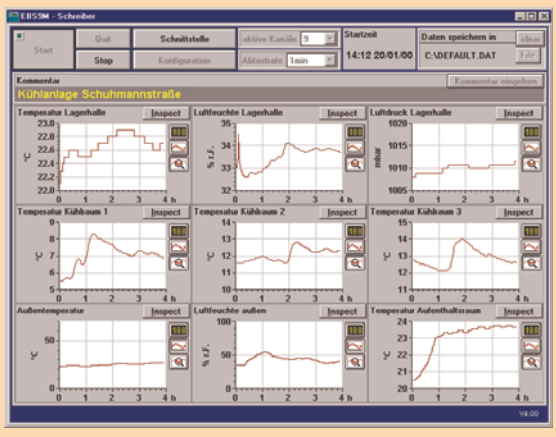
The EB 2000 MC device - cost savings in all areas !

- Short installation time - only one 2-pin line.
- Minimum material requirement - only one display and monitoring device for up to 9 sensor modules.
- Minimum time requirement for planning and commissioning - automatic sensor module detection, expandable for up to 9 sensor modules of any type whatsoever.



EBS 9M (nine channel)

Windows-software for low-cost installation of a multi-channel measuring data recording system. (please refer to page 40)



EASYBUS - sensor modules

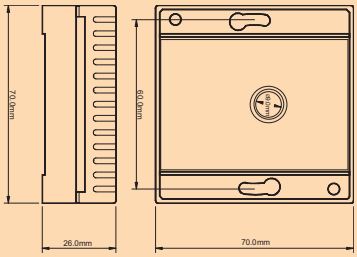
for temperature, humidity and standardized signals

Temperature - sensor modules

EBT - 2R

EBT - 2RE with external sensor for lower or higher temperatures. Sensor: p.r.t. page 89 (GMF 87) of catalogue

-VO: Option "On-site display"



Specification:

Meas. range: EBT - 2R: 0,0 ... 70,0°C
EBT - 2RE: -40,0 ... 120,0°C

Resolution: 0,1°C

Accuracy: EBT - 2R: ±0,5°C
EBT - 2RE: ±0,8°C

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)**:** GMF 87 (V4A-can, 5mm Ø, 50mm long, approx. 1m 2-pole silicon cable)

EBT - AP (design type 1)

EBT - AP (design type 2)

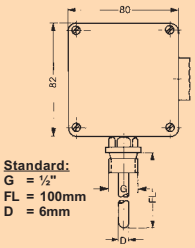
EBT - AP (design types 3 and 4)

EBT - AP (design type 5)

Temperature sensor module integrated in water-proof surface-type housing (IP65). Various sensors (KTY 87-205, Pt1000) available.

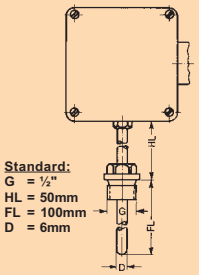
-VO: Option "On-site display" (LCD with 10 mm high digits)

Design 1



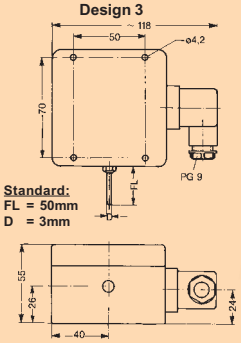
Standard:
G = ½"
FL = 100mm
D = 6mm

Design 2



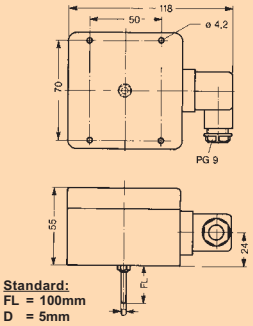
Standard:
G = ½"
HL = 50mm
FL = 100mm
D = 6mm

Design 3



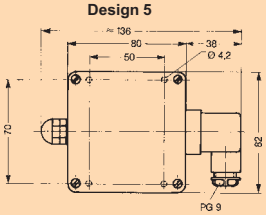
Standard:
FL = 50mm
D = 3mm

Design 4



Standard:
FL = 100mm
D = 5mm

Design 5



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)

Ordering information: at least necessary: Type, sensor element, range, output signal and type specific sensor tube data: "FL" and "D" (type 1-4), "G" (type 1, 2), "HL" (type 2).

Ordering examples: all data to be mentioned in any case!

EBT-AP, desgin 1, Pt1000 DIN cl. B, G = 1/2", FL = 100mm, D = 6 mm

EBT-AP, design 3, KTY87, FL = 50 mm, D = 3 mm

EBT-AP, design 5, Pt1000

Options: Upcharge

-LACK: Encapsulation of PC board (for outdoor use)

Extended probe (FL) or collar tube (HL):
Price incl. up to 100mm, extended length: price per 100mm

Other design types upon request - please do not hesitate to contact us!

Specification:

Sensor element:
- Semiconductor sensor, e.g. KTY 87-205
- Resistance thermometer Pt1000 acc. to DIN IEC 751

Measuring ranges:
- KTY 87-205 : -40,0 ... +120,0°C
- Pt1000: -50 ... +400°C

Resolution: KTY 87-205: 0,1°C
Pt1000: 1°C

Accuracy:
- KTY 87-205: ±0.8°C (sensor and electronics)
- Pt1000: ±0,2%FS (electronics)

Sensor accuracy: (Pt1000)
Standard: acc. to DIN class B (±0,3°C at 0°C)
Option : 1/3 DIN: ±0,1°C at 0°C
(upcharge p.r.t. page 12)

Electric connection: elbow-type plug acc. to DIN 43650 (IP65), output 2-wire connection, max. 1,5mm² each, no polarity

Busload: 2 **EASYBUS**-devices

Sensor connection:
2-wire connection available (e.g. design 5)

Sensor mounting: sensors are electrically insulated as a standard.

Ambient temperature (electronics)**:** 0...70°C

Temperature coefficient: 0,05%/°C

Storage temperature: -20...+85°C

Housing: ABS (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

Thread sizes"G": 1/2" (standard) material V2A, options: V4A; G1/4", G3/8", G1/2", M5, M6, M8, M10, M12, other threads upon request!

Sensor pipe: „D": 3 mm, 4mm (not for KTY87-205), 5 mm, 6 mm and 8 mm - material V4A (1.4571)

Collar tube: HL = please specify length desired (for design 2 only) (V4A-tube)

EASYBUS - sensor modules

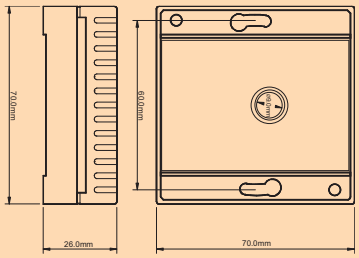
for temperature, humidity and standardized signals

Humidity - sensor modules

EBH - 2R

-VO: Option "On-site display"

-HO: Option "High-humidity sensor (0...100%)"



Specification:

Meas. range: 0,0 to 100,0% r.h.
Resolution: 0,1% r.h.
Accuracy: max. ± 3% r.h.
(linearity and hysteresis rang. from 30 to. 80% r.h.)
Sensor: capacitive, condens., washable etc.
Electric connection: 2 pin screw-type terminal, no polarity, max. 1,5mm²
Busload: 2 EASYBUS-devices
Ambient temperature: 0...70°C
Housing: 70 x 70 x 26 (H x W x D), material ABS plastic, can be mounted on flush-type socket

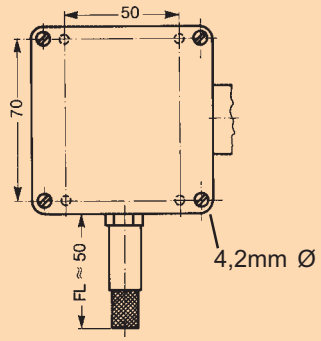
EBH - 1R

-HO: Option "High-humidity sensor (0...100%)"

-LACK: Option "Encapsulated PC-board"

-VO: Option "On-site display"

-SHUT: Option "Heat-absorption hat"



For outdoor use:
Option "encapsulated PC board" required. We also recommend using a heat absorption hat to avoid falsification of meas. data due to sun/rain etc..
(p.r.t. page 42)

Specification:

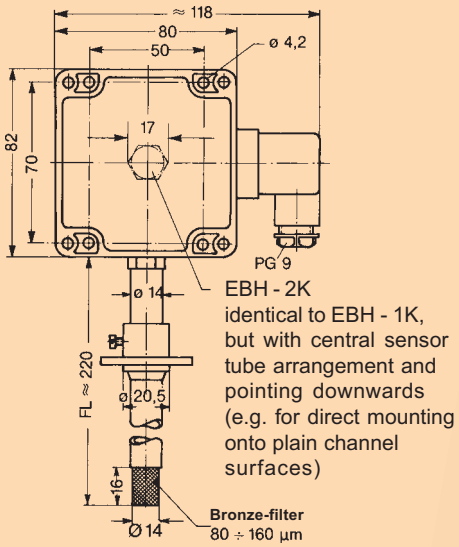
Meas. range: 0,0 to 100,0% r.h.
Resolution: 0,1% r.h.
Accuracy: max. ± 3% r.h.
(linearity and hysteresis rang. from 30 to. 80% r.h.)
Sensor: capacitive, condens., washable etc.
Housing: 80 x 82 x 55 (H x W x D), material: ABS plastic, IP rating: IP65, sensor tube: anodized aluminum, Ø 14 mm, bronze filter (80-160µm) screw connection
Ambient temperature: 0...70°C
Electric connection: quick-release fixture (plug-in and IP65) with elbow-type plug, DIN43650, max. 1,5mm²

EBH - 1K
EBH - 2K

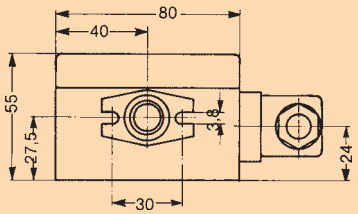
-FL300, FL400, FL500: Option "Longer probe tube"

-HO: Option High temperature (-30...+140°C)"

for other options p.r.t. EBH - 1R



EBH - 2K
identical to EBH - 1K, but with central sensor tube arrangement and pointing downwards (e.g. for direct mounting onto plain channel surfaces)



EBH - 2K

Specification:

identical to EBH - 1R, but sensor can be subjected to higher temperatures due to longer probe tube (-30...+140°C) - option

Electronics and housing : max. 0...70°C
Probe tube length: cpl. with screw-type bronze filter approx. 220mm (standard)
Extended length 300, 400 or 500mm available against upcharge.
(please specify upon order!)

Other types upon request !

EASYBUS - sensor modules

for temperature, humidity and standardized signals

Standardized signal - sensor module

EBN / K - ...[1)]

EBN / W - ...[1)]

Transducer from standardized signal (0-2V, 0-10V 0-20mA and/or 4-20mA) to **EASYBUS**.
[1)] - Please spedify desired standardized signal upon order: (e.g. EBN - 0..10V)

Specification:

Input signals: *please choose one*
=> specify upon order:
0...2V, 0...10V, 0...20mA or 4...20mA.
Meas. range: -1999 to 9999 digit,
Meas. range and decimal point can be set via EBxKonfig software.
Accuracy: ± 0.5 %
Working temperature: -25 to +60°C
Storage temperature: -30 to +85°C
Interface: EASYBUS-interface
3-pin mini-integral plug,
suitable connection cable EBSK01.
Busload: 2 **EASYBUS**-devices
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)
Housing made of ABS, screen made of polycarbonate. 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 acc. to DIN43650 for plug-in into an existing transmitter connection.

Logger - sensor modules

All **EASYLOG**-modules are busable and can be connected to the **EASYBUS**-system in any combination whatsoever.
For additional logger types and more detailed information p.r.t. pages 63, 64 and 65

EASYLOG 40K
Temperature logger

EASYLOG 24RFT
Humidity-/Temperature logger
EASYLOG 40RF
Humidity logger

EASYLOG 40KH
Temperature logger
with external sensor
(any special sensors, cable length etc. temperatures from -200 to +600°C available - please contact us)

EASYLOG 40NS W
Logger for standardized signals

MINILOG
Low cost temperature logger

Simple retrofit of temperature registration in cooling chambers >10m³ by means of **EASYLOG**.
Put in position and start - the logger runs with all the legally required settings (92/1/EWG), no cable laying - no paper !

Warranty: 2 years!

made in Germany

EASYLOG 40K

EASYLOG 40KH

EASYLOG 40K with GWH40K as protection from theft

EASYLOG has the following standard characteristics:

- Put in position and start - the logger runs with all the legally required settings (one measurement every 15 minutes) or within selectable cycle between 2(4)s ... 5h.
- Battery service life: 6-8 years (double service life as option!)
- Storage capacity: 48.000 measuring values, sufficient for 500 days at cycle time of 15 min., i.e. considerably longer than 1 year, which is required by law
- Permanent digital indication showing the following displays:

StoP	The **EASYLOG** has been "stopped". No data will be recorded. No data available. The logger has been reset and can be started again.
HALt	The **EASYLOG** is in "halt" position. No data will be recorded. The data stored are still available.
12.9	***(Temperature will be displayed. Small arrow at the upper left hand side is blinking)*** The logger is active. The temperature will be measured at eg. 15 minute intervals. The values obtained will be memorized.
St.dE	The logger is in active mode, but no data are recorded. As soon as the start delay time is over, the logger will start under the starting conditions specified by the pre-programmed settings.
St.AL	The logger is in active mode, but no data are recorded. The recording will start as soon as the temperature is between the min. and max. alarm limits.
St.Et	The logger is active, but no data are recorded. As soon as the external start key has been plugged-in the recording will start. ***Please note: The start key can be removed as soon as the recording has started.***
AL.Lo	The temperature measured has fallen below the min. alarm limit.
AL.HI	The temperature measured exceeds the max. alarm limit.
bAt	The **EASYLOG** battery has almost been used up and needs to be replaced. Please return logger to manufacturer.
FE 1	Values exceed the measuring range.
FE 2	Values have fallen below the min. measuring range.

- Wide measuring range from -25 ... +60 °C, -50 ... +150°C or -50 ... +300°C
  Special types for ranges within -200...+600°C possible upon request
- Data safe for 10 years in case of current failure.
- IP65 - splash-water proof
- Integrated clock
- 2 memory types can be set: loop memory, recording till memory is full
- Minimum dimensions - sturdy housing
- Busable - up to 240 **EASYLOG**'s can be connected via 2-wire line.
- Remote call-up and alarm monitoring via integrated **EASYBUS**-interface.
- Alarm switching output upon request.

Accessories:

EBW1

Level converter RS232 - **EASYBUS** for connection of max. 9 **EASYBUS** modules (**EASYLOG,** EBN, EBT etc.) to PC.
(Power supply EBW1: 230V/50Hz)
supplies the logger while connected (EASYLOG battery will be switched off)

EBW2

Level converter RS232 independant from mains supply (due to integrated 9V-battery) - **EASYBUS** connection of one **EASYLOG**.
(Power supply EBW2: 9V-battery)
incl. logger supply during data transfer (**EASYLOG** battery will be switched off)

GWH 40K

Wall-type mounting for simple suspension of **EASYLOG**. Dimensions: approx. 70 x 70 mm.
(cannot be used together with **EASYLOG 40NS W**).

GWH 10

Wall-type mounting for simple suspension of **EASYLOG** (cannot be used together with **EASYLOG 40NS W**).

EBSK01

Special plug with approx. 1m cable for the connection of one **EASYLOG**, EBN.. to the **EASYBUS**.

ESK-1

external starting key for the start of the logger in the starting mode: St.Et.

GSOFT 40K

Windows software for setting of device, data reading and printing of data stored.
(incl. **EASYLOG** connection cable EBSK01)

TEMPERATURE LOGGER
for individual programming of recording time

TEMPERATURE REGISTRATION (48.000 meas. values) for any application

EASYLOG 40K
EASYLOG 40KH
EASYLOG 40KH-E

Certificate of calibration -20/0/+60°C

Double battery life

Specification:

Measuring ranges:
EASYLOG 40K: -25.0 ... 60.0°C (sensor and electronics)
EASYLOG 40KH: -50.0 ... 150.0°C (sensor)
-25.0 ... 60.0°C (electronic)
EASYLOG 40KH-E: -50.0 ... 300.0°C (sensor)
-25.0 ... 60.0°C (electronic)
Special types for ranges within -200...+600°C possible upon request
Resolution display and memory: 0.1°C
Accuracy: ±0.5°C (at nominal temperature) resp. ±0.5°C ±0.2% of meas. value (for **EASYLOG 40KH-E**)
- Design 40K: sensor tube made of plastic, Ø 5 mm, approx. 35 mm long
- **Design 40KH:** sensor tube made of stainless steel, Ø 5 mm, approx. 50 mm long, approx. 1 m silicon cable. Cable with anti-buckling glanding made of polyamide, water-proof mounting to housing. (Extra cable length against upcharge.)
- **Design 40KH-E:**
as 40KH but with approx. 1 m glass silk cable.
Display: 10 mm high LCD-display
Recording rate: programmable as to your wishes from 2 sec. to 5 h
Rec. time: 500 days (if rec. rate is 15 min)
Storage capacity for meas. values:
48.000 measuring values
Working temp. (electronics) **:** -25 to +60° C
Storage temperature: -30 to +85° C
Battery service life: approx. 6 years (if recording rate is 15 min.) Double life against upcharge
Interface: EASYBUS-interface 3 pin mini-integral plug.
Busload: 2 **EASYBUS**-devices
Housing: 48.5 x 48.5 x 35.5 mm (H x W x D), sensor and plug not incl. Housing made of shock resistant plastic, transparent front made of polycarbonate, splash water-proof: IP 65
Noise immunity (EMC): the **EASYLOG 40K...** have been manufactured in accordance with the regulations concerning EMC (89/336/EWG).
The device meets EN50081-1 and EN50082-1
additional error: <0.5%

HUMIDITY LOGGER
for individual programming of recording time

EASYLOG40RF-E

HUMIDITY REGISTRATION (48.000 measuring values) for climate monitoring

EASYLOG 40RF
EASYLOG 40RF-E

Cert. of calibration humidity
(meas. points approx. 20/40/60/80%)

Double battery life

Specification:

Measuring ranges: 0.0 to 100.0% r.h.
Resolution of display: 0.1 % r.h.
Memory resolution: 0.1 % r.h.
Accuracy: ±3% from 11 to 90%
Sensor: high-quality capacitive polymer humidity sensor
Sensor tube:
- **...40RF:** ø15mm, made of polyamide
- **...40RF-E:** ø14 x 68mm tube of aluminum, connected to logger via 1m teflon cable
Protection cap: screw-type plastic protection cap for quick responses, made of polycarbonate
Display: 10 mm high LCD-display
Recording rate: programmable as to your wishes from 4 sec. to 5 h
Rec. time: 500 days (if recording rate is 15min)
Storage capacity for meas. values:
48.000 measuring values
Working temperature : -25 to +60° C
Storage temperature: -30 to +85° C
Battery service life: approx. 6 years (if recording rate is 15 min.) Double life against upcharge
Interface: EASYBUS-interface
3 pin mini-integral plug.
Connection cable with plug incl. with GSOFT40K.
Busload: 2 **EASYBUS**-devices
Housing: 48.5 x 48.5 x 35.5 mm (H x W x D), sensor and plug not incl.
Housing made of shock resistant plastic, transparent front made of polycarbonate, splash water-proof: IP 65 (excl. protection cap).
Noise immunity (EMC): the **EASYLOG 40RF..** have been manufactured in accordance with the regulations concerning EMC (89/336/EWG).
The device meets EN50081-1 and EN50082-1
additional error: <0.5%

Note for all loggers:

we suggest double battery capacity when working with fast recording rates.

