GREISINGER

Member of GHM GROUP

PROFESSIONAL MEASUREMENT

Measuring | Controlling | Regulating

MADE IN GERMANY

Product catalog

2017

Firmengebäude

Quality Standard and Certification

High-quality technical products at a fair price have made use a permanent fixture in the measuring device market. We have been on a continuously upward trend for more than 35 years. The use of state of the art machinery and devices with efficient, high-performance production processes enables the high 'Made in Germany' product quality at competitive prices.

All our products are developed and produced in Germany - that is one reason for the high-quality standard of our products. Our quality management system is certified according to ISO 9001:2008 and additionally for potentially explosive atmospheres according to DIN EN 13980:2003.

Conformity with Directive 94/9/EC ('ATEX Directive') has been mandatory for Ex products in the Member States of the EC since 01/07/2003. Our development, manufacturing and sales have been certified in accordance with Directive 94/9/EC since 01/05/2003. Several products have already been tested and approved in accordance with this standard.

MADE IN GERMANY


ZERTIFIKAT

ISO 9001:2008

GHM Messtechnik GmbH


Zertifikat über die Anerkennung der Qualitätssicherung Produktion

DNV
Zertifiziertes QM-System
ISO 9001:2008

BVS 13 ATEX ZQS/E234
Zertifiziertes QM-System
CE 0158 Ex

Sales international

Anita Renc
Direction sales international

Schloßstraße 6
88453 Erolzheim
GERMANY

Phone +49 7354 937233-401
Mobile +49 177 6149633
E-Mail
a.renc@ghm-messtechnik.de

Area
South-East Asia | France | Italy | South America | Spain | Portugal

Language
German | English | Italian | Czech

Parimal Sharma
Sales Export

Schloßstraße 6
88453 Erolzheim
GERMANY

Phone
+49 7354 937233-403
E-Mail
p.sharma@ghm-messtechnik.de

Area
Africa | Russia | Arab Countries | India | Baltic States

Language
English | Hindi | German

Feifan Jin
Sales Export

Schloßstraße 6
88453 Erolzheim
GERMANY

Phone
+49 7354 937233-405
E-Mail
f.jin@ghm-messtechnik.de

Area
China | Japan | South Korea | South-East Asia

Language
Chinese | German | English

Mina Kamal
Sales Export

Schloßstraße 6
88453 Erolzheim
GERMANY

Phone
+49-7354-937233-405
E-Mail
m.kamal@ghm-messtechnik.de

Area
Africa | Arabic countries | Israel | Greek

Language
English

Peter Wüster
Sales Export

Standort Honsberg
Tenter Weg 2-8
42897 Remscheid
GERMANY

Phone
+49-2191-9672-35
E-Mail
p.wuester@ghm-messtechnik.de

Area
South Europe | East Europe | Scandinavia | UK | Ireland

Language
German | English

Andrea Casati
Office Italy / Delta OHM S.r.l.

Via G. Marconi 5
35030 Caselle di Selvazzano (Padova)
ITALY

Mobile: +39-340-0063879
Phone: +39-049-8977150
Telefax: +39-049-635596

a.casati@ghm-messtechnik.de
www.ghm-messtechnik.de

Export processing

Edith Hiemer
Phone +49 7354 937233-47
E-Mail: e.hiemer@ghm-messtechnik.de

Michael Glaser
Phone +49 7354 937233-49
E-Mail: m.glaser@ghm-messtechnik.de

Ellen Auffurth
Phone +49 7354 937233-41
E-Mail: e.auffurth@ghm-messtechnik.de

Regina Stellmach
Phone +49 2191 9672-91
E-Mail: r.stellmach@ghm-messtechnik.de

Subsidiaries

Michal Doubek
GHM-Greisinger s.r.o.
Ovci hajek 2 / 2153
CZ158 00 PRAGUE 5 -
Nove Butovice
CZECH REPUBLIC

Phone +42 251 613-828
Telefax +42 251 612-607

info@greisinger.cz
www.greisinger.cz

Occo Andriessen
GHM-Meettechniek BV
Zeeltweg 30
3755 KA Eemnes
NETHERLANDS

Phone +31 35 53805-40
Telefax +31 35 53805-41

info@ghm-nl.com
www.ghm-nl.com

Erling Mathiesen
GHM Maaleteknik ApS
Maarslet Byvej 2
8320 Maarslet
DENMARK

Phone +45 646492-00
Telefax +45 646492-01

info@ghm.dk
www.ghm.dk

Jan Grobler
GHM Messtechnik SA Pty Ltd
16 Olivier Street
Verwoerdpark, Alberton 1453
SOUTH AFRICA

Mobile +27 74 459 0040

j.grobler@ghm-sa.co.za
www.ghm-sa.co.za

Rafael Molina
GHM do Brasil
Rua Major Solon, 130, suite 709
Campinas, São Paulo, 13015-095
BRAZIL

Mobile: +55-19-98275-0069

r.molina@ghm-messtechnik.de

Legend

Made in Germany

ISO Calibration certificate
available at surcharge

HACCP (Hazard Analysis and Critical Control Points-Konzept)
suitable for food applications according to HACCP

Min-/Max-Alarm
continuous checking of adjustable alarm boundaries (deactivate-able)
3 alarm settings:
off: alarm inactive
on: alarm via display, internal buzzer and interface
no Sound: alarm only via display and interface
Switching function:
External devices can be switched (on/off) or monitored for alarm in combination with switching module GAM3000 (optionally available)

Auto-Hold
Automatic freezing of a constant measuring value

Automatic Power-Off-Function
- 1 … 120 min (or deactivated)
- adjustable between 1 … 120 min or continuous operation
- If Auto-Off-Function is activated, device is automatically switched off after a selected period (0 ... 120 min) if it is meanwhile not used.

AutoRange
The conductivity measurement gets automatically switched to the optimal measuring range. Can be deactivated in the menu.

Battery Change Indicator

Background illumination

Horn

Hold function
The current measured value gets “frozen” on keystroke.

Logger function
manual: fetch data via buttons or interface
cyclic: fetch data via interface
adjustable cycle time: 1 s … 1 h
The logger is started or stopped by keypad or interface.
The software GSOFT3050 (see accessories) is available for comfortable read-out of logger data.

Alarm Freely adjustable alarm boundaries, pulsating alarm sound (depends on measured value)

Min / max value memory
Highest and lowest measured values are saved.

Offset correction (zero point)
The characteristic can be shifted parallel by an adjustable offset value.

Offset and slope correction
A digital offset and slope correction can be adjusted.

Tare function
Displayed value as well as min- and max-values are set to zero.

Real-time clock
Clock with day, month and year

Possible connectors

Miniature DIN-type plug
used in:
GMH 3710/50, GMH 3611/51, GMH 3692/95, GMH 3111/51/56

Banana-jack connection
used in:
GMH 3511/31/51, GMH 5530/50, GPHU 014 MP

BNC-connector
used in:
GMH 285-BNC, GMH 3830/51, GMH 3511/31/51, GMH 5530/50, GPH 114

7-pol. bajonett connector
used in:
GMH 5130/50/55, GMH 5430/50, GMH 5630/50/90/95

NST1200-connector
used in:
GTH 1150/70, GMH 1150/70, GMH 3210/30/50, GIM 3590, GMH 3330/50, GMH 3830/51

S7-connector
used in:
GE 171, GE 108, GE 173, GR 175

4-pol. bajonett connector
used in:
5000 device series

Jack connector 3,5 mm
used in:
GMH 175, GMH 285, GFTB 200, GFTH 200

7-pole diode connector
used in:
GLMU 200/400

M8 plug connector
used in:
EASYLog, T-Logg

M12 plug connector
Used in:
GTL (food sensors)

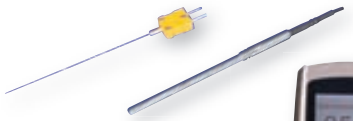
power supply 5,5 x 1,5
used in
3000er device series

Angle plug
Uses include:
Transducers

Jack connector 2,5
used in:
discontinued products, e. g. GDH ... AN Serie, GPRT 1400

Cinch connector
used in:
discontinued products, e. g. GPH 014, GPRT 1400

Product overview



SERVICE

MOBILE MEASUREMENT

HANDHELD INSTRUMENTS (with sensors/accessories)

STATIONARY MEASUREMENT / INDUSTRY

DISPLAY / CONTROLLER 099

DATA LOGGER / EASYBUS 124-125

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EX-PROTECTION

OEM- / customer-specific designs

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

I.) Optical customization

- **Colours of housing according to your wishes**
  In corresponding numbers you can order our device with a housing in another color.
- **Modified label**
  Do you want your logo on the device or the type designation matching to your name policy?
  Even photo-quality images can be applied by digital printing process.

II.) Hardware and software modifications

To a certain extend the hardware or software can be modified to your requirements.
For example this are realized modifications to customer's specifications:
- Modifying the hardware to another probe characteristic
- Creating an additional material characteristic for the GMH 38xx-series
- Other connectors
- Faster pressure measurement
- ...

Please contact us, we'll do our best to fulfil your wishes!

III.) Customer-specific developments

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

Please note that the customer versions are associated with a little extra costs or depending on the amount of ordered pieces.

Examples of printed housings

Adjustment and Certificate - all from one source

Which certificate will be required ?

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

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

1. Adjustment

(without certificate of calibration) Readjustment of the device

Adjustment

We recommend regularly sending the measuring devices in for adjustment. Complete testing and, if necessary, recalibration of the device is provided without documentation of measurements.

2. ISO calibration certificate

For return to national standards
DIN EN ISO 9000ff demands a traceable calibration of measuring and test equipment. This calibration certificate is a low-priced alternative to the DAkkS Calibration Certificate. The measuring device is adjusted as necessary when the calibration certificated is issued.

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

Temperature

ISO WPT
incl. 1 measurement point
(Please specify an inspection point)

additional measurement point
(from -30 ... +500 °C)
(Please specify an inspection point)

additional measurement point
(-90 ... -30 and +500 ... +1300 °C)
(Please specify an inspection point)

additional measurement point
-196 °C

ISO-WPT2A
Art. no. 602583
ISO Certificate of calibration with standard values:
0 °C / +70 °C

ISO-WPT2B
Art. no. 602584
ISO Certificate of calibration with standard values:
0 °C / +37 °C

ISO-WPT3
Art. no. 602596
ISO Certificate of calibration with standard values:
-20 °C / 0 °C / +70 °C

Pressure

ISO-WPD5
Art. no. 602514
ISO Certificate of calibration: 5 points ascending, 5 points descending

ISO-WPD10
Art. no. 602565
ISO Certificate of calibration: 10 points ascending, 10 points descending

Humidity

ISO-WPF4
Art. no. 602543
ISO Certificate of calibration incl. standard-measuring values (approx. 20 % / 40 % / 60 % / 80 % RH increasing and decreasing; measurement point Temperature: approx. +23 °C)

ISO-80CL
Art. no. 607734
ISO Certificate of calibration humidity (measuring values (approx. 20 / 40 / 60 / 80 % at 23 °C), pressure 5 points increase and 5 points decrease

Atmospheric Oxygen

ISO-WPO3
Art. no. 602816
ISO Certificate of calibration with 3 points:
0 / 20.9 / 100 % O_2
Note: a replacement of the sensor, before issue the WPO3, is recommended for sensors with an age of one year!

Conductivity

ISO-WPL3
Art. no. 602622
ISO Certificate of calibration with 3 points:
~147 µS/cm, ~1413 µS/cm, ~12.90 mS/cm

ISO-WPL10
Art. no. 602623
ISO Certificate of calibration with 10 points from 0.9 µS/cm to ~192 mS/cm

Ultrapure Water

ISO-WPL3-RW
Art. no. 602624
ISO Certificate of calibration with 3 points:
~2,50 µS/cm, ~7,00 µS/cm, ~15,00 µS/cm

pH

ISO-WPP3
Art. no. 602767
ISO Certificate of calibration with 3 points:
4.00 pH, 6.87 pH, 9.18 pH

ISO-WPP10
Art. no. 602768
ISO Certificate of calibration with 10 points from 1.09 pH ... 12.75 pH

3. DAkkS calibration certificates

DAkkS calibration certificates always conform to the formal, layout and procedural requirements specified in the standards and rules of the German Accreditation Association in accordance with DIN EN ISO 17025.

Temperature

DAkkS-T
(incl. 1 measurement point)
(Please specify an inspection point)

weitere Prüfpunkte
(from -80 ... +1400 °C)
(Please specify an inspection point)

additional measurement point
-196 °C

Pressure

DAkkS-P
Art. no. 602731
Over pressure -1 ... 100 bar
(incl. 9 points increase and decrease)

DAkkS-PA
Art. no. 602758
Absolute pressure 0 ... 70 bar
(incl. 9 points increase and decrease)

Further measuring ranges upon request

Humidity (incl. 1 temperature value)

DAkkS-FE
Art. no. 602871
for devices with external sensor
(Testing points: 15 % RH and 70 % RH / at 23 °C)

DAkkS-F
Art. no. 602870
for devices with fixed attached sensor
(Testing points: 20 % RH, 50 % RH and 80 % RH / at 23 °C)

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

Background knowledge in temperature measurement

Resistance: Pt100, Pt1000
The sensor element's ohmic resistance changes with temperature. This can be evaluated by the displaying device and afterwards converted to the corresponding temperature. Especially for Pt100 one distinguishes between 2-, 3- and 4-wire connection.
The 3- and 4-wire connection allows for automatic compensation of measuring error caused by the serial cable resistance.

Features:
- Highest accuracies possible
- High reproducibility of results with exchanged sensors, especially for Pt100 and Pt1000
- Standard measuring method for reference measurements

CONCLUSION: a little slower, but highly precise

Application:	GMH 3710	GMH 3750	GMH 2710-T / -E	GMH 2710-K / -G	GMH 2710-F / -I	GTH 175 PT-T / -E	GTH 175 PT-K / -G	G 1700	G 1710/20/30	GMH 285-KB / -BNC
Reference- / precision measurement	●	●								
Quality management	●	●	●	●	●	●	●	●	●	●
Difference measurement										
Surface measurement										
Core temperature measurement	●	●		●	●	●	●	●	●	●
High-temperature measurement	●	●								
Food, HACCP	●	●	●	●	●	●	●	●	●	
Water-proof			●	●	●			●	●	
Equipment:										
Sensor element	Pt100	Pt100	Pt1000	Pt1000	Pt1000	Pt1000	Pt1000	Pt1000	Pt1000	Pt1000
(max.) Meas. range [°C]	-200 ... +850	-200 ... +850	-200 ... +200	-200 ... +250	-70 ... +250	-199 ... +199	-199 ... +199	-200 ... +450	-70 ... +250	-200 ... +400
Resolution [°C]	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0,1	0,1	0.1
Plug-in probe	●	●						●		●
Measurement inputs	1	1	1	1	1	1	1	1	1	1
Min/Max, Hold, Auto-Off	●	●	●	●	●			●	●	●
Alarm (buzzer) / Data logger		●						● / -	● / -	● / -
Device information:										
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TEMPERATURE

Thermocouple: type K, type N, type S,...
The contact of two different metal compositions (e.g. NiCr and Ni) results in a voltage between contact spot (probe) and the displaying device. This voltage is almost proportional to the temperature difference and gets evaluated and converted to a temperature by the displaying device.

Features:
- Very small sensors are possible, therefore:
  - Very short response times possible
  - Highly suitable for surface measurements
- Temperatures up to 1750 °C can be measured
(depending on design of probe and type of used thermocouple)

CONCLUSION: very fast, very flexible and wide measuring range

Application:	GMH 175	GTH 200 air	GMH 3210	GMH 3230	GMH 3250	HD 32-8-16	GTH 1150	GMH 1150	GTH 1170	GMH 1170
Reference- / precision measurement						●				
Quality management	●		●	●	●	●			●	●
Difference measurement				●	●	●				
Surface measurement			●	●	●	●	●	●	●	●
Core temperature measurement	●		●	●	●		●	●	●	●
High-temperature measurement			●	●	●	●	●	●	●	●
Food, HACCP			●	●	●					
Water-proof										
Equipment:										
Sensor element	Pt1000	Pt1000	J, K, N, S, T	J, K, N, S, T	J, K, N, S, T	K, J, T, N, R, S, B, E	K	K	K	K
(max.) Meas. range [°C]	-199 ... +199	-25 ... +70	-220 ... +1750	-220 ... +1750	-220 ... +1750	-200 ... +1800	-50 ... +1150	-50 ... +1150	-65 ... +1150	-65 ... +1150
Resolution [°C]	0,1	0,1	0,1	0,1	0,1	0,05	1	1	1	1
Plug-in probe	●		●	●	●	●	●	●	●	●
Measurement inputs	1	1	1	2	2	16	1	1	1	1
Min/Max, Hold, Auto-Off		●	●	●	●	●			●	●
Alarm (buzzer) / Data logger					●					
Device information:										
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Pt100 - High-Precision Thermometer

HIGHLIGHTS:

- *Reference meter for any calibration requirement*
- *Highest accuracy*
- *Resolution (0.01 °C)*
- *Incl. calibration protocol*

ADDITIONAL FUNCTIONS AT GMH 3750:

ALARM LOGG

GMH 3710

Art. no. 600332

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

GMH 3750

Art. no. 600335

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

Application:

Reference measuring device in liquids, soft media, air/gases.