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

EASYLOG24RFT

HUMIDITY-/TEMPERATURE-REGISTRATION (24.000 meas. values each) for climate monitoring.
(Up to 48.000 meas. values per channel upon request)

EASYLOG 24RFT
EASYLOG 24RFT-E

Cert. of calibration humidity
(meas. points approx. 20/40/60/80%)

Double battery life

Specification:

Measuring range:
Humidity: 0.0 to +100.0 % r.h.
Temperature: -25.0 ... 60.0°C
Resolution display and memory:
0.1% r.h. and 0.1 °C
Accuracy: (at nominal temperature)
Humidity: ≤ ±3% in the range of 11-90%
Temperature: ±0.5°C
Sensors:
Humidity: high-quality capacitive polymer humidity sensor
Temperature: Pt1000
Sensor tube:
- **...24RFT:** ø15mm, made of polyamide
- **...24RFT-E:** ø14 x 68mm tube of aluminum, connected to logger via 1m teflon cable
Protection cap: screw-type plastic protection cap for quick responses, made of polycarbonate
Display: LCD-display, 10 mm high
Recording rate: programmable as to your wishes from 4 sec to 5 h
Rec. time: 250 days (if recording rate is 15min)
Storage capacity for meas. values:
24.000 measuring values
Working temperature : -25 to +60° C
Storage temperature: -30 to +85° C
Battery service life: approx. 6 years (if recording rate is 15 min.) Double life against upcharge
Interface: EASYBUS-interface
3 pin mini-integral plug. Connection cable with plug incl. with GSOFT40K.
Busload: 2 **EASYBUS**-devices
Housing: 48.5 x 48.5 x 35.5 mm (H x W x D), sensor and plug not incl.
Housing made of shock resistant plastic, transparent front made of polycarbonate, splash water-proof: IP 65 (excl. prot. cap).
Noise immunity (EMC): the **EASYLOG 24RFT..** have been manufactured in accordance with the regulations concerning EMC (89/336/EWG).
The device meets EN50081-1 and EN50082-1
additional error: <0.5%

TEMPERATURE-LOGGER

for individual programming of recording time

TEMPERATURE-REGISTRATION (16000 meas. values) for any application

MINILOG

(incl. connection cable EBSK01 for level converter)

Double battery life

Specification:

Meas. range: -25.0 ... 60.0°C
Display resolution: 0.1°C
Memory resolution: 0.1°C
Accuracy: ±0.5°C (at nominal temperature)
Sensor: Pt1000 (integrated in device)
Display: LCD-display, 10 mm high
Recording rate: programmable as to your wishes from 2 sec to 5 h
Recording time:
166 days (if recording rate is 15 min)
Storage capacity for meas. values:
16000 measuring values
Working temperature : -25 to +60° C
Storage temperature: -30 to +85° C
Battery service life: approx. 6 years (if recording rate is 15 min. Double life against upcharge)
Interface: EASYBUS-interface 3 pin mini-integral plug.
Please note: the **MINILOG** is not designed for permanent bus operation. During permanent bus operation the accuracy may be worse.
Busload: 2 **EASYBUS**-devices
Housing: 48.5 x 48.5 x 35.5 mm (H x W x D), plug not included
Housing made of shock resistant plastic, transparent front made of polycarbonate, splash water-proof: IP 65
Noise immunity (EMC): the **MINILOG** have been manufactured in accordance with the regulations determined by the Council for the Approximation of the Legislation amongst the Member Countries concerning EMC (89/336/EWG). The device meets EN50081-1 and EN50082-1
additional error: <0.5%

MINISOFT

Read-out software for **MINILOG** (not included in scope of supply!).
Software for demonstration purposes available via the Internet (www.greisinger.de).
(We will be pleased to send you a disk against a small charge covering our expenses)

STANDARD SIGNAL LOGGER

for measuring transducer 0 to 10 V, 0 to 20 mA or 4 to 20 mA. Replaces expensive recorders, PCs etc.

Logger for memorizing of 48000 measuring values for any standard signals
(please specify standard signal desired when ordering)

EASYLOG 40NS W - ...

(with elbow type plug)

EASYLOG 40NS K - ...

(with PG glanding and cable)

Double battery life

Specification:

Measuring range: -1999 to 9999 digits programmable
Decimal point: any position
Input signals: one signal only
- please specify when ordering
0 - 10 Volt, 0 - 20 mA or 4 - 20 mA
other input signals upon request
Display resolution: 1 digit
Memory resolution: 1 digit
Accuracy: ±0.5%
Display: 10 mm high LCD-display
Recording rate: programmable as to your wishes from 2 sec to 5 h
Recording time: 500 days (if recording rate is 15 min)
Storage capacity for meas. values:
48000 measuring values
Working temperature : -25 to +60° C
Storage temperature: -30 to +85° C
Battery service life: approx. 6 years (if recording rate is 15 min. Double life against upcharge)
Interface: EASYBUS-interface 3 pin mini-integral plug.
Busload: 2 **EASYBUS**-devices
Housing: 48.5 x 48.5 x 35.5 mm (H x W x D), (with elbow-plug: 50.5 x 90 x 39.5 mm)
Housing made of shock resistant plastic, transparent front made of polycarbonate, splash water-proof: IP 65
Electric connection: (for input signals)
- **EASYLOG 40NS W:** elbow-plug in accordance with DIN43650 for connection to an existing transmitter.
- **EASYLOG 40NS K:** connection to any standard signal source via 0.5m connection cable.
Noise immunity (EMC): the **EASYLOG 40NS...** have been manufactured in accordance with the regulations concerning EMC (89/336/EWG). The device meets EN50081-1 and EN50082-1
additional error: <0.5%

PULSE-LOGGER

for individual programming of the recording time

PULSE REGISTRATION logger for memorizing of 48000 meas. values

EASYLOG 40IMP

(with PG-glanding and cable)

Double battery life

Specification:

Meas. range: 0 to 30000 pulses/cycle
Resolution: 1 pulse
Cycle: 4sec. to 5h, freely programmable
Display range: -1999 to 9999 digits programmable
Decimal point: any place
Input signal: passive volt-free switching contact or active TTL-signal (please specify upon order)
Display resolution: 1 digit
Memory resolution: 1 digit
Accuracy: cycle time ±50 msec.
Display: LCD-display, 10 mm high
Recording rate: corr. to cycle
Recording time:
500 days (if recording rate is 15 min)
Storage capacity for meas. values:
48000 measuring values
Working temperature : -25 to +60° C
Storage temperature: -30 to +85° C
Battery service life: approx. 6 years (if recording rate is 15 min. Double life against upcharge)
Interface: EASYBUS-interface 3 mini-integral plug.
Busload: 2 **EASYBUS**-devices
Housing: 48.5 x 48.5 x 35.5 mm (H x W x D)
Housing made of shock resistant plastic, transparent front made of polycarbonate, splash water-proof: IP 65
Electric connection: (for input signals)
connection to any frequency source via approx. 0.5 m connection cable
Noise immunity (EMC): the **EASYLOG 40IMP** have been manufactured in accordance with the regulations concerning EMC (89/336/EWG). The device meets EN50081-1 and EN50082-1
additional error: <0.5%

Examples for application

- consumption measurements
- flow measurements
- quantity measurements

Attention: Our software GSOFT40K as well as a level converter (EBW1, EBW2, EBW64 or EB2000MC) are required for all EASYLOG devices for configuration and to read-out logger data. **(p.r.t. p. 58-69)**

GSOFT 40K

Operating Software For EASYLOG And MINILOG Datalogger

GSOFT40K is the comfortable operation software for the very easy operation of the **EASYLOG**'s and **MINILOG**'s. Almost every kind of measurement recording can be realized by using GSOFT40k. It supports English, German and Czech language.
(**EASYLOG**-connection cable **EBSK01** in scope of supply)

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

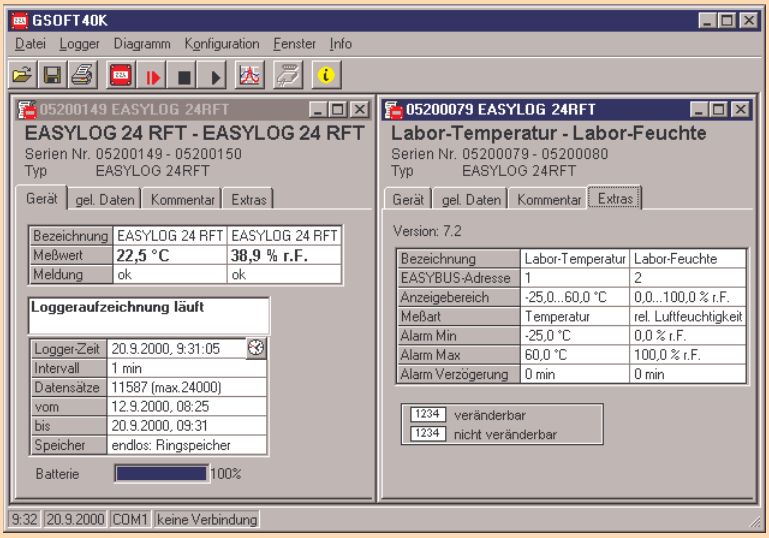
All necessary informations are comprehensed to a single clearly arranged window for each connected logger.

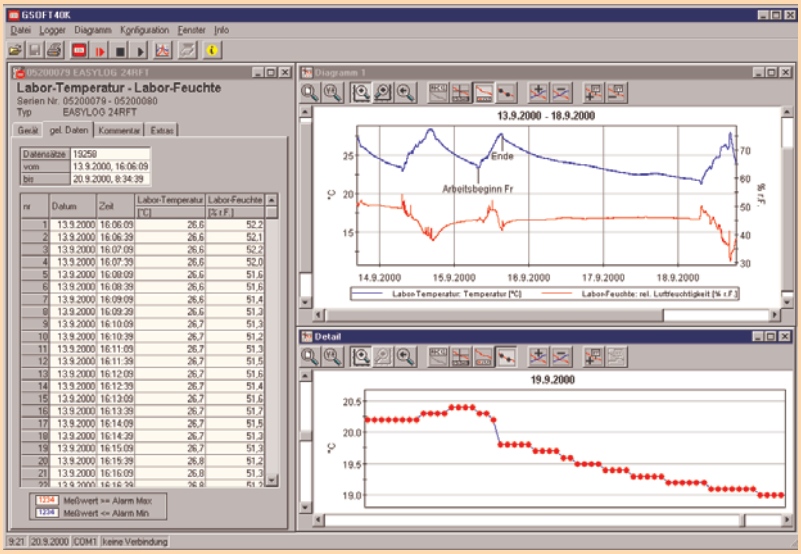
Setting of special functions

The loggers are supporting alarm functionality - easily configurable by the GSOFT40K 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 (inactivateable)
- measurement cursor (inactivateable)
- marking of measurings with symbols (inactivateable)

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.

EASYBUS & 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 GSOFT40k V7.0 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 centrallly covering distances of hundreds of kilometers. (p.r.t. page 67)

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.

An outlook to the future

GSOFT40K is permanently growing for the needs of our customers. One of the following improvements e.g. will be an automatic archivating function on selectable points of time, to get maximum data safety.

Update GSOFT 40K

(for registered users with declaration of serial number of original version)

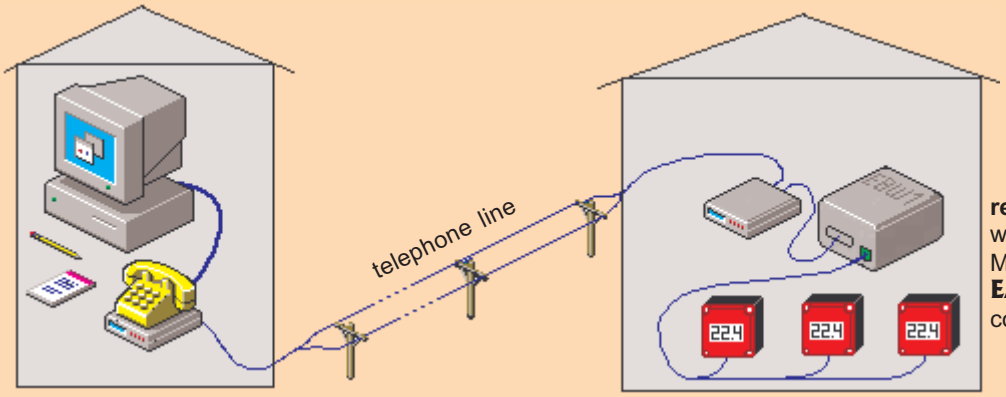
EASYLOG - Remote Operation System

for EASYLOG - dataloggers

By using the software GSOFT40K V7.0 in addtion to the local control of loggers connected at Your work place or laptop computer, they can be operated remotely covering large distances. This is made possible by using MODEMs and conventional or mobile telephone nets. The loggers can be directly connected to the EASYBUS MODEMs just by using a level converter, no additional PC is needed!

The following low cost system is sufficient already:

working place:
GSOFT40K at PC & standard modem



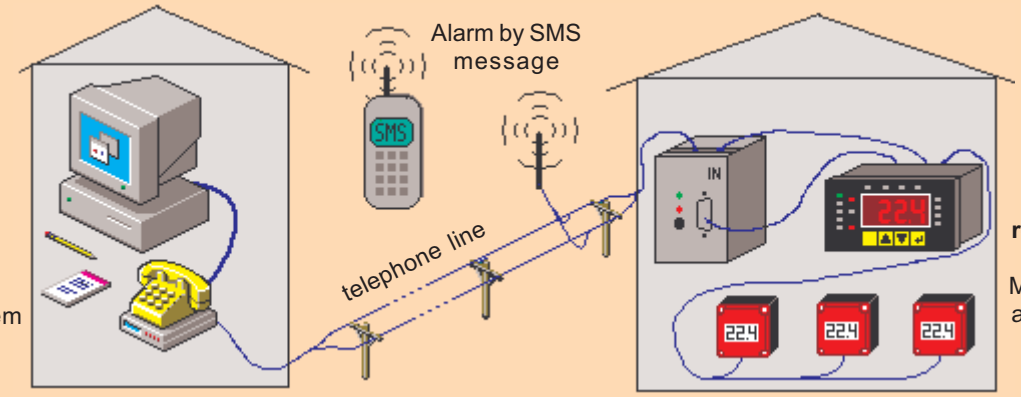
remote location:
with industry modem MODEM 1000 and **EASYBUS** level converter (e.g. EBW1)

When performing 'connect loggers' with GSOFT40K either a local serial interface connection or a telphone connection will be opened. The read out of the loggers take just a few more time than usually via a local connection, the full range of logger operations are possible.
Supported are analog MODEMs, which also may be connected to ISDN nets via a suitable terminal adapter.
The MODEM of the remote location is a **EASYBUS** - taylored industry MODEM (MODEM 1000, MODEM 2000 HS, MODEM 3000 GSM), the local MODEM at the GSOFT40K working place may be any commonly used modem or one of the MODEMs mentioned above.

Extended system with SMS alarm function

As a special feature an alarm message may be sent to your mobile phone (SMS) when using e.g. an EB2000 MC as level converter (MODEM 2000 HS or MODEM 3000 GSM required for SMS).
For example an alarm message is sent if a selectable temperature range is exceeded.

working place:
GSOFT40K mit Standardmodem



remote location:
with MODEM 2000 HS and EB 2000 MC

One or two relais alarm outputs of the EB2000 are connected to the alarm input of the MODEM. In case of an alarm the presetable alarm message is sent as SMS message to the mobile phone. When then message was received the operator may e.g. connect to the remote location by using GSOFT40K to take a closer look on what is going on. Presently supported mail systems: D1, D2 and E.

Remote operation via mobile telephone nets (900MHz)

If there isn't any telephone connection available at the remote location, or if it is a mobile system, it is possible to use the mobile GSM-MODEM. The MODEM 3000 GSM e.g. supports 900MHz mobile telephone nets and is aprooved for european use. It works like a mobile phone with integrated MODEM. Common SIM cards are supported. It just to be made sure that data transfer is unlocked by the mobile net provider.

Your advantages

With the **EASYBUS** remote operation system any number of remote locations can be controlled from a single working place. Expensive journeys over hundreds of kilometers aren't necesary any more for the most of the cases, all necssary information is available directly at the working place.
Installation and putting into operation is as easy as possible. The operation of GSOFT40K is basically the same as it used to be before. The comfortable configuration software MODKonfig (in scope of supply of GSOFT40K) gives a maximum help when setting up your industry MODEM - without necessary previous knowledge about remote data transfer.
With this powerful tools You are enabled to setup the complete reliable system within minutes.

Components For The EASYLOG Remote Operation System

MODEM 1000 analog standard industry-MODEM with password protection for the **EASYBUS** remote data transfer via analog telephone nets. (incl. mains adapter, telephone cable, 25 pole DSub cable and GSA 25S-9B)

MODEM 2000 HS analog hat rail MODEM with password protection and SMS alarm for the **EASYBUS** remote data transfer via analog telephone nets. (supply voltage: 10..60VDC, incl. telephone cable and 9 pole DSub cable)

MODEM 3000 GSM GSM MODEM for mobile 900 MHz telephone nets with password protection and SMS alarm for the **EASYBUS** remote data transfer via 900MHz mobile nets. (supply voltage: 10..60VDC, incl. 9 pole DSub cable, antenna has to be ordered separately)

Antenne 3000 GSM dual band industry antenna with fastening

GNG 12/300 Hat rail mains adaptor suitable for MODEM2000HS / 3000GSM

GNG 12 - LE plug-in power supply suitable for MODEM2000HS / 3000GSM

GSK 9S-9S-NM 9 pole null modem cable to connect a MODEM to EBW1 ... EBW240 level converters

GRS 01/9 - NM interface adapter to connect a MODEM to EB2000 MC level converters

EASYBUS PC-Master

EASYBUS PC-Masters represent the interface between sensor module, **EASYBUS** and PC. To meet customers various requirements the following options are available:

EBW 9
- level converter RS232 - **EASYBUS**
- current supply for up to 9 sensor modules
- Software EBS 9M

EBW 64
- level converter RS232/RS485 - **EASYBUS**
- current supply for up to 64 sensor modules
- Software **EASYControl**

EBW 240
- level converter RS232/RS485 - **EASYBUS**
- current supply for up to 240 sensor modules
- Software **EASYControl**

Specification:

	EBW 240	EBW 64	EBW 1
Voltage supply	230V/50Hz	230V/50Hz	230V/50Hz
Power consumption	approx. 30W	approx. 15W	approx. 5W
Max. permissible number of sensor modules	240	64	9
Permissible cable length*	1000m	1000m	200m
Baud rate	4800 Baud	4800 Baud	4800 Baud
Ambient conditions			
Operating temperature	0..55°C	0..50°C	0..50°C
Storage temperature	-20..+60°C	-20..+60°C	-20..+70°C
Humidity	20-80% non-condensing	20-80% non-condensing	20-80% non-condensing
Serial interface	RS232 or RS485	RS232	RS232
Electr. isolated	yes	yes	yes
Overload display	yes	yes	no
Short-circuit proof	yes	yes	yes
Dimensions (H x W x D)	85x200x240mm (without supply)	100x75x110mm	112x80x45mm

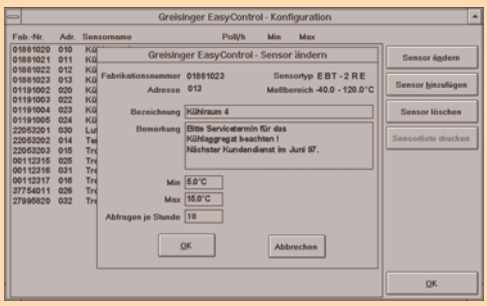
* depending on type of cable and wiring

EASYControl

Software for recording, monitoring, display and documentation of up to 240 sensor modules of the EB-series or 15 GIA/GIR ... devices:

- min./max. value monitoring for each measuring point
- straightforward display of current measuring values in form of table
- simple sorting of sensor module sequ. by means of drag and drop
- scanning cycle for each sensor module can be individually selected
- adding and deleting of sensor modules during recording operation
- display of measuring values as diagram or table
- separate fault list
- memorizing, filing of measuring data, fault lists and settings
- automatic detection of new sensor modules
- automatic system initialization
- automatic detection of all sensor modules connected
- fully automatic assignation and administration of bus addresses
- aut. detection of sensor module type, meas. range and meas. unit
- alarm supervision with EBB4out module (each one relais: min-, max-alarm, alarm in general)
- also suitable for monitoring up to 15 GIA/GIR devices (functions limited if operating with GIA/GIR).
  Note: simultaneous connection if GIA/GIR... and EASYBUS modules is not possible!

The only thing left for you to do is entering your description!



EASYBus - accessories

Accessories:

Sensor modules p.r.t. pages 60, 61, 62 **as of**

Logger p.r.t. pages 63, 64, 65 **as of**

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**

*(Please note: **EASYLOG** and EBN.. will be supplied without connection cable. The GSOFT40K includes a connection cable EBSK01. Please order EBSK01 resp. EBSK03 as required in case of permanent bus connection!)*

ESK-1 external starting key, independant from mains supply, to start logger in the starting mode St.Et
(Power supply: 9VDC - via integrated 9V-battery, dimensions: 107 x 62 x 26.5 mm (H x W x D))
*Examples for application: In the office the **EASYLOG** will be set for monitoring functions by means of the GSOFT40K; it will be prepared to start by setting it to "external Start (St.Et)". After the logger has been taken to the site of application the starting key will be connected. Press relevant button to start logger. The starting key may now be removed again.*

GWH 40K wall suspension with lock as protection against theft - see picture page 63
suitable for all **EASYLOG** 's (with the exception of **EASYLOG 40NS W**), EBN/K - ... and GIA0420WK

GWH 10 simple wall suspension, made of stainless steel, for all **EASYLOG**'s - except **EASYLOG 40NS W**
Mount wall suspension at the monitoring point; **EASYLOG** may now be easily put in

EBW 1 converter 230V~ for connection of max. 9 modules to a PC
Converter RS232 - **EASYBUS**, for the connection of max. 9 modules to the RS232-interface (9-pin Dsub-plug) of your PC.
Power supply: 230VAC / 50Hz, dimensions: 112 x 80 x 45 mm (H x W x D) - p.r.t. page 63
(Scope of suppyl incl. 9-pin Dsub-extension cable. *Please note: order Dsub9 -> Dsub25, if required! - GSA 9S-25B*)

EBW 2 converter for the connection of one module to a PC - independant from mains supply
Converter RS232 - **EASYBUS** - independant from mains supply - for the connection of one module (e.g. **EASYLOG**) to the RS232-interface (9-pin Dsub-plug) of your PC. Power supply: 9VDC - via intergrated 9V-battery, dimensions: 107 x 62 x 26.5 mm (H x W x D)
(Scope of supply incl. 9-pin Dsub-extension cable. *Please note: order Dsub9 -> Dsub25, if required! - GSA 9S-25B*)

EBW 9 set consisting of converter EBW1 and recording software EBS9M

EBW 64 converter for connection of max. 64 modules to the RS232 interface of a PC
(Scope of supply incl. 9-pin Dsub-extension cable, Dsub-adapter GSA9S-25B and recording, monitoring and display software for up to 240 sensor modules: **EASYControl**)

EBW 240 converter for connection of max. 240 modules to the RS232 interface of a PC
(Scope of supply incl. 9-pin Dsub-extension cable, Dsub-adapter GSA9S-25B and recording, monitoring and display software for up to 240 sensor modules: **EASYControl**)

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

EB 2000 MC **EASYBUS**-display and monitoring device for 9 channels, incl. level converter PC - **EASYBUS**

GRS 01/9 interface cable for EB2000 MC for connection to 9-pin RS232 interface of a PC - adapter GSA 9S-25B to snap on to 25-pin PC interface will also be supplied

GRS 01/9 - NM interface adapter to connect a MODEM to EB2000 MC level converters

MODEM 1000 analog standard industry-MODEM with password protection for the **EASYBUS** remote data transfer via analog telephone nets. (incl. mains adapter, telephone cable, 25 pole DSub cable and GSA 25S-9B)

MODEM 2000 HS analog hat rail MODEM with password protection and SMS alarm for the **EASYBUS** remote data transfer via analog telephone nets. (incl. telephone cable and 9 pole DSub cable - for power supply p.r.t. page 68)

MODEM 3000 GSM GSM MODEM for mobile 900 MHz telephone nets with password protection and SMS alarm for the **EASYBUS** remote data transfer via 900MHz mobile nets. (incl. 9 pole DSub cable, antenna and power supply has to be ordered separately)

Antenne 3000 GSM dual band industry antenna with fastening

GSK 9S-9S-NM 9 pole null modem cable to connect a MODEM to EBW1 ... EBW240 level converters

VSL 2P twisted special cable for **EASYBUS**-system, cross section 2 x 0,75 mm² **per m**

AKL 1P special branch terminal for connection to VSL2P, 2 pieces

EBS 9M Windows-software for recording and archiving of max. 9 sensor modules - p.r.t. page 40

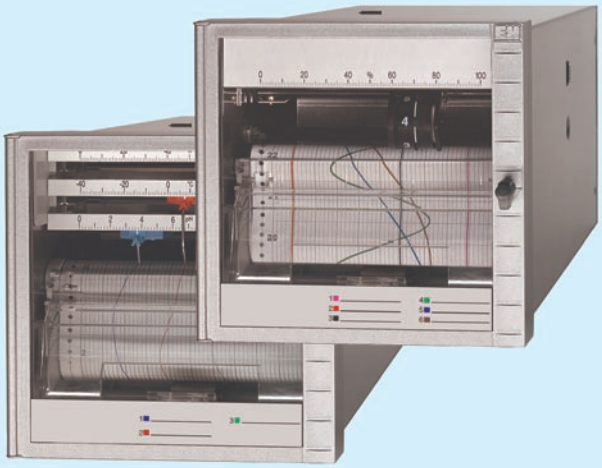
EASYControl Windows-software for recording, monitoring and archiving of max. 240 sensors of the EB-series - p.r.t. page 68

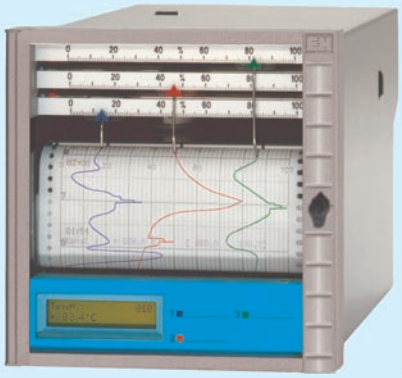
EBB 4 out **EASYBUS** switching module for alarm supervision in connection with **EASYControl**
Hat rail mounting, 4 relais (changer), supply voltage 230VAC

EASYBUS.dll Windows-function library for interface communication **EASYBUS** - PC, to write your own programmes

GSOFT 40K Windows-software for **EASYLOG** for settings, data read-out and printing of logger data (diagram or table), p.r.t. page 66. incl. **EASYLOG**-connection cable **EBSK01**

Panel-mounted Recorder





Colour line recorder, colour dot recorder

Standard signal recorders at a favourable price with up to 6 channels.Freely selectable measuring ranges, feed rate, paper types, etc.

ChromaLog 1k
1-channel line recorder

ChromaLog 2k
2-channel line recorder

ChromaLog 3k
3-channel line recorder

ChromaLog 6k
6-channel dot matrix recorder

Specification:

Measuring inputs:
Direct voltage: 0 ... 1 V, 0.2 ... 1V, 0 ... 10 V, 2 ... 10 V
Direct current: 0 ... 20 mA, 4 ... 20 mA
Input inpedance: ≥1MOhm at voltage, 50Ohm at current
Accuracy: class 0,5
Measuring range: programmable
Number of measuring points: 1, 2, 3 or 6, electrically isolated
Recording system (line recorder): fast compensation system with toothed belt drive; Setting time 0.5s. Recording via easily interchangeable colour pens (up to 1500m of ink capacity at 20mm/h at norm conditions). Death zone <0.25%
Recording system (dot recorder): interchangeable 6 chamber colour star, approx. 500000 dots per colour, intellegent dot print function for ageing reduction of print mechanism and print star.
Paper feed: selectable via rotary switch
0-10-20-60-120-300-600-1200-(3600 not at 6k) mm/h
Registration paper: roll paper (approx. 32m)
Scale: 1 interchangeable adhesive scales per channel (line recorder) or 1 common adhesive scale (dot recorder)
Writing colours: violet, red, black, green, blue, brown
Housing: Stainless steel, for panel mounting 144 x 144 mm
Mounting depth: 275 mm
Front door: metal, prot. class IP54
Ingress protection: IP54 acc. to DIN40050
Positioning requirement: 90° ±10° without restrictions
90° ±30° with restrictions within recording behaviour
Voltage supply: 230VAC, 50/60Hz
optional: 24VAC, 115VAC or 24VDC ±20%
Connections: Flat Pin Plug (DIN46244) 6.3 x 0.8mm or 2.8 x 0.8mm

Accessories, consumption material, etc. upon request!

Colour hybrid recorder

Universal compact recorder for standard signals, resistor thermometers and thermocouples with up to 6 channels. Freely selectable measuring ranges and input signals, etc.

AlphaLog 1k
1-channel line recorder

AlphaLog 2k
2-channel line recorder

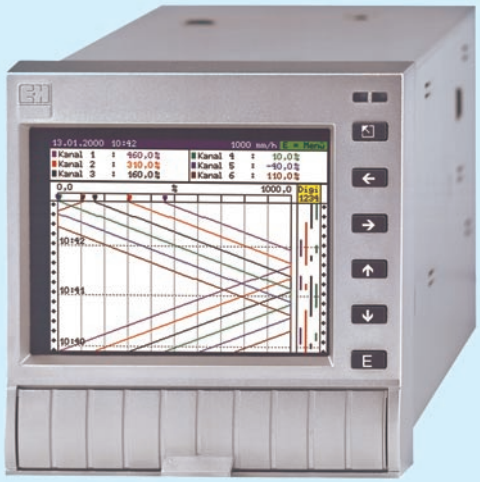
AlphaLog 3k
3-channel line recorder

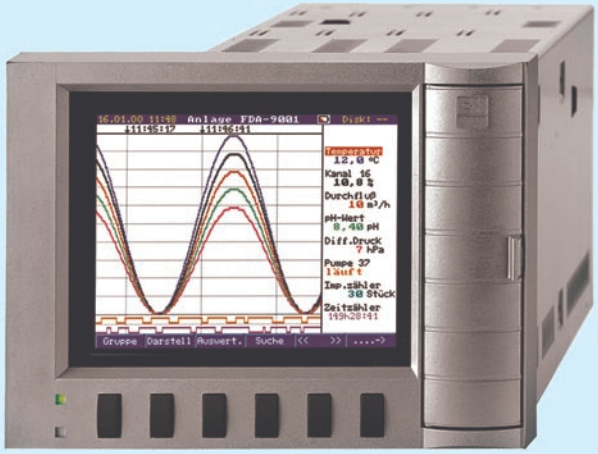
AlphaLog 6k
6-channel dot matrix recorder

Specification:

Measuring inputs:
Direct voltage: 0...1V, 0...10V, ±20mV, ±50mV, ±100mV, ±200mV, ±1V, ±2V, ±5V, ±10V
Direct current: 0..20mA, 4...20mA, ±400µA, ±1mA, ±2mA, ±4mA, ±20mA, ±40mA
Resistance thermometer: Pt 100, Ni 100, Pt 500, Pt 1000
Thermocouples: Type K, S, B, L, J, U, T, R and N
Input impedance: ≥1MOhm at voltage, 50Ohm at current
Measuring range: programmable
Number of measuring points: 1, 2, 3 or 6, electrically isolated
Recording cycle: 125ms / channel
Resolution: 12 Bit
Recording system: Stepper driven with contactless servo system for pens and print head. Setting time ≤2sec, resolution 0.1mm, death zone ≤0.2mm. Selectable time delay compensation for line recorder, recording via easily interchangeable colour pens or 6 chamber print head with formamideless inks. (ink capacity approx. 600m or approx. 500000 dots/colour)
Paper feed: adjustable, 0-5-10-20-60-120-240-300-600 mm/h
Registration paper: roll paper (approx. 64m)
Display: 2 x 16 characters LCD
Scale: 1 interchangeable adhesive scale per channel (line recorder) or 4 common adhesive scale (dot recorder)
Operation/Configuration: via 6 keys or frontside RS232 interface with PC-software ReadWIn® (in scope of supply)
Housing: Stainless steel, for panel mounting 144 x 144 mm
Mounting depth: 215 mm
Front door: metal with rubber sealing prot. class IP54
Voltage supply: 90...253VAC, 50/60Hz (Optional: 18...30VAC/DC)
Connection: reverse connect protected screw-type plug connector, wire diameter up to 2.5 mm²

Paperless Recorder / Videographic Recorder





Paperless recorder

Universal recorder for standard signals, resistor thermometers and thermocouples with up to 6 channels.
Electronic recording replaces usual recordings on paper and therefore saves consumption material. Furthermore the recorded data can easily be processed by a PC.

EcoGraph 3k

3-channel recorder

EcoGraph 6k

6-channel recorder

Specification:

Measuring inputs: universally programmable for
Direct voltage: 0...0.1V, 0...0.2V, 0...1V, 0...10V, ±1V, ±10V
Direct current: 0..20mA, 4...20mA, ±20mA
Resistance thermometer: Pt 100, Ni 100, Pt 500, Pt 1000
Thermocouples: Type B, E, J, K, L, N, R, S, T, U, W3 and W5
Input impedance: ≥1MOhm at voltage, 50Ohm at current
Connection of RTDs: 2-/3- or 4-wire connection
Measuring range: programmable
Number of measuring points: 3 or 6, electrically isolated
Recording cycle: 250ms / channel
Display: STN colour graphic display with 126mm screen diagonal, 320 x 240 Pixel.
Operation/Configuration: via 6 frontside keys and display dialogues.
Remote Operation: configuration and archiving of settings per disk or via backside mounted serial interface by means of PC-software ReadWIn®
Measurement recording: to integrated flash memory or to disk
recording length: 3 channel: 23m (memory), 43m (disk)
6 channel: 14m (memory), 26m (disk)
recording rate: ("feed rate") selectable,
0-5-10-20-60-120-240-300-600-1000 mm/h
Digital input: 4 additional operational inputs
Switching outputs: 3 change over Relais 230VAC/3A for alarm monitoring
Interface: galv. isolated serial RS232 / RS485 interface, selectable device address.
Ambient temperature: 0 ... +50°C
Relativ humidity: 10 ... 75 % r.F., without condensation
Housing: for panel mounting 144 x 144 mm
Mounting depth: approx. 210 mm
Ingress protection: front IP54, rear IP20
Positioning requirement: 90 ±30° according to DIN16257
Voltage supply: 93...264VAC, 48...63Hz, 20VA
Connection: reverse connect protected screw-type plug connectors

The videographic recorder that saves

Universal videoraphic recorder for standard signals, resistor thermometers and thermocouples with up to 16 channels.
Electronic recording replaces usual recordings on paper and therefore saves consumption material. Furthermore the recorded data can easily be processed by a PC.

MemoGraph 8k

8-channel recorder

MemoGraph 16k

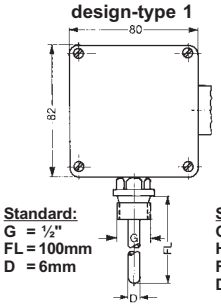
16-channel recorder

Specification:

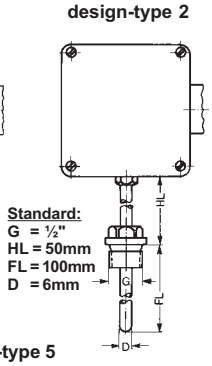
Measuring inputs: Multi functional inputs for
Direct voltage: 0...1V, 0...10V, ±20mV, ±50mV, ±100mV, ±200mV, ±1V, ±2V, ±5V, ±10V
Direct current: 0...20mA, 4...20mA, ±1mA, ±2mA, ±4mA, ±20mA, ±40mA
Resistance thermometer: Pt 100, Ni 100, Pt 500, Pt 1000
Thermocouples: Type B, J, K, L, N, R, S, T, U, W3 and W5
Input impedance: ≥1MOhm at voltage, 50Ohm at current
Connection of RTDs: 2- or 3-wire connection
Measuring range: programmable
Number of measuring points: 8 or 16, electrically isolated
Recording cycle: 125ms / channel
Accuracy: 0.25% FS ±1 digit
Display: STN colour graphic display with 145mm screen diagonal, 320 x 240 Pixel.
Operation/Configuration: via 6 frontside keys and display dialogues or via front- and backside mounted serial interface RS232.
Remote Operation: configuration and archiving of memory settings via backside mounted serial interface by means of PC-software ReadWIn, e.g. by means of Modem.
Measurement recording: to integrated flash memory or to disk
Memory cycle: 1s/2s/3s/5s/10s/15s/30s/1min"2min/3min/6min
Memory size: depending on channel count memory cycle, e.g.
4 channels: 25.9 days (intern) or 42.3 days (disk) at cycle = 30sec.
8 channels: 15.6 days (intern) or 25.4 days (disk) at cycle = 30sec.
16 channels: 7.8 days (intern) or 12.7 days (disk) at cycle = 30sec.
Switching outputs: change over Relais 230VAC/3A for alarm monitoring
Ambient temperature: 0 ... +50°C
Relativ humidity: 10 ... 75 % r.F., without condensation
Housing: for panel mounting 200 x 144 mm
Mounting depth: approx. 211 mm
Ingress protection: front IP54, rear IP20
Positioning requirement: 90 ±30° according to DIN16257
Voltage supply: 90...253VAC, 50/60z, max. 14VA
Connection: reverse connect protected screw-type plug connectors

Temperature-measuring transducer cpl. with Pt100 or NiCr-Ni (type K) sensor

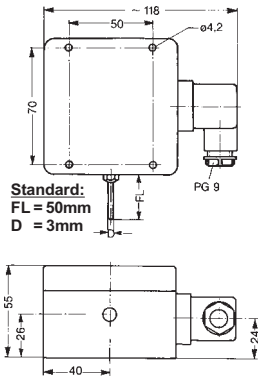
GTMU design-type 1



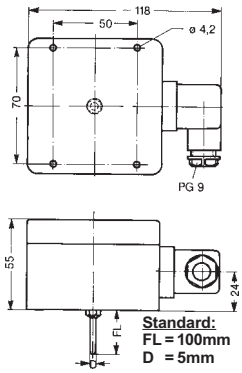
GTMU design-type 2



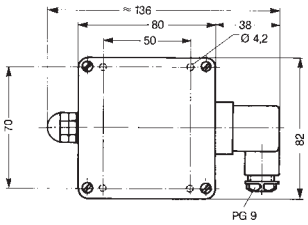
GTMU design-type 3

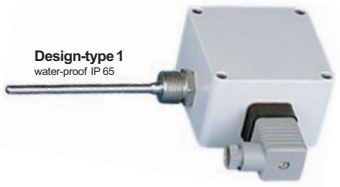


GTMU design-type 4

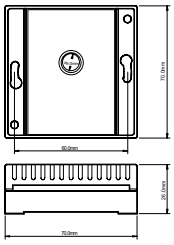


GTMU design-type 5





GTU-2R-OMU designer housing for ambient temperature sensing housing without transmitter, incl. Pt100 Sensor 2-,3- or 4-wire, Pt1000 upon request



This housing also maybe mounted directly to a concealed distribution box.

Versions with transmitter:

GTMU design-types 1 as of

GTMU design-types 2 as of

GTMU design-types 3 and 4 as of

GTMU design-type 5 as of

electrically isolated transmitters:

GTMU/GITT upcharge:

(design-type 1, 2, 3, 4 or 5 - Pt100, Pt1000 or NiCr-Ni, output 4-20mA)

transmitters for outdoor usage: (-40...+70°C)

GTMU/GKM upcharge:

(design-type 1, 2, 3, 4 or 5 - Pt100 3-Leiter, only output 4-20mA available)

Specification:

Sensor elements:
- resistance thermometer: Pt100 class B (higher sensor precision p.r.t page 12)
- thermocouple: NiCr-Ni Klasse 1

Available measuring ranges:
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
OPTION: any other measuring range against upcharge

Accuracy electronics: ±0.2% FS (Pt100), resp. ±0.2% ±0.5°C (NiCr-Ni)
Higher precision e.g. via optionally different transmitter GITT01, GKM, RT-FLEX)

Output signal: 4 - 20 mA (2-wire) - standard
optionally 0-1V, 0-2V, 0-5V, 0-10V (3 or 4 wire) available
(only possible for GTMU types 1..5)

Auxiliary energy: Vs = 12 ... 30 V DC (at 0-10V: Vs = 18 ... 30 V DC)
(for special types e.g. GTMU/GITT off 8...30V)

Reverse voltage protection: 50 V permanently

Allowable burden (for 4-20mA)**:** R_A [Ω] = Vs [V] - 12V / 0.02 A
(for special types e.g. GTMU/GITT p.r.t. refering page)

Allowable load (for 0-__Volt)**:** R_L > 3000Ω

Operating temperature electronics: 0 ... +70°C (-40...+70°C at .../GKM)

Temperature coefficient: 0.01 % / °C (Pt100), 0.05% / °C (NiCr-Ni)

Storage temperature: -20 ... +85 °C (-40...+85°C at .../GKM)

Housing: ABS (IP65)

Mounting: with holes for wall mounting (accessible after removal of cover)
Mounting distance: 70 x 50 mm (W x H)
Fixing screws: max.shaft Ø 4 mm

Mounting position: any

Electric connection: elbow plug acc. to DIN 43650 (IP65), max. cable cross section: 1.5 mm², cable diameter from 4.5 to 7 mm

Thread dimensions „G“: 1/2“ (standard) material V2A or V4A
G1/4“, G3/8“, G1/2“, M5, M6, M8, M10, M12 - Other threads upon request!

Sensor tube: „D“: 3 mm, 4 mm, 5 mm, 6 mm and 8 mm - material V4A

Collar tube: (for design-type 2 only) HL = specify desired length (V4A-tube)

Versions without transmitter:

GTU-2R-OMU as of
Pt100, 2,-/3- or 4-wire, Pt1000 upon request

GTMU-OMU design-type 1 as of

GTMU-OMU design-type 2 as of

GTMU-OMU design-type 3, 4 as of

Pt100, 2,-/3- or 4-wire, Pt1000 upon request, NiCr-Ni (not potential free).
Potential free - p.r.t options.

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).
OPTION: electrically insulated design-type available

Design-types:

Type 1: with threaded stem “G” for direct screw connection

Type 2: for extra high temperatures, threaded stem “G” at a distance from housing. HL = length of collar tube

Type 3: indoor / outdoor probe for direct wall mounting (encapsulation of electronics required for outdoor use).

Type 4: duct type probe with centrally mounted sensor tube arrangement with the shaft of device pointing downwards at a 90° angle.

Type 5: measuring transducer for Pt 100 or NiCr-Ni sensors already existing on site or for applications where sensor and housing need to be spaced (eg. due to extremely high ambient temperatures or to design reasons).

Sensor connection: (for design-type 5)
Pt 100: 2- or 3-wire connection possible
NiCr-Ni: 2-wire only
PG 7 screwed conduit entry for sensor cable (max. outer Ø 6.5 mm), connection by screw-type terminal on PC board (max. wire Ø 1.5 mm²).

Ordering information: at least necessary:
Type, sensor element, range, output signal and type specific sensor tube data: "FL" and "D" (type 1-4), "G" (type 1,2), "HL" (type 2).

Ordering examples: all data to be mentioned in any case!