Specifications:

Measuring range:	-199.99 ... +199.99 °C resp. -200.0 ... + 850.0 °C -199.99 ... +199.99 °F resp. -328.0 ... +1562.0 °F
Resolution:	0,01 °C resp. 0,1 °C; 0,01 °F resp. 0,1 °F
Linearisation:	Curve according to DIN EN 60751. GMH 3750 add. supports an userdefined curve.
Accuracy: **(±1 digit) (at nominal temperature = 25 °C)**	≤ 0.03 °C / 0.06 °F at resolution 0.01° ≤ 0.1 °C / 0.2 °F at resolution 0.1°
Temperature drift:	≤ 0.002 °C / K
Input:	probe connection via 4-pin miniature DIN-plug, Pt100, 4-wire, in acc. to DIN EN 60751
Nominal temperature:	25 °C
Working temperature:	-25 ... +50 °C
Relative humidity:	0 ... +95 % RH (non-condensing)
Storage temperature:	-25 ... +70 °C
Display:	two 4½ digit LCDs (12.4 mm or 7 mm high), as well as additional arrows.
Pushbuttons:	6 membrane keys
Output:	3-pin jack connector Ø 3.5 mm, choice between serial interface or analog output
serial interface:	direct connection to RS232 or USB interface of a PC via electrically isolated interface adapter GRS 3100 or GRS 3105 resp. USB 3100 N (p.r.t. accessories).
analog output:	0 ... 1 V, freely adjustable (resolution 13 bit, accuracy 0.05 % at nominal temperature)
Power supply:	9 V-battery, as well as additional d.c. connector for external 10.5-12 V voltage supply.
Power consumption:	approx. 1 mA, approx. 300 h
Housing:	Impact-resistant ABS plastic housing, membrane keyboard, transparent panel, integrated pop-up clip
Dimensions:	142 x 71 x 26 mm (H x W x D)
Weight:	approx. 155 g
Scope of supply:	Device, battery, calibration protocoll, manual

additional at GMH 3750:

Userdefined sensor curve:
(50 interpolation points)

Logger function
manual: 99 data sets (fetch data via buttons or interface)
cyclic: 16.384 data sets (fetch data via interface)
adjustable cycle time: 1 s … 1 h
The logger is started or stopped by keypad or interface. The software GSOFT3050 (see accessories) is available for comfortable read-out of logger data.

Accessories and spare parts:

USB 3100 N
Art. no. 601092
interface converter

GSOFT 3050
Art. no. 601336
operating software (p.r.t. page 97)

GNG 10 / 3000
Art. no. 600273
power supply

ST-R1
Art. no. 601066
device protection bag (p.r.t. page 93)

GKK 1100
Art. no. 601060
case (340 x 275 x 83 mm) with foam lining for universal use

GMHKonfig
(visit our homepage: Download --> Software)
Software description:
Comfortable software to edit the user defined sensor curve of the GMH 3750.
(e.g. for calibration laboratories etc.)

Note:
please note that for the interface communication with the device a interface converter (USB 3100 N) is necessary (p.r.t. page 94).

Suitable Pt100 Measuring Probe (4-wire)

Accuracy Pt100:

sensor accuracy acc. to DIN EN 60751

DIN cl. B: (area of validity: -50 ... +500 °C)	±0.3 °C at 0 °C
DIN cl. A: (area of validity: -30 ... +300 °C)	±0.15 °C at 0 °C
DIN cl. AA = 1/3 DIN cl. B: (0 ... +150 °C)	±0.1 °C at 0 °C
1/10 DIN cl. B:	±0.03 °C at 0 °C

Upcharges special designs:

longer probe tube
upcharge per further starting 100 mm
longer cable (silicone)
upcharge per further starting meter
other cable material
upcharge per meter
teflon covered probe tube
(for probes up to 200 mm)
(for probes used in acids and salt water, upper temperature range 250 °C)
waterproof probe handle
(casted, only possible with PVC cable -20 ... +105 °C)
higher sensor accuracy:
DIN cl. AA, for Pt100, tolerances: 0.1 °C at 0 °C
higher sensor accuracy:
1/10 DIN class B, for Pt100-probes, tolerances: 0.03 °C at 0 °C

basic fee for custom made probe

-50 °C / +400 °C

GTF 401

Art. no. 600377
Immersion probe for liquids / gases
-50 ... +400 °C, DIN cl. B

-50 °C / +400 °C

GTF 401 DIN Kl. AA

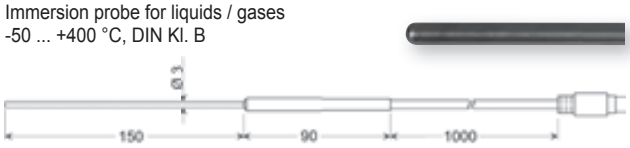
Art. no. 600378
Immersion probe for liquids / gases
-50 ... +400 °C, DIN cl. AA (±0,1 °C at 0 °C)

non-corrosive stainless steel tube (V4A) Ø 3 mm, plastic handle, anti-buckling glanding, approx. 1 m 4-wire PVC cable, 4-pin miniature DIN-type plug
Response time T_{90} water 0.4 m/s approx. 10 s, air 1 m/s approx. 40 s

-50 °C / +400 °C

GTF 35

Art. no. 600391
Immersion probe for liquids / gases
-50 ... +400 °C, DIN Kl. B



non-corrosive stainless steel tube (V4A) Ø 3 mm, shrink sleeving, approx. 1 m 4-wire PVC cable, 4-pin miniature DIN-type plug
Response time T_{90} water 0.4 m/s approx. 10 s, air 1 m/s approx. 40 s

-50 °C / +400 °C

GES 401

Art. no. 600384
Insertion probe for soft media
-50 ... +400 °C, DIN cl. B

-50 °C / +400 °C

GES 401 DIN Kl. AA

Art. no. 600385
Insertion probe for soft media
-50 ... +400 °C, DIN cl. AA (±0.1 °C at 0 °C)

stainless steel tube (V4A) Ø 3 mm with needle type prod, plastic handle, anti-buckling glanding, approx. 1 m 4-wire PVC cable, 4-pin miniature DIN-type plug
Response time T_{90} water 0.4 m/s approx. 10 s, air 1 m/s approx. 40 s

Advantages of sheath element Pt100:
- high temperature resistance
- sheath cable is bendable
- high shock resistance
- high service life

-50 °C / +400 °C

GTF 401 / 1.6

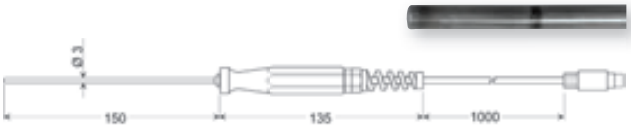
Art. no. 602066
Immersion probe with sheath element Pt100
-50 ... +400 °C, DIN cl. B

V4A sheath tube bendable, Ø 1.6 mm, plastic handle, antikink connection, approx. 1 m 4-pole cable, mini-DIN plug
Response time T_{90} water 0.4 m/s < 2 s, air 1 m/s approx. 25 s

-50 °C / +400 °C

GTF 401 1/10 DIN

Art. no. 600379
Immersion probe with sheath element Pt100
-50 ... +400 °C, 1/10 DIN cl. B (±0.03 °C at 0 °C)



stainless steel tube (V4A) Ø 3 mm, plastic handle, anti-buckling glanding, approx. 1 m 4-wire PVC cable, 4-pin miniature DIN-type plug
Response time T_{90} water 0.4 m/s < 5 s, air 1 m/s approx. 60 s

-200 °C / +600 °C

GTF 601

Art. no. 600387
Immersion probe with sheath element Pt100
-200 ... +600 °C, DIN cl. B

-200 °C / +600 °C

GTF 601 DIN Kl. AA

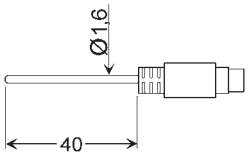
Art. no. 600388
Immersion probe with sheath element Pt100
-200 ... +600 °C, DIN cl. AA (±0.1 °C at 0 °C)

V4A-flecible jacket tube, Ø 3 mm, plastic handle, anti-buckling glanding, approx. 1 m 4-wire PVC cable, 4-pin miniature DIN-type plug
Response time T_{90} water 0.4 m/s < 5 s, air 1 m/s approx. 60 s

-25 °C / +70 °C

GLF 401 Mini

Art. no. 600395
Ambient air probe
-25 ... +70 °C, DIN cl. A

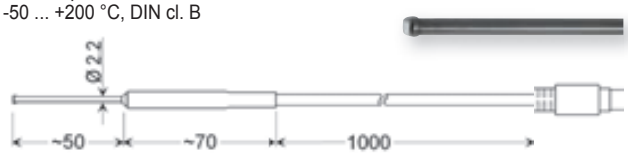


V4A tube Ø 1.6 mm, FL = approx. 40 mm, 4-pin mini DIN-type plug
Response time T_{90} air 1 m/s approx. 25 s

-50 °C / +200 °C

GOF 401 Mini

Art. no. 600396
Surface probe for solid surfaces
-50 ... +200 °C, DIN cl. B



Frontal Pt100 ceramic plate 2 x 2.3 mm, V4A tube Ø 2.2 mm, approx. 1 m 4-wire PVC cable, 4-pin miniature DIN-type plug
Response time T_{90} approx. 15 s

Calibrated Systems Pt 100

General:

The overall error of a measuring consists of the sum of the instrument error and the probe error. To minimize the overall error, we offer calibrated and optimized systems below.
Due to their excellent system accuracy they are especially suitable for quality assurance according to ISO9000ff, as reference instruments in manufacturing processes, laboratory, service and maintenance, etc.
The system optimization is done via a special characteristic curve which is determined for each temperature probe separately and stored in the instrument (GMH 3750) or with probe adjusting via offset and slope input (GMH 3710). Because of the low measuring current there is no self heating effect of the sensor (thermovoltage compensation).

GMH 3750 / SET1

Art. no. 602690
Measuring set incl. ISO certificate of calibration

Specifications:	
optimized measuring range:	-20 ... +70 °C
Temperature probe:	GTF 401 DIN Kl. AA, Pt100, 4-wire
System accuracy:	better than 0.07 °C (at opt. range)
Calibration points:	-20 °C / 0 °C / +70 °C

GMH 3750 / SET2

Art. no. 602691
Measuring set incl. ISO certificate of calibration

Specifications:	
optimized measuring range:	0 ... +250 °C
Temperature probe:	GTF 401 DIN Kl. AA, Pt100, 4-wire
System accuracy:	better than 0.3 °C (at opt. range)
Calibration points:	0 °C / 100 °C / 250 °C

GMH 3710 / SET1

Art. no. 602687
Measuring set incl. ISO certificate of calibration

Specifications:	
optimized measuring range:	-20 ... +70 °C
Temperature probe:	GTF 401 DIN Kl. AA, Pt100, 4-wire
System accuracy:	better than 0.1 °C (at opt. range)
Calibration points:	-20 °C / 0 °C / +70 °C

GMH 3710 / DKD1

Art. no. 602689
Measuring set incl. DAkkS calibration certificate DIN 17025

Specifications:	
optimized measuring range:	-20 ... +70 °C
Temperature probe:	GTF 401 DIN Kl. AA, Pt100, 4-wire
System accuracy:	better than 0.1 °C (at opt. range)
Calibration points:	-20 °C / 0 °C / +70 °C

Scope of supply:

Measuring device GMH 3750 or GMH 3710, temperature probe GTF 401 DIN Kl. AA, plastic case GKK 3500 and ISO certificate of calibration with 3 calibration points.

Precision Thermometer Pt 1000

GMH 175

Art. no. 600054
Precision Thermometer with 3.5 mm jack connector, without accessories, Battery/mains operation, for plug-in probes, Pt1000 2-wire

Application:

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

Specifications:	
Measuring range:	-199.9 ... +199.9 °C
Resolution:	0.1 °C
Accuracy: (at nominal temperature = 25 °C)	
Device:	0.1 °C ±1 digit (within range of: -70.0 ... +199.9 °C)
Display:	3½ digit, LCD display approx. 13 mm high
Working temperature:	-30 ... +45 °C (low temperature - for use in cold storage rooms!)
Storage temperature:	-30 ... +70 °C
Power supply:	9 V-Battery (included) as well as additional d.c. connector for external 10.5-12 V direct voltage supply. (suitable power supply: GNG10/3000)
Battery life:	approx. 200 operating hours
Housing:	impact resistant ABS plastic case, membrane keyboard, transparent panel, integrated pop-up clip
Dimensions:	approx. 142 x 71 x 26 mm (H x W x D)
Weight:	approx. 160 g (incl. battery)
Scope of supply:	Device, battery, manual

Accessories and spare parts:

GB 9 V
Art. no. 601115
spare battery

ST-R1
Art. no. 601066
device protection bag with cut-out for probe connection

Resistance temperature measurement Pt1000

GHM 285-KB

HIGHLIGHTS:

- *Background illumination*
- *Alarm function*

GMH 285-KB

Art. no. 605506

Alarm thermometer with 3.5 mm jack socket, without accessories

GMH 285-BNC

Art. no. 605507

Alarm thermometer with BNC socket, without accessories

General:

High precision, alarm, backlight and many other features characterize this device as a true all-rounder. The alarm function additionally allows for acoustic monitoring of the set temperature boundaries. The serial interface in combination with GAM 3000 can be used for switching additional alarm devices or realizing basic control processes.

Application:

Highly accurate measurements over a large measuring range in liquids, soft media, air/gases. Used for e.g. measurement in agriculture, quality control, laboratory, food production, etc.

Specifications:

Measuring range:	-200.0 °C ... +400.0 °C or -200.0 °F ... +752.0 °F
Resolution:	0.1 °C or 0.1 °F
Accuracy: (at nominal temperature = 25 °C)	
Device:	±0.1 °C ±1 digit (at range from -100.0 … +200.0 °C) else ±0.1 % of m.v. ±1 digit
Measuring frequency:	2 measurements / s
Display:	4½ digit LCD display (13 mm) with additional segments, wide-area backlight, duration can be adjusted
Nominal temperature:	25 °C
Working temperature:	-25 ... +50 °C
Storage temperature:	-25 ... +70 °C
Power supply:	9 V battery (included) or additionally supply socket for external 10.5-12 V DC supply. (suitable power adapter: GNG10/3000)
Battery life:	
Current measurement:	< 0,20 mA (battery lifetime with alkaline battery more than 1500 hours!)
Backlight:	<5 mA, if ‚BAT'-warning is active it gets automatically switched off
Housing:	impact-resistant ABS, membrane keypad, transparent panel, integrated pop-up clip for table top or suspended use
Dimensions:	without BNC socket: 142 x 71 x 26 mm (H x W x D) BNC socket: approx. 13 mm long
Weight:	approx. 170 g (incl. battery)
Scope of supply:	Device, battery, manual

Accessories and spare parts:

GAM 3000
Art. no. 601132
Switching module for devices of the GMH3xxx series with alarm output

ST-R1
Art. no. 601066
device protection bag with cut-out for probe connection

GKK 252
Art. no. 601056
with foam lining for universal use (235 x 185 x 48 mm)

Soil thermometer

SoilTemp 285

Art. no. 605849

Soil thermometer

General:

The universal display device combined with an extremely robust, but yet ergonomic T-handle probe made of stainless steel allows for multiple measurements in soils or bulk materials.

Application:

Silo checking, measurements in soils, waste dumps, silages, compost, etc. The alarm function additionally allows for acoustic monitoring of the selected temperature boundaries. The serial interface in combination with GAM 3000 can be used for switching additional alarm devices or realizing basic control processes. The device is also supplied by the GAM 3000: continuous operation possible.