GTMU, design-type 1, Pt100 DIN class B, 0 ... 100°C = 4-20mA, G = 1/2", FL = 100mm, D = 6 mm

GTMU, design-type 3, NiCr-Ni, electrically insulated, 0 ... 1200°C = 4-20mA, FL = 50 mm, D = 3 mm

GTMU, design-type 5, Pt100, -50 ... +150°C = 0-10V

Options - upcharges:

AV...: option: other output voltage upcharge:
(please state desired voltage - only for GTMU type 1-5)

MB...: option: any other meas. range upcharge:
(please state desired measuring range)
No upcharge for option -AV.., -MB if more than 10 pcs. are ordered

FL...: longer tube, each started further 100mm upcharge:

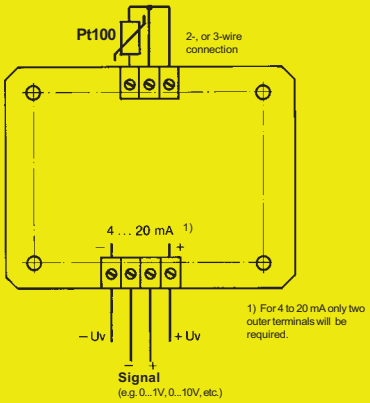
Option: **NiCr-Ni electrically insulated** upcharge:

LACK: option "encapsulated PC board" upcharge:
(for outdoor application, i.e. applications where condensation is possible)

VO: option: on-site display upcharge:
(for output signal 4-20mA, auxiliary energy Uv = 17 ... 30 V DC)

Please note: 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 88, 91, 92)

Temperature-measuring PCB for Pt100 or in snap-on housing



1) For 4 to 20 mA only two outer terminals will be required.

Type: GTP PCB

Type: 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 88, 92, 93.
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 0-1V, 0-2V, 0-5V, 0-10V (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] > 3000Ω
Operating temperature electronics: 0 ... +70 °C
Temperature coefficient: 0.05% / °C
Storage temperature: -20 ... +85 °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: PCB, 4-20mA = 0 ... 100°C, encapsulated PC board

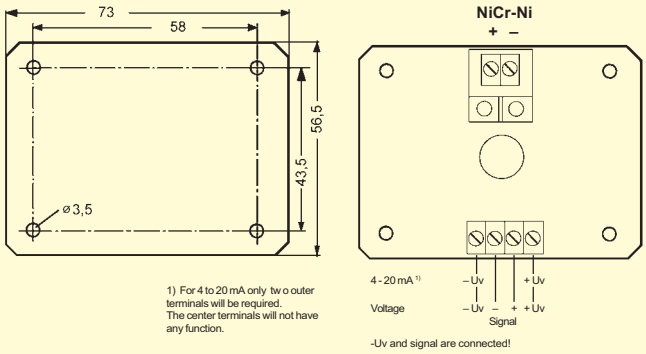
GTP -SG / AV010, MB: -50...+200°C, SSK: snap-on housing, 0-10V = -50 ... +200°C, screw-type/plug-in terminals

options - upcharges:

-AV010: option: output signal 0-10V
-AV...: option: other output signal
(please state desired voltage)
-MB: option: beliebiger 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

PC board for measuring transducer mounted in water-proof surface-type housing (IP65) p.r.t. type GTMU design-type 5 (page 72)

Temperature-measuring PCB for NiCr-Ni or in snap-on housing



1) For 4 to 20 mA only two outer terminals will be required. The center terminals will not have any function.

-Uv and signal are connected!

Type: GNTP PCB

Type: 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 14, 15, 90, 91)
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 0-1V, 0-2V, 0-5V, 0-10V (3- or 4-wire)
Auxiliary energy: Vs = 12 ... 30 V DC (at 0-10V: Vs = 18 ... 30 V DC)
Reverse voltage protection: 50 V permanently
Permissible impedance (at 4-20mA): R_A [Ω] = Uv [V] - 12V / 0.02A
Permissible load (at 0-__Volt): R_L [Ω] > 3000Ω
Operating temperature electronics: 0 ... +70 °C
Accuracy electronics: ±0.2% FS ±0.5°C
Temperature coefficient: 0.05% / °C
Storage temperature: -20 ... +85 °C
Relative atmopspheric 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):

GNTP / MB: 0...300°C, LACK: PCB, 4-20mA = 0 ... 300°C, encapsulated PCB

GNTP5015-SG / AV: 0-1V, SSK: snap-on housing, 0-1V = -50 ... +150°C, screw-type/plug-in terminals

options - upcharges:

-AV010: option: output signal 0-10V
-AV...: option: other output signal
(please state desired voltage)
-MB: option: beliebiger 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
-TSK: option: DIN type flat-pin jack free from 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 72)

Temperature-measuring transducer 4-20mA, Pt100, 3-wire

for head and rail case mounting

Panel-mounted-resistance thermometer with or without measuring transducer GKM..P

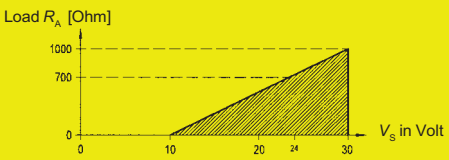
GKM..P-advantages:

- **low-price and compact for installation in DIN-connection head form B**
- **adjustable measuring range (from -50 to +400°C with only three basic types)**
- **high accuracy**
- **large ambient temperature range**
- **error message in case of sensor damage or sensor short-circuit**
- **functional warranty 5 years**
- **conforming to CE**

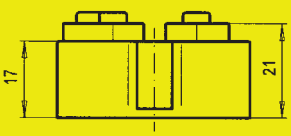
Specification: (GKM..P)

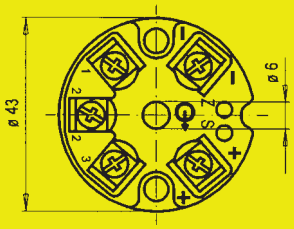
Measuring ranges: several values in the range from -50 to 400°C. Measuring range can be set by customer (or will be calibrated by our works, if desired). 3 design-types are available:
- GKM1P: -50...+50°C, 0...50°C, 0...100°C, 0...120°C, 0...150°C u. 0...200°C
- GKM2P: -50...+200°C, 0...200°C, 0...250°C, 0...300°C, 0...350°C u. 0...400°C
- GKM3P: -30...+30°C, -30...50°C, 0...60°C, 0...80°C, 0...100°C u. 0...120°C
Other ranges upon request.
Selection of measuring range: via soldering jumpers, fine-tuning by means of 2 potentiometers (zero point "Z" and span "SP")
Linearisation: linear to temperature acc. to DIN IEC 751
Meas. current: approx. 0,8 mA
Perm. resistance of connection cable: R_L = 30 Ohm overall resistance
Effect of sensor connection line: ±0,2 K / 10 Ohm (for 3-wire connection); for 2-wire connection: line resistance will be deemed as fault
Output signal: 4 - 20 mA
Auxiliary energy: V_s 10 … 30 V DC, permissible ripple factor 10%
Perm. load R_A: $R_A \leq (V_s - 10\,V) / 0{,}02\,A$ [R_A in Ohm, V_s in V]

Load diagram:

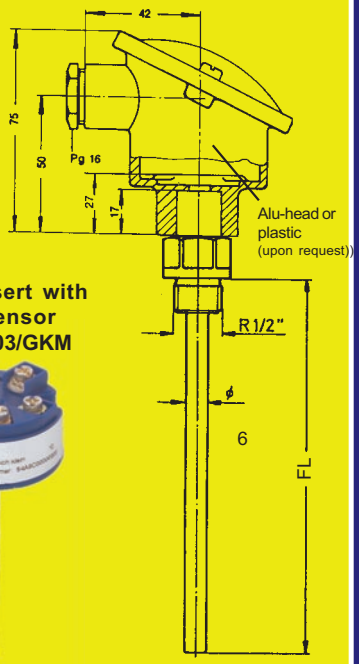


Linearity fault: ± 0,1 % of meas. span set
Temperature effect: ±0,01% / K or ±0,02 °C / K (Z); ±0,02 % / K (span)
Load effect: 0,05 % / 100 Ohm
Sensor damage: making contact < 3mA, or breaking contact >23.5mA if only one line is open
Sensor short-circuit: making contact < 3mA, or temperature meas. value if short-circuit occurs between lines 2 and 3 (equiv. to Pt100 in 2-wire connection circuit)
Electromagnetic compatibility (EMC): conforming to CE acc. to DIN EN 50082-2
Electric protection: no polarity at output
Operating and storage temperature: -40 … +85°C
Relative humidity: DIN IEC 68 2-30 var.2 0... 95 % r.h., (non-condensing)
Vibration: DIN IEC 68 2-6 10…2000 Hz 5 g
Shock: DIN IEC 68 2-27 g_n = 15
Housing: polyamide, glass fibre reinforced, IP50
Connection terminal: IP00, connection cross section 0,14 ... 1,5 mm²
Weight: approx. 30 g **Warranty:** functional warranty 5 years
Dimensions:





GTF103/GKM..P



GKM-insert with Pt100-sensor of GTF103/GKM

GKM1P (for customer setting)
(small measuring ranges: from -50 to +200°C)

GKM2P (for customer setting)
(large measuring ranges: from -50 to +400°C)

GKM3P (for customer setting)
(HKL measuring ranges: from -30 to +120°C)

GKM..P / WE (set by our works)
(please specify measuring range desired on your order!)

Rail adapter upcharge:
(for snap-on to top-hat rail

GTF103 / GKM (p.r.t. page 92)
Panel-mounted resistance thermometer
Pt100 cpl. with measuring transducer GKM..P - measuring transducer and Pt100 can be taken out in form of an insert (price valid for standard length 100mm and temperature range as to customer's specification between -50 and +400°C (depending on the measuring ranges possible for the GKM..P devices))

Special designs upon request - please contact us!

Ordering data required if device is to be set at our works:
GKM1P (0 to 200°C) or GKM2P (0 to 400°C) or GKM3P (-30 to +50°C).

Please note that the GKM..P allows a limited number of ranges only; 4-20 mA is standard, alterations not possible.
(Any range that has not been mentioned here upon request!)

For any range or output please refer to our types GTP or GTMU. Please contact us.

Programmable, electrically isolated universal transmitter GITT01

GITT01 *1

GITT01 - EX *1

(Ex-protection: EEx ia IIC T6)

*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...20mA = 0 - 300°C)

- **universally programmable for**
  - **resistance thermometers**
  - **thermocouples**
  - **resistance sensor**
  - **voltage sensor**
- **electrically isolated**
- **output linear to temperature**
- **analog output: 4 … 20 mA, 2-wire technology**
- **high accuracy for the entire ambient temperature range (-40...85°C)**
- **available with Ⓔx - protection**

  ATEX II 1 G EEx ia IIC T4 / T5 / T6
- **error messages in case of sensor damage or short-circuit, settings acc. to NAMUR NE43**
- **can be configurated in a few seconds via PC - configuration can be carried out during measuring**
- **CE - rating**

Accessories:

Snap-on mounting
(rail adapter for snap-on to top-hat rail)

Programming tool for GITT01
The programming tool consists of:
- configurations software (3,5 " disk, multilingual, online help)
- connection cable, RS 232-C (approx. 1m long, 9-pin Dsub-plug)
- operating manual

Specification:

Input signal: can be universally programmed to

		max. meas. range	*min. meas. span*
- Resistance thermometer:			
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 ... +180 °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,	W5Rh-W26Re (ASTME 988)	0 ... +2320 °C	500 K
Type D,	W3Rh-W25Re (ASTME 988)	0 ... +2495 °C	500 K
Type E,	NiCr-CuNi	-200 ... +915 °C	50 K
Type J,	Fe-CuNi	-200 ... +1200 °C	50 K
Type K,	NiCr-Ni	-200 ... +1372 °C	50 K
Type L,	Fe-CuNi	-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)	-200 ... + 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

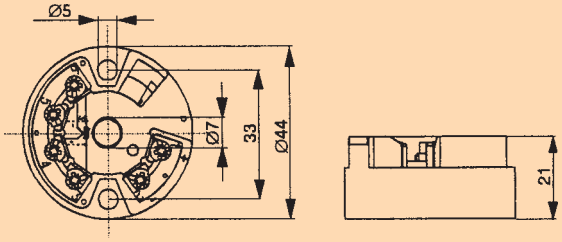
Resistance thermometer:

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): Û = 3.75 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 60s, configurable
Switch-on delay: approx. 4s
Response time: 0.5 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
Ex-approved: ATEX II 1 G EEx ia IIC T4 / T5 / T6
Operating temperature: -40 … +85 °C
Climate class: acc. to EN 60654-1, cl. C; condensation permissible
Vibration strength: 4g / 2...150Hz 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
Dimensions: Ø 44 x 21 mm



Digital Temperature Transmitter

electrically isolated, universally programmable, head mounting or rail case

T12 head mounting

T12 - SG rail case

GTF103 / T12

T12 cpl. with alu head (G½" thread and probe tube 6mm Ø of V4A, FL ≤ 100mm) - *other probe lengths, etc. against upcharge*

Upcharge for Ex - protection upon request

General:

- **universally programmable**
- **Output: 4 … 20 mA, invertable, 2-wire design**
- **Signal can be configurated for sensor damage and sensor short circuit**
- **Optional: Ex - protection available**
  EEx ia IIC T4 / T5 / T6 **EEx ib IIC T4 / T5 / T6**
- **Electrically isolated**
- **Increased ambient temperature, moisture condensation permissible**

Specification:

Input signal: universally programmable for
- RTDs: Pt100, Ni100
- thermocouples: Typ T, E, J, L, K, N, U, R, S, B, W3, W5
- resistance sensor: 0 ... 5 kOhm
- mV sensor: -10 ... 800 mV
Measuring range: -200 ... +2300°C, depending on input signal
Output signal: 4...20mA, 2-wire
Auxiliary energy: V_S 9 … 36 V DC
Perm. load R_A: $R_A \leq (V_S - 9\,V) / 0{,}021\,A$ [R_A in Ohm, V_S in V]
Operating ans storage temperature: -40 … +85 °C (T12)
-20 … +70 °C (T12-SG)
Relative humidity: T12: 0...100 % r. h., condensing permissible
T12-SG: 0... 90 % r.h., (no condensing)
Electromagnetic compatibility (EMC):
conforming to CE acc. to DIN EN 50081-1 and DIN EN 50082-2
Electric connection: screw-type terminal, cross section of terminal connections max.1,5 mm² (T12) resp. 0.25 ... 2.5 mm² (T12-SG)
IP rating: Housing: IP66, connection terminals: IP00

if interested - ask for detailed specification brochure

Accessories:

Configuration Set
The configuration set contains:
- configuration software (3,5 " disk, multilingual, online help)
- connection cable, RS 232-C (9-pin sub-D-plug)
- plug adapter (25-pin to 9-pin sub-D-plug)
- Programming device (communication - interface) incl. 9 V battery
- connection cable: Programming device <=> T12

Freely programmable Pt100-head transmitter

RT-FLEX
(transmitter for customer programming)

RT-FLEX /WE *1
(transmitter set by our works)

RT-FLEX - SG /WE *1
(transmitter set by our works and mounted in snap-on rail housing (width 22.5)

***1 = please specify design-type desired on your order.**
e.g. RT-FLEX, Pt100 3-wire, 4...20mA = 0 - 300°C

General: The programmable 4-20mA Pt100-measuring transducer RT-FLEX is normally mounted in the connection head of a temperature sensor. A selection between various resistance sensors allows connection in 2-, 3- and in 4-wire technology.

Specification:

Measuring range: -200 ... +850°C, universally programmable
Measurements to start at: -200 ... +825°C
Meas. span: 25 to1050 K
Resolution: 14 bit
Smallest step that can be made: 0.1 °C
Sensor connection: 2-, 3- or 4-wire connection
Meas. current: < 0,3 mA
Sensor monitoring: monitoring for sensor damage and short-circuit
Meas. cycle: < 700 ms
Linearisation: linear to temperature
Accuracy: ±0.25°C or ±0.1% of meas. span
Temperature effect: < ±0.01% / 10K
Analog output: 4…20 mA, 2-wire technology
Auxiliary energy: V_s 8 … 35 V DC (max. ripple factor: 3Vss @ 50/60Hz)
Perm. load 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
Damping: adjustable from 0 to 30 s
Output limits: programable, 3.5 mA, 23 mA
Signal for sensor damage: programable, 3.5mA or 23mA
Operating and storage temperature: -40 … +85 °C
Relative humidity: 0... 98 % r.h., (non condensing)
Electromagnetic compatibility (EMC):
conforming to CE acc. to DIN EN 50081-2 and DIN EN 50082-2
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. 100 g

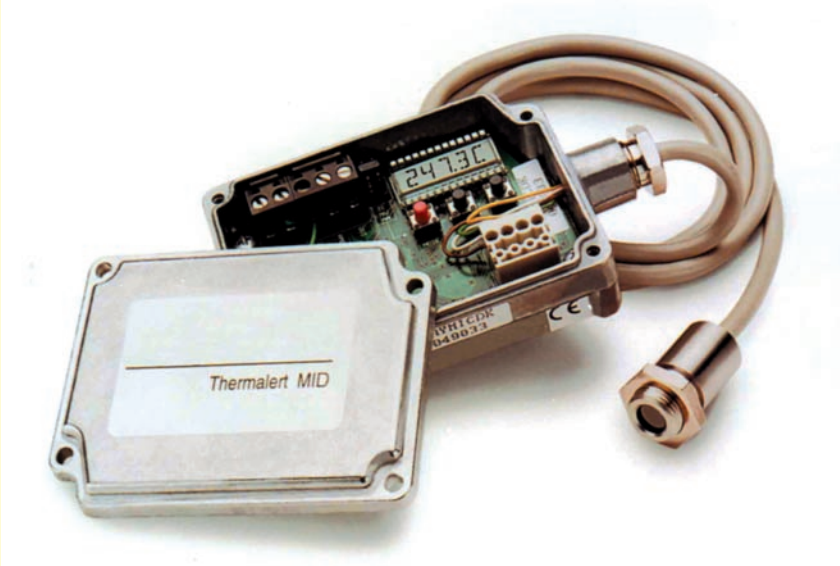
Accessories:

Programming tool für RT-FLEX
The configuration set contains:
- Configuration software (3,5 " disk, DOS and Windows, multilingual)
- connection cable, RS 232-C (9-pin sub-D-plug)
- plug adapter (25-pin to 9-pin sub-D-plug)
- battery plug, connection cable, operating manual

Infrared measuring transducer

Application:

- plastic manufacturing
- food processing
- temperature profile measuring during manufacturing processes
- temperature measurements at moving parts
- surface temperature measurements etc.
- conforming CE to EN 50081-1 and EN 50082-1



MID 105 is one of the smallest infrared sensors all over the world!

The MID miniature sensor consists of a miniature measuring transducer and a separate electronic. The sensor is that small, that it can be mounted practically anywhere. Nevertheless it has the same parameters like much larger systems. The electronic of the MID makes data acquistion functions possible, which aren't supported by other products oft this price class. Such as adjustable emmission and transmission factor, choice of output signal (0/4...20mA, 0...5V, thermocouple type K or J), adjustable measuring range, max/min value storage and mean value. All functions are setable by means of the 5 digit LCD panel.
Many accessories, such as air blow and air-cooled housing, 90° deviation mirror and mounting VEE allow for a use in a wide variety of applications, from plastic manufacturing to food processing.
The response time of the device is as quick as or even quicker than in many high-end systems (150 ms!)

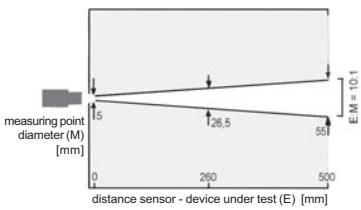
MID105

(electronic box incl. measuring hed with 1m cable)

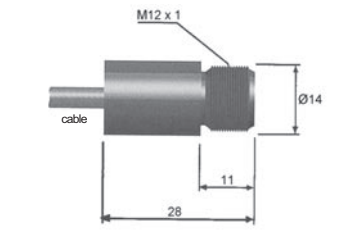
Specification:

Measuring ranges: -40 ... +600°C (-25 ... 600°C with type J thermocouple output)
Output signals: scaleable 4...20mA, 0...20mA, 0...5V, thermocouple type K or J
Accuracy: ±1% or ±1°C (higher value applicable)
Repeat accuracy: ±0.5% or ±0.5°C
Optic resolution: 10 : 1 (measuring point diameter / distance)
Spectral sensitivity: 8 ... 14 µm
Temperature resolution: 0.1°C
Response time (t_{95}): 150 ms
Emission-, transmission factor: adjustable from 0.100 to 1.1100
Supply voltage: 11 ... 26 V DC, 100 mA (switch on current), typ. 40mA
Signal processing: maximum/minimum value maintenance, averaging, averaging time up to 998s
Output resistance (TC): 50 Ohm
Min. load impedance (mV): 100 KOhm
Protection rating: IP65 (IEC529, NEMA 4)
Ambient temperature:
Electronic box: 0 ... +50°C
Measuring head: 0 ... +85°C (with air cooling: -18 ... +200°C)
Storage temperature: -18 ... +85°C
Relative humidity: 10 ... 95% r.h., non condensing
Measuring head: made of stainless steel, Ø 14 mm, length 28 mm thread M12 x 1, 1m of cable (3m and 15 m of cable upon request) Weight approx. 50g, IP65
Electronic box: made from zinc casting, 80 x 60 x 25 mm, weight approx. 270g, IP65

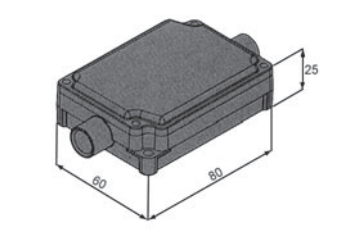
Optical resolution



Measuring head



Electronic box



Humidity meas. transducer, humidity/temperature meas. transducer

Type: GRHU

Humidity measuring transducer

Type: GHTU

Humidity/temperature measuring transducer

General:
The measuring transducer GHTU is equipped with 2 separate measuring transducers for humidity and temperature.