Specifications:

Device:	GMH 285-BNC
Probe connection:	BNC, Pt1000, 2-wire
Measuring range:	-50.0 … +250.0 °C
Measuring rod:	Stainless steel, 1000 mm x Ø 10 mm, 1 m connection cable with BNC plug, 350 g, probe handle designed for comfortable use
Scope of supply:	Device, GTF 40 T, battery, manual

Accessories and spare parts:

GMH 285-BNC
Art. no. 605507
Alarm thermometer with BNC socket

GTF 40 T-620
Art. no. 606803
Stainless steel insertion probe, FL 620 mm, with 1 m cable and BNC plug

GTF 40 T-1000
Art. no. 606791
Stainless steel insertion probe, FL 1000 mm, with 1 m cable and BNC plug

GTF 40 T-1500
Art. no. 606792
Stainless steel insertion probe, FL 1500 mm, with 1 m cable and BNC plug

GAM 3000
Art. no. 601132
Switching module for devices of GMH3xxx series with alarm output

ST-R1-US
Art. no. 605929
Device protection bag with cut-outs for sensor connector with strap

Suitable Pt1000 - Measuring probes, 2-wire

ALL PROBES AVAILABLE
ALSO WITH BNC-CONNECTOR

Accuracy Pt1000:

sensor accuracy acc. to DIN EN 60751

DIN cl. B: (area of validity: -50 ... +500 °C)	±0.3 °C at 0 °C
DIN cl. A: (area of validity: -30 ... +300 °C)	±0.15 °C at 0 °C
DIN cl. AA = 1/3 DIN cl. B: (0 ... +150 °C)	±0.1 °C at 0 °C
1/10 DIN cl. B:	±0.03 °C at 0 °C

Upcharges special designs:

longer probe tube
upcharge per further starting 100 mm
longer cable (silicone)
upcharge per further starting meter
other cable material
upcharge per meter
teflon covered probe tube
(for probes up to 200 mm)
(for probes used in acids and salt water, upper temperature range 250 °C)
waterproof probe handle
(casted, only possible with PVC cable -20 ... +105 °C)
higher sensor accuracy:
DIN cl. AA, for Pt1000, tolerances: 0.1 °C at 0 °C
higher sensor accuracy:
1/10 DIN class B, for Pt1000-probes, tolerances: 0.03 °C at 0 °C

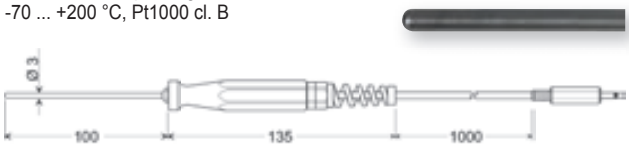
basic fee for custom made probe

All types of probes also available for Pt100 2- / 3- or 4-wire connection
We manufacture all types of probes according to your special desires - low priced and fast. Please contact us.

-70 °C
+200 °C

GTF 175

Art. no. 600423
Immersion for liquids / gases
-70 ... +200 °C, Pt1000 cl. B



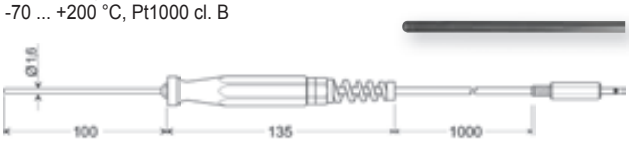
non-corrosive V4A tube, Ø 3 mm, plastic handle, anti-buckling glanding, 1 m highly flexible silicone cable, 3.5 mm gold plated jack connector
Response time T_{90}: water 0.4 m/s < 2 s, air 2 m/s approx. 40 s

Advantages of sheath element Pt1000:
- high temperature resistance
- sheath cable is bendable
- high shock resistance
- high service life

-70 °C
+200 °C

GTF 175 / 1.6

Art. no. 600424
Immersion probe with sheath element Pt1000
-70 ... +200 °C, Pt1000 cl. B

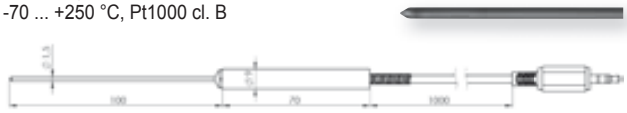


stainless steel tube (V4A), flexible, Ø 1,6 mm, plastic handle, anti-buckling glanding, 1 m highly flexible silicone cable, 3.5 mm gold plated jack connector
Response time T_{90}: water 0.4 m/s < 2 s, air 2 m/s approx. 25 s

-70 °C
+250 °C

GES 20

Art. no. 606787
Insertion probe for soft media
-70 ... +250 °C, Pt1000 cl. B

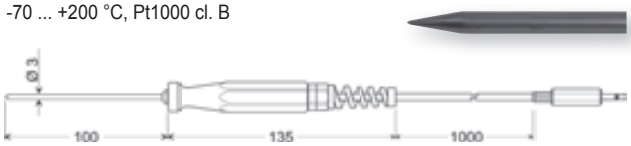


V4A tube with Ø 1.5 mm slim insertion tip, small teflon handle, stainless steel kink protection, 1 m Teflon cable, Ø 3.5 mm gold-plated jack plug
Response time T_{90}: water 0.4 m/s < 1 s, air 2 m/s approx. 12 s

-70 °C
+200 °C

GES 175

Art. no. 600431
Insertion probe for soft media
-70 ... +200 °C, Pt1000 cl. B



V4A tube Ø 3 mm with slim insertion tip, plastic handle, anti-buckling glanding, 1 m highly flexible silicone cable, 3.5 mm gold plated jack connector
Response time T_{90}: water 0.4 m/s < 2 s, air 2 m/s approx. 40 s

-70 °C
+200 °C

GLF 175

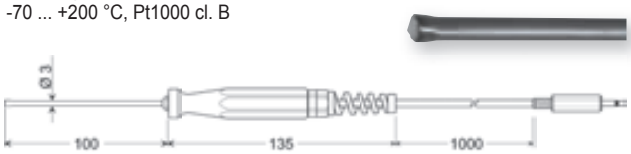
Art. no. 600438
Air/gas probe for clean media
-70 ... +200 °C, Pt1000 cl. B

(for dirty measurands use GTF 175), punched V4A protection tube, fast miniaturized Pt1000 mounted freely in tube, resulting in fast response, plastic handle, anti-buckling glanding, 1 m highly flexible silicone cable, 3.5 mm gold plated jack connector
Response time T_{90}: air 2 m/s approx. 15 s

-70 °C
+200 °C

GOF 175

Art. no. 600433
Surface probe for solid surfaces
-70 ... +200 °C, Pt1000 cl. B

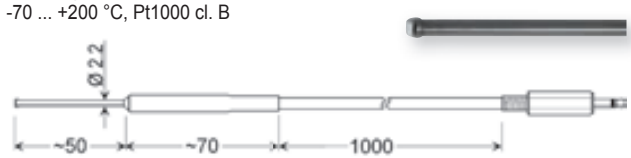


2 x 2.3 mm ceramic Pt1000 sensor mounted at the tip, V4A tube, quadratic 3 x 3 mm at the tip, plastic handle, anti-buckling glanding, 1 m highly flexible silicone cable, 3.5 mm gold plated jack connector
Response time T_{90}: approx. 15 s

-70 °C
+200 °C

GOF 175 Mini

Art. no. 600436
Surface probe for solid surfaces
-70 ... +200 °C, Pt1000 cl. B

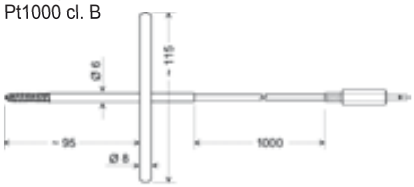


2 x 2.3 mm ceramic Pt1000 sensor mounted at the tip, V4A tube Ø 2.2 mm, 1 m highly flexible silicone cable, 3.5 mm gold plated jack connector
Response time T_{90}: approx. 15 s

-70 °C
+200 °C

GGF 175

Art. no. 601341
Probe for deep-frozen products
-70 ... +200 °C, Pt1000 cl. B



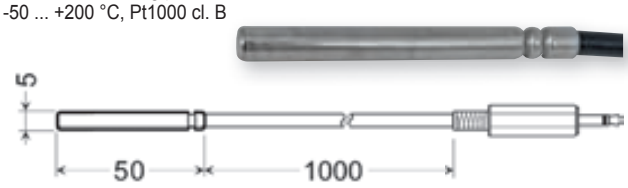
to screw into deep-frozen products, etc. no predrilling required. V4A tube, 6 mm Ø with screw prod, 1 m highly flexible silicone cable, 3.5 mm gold plated jack connector
Response time T_{90}: approx. 15 s

Suitable Pt1000 - Measuring probes, 2-wire

ALL PROBES AVAILABLE
ALSO WITH BNC-CONNECTOR

-50 °C / +200 °C

GTF 2000
Art. no. 604659
Air- / tube mounting probe
-50 ... +200 °C, Pt1000 cl. B



V4A-sensor sleeve Ø 5 mm, 1 m highly flexible silicone cable, 3.5 mm gold plated jack connector, each beginning meter upcharge
Response time T_{90}: water 0.4 m/s < 10 s, air 2 m/s approx. 60 s

Variant :

GTF 2000-WD
Art. no. 602362
water proof type, construction like described before, but cable of PVC and tube enclosed water proof. Max. 105 °C!

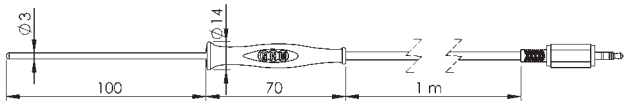
HIGHLIGHTS:

- *Lightweight, manageable handle with optimised ergonomics and flexible cable*
- *Waterproof: can be completely immersed*
- *Temporary temperature resistance of up to 250 °C*

-70 °C / +250 °C

GF 1T-T3-B
Art. no. 609545
Pt1000 handle-probe
-70 ... +250 °C, Pt1000 cl. B

GF 1T-T3-AA
Art. no. 609546
Precision Pt1000 handheld sensor
-70 ... +250 °C, Pt1000 Class AA



Immersion probe Ø 3 mm made of V4A tube, black silicone handle up to +250 °C, 1 m Silicone cable up to +230 °C continuously / +250 °C for 2 h, sensor probe and silicone handle IP67, Ø 3.5 mm gold-plated jack
Response time T_{90}: Water 0.4 m/s <2 s, air 2 m/s approx. 40 s

Variants:

GF 1T-T3-B-LE
Art. no. 609547
Pt1000 handheld sensor, Pt1000 Class B, with loose ends

GF 1T-T3-AA-LE
Art. no. 609548
Precision Pt1000 handheld sensor, Pt1000 Class AA, with loose ends

GF 1T-T3-B-BNC
Art. no. 609549
Pt1000 handheld sensor, Pt1000 Class B, with BNC connector

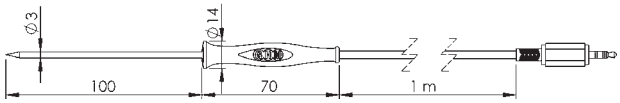
GF 1T-T3-AA-BNC
Art. no. 609550
Precision Pt1000 handheld sensor, Pt1000 Class AA, with BNC connector

-70 °C / +250 °C

GF 1T-E3-B
Art. no. 609635
Pt1000 insertion sensor
-70 ... +250 °C, Pt1000 Class B

NEW!

GF 1T-E3-AA
Art. no. 609636
Precision Pt1000 insertion sensor
-70 ... +250 °C, Pt1000 Class AA



Insertion probe Ø 3 mm made of V4A tube, black silicone handle up to +250 °C, 1 m silicone cable up to +230 °C continuously / +250 °C for 2 h, sensor probe and silicone handle IP67, Ø 3.5 mm gold-plated jack
Response time T_{90}: Water 0.4 m/s <2 s, air 2 m/s approx. 40 s

Variants:

GF 1T-E3-B-LE
Art. no. 609637
Pt1000 insertion sensor, Pt1000 Class B, with loose ends

GF 1T-E3-AA-LE
Art. no. 609638
Precision Pt1000 insertion sensor, Pt1000 Class AA, with loose ends

GF 1T-E3-B-BNC
Art. no. 609639
Pt1000 insertion sensor, Pt1000 Class B, with BNC connector

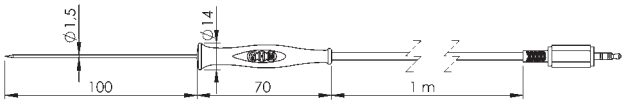
GF 1T-E3-AA-BNC
Art. no. 609640
Precision Pt1000 insertion sensor, Pt1000 Class AA, with BNC connector

-70 °C / +250 °C

GF 1T-E1.5-B
Art. no. 609641
Extra-thin Pt1000 insertion sensor
-70 ... +250 °C, Pt1000 Class B

NEW!

GF 1T-E1.5-A
Art. no. 609642
Extra-thin Pt1000 insertion sensor
-70 ... +250 °C, Pt1000 Class A



Insertion probe Ø 1.5 mm made of V4A tube, black silicone handle up to +250°C, 1 m silicone cable up to +230°C continuously / +250°C for 2 h, sensor probe and silicone handle IP67, Ø 3.5 mm gold-plated jack
Response time T_{90}: Water 0.4 m/s <1 s, air 2 m/s approx. 12 s

Variants:

GF 1T-E1.5-B-LE
Art. no. 609643
Extra-thin Pt1000 insertion sensor, Pt1000 Class B, with loose ends

GF 1T-E1.5-A-LE
Art. no. 609644
Extra-thin Pt1000 insertion sensor, Pt1000 Class A, with loose ends

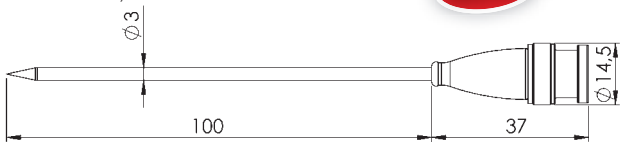
GF 1T-E1.5-B-BNC
Art. no. 609645
Extra-thin Pt1000 insertion sensor, Pt1000 Class B, with BNC connector

GF 1T-E1.5-A-BNC
Art. no. 609646
Extra-thin Pt1000 insertion sensor, Pt1000 Class A, with BNC connector

-70 °C / +250 °C

GF 2T-E3-B-BNC
Art. no. 609926
Pt1000 insertion sensor, BNC connector, without cable
-70 ... +250 °C, Pt1000 Class B

NEW!

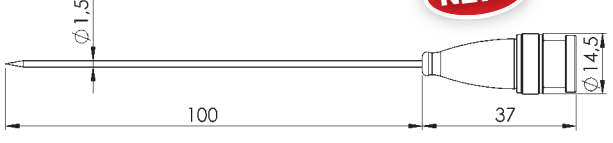


Insertion probe Ø 3 mm made of V4A tube, IP67 in connected state, BNC connector with EPDM grommet up to +75 °C
Response time T_{90}: Water 0.4 m/s <2 s, air 2 m/s approx. 40 s

-70 °C / +250 °C

GF 2T-E1.5-A-BNC
Art. no. 609824
Pt1000 insertion sensor, BNC connector, without cable;
-70 ... +250 °C, Pt1000 Class A

NEW!



Insertion probe Ø 1.5 mm made of V4A tube, IP67 in connected state, BNC connector with EPDM grommet up to +75 °C
Response time T_{90}: Water 0.4 m/s <1 s, air 2 m/s approx. 12 s

Water-proof HACCP thermometer with Pt1000 probe

HIGHLIGHTS:

- *Easy handling*
- *Battery life time > 6000 hours*
- *Device and probe are Water-proof and very robust*
- *Incl. calibration protocoll*

GMH 2710-T
Art. no. 602034
Temperature measuring device incl. universal probe

GMH 2710-E
Art. no. 602036
Temperature measuring device incl. insertion probe

GMH 2710-K
Art. no. 602038
Temperature measuring device incl. Teflon insertion probe

GMH 2710-G
Art. no. 602040
Temperature measuring device incl. mini Teflon probe

GMH 2710-F
Art. no. 604035
Single-hand temperature measurement device with integrated immersion probe

GMH 2710-I
Art. no. 604611
Single-hand temperature measurement device with integrated insertion probe

General:

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

Application:

Food (HACCP), medical / pharmaceutical science, chemistry, aquaristics, fish farming, aquaculture, etc.
GMH 2710-F/-I:
Optimal for measurements at places difficult to access, e.g.
• storage temperature control (especially food)
• temperature control for food measurements (HACCP)
• incoming inspection
• temperature measurements as part of legionellae tests
These measurements may cause problems with ordinary thermometers.

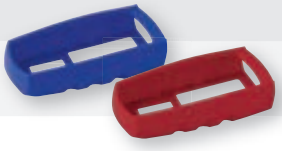
Specifications:

Measuring range:	
GMH 2710-T / -E	-199.9 ... +200.0 °C
GMH 2710-K / -G	-199.9 ... +250.0 °C
GMH 2710-F / -I	-70 ... +250 °C
Resolution:	0.1 °C
Accuracy:	
at -20.0 ... +100.0 °C	±0.1 °C ±1 digit
at -70.0 ... +200.0 °C	±0.1 % of meas. value ±2 digit, sensor calibrated with device
Probe:	Pt1000, 2-wire, isolated water- and steam-proof, permanently connected to device
GMH 2710-T	plastic handle 135 mm long 1 m PVC cable (max 100 °C) Ø 3 mm / length: 100 mm
GMH 2710-E	plastic handle 135 mm long, additionally with slim insertion tip for all soft media. 1 m PVC cable (max 100 °C) Ø 3 mm / length: 100 mm
GMH 2710-K	design type with big Teflon handle and 1 m Teflon cable, with slim insertion tip, handle and cable are resistant to temperatures up to 250 °C air temperature. Stainless steel kink protection, Ø 3 mm / length: 100 mm
GMH 2710-G	design type with small Teflon handle and 1 m Teflon cable, with slim insertion tip, handle and cable are suitable for permanent application at temperatures up to 250 °C. Stainless steel kink protection, Ø 1.5 mm / length: 100 mm
GMH 2710-F	V4A mantle tube, bendable, Ø 3 mm, length 150 mm
GMH 2710-I	V4A mantle tube with needle-shaped insertion tip, bendable, Ø 3 mm, length 150 mm
Response time T_{90}:	approx. 10 s
Display:	two 4-digit LCD (12.4 mm and 7 mm)
Nominal temperature:	+25 °C
Working temperature:	-25 ... +50 °C
Storage temperature:	-30 ... +70 °C
Power supply:	2 x AAA batteries
Battery life:	> 6000 hours
Protection class:	IP65 / IP67
Housing:	Housing made of impact-resistant ABS
Dimensions:	154 x 81 x 31 mm (H x W x D)
Weight:	215 g (incl. battery and probe)
Scope of supply:	device incl. probe, battery, calibration protocoll, manual

Accessories and spare parts:

K 50 BL
Art. no. 601352
Silicone protection cover blue

K 50 RE
Art. no. 607456
Silicone protection cover red



Precision pocket thermometer with Pt1000 probe

GTH 175 PT-T *GTH 175 PT-E* *GTH 175 PT-K* *GTH 175 PT-G*

HIGHLIGHTS:

- *Easy handling*
- *High accuracy and precision*

GTH 175 PT-T
Art. no. 600051
Temperature measuring device incl. universal probe

GTH 175 PT-E
Art. no. 600052
Temperature measuring device incl. insertion probe

GTH 175 PT-K
Art. no. 600053
Temperature measuring device incl. Teflon insertion probe

GTH 175 PT-G
Art. no. 601836
Temperature measuring device incl. mini Teflon probe

Application:

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

Specifications:

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

Variants:

GTH 175 PT-T - WD
Art. no. 600242
GTH 175 PT-E - WD
Art. no. 602307
Probe design: water-proof
Probe with PVC cable and sealed handle (max. 100 °C).
(Not possible for GTH 175 PT-K and GTH 175 PT-G)
Special designs upon request: e.g. longer cable or probe tube.

Accessories and spare parts:

GB 9 V
Art. no. 601115
Spare battery

ST-KR
Art. no. 601082
Device protection bag with round cut-out (central)

GKK 1100
Art. no. 601060
Case (340 x 275 x 83 mm) with foam lining

Complete Solutions

GTH 175 PT-T-WPT2
Art. no. 602670
Complete solution incl. immersion probe and ISO certificate of calibration WPT2 A (0 °C / 70 °C) and case GKK 252.

GTH 175 PT-T-WPT3
Art. no. 602673
Complete solution incl. immersion probe and ISO certificate of calibration WPT 3 (-20 / 0 / +70 °C) and case GKK 252.

GTH 175 PT-E-WPT3
Art. no. 602674
Complete solution incl. insertion probe and ISO certificate of calibration WPT 3 (-20 / 0 / +70 °C) and case GKK 252.

Precise universal thermometer

HIGHLIGHTS:

- *Modern and functional housing*
- *Outstanding price/performance ratio*
- *3-line display / overhead display at the push of a button*
- *Backlighting*
- *Alarm function*
- *Waterproof (IP65 / IP67)*
- *Durable, long battery life*
- *High-quality sensors: complete with Pt1000 handheld sensor (up to 250 °C incl. handle and cable!) or alternative with connection for interchangeable sensors*

Connection G 1700

G 1700
Art. no. 609826
Precise universal thermometer, with BNC connection, without sensor

G 1710
Art. no. 609828
Precise universal thermometer with permanently connected immersion sensor, Ø 3 mm

G 1720
Art. no. 609829
Precise universal thermometer with permanently connected insertion sensor, Ø 3 mm

G 1730
Art. no. 609832
Precise universal thermometer with permanently connected insertion sensor, Ø 1.5 mm

General:

The primary focus in the development of the new GMH 1000 series was place on the essential functions of the measurement technology. Pure measurement with a focus on precision, speed and reliability packaged in a compact housing distinguish an impressive price/performance ratio, Made in Germany.
The new handheld measuring devices also impress with their ergonomic design, dust and water-protected design in accordance with IP 65/67 and the illuminated display.
The compact thermometer is available with a practical BNC connection for interchangeable sensors or as a complete device including sensor with maximum overall precision.
The device redefines our entry-level measurement class - calibration log included.
The matching sensors can be used at temperatures of up to 250 °C (incl. handle and cable) and are distinguished by their compact design and small tube diameter. Integrated: High-quality Pt1000 sensors.

Application:

The highest-precision measurements in liquids and in air, for measurement of core temperatures (with insertion sensor); sensor handle and cable temperature range of up to 250 °C (permanent use temperature of 230 °C); laboratories, quality assurance, service, food, etc.

Specifications:

Measurement range:	-70.0 ... +250.0 °C (-94.0 ... +482.0 °F) with permanently connected Pt1000 sensor; -200,0 … +450.0 °C (-328,0 ... +842.0 °F) with plug-in sensor *(Observe the permissible range of application of the sensor that is used!)*
Accuracy: (at nominal temperature = 25 °C)	
G 1700 (device only):	-20 ... +100 °C: ±0.1 K ±1 digit otherwise 0.1 % of m. v. ±2 digits
G 1710 / 20 / 30 (Device + sensor):	-20 ... +100 °C: ±0.1 K ±1 digit -70 ... +250 °C: ±0.2 % of m. v. ±2 digits
Operating conditions:	-20 ... +50 °C; 0 ... 95 % r.h. (non-condensing)
Display / backlighting:	3-line unit, with background light, protected by an unbreakable pane, overhead display at the push of a button
Power supply:	2 x AA battery, >5000 h operating time

Sensor	
G 1700:	Pt1000 2-wire can be used with BNC connection
G 1710:	Immersion sensor Ø 3 mm, Pt1000 permanent 2-wire connection, V4A, 1 m cable
G 1720:	Durable insertion sensor Ø 3 mm, Pt1000 permanent 2-wire connection, V4A, 1 m cable
G 1730:	Extra-thin insertion sensor Ø 1.5 mm, Pt1000 permanent 2-wire connection, V4A, 1 m cable
Response time:	Ø 3 mm: Water 0.4 m/s <2 s; Ø 1.5 mm: Water 0.4 m/s <1 s
Protection rating:	IP65 / IP67 (only with sensors identified as waterproof in the connected state for devices with BNC connection)
Housing:	Break-proof ABS housing
Dimensions:	108 x 54 x 28 mm (H x W x T) without sensor connection
Weight:	130 g (without sensor)
Scope of supply:	Device with integrated sensor (except for G 1700), calibration log, 2 x battery, operating manual

Accessories and spare parts:

GF 1T-T3-B-BNC
Art. no. 609549
Pt1000 handheld sensor, Pt1000 Class B, with BNC connector, Ø 3 mm

GF 1T-E3-B-BNC
Art. no. 609639
Pt1000 insertion sensor, Pt1000 Class B, with BNC connector, Ø 3 mm

GF 1T-E1.5-B-BNC
Art. no. 609645
Extra-thin Pt1000 insertion sensor, Pt1000 Class B, with BNC connector, Ø 1.5 mm

GB AA
Art.-Nr: 610049
Spare battery AA (2 batteries required)

Room thermometer

GTH 200 air

Art. no. 600251

Precision room thermometer

General:

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

Application:

The room thermometer GTH 200 air is an essential tool for fast and precise temperature measurements in
- calibration rooms
- production / computer rooms
- living space
- laboratories, etc.

Specifications:

Measuring range:	-25.0 ... +70.0 °C
Resolution:	0.1 °C
Accuracy:	(±1 digit) (at nominal temperature) ± 0.5 % of meas. value ±0.1 °C
Sensor:	Pt 1000, DIN class AA
Response time T_{90}:	approx. 5 s
Display:	4½ digit, 11 mm high LCD-display
Nominal temperature:	25 °C
Working temperature:	-20 ... +70 °C
Working humidity:	0 ... 95 % RH (non condensing)
Storage temperature:	-25 ... +70 °C
Power supply:	9 V battery
Current consumption:	max. 0.1 mA
Battery life:	approx. 6000 operating hours with alkaline battery
Housing:	impact-resistant ABS housing
Dimensions:	approx. 106 x 67 x 30 mm (H x W x D), additionally the sensor head at the front side, 35 mm long, Ø 14 mm, resulting total length 141 mm
Weight:	approx. 135 g incl. battery
Scope of supply:	device, battery, manual

Hay thermometer

HayTemp 285

Art. no. 605848

Heutemperatur-Messgerät

General:

Stored hay or straw, etc. is prone to overheating (depreciation) or even self-ignition, because of biological processes. This problem is even emphasized with higher moisture contents. Therefore a regular temperature check is crucial. The HayTemp 285 optimally supports farmers as well as firefighters in silo check.

Application:

Measurements at depth up to 4 m. The alarm function additionally allows for acoustic monitoring of the selected temperature boundaries. The serial interface in combination with GAM 3000 can be used for switching additional alarm devices or realizing basic control processes. The device is also supplied by the GAM 3000: continuous operation possible.

Specifications:

Device:	GMH 285-BNC, see page 13
Probe connection:	BNC, Pt1000, 2-wire
Measuring rod:	Fiberglass probe, approx. 4 m long, approx. 10 mm Ø, 1 measuring point at probe tip
Cutting tip:	screwable, double-edged tip with integrated temperature sensor
Weight:	Measuring rod with cutting tip approx. 600 g
Scope of supply:	Device, fiberglass rod, probe tip Pt1000, BNC cable (1.5 m), battery, manual

Accessories and spare parts:

GMH 285-BNC
Art. no. 605507
Alarm thermometer with BNC socket

Fiberglasrohr
Art. no. 604407
4 m, without probe and without tip

Sondenspitze
Art. no. 604537
with integrated temperature sensor

Kabel BNC/BNC
Art. no. 602855
Connection cable with 1.5 m length

ST-R1-US
Art. no. 605929
Device protection bag with cut-outs for sensor connector and strap

Instruments for hay and straw humidity measurements: see BaleCheck Seite 43!

Precision quick-response thermometer for thermocouples

VERY QUICK RESPONSE TIME

HIGHLIGHTS:

- *Serial interface*
- *Correction factor for surface measuring can be switched on / off*
- *Analog output 0 - 1 V at GMH 3210*

GMH 3230 AND GMH 3250:

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

ADDITIONAL FUNCTIONS

GMH 3230:	*GMH 3250:*
TARA	TARA, ALARM, LOGG, clock

GMH 3210 connection

GMH 3250 connection

suitable probes p.r.t. p. 24

GMH 3210

Art. no. 600337

GMH 3210-B

Art. no. 605131

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

Specifications:		
Thermocouples:		
GMH 3210:		J, K, N, S, T
GMH 3210-B:		B, K, N, S, T,
Resolution:		0.1 °C or 1 °C
Measuring range (depending on thermocouples):		-220 ... +1750 °C
Measuring ranges: (extract)		
Type K:	**(MB1)**	-65.0 ... +300.0 °C
	(MB2)	-220 ... +1372 °C
	GMH 3210-B:	+300 ... +1750 °C
Accuracy: (extract)		
Type K:	**(for MB1)**	±0.03 % of m.v. ±0.05 % f.s.
	(for MB2)	±0.08 % of m.v. ±0.1 % f.s.
Working temperature:		-25 ... +50 °C
Probe connections:		1
Display:		two 4-digit LCDs (12.4 mm and 7 mm high)
Output:		3-pin jack connector Ø 3.5 mm, configurable
Serial interface:		direct connection to RS232 or USB interface of a PC via electrically isolated interface adapter GRS 310x or USB 3100 N (p.r.t. accessories).
Analog output:		0 ... 1 V, freely adjustable, resolution 13 bit, accuracy 0.05 % at nominal temperature
Compensation value for surface measurements:		can be set and switched on/off if required
Power supply:		9 V-battery as well as additional d.c. connector for external 10.5-12 V direct voltage supply. (suitable power supply: GNG10/3000)
Battery life:		approx. 1000 h
Housing:		impact resistant ABS plastic case, membrane keyboard, transparent panel, integrated pop-up clip
Dimensions:		142 x 71 x 26 mm (H x W x D)
Weight:		approx. 155 g
Scope of supply:		device, battery, manual

GMH 3230

Art. no. 600339

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

GMH 3250

Art. no. 600341

Precision quick-response thermometer, accessories not included, 2 plug-in probe inputs, Data logger

Specifications:		
Thermocouples:		J, K, N, S, T
Resolution:		0.1 °C or 1 °C
Measuring range:		-220°C ... +1750°C (depending on thermocouples)
Measuring ranges: (extract)		
Type K:	**(MB1)**	-199.9 ... +999.9 °C
	(MB2)	-220 ... +1372 °C
Genauigkeit: (Auszug)		
Accuracy: (extract)		
Type K:	**(for MB1)**	±0.03 % of m.v. ±0.05 % f.s. (T ≥ -60 °C) ±0.2 % of m.v. ±0.05 % f.s. (T < -60 °C)
	(for MB2)	±0.08 % of m.v. ±0.1 % f.s. (T ≥ -100 °C) ±1 °C ±0.1 % f.s. (T < -100 °C)
Probe connections:		2
Display:		two 4-digit LCD displays (12.4 mm and 7 mm high)
Serial interface:		3-pole jack socket Ø 3.5 mm, direct connection to RS232 or USB interface of a PC via electrically isolated interface adapter GRS 310x or USB 3100 N (p.r.t. accessories).
Compensation value for surface measurements:		can be set and switched on/off if required
Difference measurements:		Temperature difference probe 1 - probe 2 can be displayed if 2 probes are connected.
Logger function:		**manual:** 99 data sets (fetch data via buttons or interface) **cyclic:** 9.999 data sets (fetch data via interface) adjustable cycle time: 1 s … 1 h The logger is started or stopped by keypad or interface. The software GSOFT 3050 (see accessories) is available for comfortable read-out of logger data.
Power supply:		9 V-battery as well as additional d.c. connector for external 10.5-12 V direct voltage supply. (suitable power supply: GNG10/3000)
Battery life:		approx. 200 h
Housing:		impact resistant ABS plastic case, membrane keyboard, transparent panel, integrated pop-up clip
Dimensions:		142 x 71 x 26 mm (H x W x D)
Weight:		approx. 155 g
Scope of supply:		device, battery, manual

Accessories and spare parts:

GB 9 V
Art. no. 601115
Spare battery 9 V

GNG 10/3000
Art. no. 600273
Plug-in power supply (220 / 240 V, 50 / 60 Hz), output voltage: 10.5 V / 10 mA, suitable for devices with power supply socket

ST-N1
Art. no. 601070
Nappa leathern device protection bag with 1 rectangular cut-out for sensor connection
suitable for: GMH 3210

ST-N2
Art. no. 601072
Nappa leathern device protection bag with 2 rectangular cut-outs for sensor connection
suitable for: GMH 3230, GMH 3250

GKK 3500
Art. no. 601052
with punched lining for 1 device (394 x 294 x 106 mm)

16 channel precision quick-response thermometer for thermocouples

HIGHLIGHTS:

- *simultanous display of 4 inputs*
- *800.000 measuring data storable*
- *for thermocouples type K, J, T, N, R, S, B, E*

HD32-8-16

Art. no. 700077

Precision quick-response thermometer without accessories, 16 interchangeable sensor inputs, with data logger

General:

Ideal for complex measuring tasks in which multiple temperatures must be detected simultaneously. Ideal for complex temperature measuring tasks in which multiple temperature values must be measured, recorded and displayed at the same time.

Application:

Testing systems, drying and baking ovens, air conditioning control units, production and manufacturing processes, temperature monitoring in concrete or asphalt on roads and buildings

Specifications:

Thermocouple:	K, J, T, N, R, S, B, E
Resolution:	0.05 °C or 0.1 °C
Measuring range (depends on thermocouple):	Type K: -200 °C … +1370 °C Type J: -100 °C … +750 °C Type T: -200 °C … +400 °C Type N: -200 °C … +1300 °C Type R: +200 °C … +1480 °C Type S: +200 °C … +1480 °C Type B: +200 °C … +1800 °C Type E: -200 °C … +750 °C
Accuracy (depends on thermocouple):	±0.1 ... ±0.4 °C
Number of inputs:	16
Operating conditions:	-5 °C ... +50 °C working temperature -25 °C ... +65 °C storage temperature 0 ... 90 % relative humidity
Logger function:	800.000 data sets
Display:	LCD display with background illumination, 128 x 64 pixel, simultanous display of 4 inputs
Serial interface:	Communication via galvanically isolated 9-pin USB connecting cable
Power supply:	4 x 1.5 V alkaline batteries, via external 12 V DC mains adapter or via PC interface
Housing:	ABS, IP64
Dimensions:	220 x 180 x 50 mm
Weight:	1100 g
Scope of supply:	Device, manual, batteries, DeltaLog9 Software, carrying strap

Accessories and spare parts:

SWD10
Art. no. 700039
(power supply, see e.g. HD-3409-2)

CP22
Art. no. 700078
Connection cable USB 2.0 for connection to PC.