Specification : (humidity: GRHU... or GHTU...)

Humidity sensor: capacitive thin-film polymer sensor
Measuring range humidity: 0 to 100% relative humidity - sensor maybe subjected to condensing, rec. range: 30 to 80% r.h. (for standard sensor). For higher or lower range choose option “high-humidity sensor”, recommended range for high-humidity sensor: 5 to 98% r.h.
(When ordering option high-humidity sensor, please make sure to specify main measuring range: eg 0 to 40% r.h. or 60 to 95% r.h. etc.)
Other measuring ranges available (option) against upcharge.
Accuracy:
Linearity: standard sensor: ±2% from 30 ... 80 % r.h.
high-humidity sensor: ±2% from 11 ... 90 % r.h.
Hysteresis: standard sensor: ±1.5% r.F.
high humidity sensor: ±1% r.F.

Specification: (temperature: for GHTU only...)

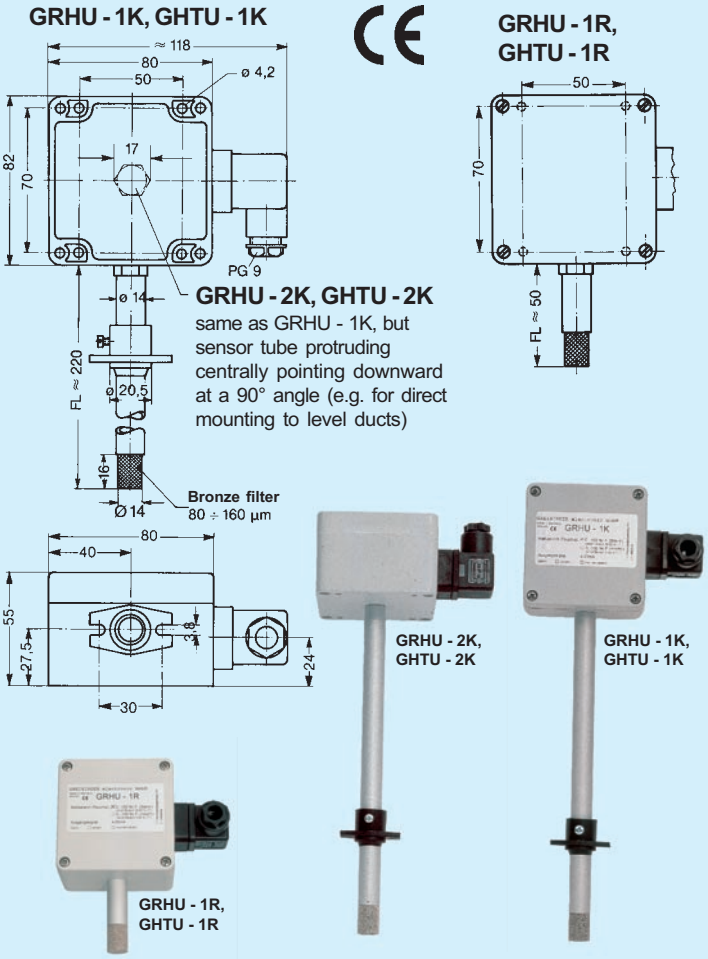
Temperature sensor: platinum resistance thermometer Pt100
Measuring range temperature: 0 ... 70°C (standard)
OPTION: -30 ... +40°C, others upon request
Accuracy temperature: acc to DIN 751 DIN cl. B ±0.3°C at 0°C (standard tolerances) - other accuracies available optionally

Specification: (GRHU... and GHTU...)

Output signal: 4-20mA (2-wire) or 2 * 4-20mA (2-wire)
optionally available 0-1V and 0-10V (3- or 4 wire)
(other output signals upon request)
Auxiliary energy: 12 ... 30 V DC or 18 ... 30 V DC for output: 0-10V
Reverse voltage protection: 50V permanently
Permissible impedance (at 4-20mA)**:** R_A [Ω] = Vs [V] - 12V / 0.02 A
Permissible load (at 0-1(10)V)**:** R_L [Ω] > 3000Ω
Working temperature electronics: 0 ... +70 °C
Working temperature sensors: 0 ... +70 °C (standard humidity sensor)
-30 ... +110°C (standard humidity sensor with OPTION high temperature)
-30 ... +140°C (high humidity sensor with OPTION high temperature)
Storage temperature: -20 ... +70 °C
Relative humidity (electronics)**:** 0 ... 98 % r.h. (non- condensing)
If there is a risk of condensation due to temperature changes, please use our encapsulated or lacquered types (optionally available).
For outdoor application: please refer to heat absorption hat page 42
Housing: ABS (IP65)
Mounting position: sensor tube vertically pointing downwards to horizontal
Sensor tube: anodised aluminium, Ø 14 mm, with screw-type bronze filter 80 to 160 µm, nickel plated
Sensor length: 50 mm or 220 mm. (standard) - other length available optionally! Available sensor length "FL": 300 mm, 400 mm, 500 mm.
If device is to be operated at temperatures outside the range specified (0 to 70° C) make sure that electronics is not subjected to temperatures higher or lower than that (eg use extra long tube to go through wall into cooling chamber, climatic chamber, open air etc.).
Mounting: with mounting holes for wall mounting (accessible after cover has been removed) or by means of plastic tube clamps, additional wall support for direct mounting to channels, etc.
Mounting distance for wall mounting: 70 x 50 mm (W x H)
Fixing screws for wall mounting: max. shaft-Ø 4 mm
Electric connection: elbow-type plug acc. to DIN 43650 (IP65), max. wire cross section: 1.5 mm², wire Ø from 4.5 to 7 mm

For outdoor application:

Make sure to use special humidity measuring transducers with heat absorption hats. (Head absorption hat p.r.t. page 42)
Make sure to use special humidity/temperature measuring transducer with heat absorption hats.



Prices (standard types):

GRHU - 1R (sensor tube at the side, FL = 50mm)
GRHU - 1K (sensor tube at the side, FL = 220mm)
GRHU - 2K (sensor tube pointing downwards, FL = 220mm)
GHTU - 1R (sensor tube at the side, FL = 50mm)
GHTU - 1K (sensor tube at the side, FL = 220mm)
GHTU - 2K (sensor tube pointing downwards, FL = 220mm)

Prices (options): (prices stated are net prices - no quantity discount possible)

-HO: High-humidity sensor upcharge:
(for humidity measuring < 30 % r.h. and > 80 % r.h.)
-HT: high temperature upcharge:
(-30...+110°C, or -30...+140°C for high humidity sensor)
-LACK: Encapsulated PC board upcharge:
-FL300, FL400, FL500: upcharge:
(**Extra long sensor tube** - no interim lengths possible)
-AV01: output signal 0-1V for **GRHU** upcharge:
-AV010: output signal 0-10V for **GRHU** upcharge:
-MB...: Any measuring range for **GRHU** upcharge:
(please state desired measuring range)
-AV01: output signal 0-1V for **GHTU** upcharge:
-AV010: output signal 0-10V for **GHTU** upcharge:
-MB...: Any measuring range for **GHTU** upcharge:
(please state desired measuring range)
-VO: on-site display for humidity or upcharge:
temperature (for output signal 4-20mA, auxiliary energy Uv = 17 ... 30 V DC)
-SHUT: Heat absorption hat upcharge:

Order code (examples):

GRHU-1R / MB 20-90%: GRHU-1R, 4-20mA = 20-90%
GRHU-2K / AV01, FL300: GRHU-2K, 0-10V = 0-100%, FL = 300 mm
GHTU-1K / HO, HT, LACK: GHTU-1K, 4-20mA, high temperature and high humidity design-type, encapsulated PC board

Passive Signal Isolator

without auxiliary supply (taps from measuring signal loop)

for the galvanic isolation of 0/4...20mA current loops

CLI22S 1 channel

CLI22D 2 channel

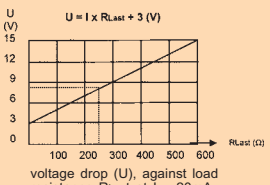
Description:

The CLI22S is a current driven (passive) signal isolator. It can be integrated in curent loops of up to 50mA. The output current follows correspondingly to the input current, i.e it has a transmission factor of 1:1.
The CLI22D is the two channel version. Both channels are completely independent from each other.
The high isolation voltage of up to 4000 VAC guarantees a reliable galvanic isolation.
The loop driven isolators are efficient tools to isolate connected current loops or to get rid of earth loops.
Furthermore the highly effective isolation protects more expensive equipment excellently against voltage peeks induced for example by lightnings, switching of large inductive loads and so on.

Specification:

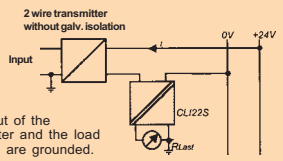
Input current: 0/4...20 mA, max. 50 mA
Voltage load: I x R_{Load} + 3 V (p.r.t diagram)
Max. admissible voltage load: 15V
Output current: 0/4...20 mA, max. 50 mA (output = input)
Admissible load: 600Ω at 20 mA, 240Ω at 50 mA
Auxiliary energy: not required, device taps from loop current.
Accuracy: 0.1 % FS at R_{Last} = 250 Ω
Long term stability: 0.1% per year (typ.)
Isolation voltage: input / output : 4000 VAC, 1 min
Response time: 10...90 % 0.1 s
Operating temperature: -25...+70 °C
Storage temperature: -40...+70 °C
Relative humidity: 0...95 % r.h., non condensing
Housing: ABS, 90 x 28 x 60 mm (L x W x D)
Mounting: hat rail mounting acc. to DIN EN 50022, 35mm
Electrical connection: via screw type terminals, max. cable diameter 2.5 mm² , AWG14
IP rating: housing: IP40, connection terminals: IP20
Weight: 100g (CLI22S); 150g (CLI22D)

Voltage load:



voltage drop (U), against load resistance R_{Last} at I = 20mA

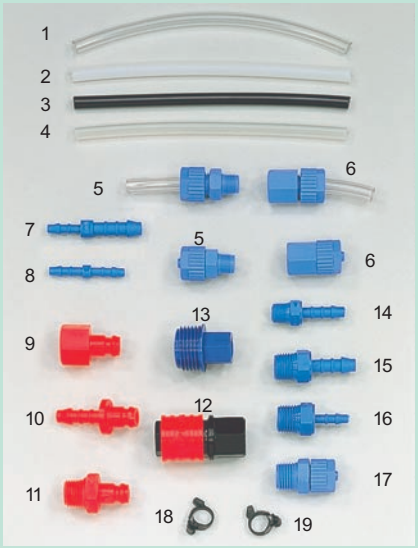
Example application:



The input of the transmitter and the load (display) are grounded.

When connecting by means of a CLI22 no ground current can flow.

Note: Do not connect the zero potential line of the power supply to ground.



TUBES, TUBE CLIPS, ADAPTERS, etc.

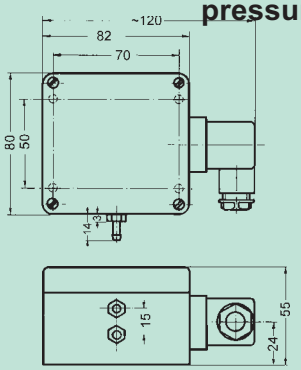
for GMH31xx, GDH devices and pressure measuring transducers

GDZ-01 = PVC-tube (5bar)
6/4 (6mm outside-Ø, 4mm inside-Ø)
GDZ-02 = PE (Polyethylene) (10bar)
6/4 (6 outside-Ø, 4 inside-Ø)
GDZ-03 = PU (Polyurethane) (9bar)
6/4 (6 outside-Ø, 4 inside-Ø)
GDZ-04 = PAW (Polyamide) (25bar)
6/4 (6 outside-Ø, 4 inside-Ø)
GDZ-05 = Screw-type glanding
for 6/4 tube with outer thread R1/8"
GDZ-06 = Increaser glanding
for 6/4 tube with internal thread R1/8"
GDZ-07 = Double reducer
Tube with 6 inside-Ø to 6/4 tube
GDZ-08 = Double adapter
6/4 to 6/4 tube
GDZ-09 = Coupling adapter made of brass with internal thread R1/4" (suitable for pos. 12)
GDZ-10 = Coupling adapter made of brass with tube with 6mm inside-Ø (suitable for pos. 12)
GDZ-11 = Coupling adapter made of brass with outer thread R1/4" (suitable for pos. 12)
GDZ-12 = Coupler socket made of brass (single-hand use) with internal thread R1/4"
GDZ-13 = Increaser/reducer with G1/2" outer thread and G1/8" internal thread
GDZ-14 = Reducer for 6/4 tube with external thread R1/8"
GDZ-15 = Reducer for tube with 6 mm inside-Ø with external thread R1/8"
GDZ-16 = Reducer for 6/4 tube with external thread R1/4"
GDZ-17 = Reducer glanding for 6/4 tube with external thread R1/4"
GDZ-18 = Tube clamp for 6/4 tube
GDZ-19 = Tube clamp for 8/6 tube (8mm outer-Ø and 6mm inside-Ø)
GDZ-20 = Screw-type increaser/reducer for 6/4 tube with external thread R1/4" (no picture)
GDZ-21 = T-piece for tubes 6/4 (no picture)

Other accessories upon request.

Pressure measuring transducer

for absolute pressure, over/under pressure and pressure difference



EN50081-1 and EN50082-2
for unrestricted use in
residential and industrial areas

Type: GMUD

Application: for air, non-corrosive, non oxidising and non-reducing gases and liquids. Not suitable for water! Suitable for controlling, measuring and monitoring on the climatic/ventilation, environmental and medical technology sector. For use in water an air cushion or hydrophobic filter is required - please contact us.

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 compensation 0 to 70°C

Measuring ranges: (standard)

Absolute pressure:	0 to 1100 mbar (e.g. barometric air pressure)
	0 to 2 bar
	0 to 7 bar
Relative pressure:	0 to 5 mbar (500 Pa)
	0 to 10 mbar (1000 Pa)
	0 to 16 mbar (1600 Pa)
	0 to 70 mbar (7000 Pa)
	0 to 2 bar
	0 to 10 bar

OPTION: any intermediate values upon request

Overload and bursting pressure:

Meas. range:	5, 10 mbar	20 mbar	70 mbar	1100 mbar	2 bar	7, 10 bar
Overload:	250 mbar	350 mbar	1.3 bar	2 bar	4 bar	13.5 bar

Typ. accuracies:
±0.2% FS (hysteresis and linearity), ±0.4% FS (temperature effect 0 - 50°C) at meas. range ≤ 16mbar: ±0.6% FS (temperature effect 0 to 50°C)
OPTION: double accuracy for meas. range >25mbar - against upcharge

Output signal: 4 - 20 mA (0-10V against upcharge)

Auxiliary energy: Vs = 12 ... 30 V DC (at 0-10V: Vs = 18 ... 30 V DC)

Permissible impedance (at 4-20mA): R_A [Ω] = Vs [V] - 12V / 0.02A

Permissible load (at 0-__Volt): R_L [Ω] > 3000Ω

Operating temperature: 0 ... +70 °C

Storage temperature: -45 ... +85 °C

Pressure connection: 2 metal connection pieces (nickel plated) for plastic tube 6 x 4 mm (4 mm inner diameter)

Mounting position: any position (small ranges up to 10 mbar depending on position)

Housing: ABS (IP65)

Fixing: by means of fixing holes for wall mounting (accessible after cover has been removed)

Mounting distance: 70 x 50 mm (H x W)

Fixing screws: max. shaft Ø 4 mm

Electric connection: elbow-type plug conforming to DIN 43650 (IP65) max. wire cross section 1.5 mm², wire/cable Ø from 4.5 mm to max. 7 mm

Prices options:

High-precission pressure range 1 to 25 mbar

Other standard pressure ranges

AV010: option **output signal 0-10V**

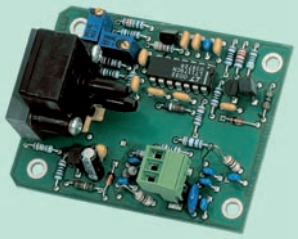
MB...: option **any measuring range**
(please state desired measuring range)

LACK: option **"encapsulated PC board"**
(for outdoor application)

DSG: option **double sensor accuracy**
(not possible for high-precision range!)

VO: option **on-site display**
(for output signal 4-20mA, auxiliary energy Uv = 17 ... 30 V DC)

2-wire pressure measuring transducer 4...20mA



Type: GMDP

Application: for air, non-corrosive, non oxidising and non-reducing gases and liquids. Not suitable for water! Suitable for controlling, measuring and monitoring on the climatic/ventilation, environmental and medical technology sector.

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 compensation 0 to 70°C

Measuring ranges: (standard)

Absolute pressure:	0 to 1100 mbar
	0 to 2 bar
	0 to 7 bar
Relative pressure:	0 to 70 mbar
	0 to 2 bar
	0 to 10 bar

OPTION: any intermediate values (under pressure also possible) against upcharge available upon request: e.g. ±1bar, 0 bis 350mbar, 0 to 10mbar, etc.

Overload and bursting pressure:

Meas. range:	70 mbar	1100 mbar	2 bar	7, 10 bar
Overload:	1.3 bar	2 bar	4 bar	13.5 bar

Sensor accuracy (typ. values):
±0.2% FS (hyst. and linearity), ±0.4% FS (temperature effect from 0 to 50°C)
OPTION: double accuracy - against upcharge

Output signal: 4 - 20 mA

Auxiliary energy: 12 ... 35 V DC

Permissible impedance: R_A [Ω] = Uv [V] - 12V / 0.02 A

Operating temperature: 0 ... +70 °C

Storage temperature: -45 ... +85 °C

Relative humidity: 0 ... 80 % r.h. (non-condensing)

Pressure connection: 2 plastic connection pieces for plastic tube 6 x 4 mm (4 mm inner diameter)

Mounting position: any position (small ranges up to 10 mbar depending on position)

Design-type: electronic PC board cpl. with sensor, 56 x 70 x 33 mm (BxHxT)

Mounting: 4 holes, 3.5 mm Ø each
Mounting distance: 43,5 x 58 mm (W x H)

Electric connection: screw-type/plug-in terminal

Miscellaneous: potentiometer zero point and scale

Order code:

GMDP 0...1100 mbar abs. / DSG:
GMDP, 4-20mA = 0...1100 mbar abs., double sensor accuracy

GMDP -1.. 10 bar rel. / AV010, LACK:
GMDP, 0-10V = -1 to 10 bar rel., encapsulated PC board

Prices, options:

Standard pressure ranges

High-precision pressure range (1 to 25 mbar)

AV010: option **output signal 0-10V**

MB...: option **any measuring range**
(please state desired measuring range)

LACK: option **"encapsulated PC board"**

DSG: option **double sensor accuracy**
(not possible for high-precision range!)

For suitable tubes, accessories p.r.t. page 79

UniTrans - the Universal Transmitter for various applications

- **Accuracy 0,15 %**
- **scaleable measuring ranges via Turn down of up to 1 : 20**
- **limits of measuring range from 0 … 20 mbar up to 0 … 1000 bar**
- **wetted parts made of stainless steel**
- **medium temperature from -30°C up to +105°C**
- **ingress protection IP 65, optionally IP 67**
- **optionally: food- / pharmaceutical version (acc. to EHEDG)**
- **various process connections available**
- **output signal 4 ... 20 mA, two-wire**

Type: UT-10
(Pressure measuring transducer with display)

Type: UT-11
(Pressure measuring transducer with display, flush diaphragm)

Type: UT-11E
(Pressure measuring transducer with display, flush diaphragm acc. to EHEDG)

Description:

With its maximal Turn down of 1 : 20 the **UniTrans** even adapts to applications with large changes in measuring range (e.g. a 100 bar transmitter can be turned down to 5 bar). Due to its internal digital signal processing the **UniTrans** has a very good measuring accuracy.

The display can be adjusted mechanically and set electronically, two features which guarantee an optimal readout and a multifunction display. The display can be rotated in steps of 90°. Bargraph and trend are displayed permanently.
The parameters like user language, units, zero point, span, inverted signal etc. can be easily set via the self-explaining menu. As user language, German, English, French, Spanish, or Italian can be selected.
The transmitter is delivered with the display mounted to the front. To be read from above, the display position can be easily changed.
All common units can be displayed. Additional text (e.g. min. / max. values, or temperature at the sensor) can be set in two extra lines.
The display has a high contrast and can therefore be very easily read. An unwanted tampering of the transmitter is avoided by covered setting keys.

The **UniTrans** also offers the possibility of a tank linearisation. This is achieved by assigning the non-linear relation between filling level and amount (e.g. of a spherical tank) to the 4 ... 20 mA signal via a value table. Here up to 32 holding points can be defined.