Note: Connection cable for PC and temperature sensors (page 24) must be ordered sparately.

Quick response thermometer type K

GTH 1150

GMH 1150

GTH 1150

Art. no. 600047

Quick response thermometer, accessories not included, for plug-in probes

GMH 1150

Art. no. 600045

Quick response thermometer, accessories not included, 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.

Specifications:

Measuring range:	-50 ... +1150 °C
Resolution:	1 °C
Accuracy: (at nominal temperature = 25 °C)	≤1 % ±1 digit (from -20 ... +550 and 920 ... 1150 °C) ≤1.5 % ±1 digit (from 550 ... 920 °C) from -20 ... -50 °C according to attached correction table
Probe connection:	flat-pin plug (free of thermo-voltage) suitable for all NiCr-Ni probes (type K)
Display:	3½ digit, approx. 13 mm high
Working temperature:	0 ... 45 °C
Storage temperature:	-20 ... +70 °C
Power supply:	9 V battery (included), Additional at GMH 1150: d.c. connector for external 10.5-12 V direct voltage supply. (suitable power supply: GNG10/3000)
Battery life:	approx. 700 operating hours
Dimensions:	GTH ...: approx. 106 x 67 x 30 mm (H x W x D). impact resistant ABS plastic housing. GMH ...: approx. 142 x 71 x 26 mm (H x W x D). impact resistant ABS plastic housing, integrated pop-up clip
Weight:	approx. 150 g (GTH 1150), approx. 160 g (GMH 1150)
Scope of supply:	device, battery, manual

Accessories and spare parts:

GTF 300
Art. no. 600072
wire probe

additional NiCr-Ni probes (type K) **p.r.t. page from 24**

GB 9 V
Art. no. 601115
spare battery

GNG 10 / 3000
Art. no. 600273
power supply

ST-KN
Art. no. 601080
device protection bag, suitable for GTH 1150

ST-N1
Art. no. 601070
device protection bag, suitable for GMH 1150

Precision quick response thermometer Type K

GTH 1170

GMH 1170

GTH 1170

Art. no. 600000

Precision quick response thermometer, accessories not included, for plug-in probes

GMH 1170

Art. no. 600113

Precision quick response thermometer, accessories not included, for plug-in probes

Application:

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

Specifications:

Measuring ranges:	-65.0 ... +199.9 °C or -65 ... +1150 °C (-85.0 ... +199.9 °F or -85 ... +1999 °F)
Resolution:	0.1 °C or 1 °C (0,1 °F or 1 °F)
Accuracy: ±1 digit (at nom. temperature)	-65.0 ... +199.9 °C: ±0.05 % of m.v ±0.2 % FS -65 ... +1150 °C: ±0.1 % of m.v ±0.2 % FS
Temperature drift:	0.01 %/K
Point of comparison:	±0.3 °C
Probe connection:	standard flat-pin plug (free of thermo-voltage) suitable for all NiCr-Ni (type K) - probes
Display:	3½ digit, LCD display approx. 13 mm high
Working temperature:	-25 ... +50 °C
Storage temperature:	-25 ... +70 °C
Power supply:	9 V battery
Measuring interval:	approx. 3 meas. / s
Battery life:	approx. 2000 operating hours
Dimensions:	GTH ...: approx. 106 x 67 x 30 mm (H x W x D). impact resistant ABS plastic housing. GMH ...: approx. 142 x 71 x 26 mm (H x W x D). impact resistant ABS plastic housing, integrated pop-up clip
Weight:	approx. 135 g (GTH 1170), approx. 150 g (GMH 1170)
Scope of supply:	Device, battery, manual

Accessories and spare parts:

NiCr-Ni (type K) probes **p.r.t. page from 24**

GB 9 V
Art. no. 601115
spare battery

ST-KN
Art. no. 601080
device protection bag, suitable for GTH 1150

ST-N1
Art. no. 601070
device protection bag, suitable for GMH 1170

GTH 1170-GTF 900-WPT
Art. no. 602675
Complete Solution incl. immersion probe GTF 900 and certificate of calibration WPT (with meas. points: 0 / 100 / 250 / 500 °C) and case GKK 1100.

Universal measuring set

GMH 3210-Universal-SET

Art. no. 607061

Universal temperature measuring set

Application:

Ready-to-use universal temperature measuring set with 3 different type K temperature sensors. Perfectly suitable for measurements in liquids, air and gases as well as surfaces.

Specifications:

GMH 3210:	see page 20
GTF 300:	see page 26
GTF 400:	see page 24
GOF 500:	see page 24
Scope of supply:	GMH 3210 – temperature measuring device, GTF 300 – wire probe, GTF 400 – immersion probe for gases and liquids, GOF 500 – surface probe, GKK1105 – plastic case, battery, manual

Accessories and spare parts:

ISO-WPT
Art. no. 604652
according to DIN ISO 9000
Test points -20 °C, +70 °C, +200 °C depending on probe

GTF 300
Art. no. 600072
Wire probe

GTF 400
Art. no. 600502
Immersion probe

GOF 500
Art. no. 600488
Surface probe

GKK 1105
Art. no. 601050
Case with cut-outs for 1 device of GMH 3xxx series

Basic measuring set

GMH 1170-Basic-SET

Art. no. 605414

Universal temperature measuring set

Application:

Ready-to-use temperature measuring set with a universal insertion probe plus a wire probe in a case

Specifications:

GMH 1170:	see page 22
GTF 300:	see page 26
GES 900:	see page 25
Scope of supply:	Device, wire probe, insertion probe, plastic case, battery, manual

Accessories and spare parts:

GMH 1170
Art. no. 600113
Precision quick-response thermometer

GTF 300
Art. no. 600072
Wire probe

GES 900
Art. no. 600518
Insertion probe

GKK 1105
Art. no. 601050
Case with cut-outs for 1 device of GMH 3xxx or 5xxx series

For calibration certificates see page 7.

Temperature measuring set

GTH 1150-Gourmet-SET

Art. no. 605415

Temperature measuring set

Application:

This combination often used by top chefs is recommended for measuring the core temperature of meat, cooking oil, etc. The thin needle will barely damage the meat. The core temperature measurement range of -65 ... +400 °C can be determined very quickly.

Specifications:

GTH 1150:	see page 21
GTE 130-OK:	see page 27
Scope of supply:	Device, probe, battery, manual

Accessories and spare parts:

GTH 1150
Art. no. 600047
Quick-response thermometer

GTE 130-OK
Art. no. 601483
Insertion probe

ST-KN
Art. no. 601080
Device protection bag with rectangular cut-out for sensor connection

GKK 252
Art. no. 601056
Case with foam lining for universal use (235 x 185 x 48 mm)

For calibration certificates see page 7.

Type K - Measuring Probe (NiCr-Ni) With DIN-type flat-pin plug

ACCURACY

Thermocouples:

sensor accuracy acc. to DIN EN 60584-2
class 1 for **Type K:** ±1.5 °C at range -40 ... +375 °C
class 1 for **Type N:** ±1.5 °C at range -40 ... +375 °C
class 1 for **Type S:** ±1 °C at range 0 ... 1100 °C

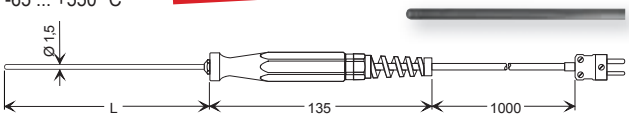
basic fee for custom made probe

-65 °C / +550 °C

GTF 400

Art. no. 600502
Immersion probe
-65 ... +550 °C

VERY FAST

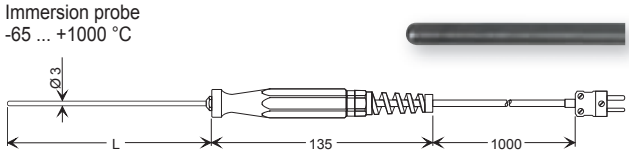


inexpensive, fast, elastic (rigid)
non-corrosive V4A tube Ø 1,5 mm, L=130 mm, plastic handle, anti-buckling glanding, 1 m silicone cable, Miniature flat plug
Response time T_{90}: water 0.4 m/s approx. 3 s

-65 °C / +1000 °C

GTF 900

Art. no. 600505
Immersion probe
-65 ... +1000 °C



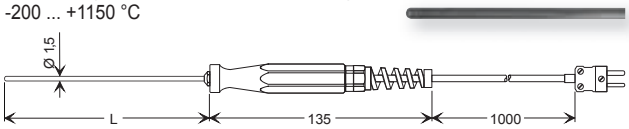
inexpensive, elastic (rigid)
non-corrosive V4A tube Ø 3 mm, L=130 mm, plastic handle, anti-buckling glanding, 1 m silicone cable, Miniature flat plug
Response time T_{90}: water 0.4 m/s <2 s, air 2 m/s approx. 40 s

-200 °C / +1150 °C

GTF 1200

Art. no. 600507
Immersion probe with sheathed thermocouple
-200 ... +1150 °C

BENDABLE



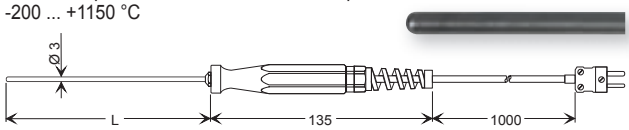
Inconel 600 jacket tube Ø 1.5 mm, flexible, L=150 mm, plastic handle, anti-buckling glanding, 1 m silicone cable, Miniature flat plug
Response time T_{90}: water 0.4 m/s approx. 3 s

-200 °C / +1150 °C

GTF 1200/300

Art. no. 600510
Immersion probe with sheathed thermocouple
-200 ... +1150 °C

BENDABLE
POTENTIAL FREE



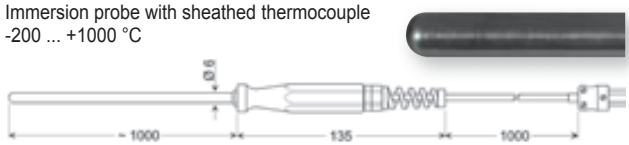
Inconel 600 jacket tube Ø 3 mm, flexible, L = 300 mm, plastic handle, anti-buckling glanding, 1 m silicone cable, Miniature flat plug
Response time T_{90}: water 0.4 m/s approx. 5 s

-200 °C / +1000 °C

GTF 1000 AL

Art. no. 600512
Immersion probe with sheathed thermocouple
-200 ... +1000 °C

VERY ROBUST



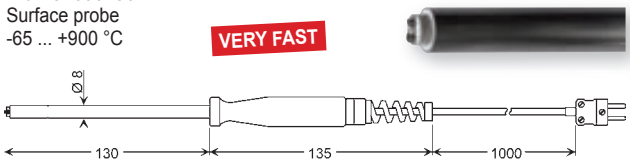
for aluminium melt, non-ferrous metal, etc.
V4A tube Ø 6 x 1.4 mm, L=1000 mm rigid, additional internal mantle thermocouple, plastic handle, anti-buckling glanding, 1 m silicone cable, Miniature flat plug
Response time T_{90}: water 0.4 m/s approx. 30 s

-65 °C / +900 °C

GOF 130

Art. no. 600490
Surface probe
-65 ... +900 °C

VERY FAST

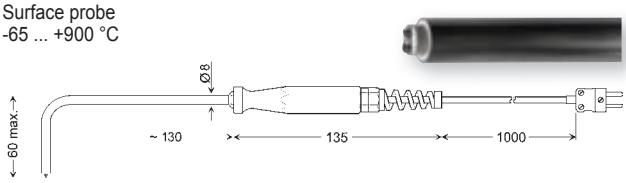


for any solid surface
2 laser welded NiCr-Ni resilient springs, V4A-tube Ø 8 mm, plastic handle, anti-buckling glanding, 1 m silicone cable, Miniature flat plug
Response time T_{90}: water 0.4 m/s approx. 2 s

-65 °C / +900 °C

GOF 900 HO

Art. no. 600500
Surface probe
-65 ... +900 °C

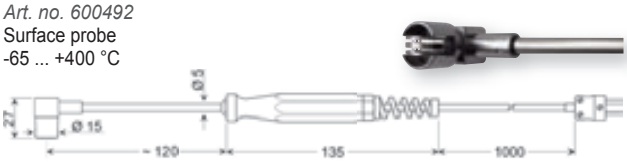


for any solid surface
2 laser welded NiCr-Ni resilient springs, V4A tube gebogen, plastic handle, anti-buckling glanding, 1 m silicone cable, miniature flat plug
Response time T_{90}: water 0.4 m/s approx. 2 s

-65 °C / +400 °C

GOF 200 HO

Art. no. 600492
Surface probe
-65 ... +400 °C

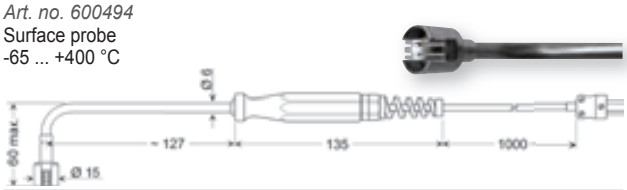


for fastest measurements in small gaps
Small elbow-type, flexible thermocouple tapes, plastic handle, anti-buckling glanding, 1 m silicone cable, miniature flat plug
Response time T_{90}: water 0.4 m/s approx. 2 s

-65 °C / +400 °C

GOF 400 HO

Art. no. 600494
Surface probe
-65 ... +400 °C

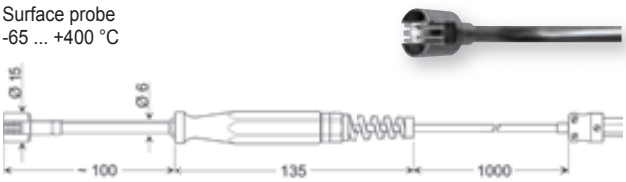


for fastest measurements
Small elbow-type, flexible thermocouple tapes, plastic handle, anti-buckling glanding, 1 m silicone cable, miniature flat plug
Response time T_{90}: water 0.4 m/s approx. 2 s

-65 °C / +400 °C

GOF 400 VE

Art. no. 600496
Surface probe
-65 ... +400 °C



for fastest measurements, flexible thermocouple tapes, plastic handle, anti-buckling glanding, 1 m silicone cable, miniature flat plug
Response time T_{90}: water 0.4 m/s approx. 2 s

MH 400VE
Art. no. 607502
magnet holder, heat resistant up to 100 °C

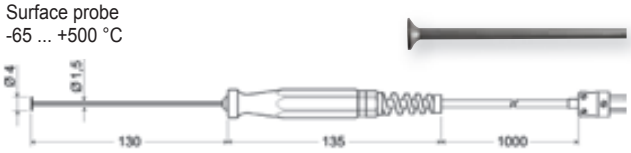
Type K - Measuring Probe (NiCr-Ni) With DIN-type flat-pin plug

-65 °C / +500 °C

GOF 500

Art. no. 600488

Surface probe
-65 ... +500 °C



for any straight and solid surface; solid copper plate, plastic handle, anti-buckling glanding, 1 m silicone cable, miniature flat plug

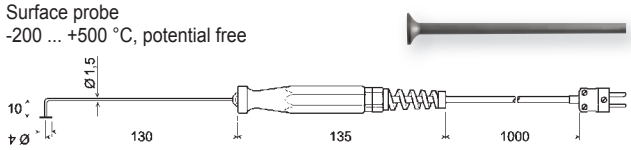
Response time T_{90}: water 0.4 m/s approx. 5 s

-200 °C / +500 °C

GOF 500 HO

Art. no. 600498

Surface probe
-200 ... +500 °C, potential free



for any straight and solid surface, small elbow-type, solid copper plate, Ø 1.5 MTE (K) Inconel 600 bendable, plastic handle, anti-buckling glanding, 1 m silicone cable, Miniature flat plug

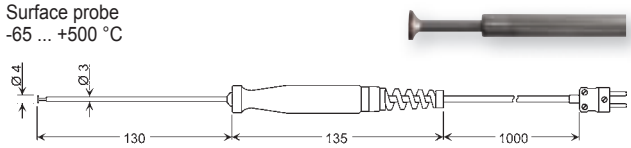
Response time T_{90}: approx. 5 s

-65 °C / +500 °C

GOF 130 CU

Art. no. 600486

Surface probe
-65 ... +500 °C



for any straight and solid surface
Spring-loaded copper plate, plastic handle, anti-buckling glanding, 1 m silicone cable, miniature flat plug