Design
All wetted parts are made of stainless steel and the measuring cell is completely welded. In contrast to ceramic measuring cells there are no sealing elements to restrict the choice of measuring media. The casing is made of highly resistive, fiberglass-enforced plastic (PBT) and has an ingress protection of IP 65 (optionally IP 67).

The **UniTrans** needs a power supply of 12 ... 36 V and has an output signal of 4 ... 20 mA, two-wire.

Options - upcharges:

Ingress protection = IP67
Absolute pressure
Pressure diaphragm = Hastelloy C4 (for UT-11 and UT-11E)
O-ring = viton or EPDM (for UT-11 and UT-11E)
Pressure connection G1 1/2 comp with ISO228 (for UT-11)
device without display

Specification:

Meas. ranges: 0.4 1.6 6 16 40 100 250 600 1000
Overpressure limit: 2 10 35 80 80 200 500 1200 1500
Burst pressure: 2 10 35 80 400 800 1200 2400 3000
Pressure reference: relative pressure (optionally absolute pressure up to 16 bar available)
Output signal: 4-20mA, 2-wire
Auxiliary energy: 12...36VDC
Permissible impedance: R_A [Ω] = Uv [V] - 12V / 0.023 A
Response time: $t_{90} \leq 10$ ms
Damping: 0 ... 40 s (adjustable)
Accuracy: (linearity, including hysteresis and repeatability)
< 0.10 % FS (≥ 40 bar); < 0.15 % FS (< 40bar)
Hysteresis: < 0.04 % FS
Repeatability: < 0.05 % FS
1-year stability: < 0,1 % FS (under reference conditions)
Behaviour with Turn down:
Turn down of up to 1 : 5: no change of accuracy
Turn down 1 : 5 to 1 : 20: the accuracy must be multiplied by the factor (Turn down / 5)
(calculation example for TD = 1 : 15, Accuracy = 0.1 x (15 / 5) = 0.3)
Medium temperature: -30 ... +105 °C
Ambient temperature: -20 ... +70 °C
Storage temperature: -35 ... +80 °C
Compensated temp. range: -20 ... +80 °C
TK in the compensated range: ≤ 0.01 % FS / K (zero point)
≤ 0.01 % FS / K (span)
Pressure connection:
UT-10: G 1/2 B
UT-11: G 1 B, flush diaphragm with O-ring (0.4 to 1.6 bar)
G 1/2 B, flush diaphragm with O-ring (6 to 600 bar)
G 1 1/2, flush diaphragm comp. with ISO228 (0.4 to 16 bar)
UT-11E: G 1, flush diaphragm with O-ring (0.4 to 16 bar)
Materials: casing: highly resistive, fiberglass-enforced plastic (PBT)
UT-10 press. diaphragm: stainless steel 1.4571 and 1.4542
UT-11 press. diaphragm: st. steel 1.4571 (opt. Hastelloy C4)
UT-11 O-ring: NBR (optionally: Viton or EPDM)
Ingress protection: IP65 (optionally: IP67)
Electric connection: locking plug M 20 x 1.5 with internal clamping block for cable diameters of 7 up to 13 mm, wire diameters up to 2.5 mm².
Electromagnetic compatibility (EMC): CE - conformity acc. to DIN EN 50081-1, DIN EN 50081-2 and DIN EN 50082-2
Electrical protection: cross-wiring, overvoltage and short circuit protection
Dimensions: 86 x 111 x 130 mm (without pressure connection)
Weight: approx. 0.7 kg

Water level / well probe
Tank contents meas. probe

Type: GBS 01

Application: permanent fill level measuring and remote transmission of contents respectively liquid level of oil tanks, water or liquid tanks, deep wells, rivers, lakes, water collection sumps in garbage pits etc.

Description: piezoresistive pressure sensor with temperature compensation. Welded, non-corrosive design with integral and additionally sealed water-proof connecting cable.
Pressure compensation achieved via tube within the cable. Please specify cable length (up to max. of 500 m) when ordering.

Specification:

Meas. ranges: 0.1 bar (100mbar) to 25 bar = 1 to 250m water column
Available ranges: 0.1, 0.25, 0.4, 0.5, 0.6, 1.0, 1.6, 2.5, 4.0, 6.0, 10.0, 16.0 and 25.0 bar

Overload and bursting pressure:

Meas. range (bar):	0.1, 0.25, 0.4, 0.6	1 to 600 bar	1000
Overload (bar):	1.2	2 x meas. range	1500

Output signal: 4-20mA (others upon request - upcharge)
Permissible impedance: R_A [Ω] = Vs [V] - 10V / 0.02 A
Auxiliary energy: 10...30VDC (others upon request)
Accuracy: linearity: typ ±0.2 % FS (max. ±0.5 %)
stability: typ ±0.1 % FS (max. ±0.2 %)
Operating temperature: 0 ... +50 °C [1)]
Temperature coefficient: ~0.02 % FS / K
Housing: chromium-nickel alloy 1.4301 or 1.4571. Male thread G 1/2" accessible after removal of plastic protection cap.
Probe dimensions: Ø 27 mm, length of metal body: approx. 115 mm, cable Ø approx. 7.5 mm
Electric connection: fixed integral cable (PU=polyurethane), standard length 10 m (suitable for fuel oil).
Extra long cable against upcharge (please specify when ordering)
Glass-fibre screen protects cable against tearing.

Special design-types (upcharge):

Upcharge for **extra long cable** upcharge per m

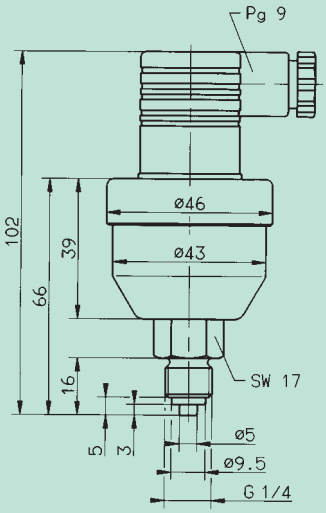
[1)] applications with higher temperature of media (+85°C) with 10m teflon cable upcharge:

Non-standard **output signal**: e.g. 0-10V upcharge:

Integrated **lightning protection**: **upon request**

Ex-protection upon request!

Pressure measuring transducer



Type: GAH 40

General application: measuring of over/underpressure for pneumatics, hydraulics, cooling and hydro technology, compressors etc.

Specification:

Measuring principle: thick-film stainless steel sensor

Meas. ranges:	-1 to 1.5 bar	0 to 2.5 bar
	-1 to 3 bar	0 to 4 bar
	-1 to 5 bar	0 to 6 bar
	-1 to 9 bar	0 to10 bar
	-1 to 15 bar	0 to 16 bar
		0 to 25 bar

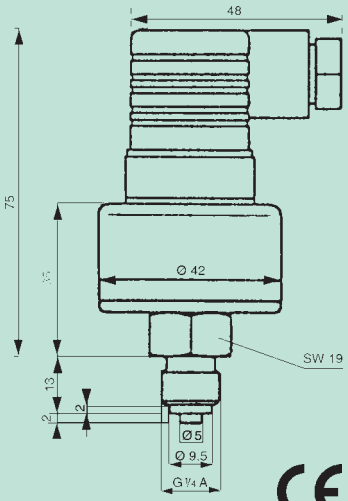
For higher or additional values please refer to GPE81 (page 83)
Overload limit: twice the measuring value acc. to VDI/VDE 2184
Output signal: 4-20mA, 2-wire
Permissible impedance: R_A [Ω] = Vs [V] - 11.5V / 0.02 A
Auxiliary energy: 11.5...30VDC
Accuracy: linearity: ≤1% of output range conforming to DIN JEC 770.
Zero signal error ±0.6% of output range.
Hysteresis and repeatability: ≤0.5%
Permissible medium/ambient temperature: -40 to +85° C
Influence of ambient temperature: for range -20 to +70° C ≤0.05%/K
Electromagnetic compatibility:
Electrostatic discharge: IEC 801-2/severity 4 (testing voltage 15 kV)
Transient interference (burst): IEC 801-4/severity 4 (testing voltage applied to input/output 2kV)
Electromagnetic fields: IEC 801-3/severity 3 (intensity on test floor 10 V/m)
Setting time: ≤30 ms
Mechanic oscillation: max. 10 g at 15 to 2000 Hz
Mechanic shock: 500 g/1 ms
Mounting position: any position
IP rating: IP 65 conforming to DIN 40 050
Material of housing:
Parts coming into contact with pressure media: standard stainless steel 1.4562 and 1.4571
Housing: stainless steel 1.4301, polycarbonate
Pressure connection: G¼" A acc. to DIN 16288 (standard) - others upon request
Electric connection: elbow-type plug acc. to DIN 43650, design-type AF
Weight: approx. 110g

Special design-types (upcharge):

Pressure connection: conn. 7/16 UNF upcharge:

GWA1214 V4A (1.4571) thread adapter G½"
with internal thread G¼" to screw onto measuring transducer

Pressure measuring transducer



EN50081-1 and EN50082-2
for unrestricted use in
residential and industrial areas

Type: GPE 81 [1)]

[1)] Please specify measuring range and output signal desired upon order.

General application: Suitable for all applications in machine and systems engineering, automotive technology as well as cooling and air conditioning technology.

Specification:

Meas. principle: piezoresistive or thin-film strain gauge

Piezoresistive (0-1 to 0-10 bar rel.)

Meas. ranges:	1	1.6	2.5	4	6	10
Overload limit:	5	10	10	17	35	35

Thin-film strain gauge (0-16 to 0-1500 bar rel.)

Meas. ranges:	16	25	40	60	100	160	250	400	600	1000	1500
Overload limit:	50	twice the value									

Output signal: (please select one of the following:)
4-20mA, 2-wire, R_A [Ω] = Uv [V] - 10V / 0.02 A
0-10V, 3-wire, $R_A \geq 5$ kΩ
1-5V, 3-wire, $R_A \geq 5$ kΩ
1-6V, 3-wire, $R_A \geq 5$ kΩ

Auxiliary energy: 10...30VDC (for output 4-20 mA)
14...30VDC (for outputs 0-10V, 1-5V, 1-6V)

Accuracy: (deviation from parameter incl. hysteresis)
< 1% FS (setting of cut-off point); < 0.5% FS (setting of tolerance band, BFSL)

Repeatability: < 0.1 % FS

Stability/year: <0.3 % FS (under reference conditions)

Response time: $t_{90} \leq 5$ ms

Permissible temperature of meas. material: -40 ... +100 °C

Ambient temperature: -30 to +80° C

Compensated area: 0 to +80° C

TK in compensated area: ±0.04 FS/K (zero point)
±0.03 % FS / K (span)

Material: Parts coming into contact with pressure media: 1.4571 (V4A) or 1.4542
Housing: 1.4301 (V2A)

Pressure connection: G ¼ A

Protection rating: IP65 (with cable IP67)

Electric connection: via elbow-type pluge acc. to DIN 43650

Electric protections: reverse voltage protection, over-voltage and short-circuit protection

Weight: approx. 150g

Delivery: 4-20mA (standard) from stock (in most cases),
0-10V, 1-5, 1-6V or absolut pressure please contact us for best delivery!

Options:

GPE81 but with elbow-type plug with anti-buckling glanding, 1.5m cable (IP67) upcharge:

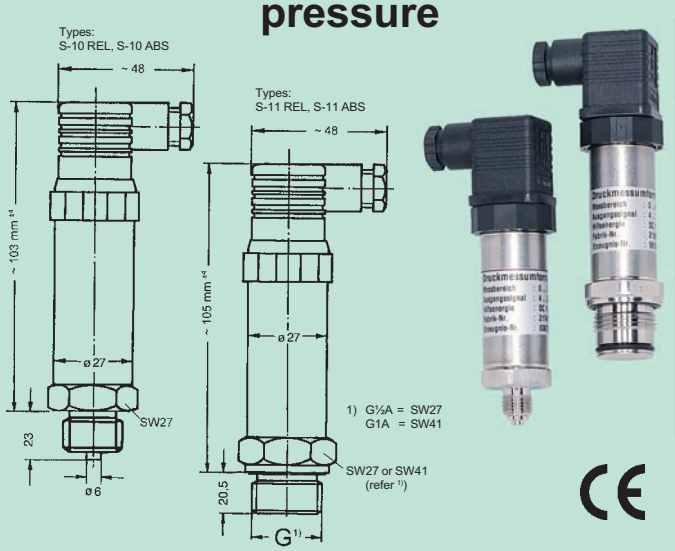
Cable longer than 1.5m upcharge:

absolute pressure upcharge per m:

GWA1214 V4A (1.4571) thread adapter G½"
with internal thread G¼" and external thread G½"

Measuring transducer also available as absolute pressure transducer - p.r.t. to options!

Pressure measuring transducer for over/under and absolute pressure



S-10 REL
(Standard, electric zero at ambient pressure)

S-11 REL
(Flush, electric zero at ambient pressure)

S-10 ABS
(Standard, absolute, electric zero at vacuum)

S-11 ABS
(Flush, absolute, electric zero at vacuum)

Description: piezoresistive pressure sensor with temperature compensation. Completely elded and stainless steel design. Measuring element in silicon oil AK 100. (up to 16 bar) over 25 bar: thin film strain gauge.

Specification:

Meas. ranges: in bar (other values upon request)
S-10 REL and S-11REL: 0.1, 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, 25, 40, 60, 100, 160, 250, 400, 600, (1000 only S-10)

Overload and bursting pressure:

Meas. range (bar):	0.1, 0.25, 0.4, 0.6	1 to 600 bar	1000
Overload (bar):	1.2	2 x meas. range	1500

Output signal: 4-20mA (others upon request)

Permissible impedance: R_A [Ω] = Uv [V] - 10V / 0.02 A

Auxiliary energy: 10...30VDC (others upon request)

Accuracy: linearity: typ ±0.2 % FS (max. ±0.5 %)

Stability: typ ±0.1 % FS (max. ±0.2 %)

Operating temperature: -10 ... +80 °C (compensated area);
for other operating temperature p.r.t. special design-types [2) 3)]

Storage temperature: -65 ... +125 °C

Temperature coefficient: ~0.02 % FS / K (depending on meas. range)

Housing: stainless steel 1.4435 (IP65)

Pressure connection: please specify on order!
Type S-10... : G½A
Type S-11... : G1A (up to 2.5bar), G½A (from 4 to 600 bar)
(for others p.r.t. special design-types - we reserve the right to make technical changes!)

Mounting position: any

Electric connection: standard via elbow-type plug acc. to DIN 43650 (elbow-type plug resulting in longer device - please refer to dimensioned drawing showing elbow-type plug).

Electric protections: reverse voltage protection, over voltage and short-circuit protection.

Special design-types (upcharge):

[2)] Oper. temp. up to 125°C (S-10 REL and S-11 REL) upcharge:

[3)] Oper. temp. up to 150°C (for S-11 REL only) upcharge:

Pressure connection: Type S-10... other threads upon request!

Output signal: 0-10V (3-wire, feed: 14...30VDC)
and others upon request

Attention: Please **always** note pressure connection desired on your order as this may result in technical changes !

Ex-protection: upon request!

Flow meter for a wide range of applications

Suitable evaluation units: GIA1000FR, GIR1002FR, GIA10N

FFG 60

Beverage-Flow-Meter, SK223.01 approved.

Advantages:

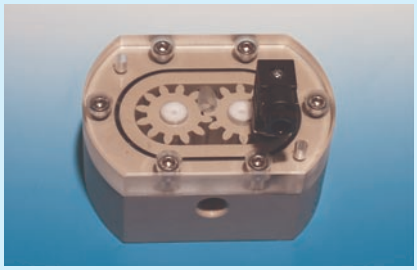
- Sturdy design, can be dismounted for cleaning without any tools being required
- Easy cleaning
- SK 223.01 approved

Application:

Measuring of low-viscous media in beverage industry etc. such as wines, spirits, mineral water, soft drinks, coke etc.

Specification:

Pulse rate: approx. 1000 pulses/l (nozzle 2mm)
Meas. range: 0.1 - 12 litres/min.
Operating pressure: max. 5.5 bar
Viscosity of media: < 80 cSt.
Meas. accuracy: ±2%
Repetitive accuracy: <0.25%
Power supply: 5-24VDC; max. 13mA
Output signal: open collector, NPN
Flow connections: 2 x G¼" (outer thread)
Operating temperature: -40 to 65° C
Dimensions: approx. 95 x 68 x 65 mm (HxWxD). Material of housing: ARNITE, Sealings: Silicon.
Weight: approx. 125 g



VZB

special design for higher viscous media!

Advantages:

- Suitable for higher viscous media
- Simple maintenance
- Parts coming into contact with media made of plastic

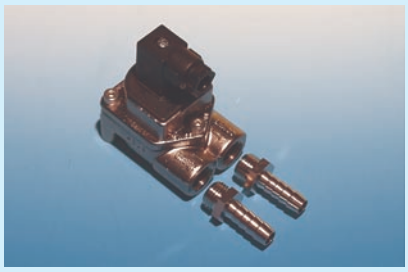
Application:

Beverage industry: (no cavities): coffee, wine mineral water etc..
Chemical industry: acids, alkaline solutions, etc. dosing technology in general

Specification:

Pulse rate: approx. 1300 pulses/l (nozzle 1mm)
Meas. range: 0.4 - 6 litres/min.
Operating pressure: max. 16 bar
Viscosity of media: < 6000 cSt.
Meas. accuracy: ±0.5%
Repetitive accuracy: <0.25%
Power supply: 5-24VDC; max. 13mA
Output signal: open collector, NPN
Flow connections: 2 x G¼" IG
Operating temperature: 5 to 35° C
Dimensions: approx. 110 x 80 x 79 mm incl. plug. Material of housing: polypropylen, sealing: EPDM.

Other meas. ranges upon request !!



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:

Pulse rate: approx. 2.350 pulsesl (nozzle 1mm)
Meas. range: 0.03 - 5 litres/min.
Operating pressure: max. 20 bar
Viscosity of media: < 80 cSt.
Meas. accuracy: ±2%
Repetitive accuracy: <0.25%
Power supply: 5-24VDC; max. 13mA
Output signal: open collector, NPN
Flow connections: 2 x G¼"IG parallel
Operating temperature: -40 to 120° 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.

FMFG

Advantages

- Compact device
- Highly suitable for aqueous media
- Standard thread connection

Application:

Measuring of liquid media in:
House-hold appliances: washing machines, dish washers
Chemical industry: acids, alkaline solutions etc. dosing technology in general

Specification:

Pulse rate: approx. 300 pulses/l (nozzle 8 mm)
Meas. range: 0.5 - 16 litres/min.
Operating pressure: max. 6 bar
Viscosity of media: < 80 cSt.
Meas. accuracy: ±3%
Repetitive accuracy: <0.25%
Power supply: 5-24VDC; max. 13mA
Output signal: open collector, NPN
Flow connections: 2 x G¼" (outer thread)
Operating temperature: max 65° C
Dimensions: approx. 110 x 60 x 80 mm. Material of housing: polypropylen, sealing: EPDM.

FHKK-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.
Industriy: Monitoring of cooling media circuit at machines, dosing and consumption quantity measurements

Specification:

Pulse rate: depending on nozzle. (please contact us) approx. 2350 Imp./l (nozzle 1mm), ..., approx. 570 Imp./l (nozzle 3mm)
Meas. range: 0.03 - 5 l/min. (depending on nozzle)
Operating pressure: max. 16 bar
Viscosity of media: < 80 cSt.
Meas. accuracy: ±2%
Repetitive accuracy: <0.25%
Power supply: 5-24VDC; max. 13mA
Output signal: open collector, NPN
Flow connections: 2 x G¼"IG parallel
Operating temperature: 0 to 95° C
Dimensions: approx. 55 x 40 x 66 mm incl. plug. Material of housing: PVDF glass globe reinforced, sealings: EPDM, nozzle: PTFE, axis: PCTFE.

FHKSC

Advantages:

- Compact device
- Measuring of very small quantities
- Highly suitable for sucking operations

Application:

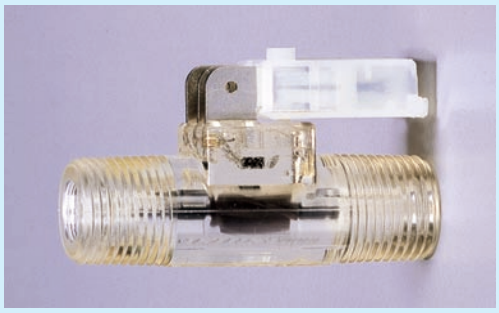
Measureming of low-viscous media in:
Beverage industry: wine, spirits, mineralwater etc.
Chemical industry: acids, alkaline solutions etc. petrol, fuel

Specification:

Pulse rate: approx. 1800 pulses/l (nozzle 1.2mm)
Meas. range: 0.01 - 1 litres/min.
Operating pressure: max.1 bar
Viscosity of media: < 50 cSt.
Meas. accuracy: ±2%
Repetitive accuracy: <0.25%
Power supply: 5-24VDC; max. 13mA
Output signal: open collector, NPN
Flow connections: 2 x 6 mm tube connection
Operating temperature: -40 to 65° C
Dimensions: approx. 55 x 40 x 55 mm. Material of housing: ARNITE, sealing: silicon.

Flow measuring transducer with Hall-effect sensor

for liquids



VISION 2008

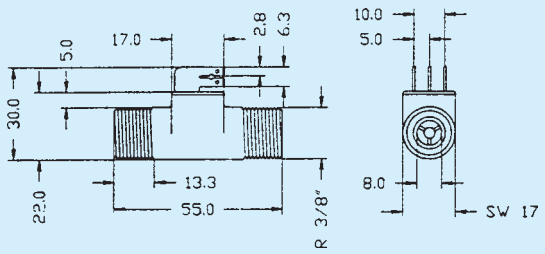
cpl. with 1 m of cable, ready for plug-in .

Specification:
- minimum size, maximum accuracy
- easy installation
- installation in any position possible
- optimum-quality due to high-quality materials used
- no maintenance

Range of application:
- manufacturing of oil and gas burners, flow heaters
- manufacturing of cooling systems
- automotive technology (measuring of petro consumption, etc.)
- manufacturing of dish washers and washing machines
- laboratories
- chemical works, pharmaceutical industry
- agriculture and horticulture

Specification:

Rotor-position scanning:	Hall-Sensor
Measuring range:	0.5 - 25 l/min
Resolution:	approx. 1000pulses/l
Measuring agent:	clean liquids, we recommend filtering with approx. 20 to 40 micron
Viscosity:	up to approx. 15 cSt.
Accuracy:	±1.5% ranging from 10 - 100% with Qmax
Repeatability:	≤ 0.2%
Working temperature:	-20 to +100°C
Operating pressure:	25 bar
Max. pressure:	200 bar
Electric connection:	AMP Faston 2,8/6,3mm
Auxiliary energy:	5 - 24 V DC
Power consumption:	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 (H x W x D)
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



Our new device for large-scale applications !

VTH 25 MS - 180

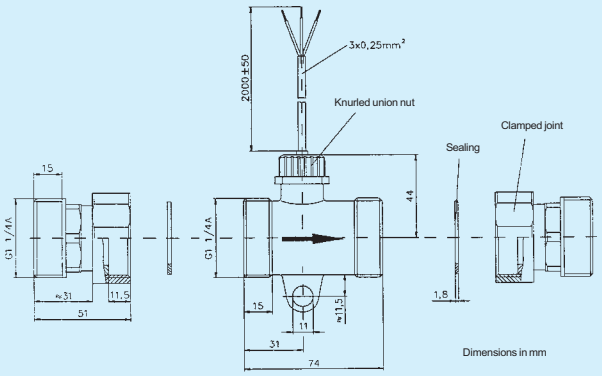
Axial turbine flow sensor for liquids.

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.

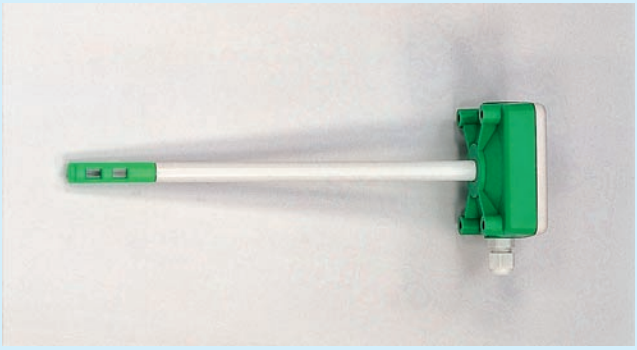
Areas of application:
- measuring of cooling water
- medical technology
- plastic industry
- solar plants, heating systems
- machines for bakeries, large-scale catering establishments, cooking equipment
- machine tools
- photographic laboratories
- fuel dispensers, dosing units
- measuring of heat quantities

Specification:

Sensor:	Hall-effect-sensor
Measuring range:	4 - 180 l/min (signal emission as of 1 l/min)
Resolution:	approx. 67 pulses / litre
Measuring agent:	liquids
Max. particle size:	0.5 mm
Measuring accuracy:	±1.5% of measured value
Repeatability:	±0.2%
Working temperature:	Tmax = 90°C
Max. operating pressure:	10 bar
Auxiliary energy:	4.5 - 24 V DC
Output signal:	frequency signal, open collector NPN
Material:	
Turbine body:	brass
Rotor:	PPO, with solenoids
Bearings:	saphire
Shaft:	CrNi-steel
Delivery connection:	G 1¼" - outer thread
Nominal width:	DN 25



Flow/temperature measuring transducer



Properties:
- high accuracy
- quick response time
- shock resistant
- resistant to pollution
- almost independant of flow direction
- low power requirements

Application: Measuring transducer of the GSTU series are designed to carry out most precise measurements of air velocity (mass flow) and temperature. GSTU devices are used for ventilation and air conditioning technology, to monitor clean rooms and for process and environmental technology.

Measuring principle: no moving parts. Hot-film anemometer principle. Ambient temperature will be compensated for by a second sensor element.

By using newly developed thin-film elements the well-known advantages of a thermal measuring principle (which is not subject to any wear) could even be improved. The measuring head is designed to allow measurements independent from the flow direction for the most part, so that easy installation is ensured. The installation flange included in the scope of supply allows for an infinitely variable adjustment of the insertion depth into the duct.

GSTU 02 (0...2 m/s)
GSTU 10 (0...10 m/s)
GSTU 20 (0...20 m/s)

Specification:

Measuring range flow:
GSTU 02: 0...2 m/s
GSTU 10: 0...10 m/s
GSTU 20: 0...20 m/s

Measuring range temperature: 0 ... 50 °C (for all types)
Output signal: 4-20mA each (others e.g. 0-10V upon request)
Flow: 4-20mA = 0...2 m/s; 0...10 m/s or 0...20 m/s
Temperature: 4-20mA = 0...50 °C

Accuracy flow:
GSTU 02: ±0.03 m/s ±0,5% of measured value
GSTU 10: ±0.2 m/s ±0,5% of measured value
GSTU 20: ±0.5 m/s ±0,5% of measured value

Measuring range temperature: ±0,5 °C (for all types)
Response time: t_{90} (flow) < 1s at 10m/s
Dependancy on flow direction: (at 10m/s) < 0,3 m/s at $\Delta\alpha$ < 10°
Voltage supply: 24VDC ±20%, max. 150mA
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
Sensor length: 200 (250) mm, Ø 12 mm

Accessories:

GNG 24/150 (power supply: 24VDC, 150mA)

Flow measuring transducer

Properties:
- 3 measuring ranges integrated in each device
- selection between 2 different response times
- high accuracy
- almost independant of flow direction
- shock resistant
- resistant to pollution

Typical application:
GSMU 0102: e.g. monitoring of clean rooms and laminar flow
GSMU 1020: e.g. air conditioning and ventilation technology, process and environmental technology

Measuring principle: no moving parts. Hot-film anemometer principle.

GSMU 0102 B5
GSMU 0102 C5
GSMU 1020 B5
GSMU 1020 C5

Specification:

Measuring range flow:
GSMU 0102..: 0...1 m/s, 0...1.5 m/s and 0...2 m/s
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% r.h., 1013hPa)
GSMU 0102: 0 ... 1.0 m/s: ± 0,06 m/s ± 2 % of measured value
0 ... 1.5 m/s: ± 0,07 m/s ± 3 % of measured value
0 ... 2.0 m/s: ± 0,07 m/s ± 3 % of measured value
GSMU 1020: 0 ... 10 m/s: ± 0,3 m/s ± 3 % of measured value
0 ... 15 m/s: ± 0,3 m/s ± 3 % of measured value
0 ... 20 m/s: ± 0,3 m/s ± 4 % of measured value

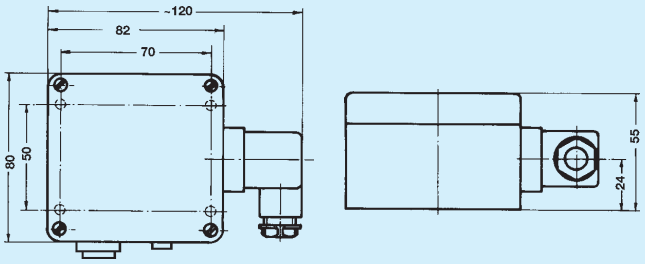
Response time: t_{90} (at 10 m/s): typ. 2s or 0.2s
Response time can be set by means of jumper.
Dependancy on flow direction: < 3 % of measured value at $\Delta\alpha$ < 10°
Voltage supply: AC / DC ±10%, max. 150mA
max. load: 500 Ohm
Connection: screw-type terminals up to 1.5 mm²
Operating temperature: -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
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: 24VDC, 150mA)
GNT 0520 (mains transformer: 230V~ to 24V~, with mounting clamp and screw-type terminals. Dimensions approx. 62 x 56 x 32.5 mm

pH-measuring transducer

with on site display and electrically isolation



GPHU 014 MP

with automatic and manual temperature compensation, (meas. transducer without electrode and temp. probe)

Specification:

Measuring range: 0.00 to 14.00 pH
Accuracy: 0.02 pH ±1 digit
Output signal: 4 - 20 mA (2-wire - standard)
0 - 10 V (3-wire - option)
Electric isolation: output electrically isolated
Auxiliary energy: 12 ... 30 V DC
18 ... 30 V DC (for option 0-10V)
Perm. impedance (at 4-20mA): R_A [Ω] = Uv [V] - 12V / 0.02 A
Permissible load (bei 0-10Volt): R_L > 3000 Ω
Electrode: any pH electrode of our program is suitable.
(electrode not included in scope of supply)
Input resistance: 10^{12} Ohm
Electrode socket: Cinch-socket (standard)
Optionally available with BNC- and DIN-socket (please specify on your order)
Temperature compensation: 0 ... 100°C,
manually via 3 keys or automatically via external Pt1000 sensor.
Calibration: via 3 keys and integrated LCD
Temperature sensor socket: 3.5mm phono plug or banana plug for the DIN-socket type.
Display: approx. 10 mm high, 3½-digit LCD-display
Working temperature measuring transducer: 0 ... +50 °C
Storage temperature: -20 ... +85 °C
Electric connection: elbow-type plug acc. to DIN 43650 (IP65), max. wire cross section: 1.5 mm², wire diameter from 4.5 to 7 mm
Housing: ABS (IP65) with the exception of electrode and temperature 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 (accessible after removal of cover)
Mounting distance: 70 x 50 mm (W x H)
Fixing screws: max. schaft-Ø 4 mm

Ordering type (examples):

GPHU 014 MP / BNC, AV010:
GPHU014MP with BNC electrode socket and 0-10V outputsignal

Options - upcharge:

AV010: output singal 0-10V
BNC: electrode socket: BNC
DIN: electrode socket: DIN

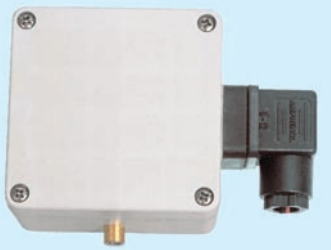
Accessories:

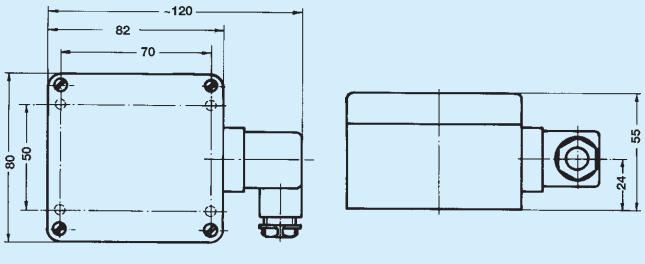
Pt1000-temperature probe (p.r.t. page 13, 88)
GE 100 standard electrode, cinch-plug0
GE 107 special pH electrode with integrated Pt1000-temperature sensor, DIN-plug
PG 13,5 thread (suitable for any electrode)
GAK 1400 (working and calibration set - p.r.t. page 33)

For additional electrodes and accessories p.r.t. page 13, 33 and 88

Redox-measuring transducer

with electrically isolation





GRMU 2000 MP

Specification:

Measuring range: ±2000 mV
or special limited measuring ranges acc. to customer specification!
Accuracy: 0.2 %
Output signal: 4 - 20 mA (2-wire - standard)
0 - 10 V (3-wire - option)
Electric isolation: output electrically isolated
Auxiliary energy: 12 ... 30 V DC
18 ... 30 V DC (for option 0-10V)
Perm. impedance (at 4-20mA): R_A [Ω] = Uv [V] - 12V / 0.02 A
Permissible load (bei 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)
Optionally available with BNC-socket (please specify on your order)
Option: "on site display: approx. 10 mm high, 3½-digit LCD-display
Working temperature measuring transducer: 0 ... +50 °C
Storage temperature: -20 ... +85 °C
Electric connection: elbow-type plug acc. to DIN 43650 (IP65), max. wire cross section: 1.5 mm², wire diameter from 4.5 to 7 mm
Housing: ABS (IP65) with the exception of electrode and temperature 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 (accessible after removal of cover)
Mounting distance: 70 x 50 mm (W x H)
Fixing screws: max. schaft-Ø 4 mm

Ordering type (examples):

GRMU 2000 MP / BNC, VO:
GRMU2000MP with BNC electrode socket and on site display

Options - upcharge:

VO: on site display
AV010: output singal 0-10V
BNC: electrode socket: BNC
MB...: limited measuring range (please state the desired range)

Accessories:

GE 105 redox electrode, cinch-plug
PG 13,5 thread (suitable for any electrode)

For additional electrodes and accessories p.r.t. page 33

Conductivity measuring transducer

Output signal: 0-1V

Please contact us!

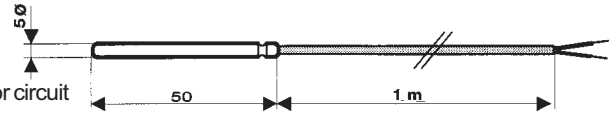
Standard probes and custom-designed temperature probes

customized products can only be ordered written and can generally not be exchanged!

GTF 10 (for GIA10)

-40 ... +100°C (120°C)

special feature: integrated suppressor circuit



Sensor: KTY87-205
Cable: silicon, 2-wire, 1m
Sensor tube: V4A

GTF 10 - Pt1000 (for GIA10)

-50 ... +400°C

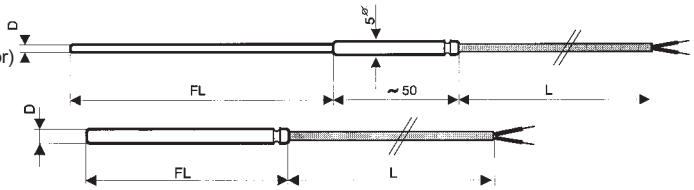
design identical to GTF1002, but with Pt1000-sensor DIN cl. B

Sensor: Pt1000
Cable: silicon, 2-wire, 1m
Sensor tube: V4A

GTF 101

-200 ... +1150°C (depending on sensor)

pre-assembled according to customer specification



basic price **as of**
for Ø3mm, FL=100, L=1m of silicon cable

Final price can only be determined after receipt of customer specificaton!

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 (1.4571)
FL= please specify probe length upon order (in mm)
D = Ø 0.5 mm to Ø 8.0 mm. - please specify Ø upon order (available Ø: 0.5, 1.0, 1.5, 2.0, 2.2, 3.0, 4.0, 5.0, 6.0, 6.7, 8.0)
At probe diameters below 4 mm an additional sleeve of Ø 5 mm and 50 mm length is mounted.
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.

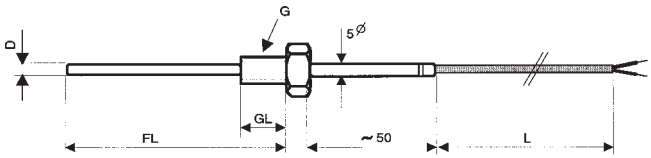
Additional order specificaton:
a) temperature range
b) ambient temperature
c) plug of other cable connection

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



basic price **as of**
for standard Ø3mm, FL=100, L=1m of silicon cable

Final price can only be determined after receipt of customer specificaton!

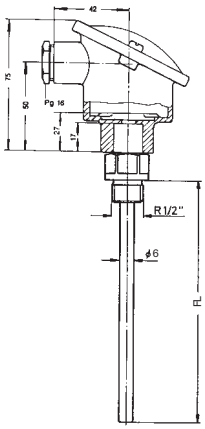
Please contact us to find out which dias are available for our various sensors.

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 (1.4571)
FL= please specify probe length upon order (in mm)
D = Ø 0.5 mm to Ø 8.0 mm. - please specify Ø upon order (available Ø: 0.5, 1.0, 1.5, 2.0, 2.2, 3.0, 4.0, 5.0, 6.0, 6.7, 8.0)
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.
G = please specify thread desired: e.g. M5 or G½" etc. **Material:** stainless steel
(Available threads: M5, M6, M8, M10, M12, R1/4", R3/8", R1/2", R3/4", M10x1, M12x1.5, M14x1.5)
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

Additional specification: temperature range, ambient temperature, plug or other cable connection

GTF 103 ...

-200 ... +1150°C
(depending on sensor)



GTF 103 S Standard design:
Pt100 class B in 2-, 3- or 4-wire connection - please specify upon order.
DIN B-head (lacquered aluminium)
R1/2" thread, FL=100mm, D=6mm Ø
Thread and sensor tube made of V4A (1.4571) stainless steel, welded.

GTF 103 customized design (p.r.t. page 92) basic price as of
GTF 103 OS as GTF103 but without sensor and clamping plate: basic price as of

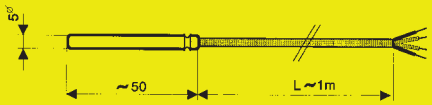
Choice of different constructions: (detailed informations and upcharges p.r.t. page 92)
- **possible sensors:** Pt100, Pt1000 (2-/ 3- or 4-wire), NiCr-Ni
- **any probe lenght "FL", probe tube dia, thread**
- **other probe head:** plastic, stainless steel, design type DE
- probe insert exchangeable or removeable by means of a ceramic terminal support
- complete with integral head transmitter Pt100 / 4-20mA output

Upcharge for higher probe accuracy (Pt100/Pt1000): p.r.t. page 12

GTF 200 Pt100

-50 ... +200°C
Pt100, 4-wire

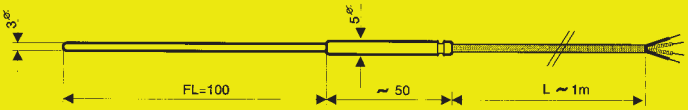
Sensor: Pt100, DIN cl.B (±0,3°C at 0°C)



Sensor sleeve made of st. steel
Cable: silicon, 4-wire
(4 x 0.14²), approx. 1m long

GTF 1002

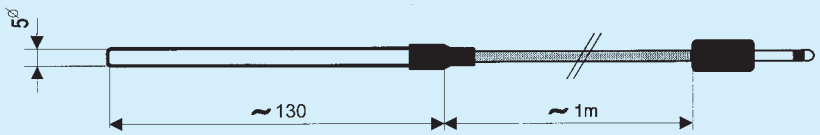
-50 ... +400°C
Pt100, 4-wire



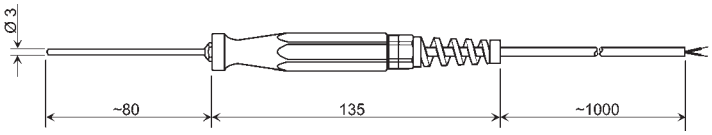
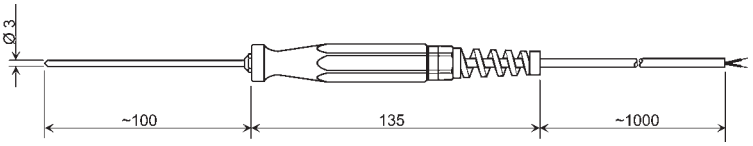
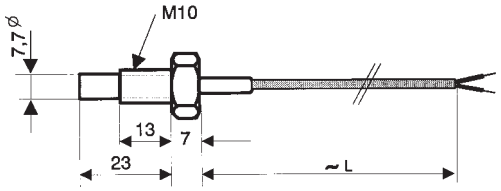
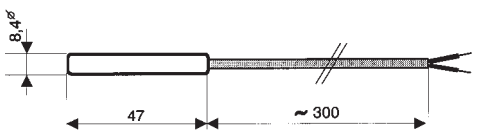
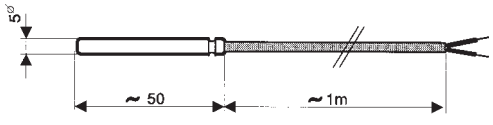
Tube made of V4A (1.4571)
Cable: silicon, 4-wire
(4 x 0.14²), approx. 1m long
suitable for 2-/3- or 4-wire probe

Sensor: Pt100, DIN cl.B (±0,3°C at 0°C). Upcharge for higher accuracies p.r.t. page 12/13

GTF 1400 -20 ... +110°C
Temperature probe for GPRT1400A



Sensor: KTY87-205, exchange tolerance from 0-100°C: 1°C
Sensor tube: made of V4A (1.4571) with shrinkable sleeve at cable outlet
Cable: approx. 1 m of highly flexible silicon cable with 3.5 mm Ø plug