Response time T_{90}: approx. 5 s

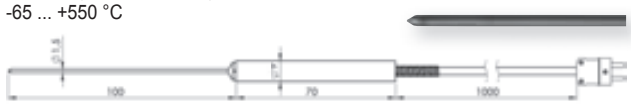
-65 °C / +550 °C

GES 20K

Art. no. 602591

Core temperature- / food probe
-65 ... +550 °C

VERY THIN



Use for canteen kitchen, backeries, butcher´s shops, etc.
V4A tube with Ø 1.5 mm slim insertion tip, small Teflon handle, stainless steel kink protection, 1 m Teflon cable, miniature flat plug

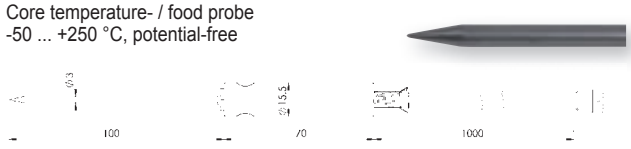
Response time T_{90}: water 0.4 m/s <1 s, air 2 m/s approx. 12 s

-50 °C / +250 °C

GES 21K

Art. no. 600074

Core temperature- / food probe
-50 ... +250 °C, potential-free



Use for canteen kitchen, backeries, butcher´s shops, etc.
V4A tube Ø 3 mm with needle-shaped insertion tip, big white Teflon handle, stainless steel kink protection, 1 m Teflon cable, miniature flat plug

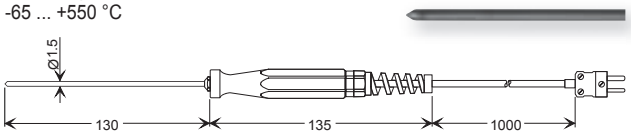
Response time T_{90}: water 0.4 m/s <2 s, air 2 m/s approx. 40 s

-65 °C / +550 °C

GES 130

Art. no. 600514

Insertion probe for soft media
-65 ... +550 °C



V4A tube with Ø 1.5 mm slim insertion tip, plastic handle, anti-buckling glanding, 1 m silicone cable, miniature flat plug

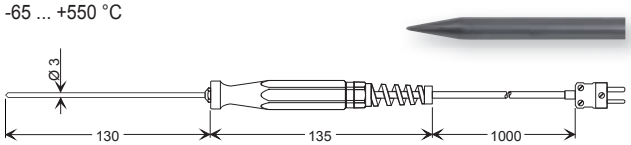
Response time T_{90}: water 0.4 m/s approx. 3 s

-65 °C / +550 °C

GES 500

Art. no. 600516

Insertion probe for soft media
-65 ... +550 °C



V4A tube with Ø 3 mm with needle-shaped insertion tip, plastic handle, anti-buckling glanding, 1 m silicone cable, miniature flat plug

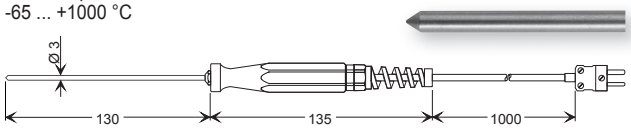
Response time T_{90}: water 0.4 m/s approx. 5 s

-65 °C / +1000 °C

GES 900

Art. no. 600518

Insertion probe for soft media
-65 ... +1000 °C



Spring-loaded V4A tube with slim Ø 3 mm insertion tip, plastic handle, anti-buckling glanding, 1 m silicone cable, miniature flat plug

Response time T_{90}: water 0.4 m/s approx. 5 s

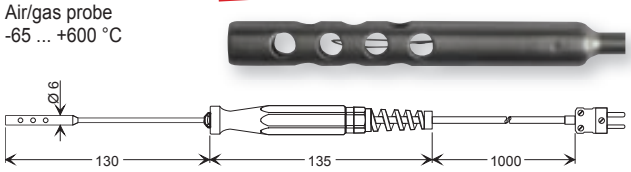
-65 °C / +600 °C

GTL 130

Art. no. 602304

Air/gas probe
-65 ... +600 °C

VERY FAST



for room temperature, flue gases, etc.
perforated V4A protective tube, fused thermocouple wires arranged behind, plastic handle, anti-buckling glanding, 1 m silicone cable, miniature flat plug

Response time T_{90}: air 2 m/s approx. 1.5 s

-65 °C / +200 °C

GKF 125

Art. no. 600520

Probe for compost, grain, etc.
-65 ... +200 °C

VERY ROBUST

split-second response time, yet highly resilient
V4A tube Ø 8 mm reduced to Ø 3 mm at the front, plastic handle, anti-buckling glanding, 1 m silicone cable, miniature flat plug

Response time T_{90}: water 0.4 m/s approx. 6 s

Type K - Measuring Probe (NiCr-Ni) With DIN-type flat-pin plug

-65 °C / +550 °C

GAF 200

Art. no. 600522

Asphalt probe
-65 ... +550 °C

for liquid or soft media etc.
V4A tube 8 mm dia. reduced to 3 mm, plastic handle, anti-buckling glanding, spiral cable stretchable to 1.2 m, DIN-type flat-pin plug

Response time T_{90}: water 0.4 m/s approx. 6 s

-50 °C / +200 °C

GRF 200

Art. no. 604663

Tire probe
-50 ... +200 °C

fast response insertion probe with stop screw (needle adjustable 0 ... approx. 14 mm). Suitable for measuring temperature of tires and other soft media. Plastic handle, anti-buckling glanding, spiral cable (approx. 1.2 m drawn out), miniature flat plug

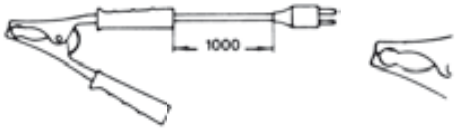
Response time T_{90}: approx. 5 s

-65 °C / +150 °C

GTZ 300

Art. no. 603287

Clip-on probe
-65 ... +150 °C



for temperature measurements at tube surfaces
for tubes up to approx. 25 mm Ø, 1 m silicone cable, miniature flat plug

Response time T_{90}: approx. 3 s

-65 °C / +300 °C

GTF 300

Art. no. 600072

Wire probe for quick-response measurements
Measuring tip twisted/fused

GTF 300-UV

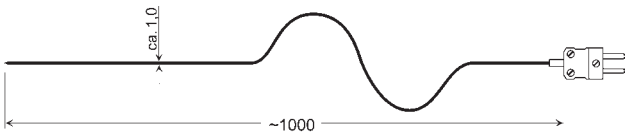
Art. no. 600081

Wire probe for quick-response measurements
Measuring tip non-twisted/fused

GTF 300-SP

Art. no. 605973

Wire probe for quick-response measurements
Measuring tip with weld bead
-65 ... +300 °C, insulation up to +250 °C



for air, gases, diminutive surfaces
Teflon-insulated twisted Ø 0.2 mm thermocouple wires, fused measuring tip, very flexibel, miniature flat plug

Response time T_{90}: water 0,4 m/s approx. 0.3 s

-65 °C / +400 °C

GTF 300 GS

Art. no. 602554

Wire probe for quick-response measurements
twisted measuring tip

GTF 300 GS-UV

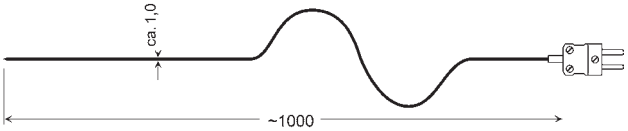
Art. no. 607893

Wire probe for quick-response measurements
Measuring tip non-twisted/fused

GTF 300 GS-SP

Art. no. 606208

Wire probe for quick-response measurements
Measuring tip with weld bead
-65 ... +400 °C



for air, gases, diminutive surfaces (not for liquids)
glass filament insulated Ø 0.2 mm thermocouple wires, miniature flat plug

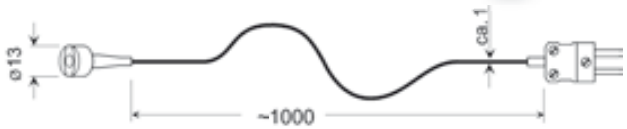
Response time T_{90}: water 0.4 m/s approx. 0.3 s
Additional charge for any length per m

-65 °C / +250 °C

GMF 250

Art. no. 600071

Magnetic surface probe
-65 ... +250 °C



self-adhesive on magnetic materials, spring-loaded CU plate Ø 5 mm, 1 m Teflon-insulated twisted cable, miniature flat plug

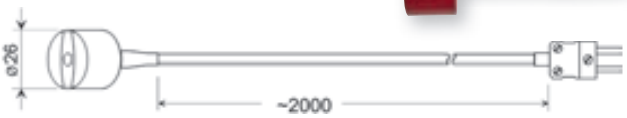
Response time T_{90}: approx. 5 s

-65 °C / +200 °C

GMF 200

Art. no. 601377

Magnetic surface probe
-65 ... +200 °C



self-adhesive on magnetic materials (higher magnetic holding force), spring-loaded CU plate Ø 5 mm, resilient 2 m long silicone cable, miniature flat plug

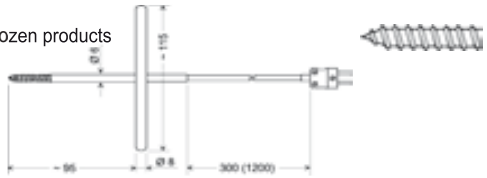
Response time T_{90}: approx. 5 s

-65 °C / +200 °C

GGF 200

Art. no. 603418

Probe for deep-frozen products
-65 ... +200 °C



to screw into deep-frozen products, etc. no predrilling required, V4A-tube, 6 mm Ø with screw prod, spiral cable (approx. 1.2 m drawn out), DIN-type flat-pin plug

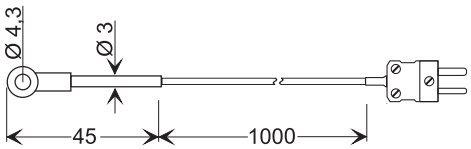
Response time T_{90}: approx. 15 s

Type K - Measuring Probe (NiCr-Ni) With DIN-type flat-pin plug

-50 °C
+250 °C

GKF 250

Art. no. 600141
Cable lug probe
-50 ... +250 °C



For tightening with suitable screw (standard M4), 1 m Teflon cable, miniature flat plug

Response time T_{90}: approx. 10 s

-50 °C
+500 °C

GLS 500

Art. no. 602962
Soldering tip probe
-50 ... +500 °C (for short time)

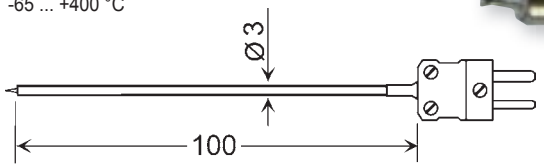
for direct connection to instrument
2 laser-fused spring-loaded spiral springs made of NiCr-Ni, ceramic tube approx. 6 mm in diameter, miniature flat plug

Response time T_{90}: approx. 2 s

-65 °C
+400 °C

GTO 130 OK

Art. no. 600134
Air-/Gas probe
-65 ... +400 °C



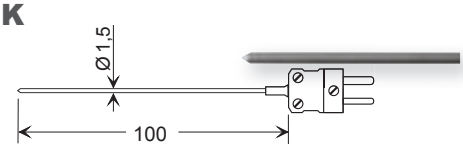
changeable probe without cable, limited suitable also for surfaces
NiCr-Ni-wire Ø 0.5 mm, welded and grinded flat, V4A-tube Ø 3 mm, DIN-type flat-pin plug, rigid connection

Response time T_{90}: approx. 2 s

-65 °C
+400 °C

GTE 130 OK

Art. no. 601483
Insertion probe
-65 ... +400 °C



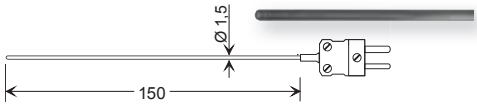
interchangeable probe without cable for soft media
Spring-loaded V4A tube with slim Ø 1.5 mm insertion tip, miniature flat plug with a rigid connection

Response time T_{90}: approx. 3 s

-200 °C
+1150 °C

GTT-15-150

Art. no. 607552
Immersion probe
-200 ... +1150 °C



for air, gases, and liquids
Sheathed thermocouple with Inconel 600 jacket tube Ø 1.5 mm, bendable, miniature flat plug with a rigid connection

Response time T_{90}: water 0.4 m/s approx. 3 s

+50 °C
+1550 °C

GBF 1550

Art. no. 603037
Bunsen burner probe - type S
+50 ... +1550 °C

FOR HIGHEST TEMPERATURES

Probe tip may be directly exposed into the flame
V4A tube Ø 8 mm, with reduced Ø 5.5 mm ceramic tube, plastic handle, silicone cable, miniature flat plug

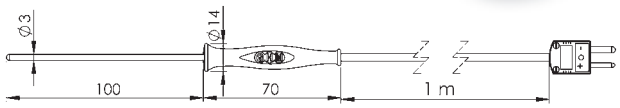
Response time T_{90}: approx. 2 s

-65 °C
+550 °C

GF 1TK-T3

Art. no. 609695
Ø 3 mm immersion sensor
-65 ... +550 °C, type K, Class 1

NEW!



Immersion probe Ø 3 mm made of V4A tube, black silicone handle up to +250 °C, 1 m Silicone cable up to +200 °C, probe and silicone handle IP67, mini flat connection

Response time T_{90}: Water 0.4 m/s <2 s, air 2 m/s approx. 40 s

Variants:

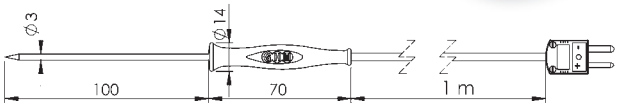
GF 1TK-T3-LE
Art. no. 609696
with loose ends

-65 °C
+550 °C

GF 1TK-E3

Art. no. 609697
Ø 3 mm insertion sensor
-65 ... +550 °C, type K, Class 1

NEW!



Insertion probe Ø 3 mm made of V4A tube, black silicone handle up to +250 °C, 1 m silicone cable up to +200 °C, probe and silicone handle IP67, mini flat connection

Response time T_{90}: Water 0.4 m/s <2 s, air 2 m/s approx. 40 s

Variants:

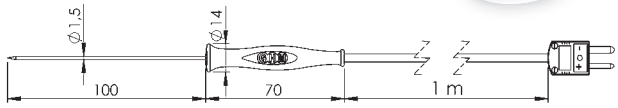
GF 1TK-E3-LE
Art. no. 609698
with loose ends

-65 °C
+550 °C

GF 1TK-E1.5

Art. no. 609699
Ø 1.5 mm extra-thin insertion sensor
-65 ... +550 °C, type K, Class 1

NEW!



Insertion probe Ø 1.5 mm made of V4A tube, black silicone handle up to +250°C, 1 m silicone cable up to +200 °C, probe and silicone handle IP67, mini flat connection

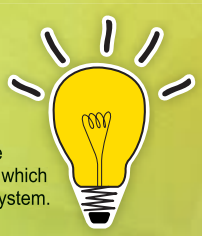
Response time T_{90}: Water 0.4 m/s < 2 s, air 2 m/s approx. 12 s

Variants:

GF 1TK-E1.5-LE
Art. no. 609700
with loose ends

INFRARED

Infrared measurement
Infrared measurements can be used to measure the temperature of a surface on a device under test without the need to come into contact with that surface (except objects with a shiny metal surface; glass suitable under certain conditions).
The IR sensor measures the infrared radiation emitted by the device under test. The measurement is supported by a laser which designates the surface measured by the optical measuring system.



Properties:
- Ultrafast and contactless surface measurement
- For measurement tasks that cannot be accomplished using PT100 or type K devices (e.g. abrasive chemicals, small components, ...)

Application:	MT 400	GIM 530 MS	ST 512	GIM 3590
Precision measurement		●		●
Fast scanning of surfaces	●	●	●	●
Food	●	●	●	●
Quality management	●	●	●	●
Equipment:				
Measuring range [°C]	-20 ... +343	-32 ... +530	-50 ... +1000	-35 ... +900
Laser	single	single	dual	cross
Additional probe connection				Type K
Optical resolution (Distance / Spot size)	8:1	20:1	30:1	75:1
Emissivity	0.95 fix	0.100 ... 1.000	0.10 ... 1.00	0.100 ... 1.100
General functions	Min/Max, Hold	Min/Max, Hold, Offset	Min/Max, Hold	Min/Max, DIF, Hold, AVG
Alarm		optical, acoustical		optical, acoustical
Data storage and visualisation / interface				100 measuring protocols, software for visualisation / ●
Device information:				
Catalogue page	**page 29**	**page 29**	**page 30**	**page 30**

Infrared Thermometer

BAT
HOLD
MIN MAX

MT 400

Art. no. 601438

Infrared thermometer with laser

General:

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

Application:

- **Electrics** – locating overheated cables and contacts
- **Heating / ventilation / air-conditioning** monitoring of heat exchanger
- **Food** – Checking food temperature during keeping warm or storing

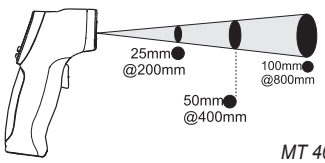
Specifications:

Measuring range:	-20 °C ... +343 °C
Resolution:	0.1 °C, 0.1 °F
Accuracy: (@ 18 °C ... 28 °C and < 80 % RH)	
<-7 °C:	±4 °C
≥-7 °C:	±2 % of meas. value +2 °C
Optical resolution (D/S):	approx. 8:1
Response time (t95):	< 1 s
Spectral range:	8 - 14 µm
Emission rate:	permanently set to 0.95
Sight:	single laser
Working temperature:	0 ... 50 °C
Storage temperature:	-20 ... +60 °C
Power supply:	9 V battery
Features:	°F, background illumination
Dimensions:	82 x 41,5 x 160 mm (H x W x D)
Weight:	180 g
Scope of supply:	Device, battery, manual

Accessories and spare parts:

GB 9 V
Art. no. 601115
spare battery

GKK 3100
Art. no. 601058
case with foam lining (275 x 229 x 83 mm)



MT 400

Infrarotthermometer mit Präzisionsglasoptik

BAT
HOLD
MIN MAX

HIGHLIGHTS:

- *Adjustable visible and audible alarm*
- *Constant measuring area in between the distance of 13 to 140 mm*
- *Targeting laser for exact aiming of the object to be measured*
- *Fast scanning of hot and cold spots within 0.3 s*

GIM 530 MS

Art. no. 601229

Infrared thermometer with laser

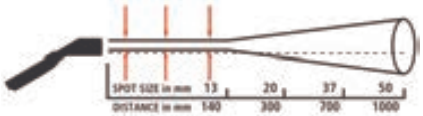
General:

User-friendly industrial design combined to state of the art technology are setting a new standard in professional and all day non-contact temperature measuring.
The large temperature range of -32 ... +530 °C, the targeting laser and the optical resolution of 20:1 allow very precise measuring of surfaces in a variety of applications. Simply aim at the target with the laser, push the trigger and the value is displayed within 0.3 seconds plus several other informations.

Application:

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

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



optical diagram:
ratio: spot size / distance

Specifications:

Measuring range:	-32 ... +530 °C (-20 ... +980 °F)
Resolution:	0.1 °C (0.1 °F)
Temperature display:	°C or °F selectable
System accuracy:	(at ambient temperature = 23 °C ±5 °C)
±1 % or ±1 °C	from 0 °C ... 530 °C (highest value shall be valid)
±1 °C ±0.07 °C/°C	from 0 °C ... -32 °C
Repeat accuracy:	±0.5 % or ±0.7 °C from 0 °C ... 530 °C (highest value shall be valid) ±0.7 °C ±0.05 °C / °C from 0 °C ... -32 °C
Optical Resolution (D:S):	20 : 1
Response time (t_{95}):	0.3 s
Spectral range:	8 ... 14 µm
Emission rate:	0.100 ... 1.000, free selectable
Laser:	< 1 mW laser class IIa
Configuration:	Min/Max/Scan/Hold/Offset/°C/°F
Display illumination:	yes
Alarm function:	optical and acoustic HIGH-/LOW-alarm
Working temperature:	0 ... 50 °C
Storage temperature:	-20 ... +60 °C (without battery)
Power supply:	9 V alkaline battery
Battery life:	approx. 20 hours for use with laser and illumination
Dimensions:	190 x 38 x 45 mm (H x W x D)
Weight:	approx. 150 g;
Scope of supply:	Device, battery, manual, device bag made of nylon

Accessories and spare parts:

GKK 252
Art. no. 601056
small case (235 x 185 x 48 mm) with foam lining

ISO-WPT
Art. no. 600888
(testpoints at +24 °C, +166 °C and +500 °C)

Infrared measurement is not suitable for liquids and specular or reflective surfaces

Infrared Thermometer

ALARM
HOLD
MIN MAX

HIGHLIGHTS:

- *Dual-laser*
- *Alarm function*

ST 512

Art. no. 600004

Infrared thermometer with dual laser

Application:

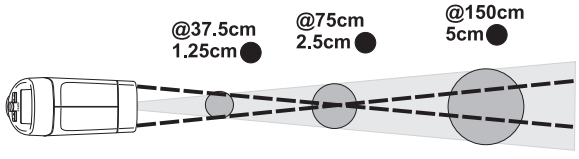
- **Monitoring of circuit boards:** overheated parts
- **Heating / ventilation / air-conditioning:** detecting bad isolation, untight pipes, energy consumption, general service measurements, etc.
- **Electrical systems, machines, power engines:** detecting hot spots at electric connections, temperature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

Specifications:

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

Accessories and spare parts:

ISO (25 / 100 / 200 °C)
Art. no. 607071
Initial calibration at first delivery



ST 512

Infrared Thermometer

ALARM
HOLD
MIN MAX

HIGHLIGHTS:

- *with thermocouple input*
- *incl. software and calibration protocol*

GIM 3590

Art. no. 600005

Infrared thermometer with cross-hair laser

General:

The measured point will be marked exactly with the precision of a laser cross-hair. The integrated sharp point optics allows measurements of even smallest measuring objects down to 1 mm. Its position sensor turns the display always to the most comfortable orientation.

- switchable focus point optics
- laser cross-hair shows real measuring point size
- Flip-display
- additional thermocouple input
- USB interface and graphical software

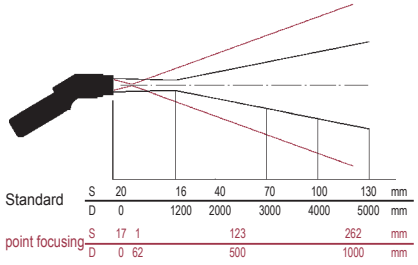
Specifications:

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

Accessories and spare parts:

ISO-WPT
Art. no. 603274

Stativ
Art. no. 603541



GIM3590

Infrared measurement is not suitable for liquids and specular or reflective surfaces

HUMIDITY / FLOW RATE

Application:	GMH 3330 + TFS 0100 E	GMH 3350 + TFS 0100 E	GFTH 95	GFTH 200	GFTB 200
Air conditioning / Ambient air monitoring	●	●	●	●	●
Meteorology					●
Room climate	●	●			●
Flow measurement	●	●			
Air pressure measuring					●
Calculation of:					
Dew point Td	●	●		●	●
Wet bulb temperatur Twb				●	●
Moisture content x / Absolute humidity d					●
Dew point distance / Enthalpy	●	●			
Equipment:					
Plug-in probe	●	●		● (Temperature)	
Min/Max, Hold, Auto-Off	●	●		●	●
Serial interface	●	●			●
Alarm		●			●
Data logger		●			
Device information:					
Catalogue page	page 32	page 32	page 35	page 35	page 34

Humidity, temperature and flow rate measuring device

HIGHLIGHTS:

- *Calculation of dew point temperature, dew point distance and enthalpy*
- *Additional temperature input (type K)*

ADDITIONAL FUNCTIONS GMH 3350:

GMH 3330

Art. no. 600343
Climate measuring device, probe not included

GMH 3350

Art. no. 600345
Climate measuring device, probe not included, with data logger

General:

The GMH 33xx devices are universal precision hygrometer / Thermometer and flow meter with additional Thermocouple input in one. The plug-in probes are interchangeable without recalibration, because your calibration data are on an integrated memory stick (TFS ....) or they are interchangeable by the high mechanical precision (STS ...). The thermocouple input T2 is optimized to to be able to quickly absorb surface temperatures to e.g. to display the dew point directly.

Application:

- Heating / Ventilation Air Conditioning (HVAC)
- Indoor air, meteorology, laboratory, research and teaching
- Energy assessment / optimization of buildings
- Identify research in structural damage

Specifications:

Measuring ranges:	
Relative humidity:	0.0 ... 100.0 % RH
Ambient temperature:	-40.0 ... +120.0 °C (depending on TFS-probe)
Surface temperature:	-80.0 ... +250.0 °C
Flow rate:	depending on STS probe (p.r.t. next page)
Resolution:	0.1 % RH, 0.1 °C / 0.1 °F, 0.01 m/s
Accuracy (device) (±1 digit) (at nominal temperature = 25 °C)	
Relative humidity:	±0.1 %
Ambient temperature (Pt1000):	±0.2 %
Surface temperature (NiCr-Ni):	±0.5 % of m.v. ±0.5 °C
Flow rate:	±0.1 %
Probes: (p.r.t. next page)	No calibration required for exchange of humidity/ temperature or flow rate probe.
Probe connection:	6-pin screened Mini-DIN-socket
NiCr-Ni-connection:	for miniature flat-pin plug
Display:	two 4½ digit LCDs (12.4 mm or 7 mm high), as well as additional functional arrows.
Working temperature:	-25 ... +50 °C
Relative humidity:	0 ... 95 % RH (non-condensing)
Storage temperature:	-25 ... +70 °C
Pushbuttons:	6 membrane keys
Interface:	serial interface, direct connection to RS232 or USB interface of a PC via electrically isolated interface adapter GRS 3100 or GRS 3105 resp. USB 3100 N (p.r.t. accessories).
Power supply:	9 V battery as well as additional d.c. connector for external 10.5-12 V direct voltage supply. (suitable power supply: GNG10/3000)
Battery life:	approx. 120 h (incl. TFS0100)
Calculation of dew point:	based upon humidity and temperature
Calculation of dew point distance:	by means of a surface measurement
Calculation of enthalpy:	thermal content h of the air
Adjustment-function for atmospheric humidity measurements	
NiCr-Ni-temperature measuring:	any standard NiCr-Ni-probe (type K) can be plugged in. Recommendation: GOF 400 VE (p.r.t. p. 24). A compensation value can be set for surface measurement if necessary.
Flow measurements:	Two different systems for averaging are integrated: **continuous averaging:** the average value displayed is calculated using the last measurements during the averaging time set. **averaging upon request:** by starting the current measuring value will be displayed for the averaging time. As soon as the time has expired the average value will be displayed, the device is in HOLD mode. **selectable averaging time:** 1 ... 30 s
Logger function (GMH 3350):	**manual:** 99 data sets (fetch data via buttons or interface) **cyclic:** 5.400 data sets (fetch data via interface) adjustable cycle time: 1 s … 1 h The logger is started or stopped by keypad or interface. The software GSOFT3050 (see accessories) is available for comfortable read-out of logger data.
Housing:	Impact-resistant ABS plastic housing, membrane keyboard, transparent panel, integrated pop-up clip
Dimensions:	142 x 71 x 26 mm (H x W x D)
Weight:	approx. 160 g (incl. battery)
Scope of supply:	Device, battery, manual

Accessories and spare parts:

GNG 10/3000
Art. no. 600273
Plug-in power supply

USB 3100 N
Art. no. 601092
Interface converter, electrically isolated

GSOFT 3050
Art. no. 601336
Software for the setting, data read-out and printing of all logger data stored for devices of the GMH3xxx-series with logger function

GAM 3000
Art. no. 601132
Switching module for devices of the GMH3xxx-series incl. alarm output

ST-RN
Art. no. 601074
Device protection bag with cut out for sensor connection

GKK 3500
Art. no. 601052
Big case with cut-outs for GMH3xxx

GKK 3600
Art. no. 601062
case with foam lining for universal use

Complete Solution

GMH 3330-TFS 0100E-WPF4

Art. no. 602682
Complete Solution with humidity-/temperature probe TFS 0100 E and incl. certificate of calibration WPF4 (~20 % / ~40 % / ~60 % / ~80 % RH ascending / descending) and case GKK 3500.

Measuring probes humidity / temperature

TFS 0100 E

Art. no. 601488
(0.0 ... 100.0 % RH)
Humidity / temperature probe, exchangeable without any loss in accuracy

General:

Hand sensor for universal application
cap with integral stainless steel gauze filter for good mechanical protection and despite optimum airflow also for fast measurements in ambient air

Specifications:

Measuring ranges:	
Humidity:	0.0 ... 100.0 % RH (rec. range of application: 11 ... 90 % RH)
Temperature:	-40.0 ... +120.0 °C (attention: working temperature of electronics!)
Accuracy: (at nominal temperature = 25 °C)	
Humidity:	±2.5 % RH (in the range of 10 ... 90 % RH)
Temperature:	±0.5 °C
Sensors	
Humidity:	capacitive polymer humidity sensor
Temperature:	Pt1000, DIN cl. AA
Electronics:	PC board with amplifier and data memory for sensor data (calibration, etc.) integrated in probe handle.
Working temperature:	-25 ... +60 °C (handle and electronics) -40 ... +100 °C (for short time up to +120 °C) (sensor head and tube)
Relative humidity:	0 ... +100 % RH
Dimensions:	Probe tube: Ø 14 x 119 mm, plastic handle: Ø 19 x 135 mm, approx. 1.2 m PVC connection cable with 6-pin Mini-DIN-plug
Weight:	approx. 90 g
Scope of supply:	sensor, manual

Variant:

TFS 0100 E-POR
Art. no. 606784
Humidity / temperature sensor with plastic paper filter for use in dusty environments and also in powder colors and granulates

Measuring probes Surface temperature:

GOF 400VE

Art. no. 600496
(p.r.t. page 24)
Quick-response surface probes for walls, floors etc.

GTF 300

Art. no. 600072
(p.r.t. page 26)
Quick-response basic thermocouple probe for universal applications (surface measurement)

Measuring probes flow speed

STS 005

Art. no. 602396
(0.05 ... 5.00 m/s)
Flow measuring probe with snap-on head, exchangeable without any loss in accuracy

Specifications:

Sensor type:	windmill-type anemometer
Measuring range:	0.05 ... 5.00 m/s (water)
Accuracy:	±1 % of range ±3 % of meas. value (at nominal temperature = 25 °C)
Permiss. angle flow:	±20°, without additional measuring faults
Working temperature:	0 ... +70 °C
Relative humidity:	0 ... +100 % RH (non-condensing)
Dimensions:	Probe head: Ø 11 x 15 mm, tube: Ø 15 mm, overall length 165 mm, required insertion opening: Ø 16 mm, approx. 5 m PVC connection cable with 6-pin Mini-DIN-plug
Weight:	approx. 75 g
Scope of supply:	sensor, manual

Accessories and spare parts:

STE 005
Art. no. 602406
Spare snap-on head for STS 005

STS 005-GTS
Art. no. 602645
GTS Telescopic rod (overall length 1 m)

Measuring probes flow / air

STS 020

Art. no. 602397
(0.55 ... 20.00 m/s)
Flow measuring probe with snap-on head, calibrated and exchangeable.

Specifications:

Sensor type:	windmill-type anemometer
Measuring range:	0.55 ... 20.00 m/s (air)
Accuracy:	±1 % of range ±3 % of meas. value (at nominal temperature) = 25 °C)
Permiss. angle flow:	±20°, without additional measuring faults
Working temperature:	-10 ... +80 °C
Relative humidity:	0 ... +100 % RH (non-condensing)
Dimensions:	Probe head: Ø 11 x 15 mm, tube: Ø 15 mm, overall length 165 mm, required insertion opening: Ø 16 mm, approx. 5 m PVC connection cable with 6-pin Mini-DIN-plug
Weight:	approx. 75 g
Scope of supply:	sensor, manual

Accessories and spare parts:

STE 020
Art. no. 602519
Spare snap-on head for STS 020

STS 020-GTS
Art. no. 604217
GTS Telescopic rod (overall length 1 m)

picture shows GTS with assembled STS 020

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

HIGHLIGHTS:

- *alarm function with integrated buzzer*
- *PC interface*
- *additional display for further parameters, e.g. dew point temperature and absolute humidity*

GFTB 200

Art. no. 600161
Hygro-/Thermo-/Barometer

General:

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

Application:

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

Specifications:

Measuring ranges:	
Temperature:	-25.0 °C ... +70.0 °C
Air humidity:	0.0 ... 100.0 % RH (recommended range: 11 … 90 % RH)
Air pressure:	10.0 ... 1100.0 mbar
Calculated parameters:	
Dew point temperature Td:	-40.0 ... +70.0 °C
Wet bulb temperature Twb:	-27.0 ... +70.0 °C
mixing ratio x:	0.0 ... 280.0 g/kg
Absolute humidity d:	0.0 ... 200.0 g/m³
Resolution:	0.1 % RH; 0.1 °C or 0.1 °F, 0.1 mbar
Accuracy: (±1 digit) (at nominal temperature = 25 °C)	
Temperature:	±0.5 % v. MW. ±0.1 °C (Pt1000 DIN cl. AA)
Air humidity:	±2.5 % RH (at range 11 ... 90 %)
Air pressure:	±1.5 mbar (750 ... 1100 mbar)
Sensors:	
Temperature:	Pt1000
Air humidity:	capacitive polymer humidity sensor
Air pressure:	piezo-resistive sensor hybrid
Response time:	T_{90} = 10 s
Display:	4½ -digit, approx. 11 mm high LCD-display with additional displays
Operation elements:	3 keys for ON/OFF, min/max value display, hold
Nominal temperature:	25 °C
Working conditions:	
electronics:	-25 ... +70 °C; 0 ... 80 % RH (non condensing)
sensors:	-25 ... +70 °C; 0 ... 100 % RH
Power supply:	9 V battery
Battery life:	approx. 400 d at 1 measuring / 60 s (mode SLOW) approx. 180 d at 1 measuring / s (mode FAST)
Interface:	Serial interface, via electrical isolated interface converter USB 3100 N (accessories) directly connectable to PC.
Configurable display:	choice between automatically displaying all values rotationally (cycle of 2 or 4 s) or manual selection, units not needed can be excluded
Offset und Scale:	digital offset- and scale adjustment of measurements
Tendency indicator:	Air pressure rising/falling (for barometer)
Sea level correction:	Barometric values can be converted to sea level (therefore the input of the current altitude is needed).
Housing:	Housing made of impact-resistant ABS
Dimensions:	approx. 106 x 67 x 30 mm (H x W x D), additionally the sensor head at the front side, 35 mm long, Ø 14 mm; resulting total length 141 mm
Weight:	approx. 130 g incl. battery
Scope of supply:	Device, battery, manual

Variante:

GFTB 200-KIT
Art. no.600890
Hygro-/Thermo-/Barometer with USB-interface kit, consisting of:
• USB interface converter USB 3100 N
• multi channel software EBS20M (to record all device units)

Accessories and spare parts:

GKK 252
Art. no. 601056
case (235 x 185 x 48 mm) with foam lining

ISO-WPF4
Art. no. 602543
Certificate of calibration, humidity, for ISO9000ff (p.r.t. page 7)

ISO-WPD5
Art. no. 602514
Certificate of calibration, pressure, for ISO9000ff (p.r.t. page 7)

ISO-80CL
Art. no. 607734
Certificate of calibration humidity (measured points about 20/40/60/80 % at 23 °C)
Pressure 5 points increase, 5 points decrease over the entire measuring range

HIGHLIGHTS:

- *easy and fast search for thermal bridges*
- *targeting laser for precise location even of inaccessible areas*
- *audible alarm below dewpoint*

GFTB 200 SET

Art. no. 600163
Measurement set GFTB200 incl. infrared thermometer GIM 530 MS and case GKK 3000

General:

The additional infrared thermometer contained in the GFTB 200 SET makes it easy to check mould-problem areas on walls etc. The wall can easily be scanned by means of the laser beam within very short time. When wall temperature falls below the critical dewpoint (this is, when the wall gets wet), the device alerts with an audible signal.
Note: for technical data for the infrared thermometer GIM530MS please refer to catalog page 29.