Ordering type measuring range	Applications / dimension (mm)	Price
GMF 11/152 Sensor: KTY10-6 bzw. KTY11-6 -50 ... +150°C **GMF 11/180** Sensor: KTY83-110 -50 ... +175°C **GMF 11/84** Sensor: KTY84-130 -50 ... +200°C	**Immersion probe for liquids / gases, bulk materials**  **Sensor tube:** V4A (1.4571) **Handle:** polyamide **Cable:** approx. 1m of highly flexible cable (2 x 0.25²)	
GMF 21/152 Sensor: KTY10-6 bzw. KTY11-6 -50 ... +150°C **GMF 21/180** Sensor: KTY83-110 -50 ... +175°C **GMF 21/84** Sensor: KTY84-130 -50 ... +200°C	**Injection probe for soft media,** with slim injection tip  **Sensor tube:** V4A (1.4571) **Handle:** polyamide **Cable:** approx. 1m of highly flexible cable (2 x 0.25²)	
GMF 15/152 Sensor: KTY10-6 -50 ... +60°C **GMF 15/180** Sensor: KTY83-110 -50 ... +60°C **GMF 15/87** Sensor: KTY87-205 -40 ... +60°C Other sensors upon request!	**Screw-type sensor M10**  **Sensor tube:** brass, nickel-plated **Cable:** silicon 2 wire, approx. 1m long, (2 x 0.5²)	
GMF 30/180 Sensor: KTY83-110 -50 ... +60°C **GMF 30/87** Sensor: KTY87-205 -40 ... +60°C Other sensors upon request!	**Immersion/touching/air sensor**  **Sensor tube:** aluminium head, D = Ø 8.4 mm **Cable:** silicon 2 wire (2 x 0.5²), approx. 30 cm long upcharge per m of flexible lead	
GMF 30/180 V4A Sensor: KTY83-110 -50 ... +175°C **GMF 87** Sensor: KTY87-205 -40 ... +120°C	 **Sensor tube:** V4A-head, 5 mm Ø **Cable:** approx. 1 m of highly flexible silicon cable. Sensor without suppressor circuit. For suppressor circuit p.r.t. GTF10	

Customized jacket thermo elements NiCr-Ni,

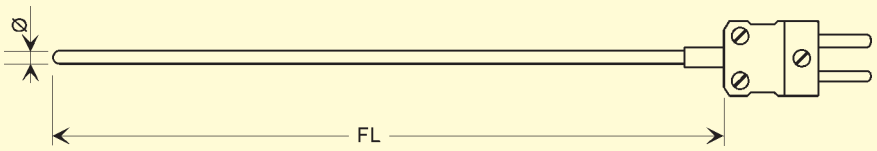
low price standard lengths available from stock

(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)



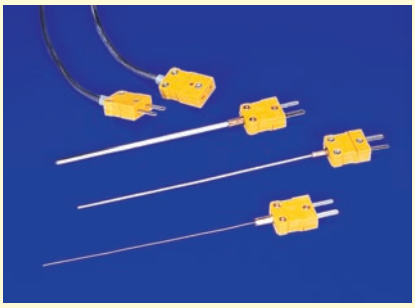
Upon request:

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



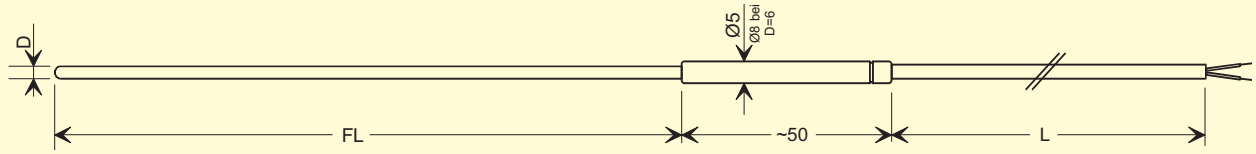
Type	Ø mm	FL -20 mm	Price	Type	Ø mm	FL -20 mm	Price
GTT05150	0,5	150		GTT30150	3,0	150	
GTT05250		250		GTT30250		250	
GTT05500		500		GTT30500		500	
GTT051000		1000		GTT301000		1000	
GTT051500		1500		GTT301500		1500	
GTT10150	1,0	150		GTT60150	6,0	150	
GTT10250		250		GTT60250		250	
GTT10500		500		GTT60500		500	
GTT101000		1000		GTT601000		1000	
GTT101500		1500		GTT601500		1500	
GTT15150	1,5	150		**Accessories:**			
GTT15250		250		**NKU1200** (coupling free from thermal e.m.f.)			
GTT15500		500		**NKU1200O** (U-coupling free from thermal e.m.f.)			
GTT151000		1000		**NST1200** (plug free from thermal e.m.f.)			
GTT151500		1500		**AGL1** (silicon compensation line) per m			
				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 silicon 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 accoracy as compared to class 2. As a comparison with class 2: ±2,5°C or ±0.75% of meas. value)
Connecting cable: silicon 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 agressive 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 (thermo element 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 77)
- Extended or other cable (please specify upon order): silicon cable (up to 200°C) or glass silk cable (up to 400°C).
- Internal flat-pin plug (NST1200)

Type	Ø mm	FL -20 mm	Price	Type	Ø mm	FL -20 mm	Price
GTF101-5/05150	0,5	150		GTF101-5/30150	3,0	150	
GTF101-5/05250		250		GTF101-5/30250		250	
GTF101-5/05500		500		GTF101-5/30500		500	
GTF101-5/051000		1000		GTF101-5/301000		1000	
GTF101-5/051500		1500		GTF101-5/301500		1500	
GTF101-5/10150	1,0	150		GTF101-5/60150	6,0	150	
GTF101-5/10250		250		GTF101-5/60250		250	
GTF101-5/10500		500		GTF101-5/60500		500	
GTF101-5/101000		1000		GTF101-5/601000		1000	
GTF101-5/101500		1500		GTF101-5/601500		1500	
GTF101-5/15150	1,5	150		**Accessories:**			
GTF101-5/15250		250		Clamping screw conn. Ø1.5, 3.0 or 6.0 as of			
GTF101-5/15500		500		Silicon cable (up to 200°C) per m			
GTF101-5/151000		1000		Glass silk cable (up to 400°C) per m			
GTF101-5/151500		1500		Internal flat-pin plug (NST1200)			

Other accessories see pages 90, 92 and 93.

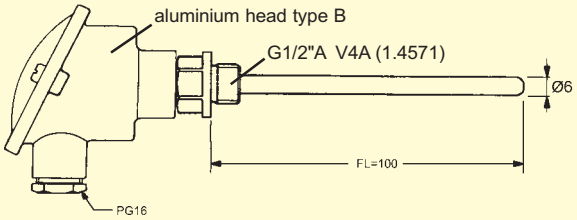
Accuracy class 1 for all thermo elements (almost double accuracy than class 2!)

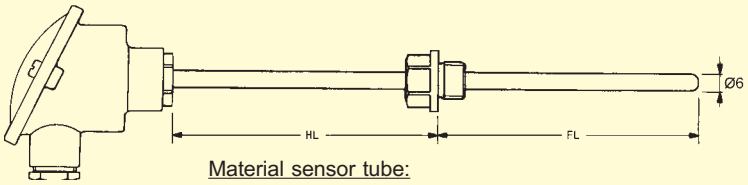
Customized probes acc. to your requirements or standard design and accessories

(Del. time from stock or 1 to 2 working days) Other design types p.r.t page 88

GTF 103 (basic design)

GTF 103 OS (without sensor and terminal)





Material sensor tube:
for Pt100/1000 = material V4A (1.4571)
for NiCr-Ni = Inconel 600

Sensor: upcharges:

Pt100 / Pt1000 (2-, 3- or 4-wire)
- -50 ... + 400°C, DIN class B — standard
- ±200°C, DIN class B
- -50 ... + 600°C, DIN cl. B, Jacket-Pt100

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 — standard

Double - NiCr-Ni (type K)
- -200 ... + 1150°C, class 1

Sensor Head:
- DIN B head (Alu lacquered), max. 200°C — standard
  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 theads are not available for small series! (For larger series on request)
- with thread, G½", V4A (1.4571) — standard
  for fixed mounting or for interchangeable sensor in combination with immersion sleeve EST02.
- without thread — no upcharge
  for interchangeable sensor application in combination with immersion sleeve EST01 or with stainless steel clamping ring glanding for exact adjustment of sensor position.

Tube length: (Pt100/1000 and NiCr-Ni) upcharges:
- Probe lenght "FL" up to 100mm — standard
- Probe length per each started additional 100mm
- Neck tube length "HL" each started 100mm
  for higher temperatures, because sensor head (without transmitter) is suitable just up to 200°C or for bridging insulations.

Probe diameter:
note: other diameters than stated below are not available!

Pt100 / Pt1000
- Ø 6 mm, not flexible — standard
- 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. 30mm stiff, then flexible
- Ø 3 mm, approx. 30mm stiff, then flexible

NiCr-Ni (type K), not potential-free
- Ø 6 mm, not flexible — standard
- 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: upcharges:

GTF103 / GKM with transducer for Pt100,
Output signal 4-20mA, measuring ranges p.r.t. page 74
(to be stated on order!)

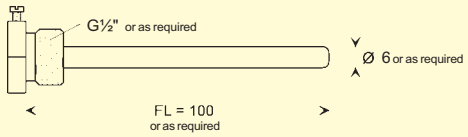
GTF103 / T12 with electrically isolated transducer
for Pt100, NiCr-Ni, output signal 4-20mA, measuring range to be stated on order! (p.r.t. page 76)
Please note: device has larger alu sensor head

2.Clamping ring screw connection GKV... st.steel (for all probes without thread)

Type:	Outer thread	Clamp. ring-Ø (sensor tube-Ø)	Clamping ring	Price
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	

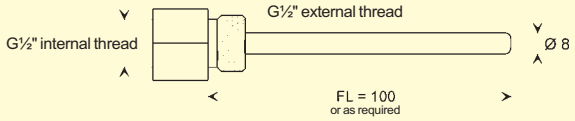
3. Immersion sleeve of stainless steel

3.1. Immersion sleeve EST01 for all probes without thread (p.r.t. p. 88-92). **Basic price for 100mm**



standard: G1/2", FL=100mm, outer-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, outer-Ø = 8mm for probes with 6mm Ø
customized lengths, diameters or threads are possible against upcharge - to be stated on order!

4. Cables and lines:

4.1. Silicon cable (max. 200°C) with teflon screened wires

S2P:	Silicon cable, 2-pole, highly flexible	price per meter
S3P:	Silicon cable, 3-pole, 3 x 0,14² cross section (insulation 2 x blue, 1 x white)	price per meter
S4P:	Silicon cable, 4-pole, 4 x 0,14² cross section (insulation 2 x blue, 2 x white)	price per meter

4.2. Glass silk insulated cable with stainless steel braiding (max. 400°C)

G2P:	glass silk insulated cable, 2-pole	price per meter
G3P:	glass silk insulated cable, 3-pole	price per meter
G4P:	glass silk insulated cable, 4-pole	price per meter

4.3. Teflon insulated cable with individual teflon insulated wires

T2P:	teflon insulated cable, 2-pole	price per meter
T3P:	teflon insulated cable, 3-pole, with additional cable screen	price per meter
T4P:	teflon insulated cable, 4-pole, with additional cable screen	price per meter

4.4. PVC-lines (max. 70°C)

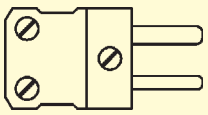
P2P:	PVC cable, 2-pole	price per meter
P3P:	PVC cable, 3-pole	price per meter
P4P:	PVC cable, 4-pole	price per meter

4.5. Compensation lines for NiCr-Ni (type K), 2-wire

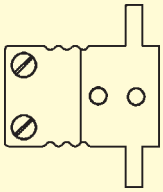
AGL1:	Silicon cable (max. 200°C)	price per meter
AGL2:	Teflon cable (250°C) screened	price per meter
AGL3:	Thermo wire (can also be used as thermo couple) glass silk (max. 400°C)	price per meter
AGL4:	Teflon screened twisted thermo wire, wire-Ø 0,2mm (max. 250°C)	price per meter
AGL5:	Thermo wire, with glass silk braiding , wire-Ø 0,2mm (max. 400°C)	price per meter

5. Flat-pin connections, free from thermal e.m.f. type K (NiCr-Ni) and type S (PtRh-Pt):

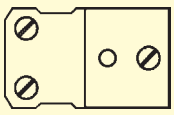
(for operating temperature up to 200°C)



NST 1200
NST 1700



NKU 1200 O
U-coupling for installation in front panels

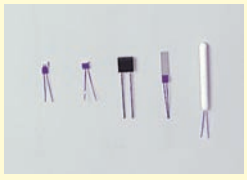


NKU 1200
NKU 1700

NST1200 "K"
NKU1200 "K"
NKU1200 O "K"
NST1700 "S"
NKU1700 "S"

For higher temperatures use keramic plug and coupling - price upon request.

6. Sensor elements: Pt100/1000, NTC´s, PTC´s, (NiCr-Ni p.r.t. pages 90-91):



Type:	Description, dimensions	meas. range	tolerance	price
Pt100/1	Ceramic lamina, 2 x 2.3 x 0.6 mm	-50 ... +500°C	B	
Pt100/2	Ceramic lamina, 2 x 2.3 x 0.6 mm	-50 ... +500°C	1/3 DIN	
Pt100/3	Ceramic lamina, 2 x 4 x 0.9 mm	-196 ... +500°C	B	
Pt100/4	Wound design, Ø2 x 15 mm	-200 ... +600°C	B	
Pt100/5	TO92-housing	-50 ... +150°C	B	
Pt1000/1	Ceramic lamina, 2 x 10 x 0.9 mm	-50 ... +400°C	B	
Pt1000/2	TO92-housing	-50 ... +150°C	B	
KTY 10-6	2kOhm (25°C), TO92-housing	-50 ... +150°C		
KTY 11-2A	2kOhm (25°C), TO92 Mini-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	-50 ... +300°C		

Other sensors upon request

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

cpl. and ready for use incl. controller, water probe, solenoid, signal buzzer

GEWAS 191A

cpl. as above but equipped with switch-off mechanism for supervised device in case of alarm (up to 16A, 220 V 50 Hz)

Application: households (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 additonal 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 191A - 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; alarm controlled socket outlet with earthing contact used for GEWAS 191 A, ie 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

GAZ-1 socket outlet 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 - Available as plug-in or panel mounted device.

ALARM PROTECTION DEVICE

with or without alarm transmitter and relay switching output (changeover contact)

ALSCHU 480

plug-in for 230V~ (plug not included)

ALSCHU 480 P

as above, but with volt-free switching output

GEWAS 200

Panel-mounted alarm protection device with volt-free relay output (snap-on mounting for top hat rail in special snap-on housing) (sensor not included)

Application: alarm in case of any liquid leaking or penetrating, prevents water damage by closing solenoid valves of any size and by offering the possibility to plug any number of water probes. Volt-free alarm contact for damage report to supervision centre (eg ALSCHU 480 P or GEWAS 200). Accoustic or optical (flashing pilot lamp) alarm available. We manufacture custom-designed devices for your requirements.

Specification: (ALSCHU)

Control device: (ALSCHU) 112x71x48 mm (HxWxD), operation indicator lamp, selector switch: pos. I (switching output energised in case of alarm), pos. II (switching output de-energised in case of alarm). On/Off switch, sensor socket.

Power supply: 230 V 50 Hz (approx. 1VA) (others upon request), automatic via earthing pin adaptor plug

Control output: sensor controlled adaptor plug with socket outlet with earthing contact. Direct switching capacity approx. 2400 VA (10 A ohmic load) at 230 V 50 Hz. Volt-free output for ALSCHU 480 P for any DC or AC voltages up to max. 220 V. Contactor to be triggered in case of higher voltages, rotary current or higher outputs.

Specification: (GEWAS 200)

Power supply: 220 V/240 V 50/60 Hz (others upon request), power consumption approx. 1 VA

Switching relay output: relay (changeover contact) 230 V 50/60 Hz (10 A ohmic load)

Sensor connection: direct connection for 2 water probes GWF-1 (parallel connection for any number of probes).

Electric connection: screw-type terminals

Accessories and spare parts:

GWF-1S plug-in water sensor

GWF-1 water sensor without plug

GAZ-1 socket outlet adapter (required for each additional water sensor)

GSS-1S level probe (plug-in float switch) for electrically non-conductive media (normally open/ normally closed function can be selected by customer)

GNS-1S plug-in level probe 2-pin (stainless steel electrodes)

GSAS-1 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)

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:

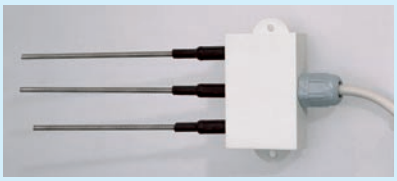
Control device: housing 112 x 71 x 48 mm (H x W x D). Flashing LED indicating control state. Selector switch for emptying or filling. Plug-in socket for electrodes.

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, PVC 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. Price:
(standard length up to approx. 15 cm)
Other lengths upon request.



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 GNG 09 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 power supply

GWF-1S plug-in water sensor

GAZ-1 socket outlet adapter (required for each additional water sensor)

GSS-1S level probe (plug-in float switch) for electrically non-conductive media (normally open/ normally closed function can be selected by customer)

GNS-1S plug-in level probe 2-pin (stainless steel electrodes)

GSAS-1 plug-in, self-adhesive magnetic contact

VEKA 2 extension cable 2m

VEKA 5 extension cable 5m

VEKA 10 extension cable 10m

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 conected 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, installation length approx. 55mm) for installation in the line, water sensor, alarm buzzer and switch-off of connected devices 16A, 230V~. Device is capableto 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.

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).

Electric specification:

of 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.

Spare or additional solenoid valves:

GMV-½" L add. solenoid valve ½" for direct cable connection, approx. 1m cable, loose ends

GMV-½" H add. solenoid valve ¾" manual mounting, approx. 1m cable, loose ends

GMV-¾" add. solenoid valve ¾" for direct cable connection, approx. 1m cable, loose ends

GMV-1" add. 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. page 94**

Context

Catalogprice valid as of July 1, 2001 **Brochure is subject to technical and commercial changes!**

Delivery and Payment Conditions: (Excerpt)

1. All our contracts are solely based on the following conditions. Any changes will be subject to our express written approval. We shall not accept other contractual conditions, even if they have not been expressly refused by us, and all the orders will be carried out in accordance with our conditions.
2. Our quotations shall not be binding. Orders shall only be binding if they have been confirmed by us in writing or if they have been fulfilled by delivery of the goods or rendering of the service requested. Any oral collateral agreements shall not apply unless they have been confirmed by us in writing.
3. Our prices are ex works Regenstauf including packing, not including delivery and VAT applicable in the country of destination.
   Invoicing shall be based on the prices valid on the day of delivery of the part or rendering of the service requested unless we concluded a written agreement for a fixed price (max. 12 months). First-time customers will only be served on a cash on delivery basis or if advance payment has been made. Deliveries outside of Germany will only be made against advance payment or on a cash against delivery basis.
4. We carry out repairs at cost. Delivery of repaired articles shall only be made on a cash against delivery basis. If a cost estimate is required we shall charge you € 13.-- + VAT so as to cover our expenses. All items shall be sent to our works without any costs accruing for us.
5. Our invoices for deliveries within Germany shall be payable within 10 days less 2 % cash discount, or net within 30 days, as of the date of the invoice.
   If payment is not effected in time we reserve the right to demand interest payments pursuant to the rules and regulations provided by the German Law.
6. Until payment in full of the claims resulting from the contract with the purchaser we retain title to the goods.
7. Warranty for all new goods sold as well as for services rendered shall, unless otherwise agreed upon or stipulated by law, be 6 months as of the passing of the risk or as of the receiver being notified that performance has been completed.
   The warranty obligation shall be limited to the rectification of defects or to a replacement delivery. Any claims shall be made known to us within 8 days or goods shall be received at our works (f.o.c. for us) within that time. In case we agree to take back standard items we charge 10% for unused goods solely to cover our administrative expenses; in case of our taking back damaged goods we will also charge the extra costs accruing. Make sure to always state the invoice number!
   Orders for special design items (e.g. custom-made sensors, devices including optional items etc.) shall only be accepted in writing. Customer shall not have the right to exchange such articles.
8. Regardless of the cause in law, we shall not assume any liability, unless in cases of intent or gross negligence, and only if an essential stipulation of the contract has been violated with such violation providing a risk to the purpose of the contract. Whenever legally permissible our obligation to pay for damages shall be limited to the invoice amount for the quantity of goods that were directly responsible for the damaging event. This clause shall have no influence on the liability for damage done to persons and property according to the laws on product liability.
9. In addition the General Conditions on Delivery and Performance regarding products and services in the electric industry recommended by the Zentralverband der Elektrotechnischen Industrie e.V. (Central Registered Association of the Electrical Industry) shall apply.
10. Provided the purchaser is a merchant who has been entered in the commercial register, general jurisdiction for all disputes arising directly or indirectly from the contractual agreement shall lie in Regensburg or, if so chosen by us, in the purchaser's area of general jurisdiction.
11. Registered office:
    GREISINGER-electronic GmbH, Hans-Sachs-Straße 26, D - 93128 Regenstauf,
    Commercial register Regensburg HRB2389, Local Court (Amtsgericht) Regensburg
    Managing director: Dipl. Ing. Otmar Greisinger, Dipl. Ing. (FH) Christian Greisinger
12. Place of performance: Regenstauf, Venue: Regensburg

93128 Regenstauf, 1.7.2001