Humidity/Temperature Measuring Device

GFTH 95

Art. no. 600245
Hygro-/Thermometer

Application:

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

Specifications:

Measuring range:	
°C:	-20.0 ... +70.0 °C
% RH:	10 ... 95 % RH (recommanded range: 30 ... 80 %)
Resolution:	0.1 °C or 0.1 % RH
Accuracy: (±1 digit) (at nominal temperature = 25 °C)	
temperature:	±0.5 % of m.v. ±0.1 °C
humidity:	±3 % RH (for range 30 ... 80 %)
Measuring probe	
temperature:	Pt 1000
humidity:	capacitive polymer humidity sensor
Response time	T_{90} = 15 s
Display:	3½-digit, 13 mm high LCD-display
Operation elements:	slide switch for selection of measuring range
Nominal temperature:	25 °C
Operating conditions	
Electronic:	-20 ... +70 °C; 0 ... 80 % RH (non-condensing)
Sensors:	-20 ... 70 °C; 0 ... 100 % RH
Power supply:	9 V-battery
Battery life:	approx. 3000 h
Housing:	impact resistant ABS-housing
Dimensions:	approx. 106 x 67 x 30 mm (H x W x D), plus sensor head protruding at the longer side 35 mm long and 14 mm Ø, overall length 141 mm.
Weight:	approx. 135 g incl. battery
Scope of supply:	Device, battery, manual

Accessories and spare parts:

GB 9 V
Art. no. 601115
spare battery

GKK 252
Art. no. 601056
case (235 x 185 x 48 mm) with foam lining

ISO-WPF4
Art. no. 602543
Certificate of calibration for ISO9000ff (p.r.t. page 7)

Humidity / Temperature / Dew Point Measuring Device

HIGHLIGHTS:

- *External Pt1000 temperature probe connectable*
- *Relative humidity, temperature and dew point in just one instrument*

GFTH 200

Art. no. 600249
Hygro-/Thermometer

General:

Because of the low power consumption and the integrated min-/max-value memory the GFTH 200 is perfectly suitable for long term climate surveillances.

Specifications:

Measuring range:	
Temperature:	-25.0 ... +70.0 °C; -13.0 ... +158.0 °F
% RH:	0.0 ... 100.0 % RH (recommended range: 11 ... 90 % RH)
Td: (Dewpoint)	-40.0 ... +70.0 °C or -40.0 ... +158.0 °F
Resolution:	0.1 % RH, 0.1 °C or 0.1 °F
Accuracy: (±1 digit) (at nominal temperature = 25 °C)	
Temperature (internal):	±0.5 % of m.v. ±0.1 °C
Temperature (external):	0.1 °C (device) + probe accuracy
Humidity:	±2.5 % RH (for range 11 ... 90 %)
Measuring probe	
Temperature:	Pt 1000
Humidity:	capacitive polymer humidity sensor
Response time:	T_{90} = 10 s
Terminal for external probe:	for connection of any Pt1000-probes with 3.5 mm mono plug (for suitable probes p.r.t. page 14)
Display:	3½-digit, 13 mm high LCD-display
Operation elements:	3 keys for On/Off, min-/max-value display and hold. Slide switch for selection of measuring range.
Nominal temperature:	25 °C
Operating conditions	
Electronic:	-25 ... +70 °C; 0 ... 80 % RH (non-condensing)
Sensors:	-25 ... +70 °C; 0 ... 100 % RH
Power supply:	9 V battery
Battery life:	>2 years at 1 measuring / 60 s approx. 120 days at 1 measuring / s (mode FAST)
Housing:	impact resistant ABS-housing
Dimensions:	approx. 106 x 67 x 30 mm (H x W x D), plus sensor head protruding at the longer side 35 mm long and 14 mm Ø, overall length 141 mm.
Weight:	approx. 135 g incl. battery
Scope of supply:	Device, battery, manual

Accessories and spare parts:

GOF 175 Mini
Art. no. 600436
temperature probe for surface temperature measuring (p.r.t. page 14)

further temperature probe **refer to page 14**

GKK 252
Art. no. 601056
case (235 x 185 x 48 mm) with foam lining

ISO-WPF4
Art. no. 602543
ISO Certificate of calibration for ISO9000ff (p.r.t. page 7)

Complete Solution

GFTH 200-WPF4

Art. no. 602678
Complete solution incl. certificate of calibration ISO-WPF4 (~20 % / ~40 % / ~60 % / ~80 % RH increasing and decreasing) and case GKK 252.

EASY SEARCH FOR THERMAL BRIDGES

GFTH 200 SET

Art. no. 600285
Measuring set incl. infrared thermometer GIM 530 MS and case GKK 3000

General:

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

Advantages GFTH 200 SET:

- targeting laser for precise location even of inaccessible areas
- audible alarm below dewpoint
- fast evaluation of mould-problem areas

Scope of supply: GFTH 200, GIM 530 MS, battery, GKK 3000, manual

GIM 530 MS:
for technical data for this instrument please refer to page 29.

MATERIAL MOISTURE

Application:	GMK 210	GMK 100	GMI 15	GMR 110	GMH 3810	GMH 3831 + passende Elektrode	GMH 3851 + passende Elektrode	BaleCheck 100	BaleCheck 200
Carpenter, joiners, DIY		●	●	●	●	●			
Boat & Caravan (wood & GFK)	●								
Certified glue lam						●	●		
Foelwood, wooden log				●	●	●	●		
Wood chips						●	●		
Plaster, screed, concrete, bricks, lime mortars		●	●	●	●	●	●		
Construction-damage assessment/ Water damage restoration		●	●	●	●	●	●		
Hay bale / bale of straw/ Corn (barley, wheat)						●	●	●	●

Equipment:

Method	capacitive (non-destructive)			resistive (resistance)					
Sensor / Probe	integrated			integrated		external		external GSF 40	external GSF 40TF
Characteristics	14	18		4	494			4	494
User curves							4		
General functions	Hold, Auto-Off	Hold, Auto-Off		Hold, Auto-Off	Hold, Auto-Off, Sort	Hold, Auto-Off, Sort	Hold, Auto-Off, Sort	Hold, Auto-Off	Hold, Auto-Off, Sort
Serial interface / analog output						● / 0 ... 1 V	● / 0 ... 1 V		● / 0 ... 1 V
Data logger							●		

Device information:

Catalogue page	**page 38**	**page 38**	**page 37**	**page 42**	**page 42**	**page 39**	**page 39**	**page 43**	**page 43**

Material Moisture Measurement with GREISINGER-handheld instruments

Member of GHM GROUP

Methods

• Resistive measuring method

(GMR 110, GMH 3810, GMH 3831, GMH 3851)
The electrical resistance often depends on the material moisture. Therefore the devices measure the (possibly extremely high) values of resistance and convert them to the displayed value by means of integrated characteristic curves. The temperature has to be compensated especially at the measurement of wood – all GREISINGER- instruments have an integrated temperature compensation. In most cases the contact is realised by nails that are driven into the material are used to contact.

• Capacitive measuring method

(GMK 210, GMK 100, GMI 15)
The dielectric properties of an object are often a good indicator for its material moisture. The dielectric coefficient of water is considerably higher than that of dry lumbers or building materials. Therefore the total dielectric
coefficient of the measuring object can be easily used to get its material moisture. For the measurement the device has to be applied on the material.
Precondition therefore: planar surfaces, no metallic elements.

• relative humidity

(i.e. mit GMH 3330 + TFS 0100 E)
Another method is to measure the material moisture indirectly by means of the relative humidity: The humidity in a sealed hole within a material
depends on the material moisture. By means of a so-called sorption isotherm or a corresponding table the material moisture can be calculated from the humidity.

• dry method

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

Units

• Material moisture u (also „atro“):

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

• Moisture content w:

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

• “Digit“ (GMI 15)

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

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

Indicator for moisture in wood and buildings

BAT

HIGHLIGHTS:

- *nondestructive measurement*
- *easy and fast moisture rating*

GMI 15

Art. no. 600059
Indicator for moisture in wood and buildings

General:

Device for high-speed determination of moisture in buildings, contracting work etc. The GMI 15 allows detection of moisture in wood down to a depth of approx. 3 cm and in concrete or wash floor down to a depth of approx. 4 cm. Detection of moisture behind ceramic tiles and/or various wall or floor coverings.
To check moisture simply place device on the surface to be measured - no injection into the measuring object required. The displayed values by „digit“ are relative, that means the values can be well compared.

Application:

Humidity indication for i.e. estate agents (for fast control state of buildings), property management, house owners, architects, building experts, building contractors, etc.
Note:
The GMI 15 is an indicator for the fast estimation - it does not replace precision instruments like the GMH 3810, GMH 3831, GMH 3851 or GMK 100.

Specifications:

Display:	3½-digits, 13 mm high LCD
Display range	
concrete / floor pavement:	0 ... 5 = dry 6 ... 9 = humid, normal humidity level 10 ... = wet
wood / fibre glass reinforced polyester:	0 ... 3 ~ 0 ... 12 % : dry 3 ... 6 ~ 12 ... 20 % : air-dry 6 ... 11 ~ 20 ... 30 % : wind-dry 11 ... ~ 30 % ... : wet
Power supply:	9 V-battery
Battery life:	approx. 60 h
Working temperature:	0 ... 50 °C (not frozen)
Storage temperature:	-20 ... +70 °C
Relative humidity:	0 ... 80 % RH (non-condensing)
Housing:	Impact resistant ABS plastic housing
Dimensions:	approx. 106 x 67 x 30 mm (H x W x D)
Weight:	approx. 150 g (ready for use)
Scope of supply:	Device, battery, manual

Measuring device moisture

rear side of device

HIGHLIGHTS:

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

GMK 100

Art. no. 600105

Measuring device moisture in wood and buildings

General:

The GMK 100 is a capacitive material moisture measuring device with direct moisture display in percent. It is optimally suited for home and handcraft. Depending on the application, it is possible to display the material moisture “u” or the water content “w”. The humidity is measured by a measuring plate on the back of the device. With a side-mounted switch the measuring depths can be changed. With the help of measurements in different depth a statement could be made if for example the material dries already or if the moisture is just on the surface of the material.

Application:

Humidity measurement and indication of wood, concrete, screed, plaster, etc.

Specifications:

Display:	2 displays for material and measured value, in % material moisture or in % moisture content, backlight
Moisture rating	
Visual:	Rating of the moisture in 6 levels from WET to DRY
Acoustic:	Signal tone
Measurement depths:	10 mm and 25 mm
Curves:	18 characteristic curves for wood (with assignment tabel for wood species) and popular materials, additionally reference curve (rEF) for high-resolution relative measurements
Working temperature:	-25 ... +50 °C (not frozen)
Storage temperature:	-25 ... +70 °C
Power supply:	9 V battery
Battery life:	max. 2000 h without backlight
Power backlight:	approx. 2.5 mA (Auto-Off)
Housing:	impact-resistant ABS plastic housing, plastic foil keyboard, clear screen
Dimensions:	approx. 106 x 67 x 30 mm (H x W x D)
Weight:	approx. 145 g (ready for use)
Scope of supply:	Device, battery, manual

Accessories and spare parts:

PW 25
Art. no. 601368
Testing probe to control the device

Measuring device moisture

rear side of device

HIGHLIGHTS:

- *Moisture display in percent*
- *Acoustical and visual moisture rating*
- *14 material characteristics for wood and GFK*
- *2 different measurement depth for Caravan & Boat*
- *Search mode for quickly locating humidity and the like*

GMK 210

Art. no. 600107

Material moisture measuring device for caravan and boat

General:

The GMK 210 is a capacitive material moisture measuring device with direct moisture display in percent. It is optimally suited for home and handicraft. Depending on the application, it is possible to display the material moisture “u” or the water content “w”. The humidity is measured by a measuring plate on the back of the device. With a side-mounted switch the measuring depth can be changed. With the help of measurements in different depth a statement could be made if for example the material dries already or if the moisture is just on the surface of the material.

Application:

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

Specifications:

Display:	2 displays for material and measured value, in % material moisture or in % moisture content, backlight
Moisture rating:	
Visual:	Rating of the moisture in 6 levels from WET to DRY
Acoustic:	Signal tone
Measurement depths:	10 mm and 25 mm
Curves:	14 characteristic curves for wood (with assignment tabel for wood species) and GFK, insulating materials i.e. Styropor; additionally reference curve for high-resolution relative measurements
Working temperature:	-25 ... +50 °C (not frozen)
Storage temperature:	-25 ... +70 °C
Power supply:	9 V battery
Battery life:	max. 2000 h without backlight
Power backlight:	approx. 2.5 mA (Auto-Off)
Housing:	impact-resistant ABS plastic housing, plastic foil keyboard, clear screen
Dimensions:	approx. 106 x 67 x 30 mm (H x W x D)
Weight:	approx. 145 g (ready for use)
Scope of supply:	Device, battery, calibration protocol, manual

Accessories and spare parts:

PW 25
Art. no. 601368
Testing probe to control the device

Precision material moisture measuring device for wood, building materials, straw, hay, paper, textiles, etc.

HIGHLIGHTS:

- *serial interface or analog output 0-1 V, freely scalable*
- *4 programmable characteristics (GMH 3851)*
- *incl. calibration protocol*

ADDITIONAL FUNCTIONS GMH 3851:

466 WOOD TYPE CHARACTERISTICS
28 CONSTRUCTION MATERIALS

Conform to
EN 14080 : 2013 EN 16351 : 2015
Suitable e.g. for glued timber construction and laminated timber (MPA certified and listed)

GMH 3831

Art. no. 609289
Resistive material moisture and temperature measuring device, w/o accessories

GMH 3851

Art. no. 602009
Resistive material moisture and temperature measuring device, w/o accessories, with data logger and programmable characteristic curves memory

General:

The GMH 3831 and GMH 3851 offer decisive advantages in handling, user-friendliness, functional range and accuracy. The absolute moisture of 494 material types is displayed directly and can be automatically converted to water content. The cumbersome usage of calculation tables becomes a thing of the past. Additionally you get a moisture rating (wet ... dry) of the measured material.

Application:

Precision measurements in cut-wood, chip board, veneer, sawdust, wood chips, wood wool, flax, straw, hay, concrete, bricks, wash floor, plaster, limestone mortar, cement mortar, paper, carton, textiles, wood chips, professional firewood humidity measurement, etc.
User:
architect, expert, inspector, building contractor, painter, carpenter, parquet joiner, floor tiler, wood works, timber desiccation plant, building repair company, textile industry etc.

Specifications:

Measuring principle:	
Moisture:	Resistive material moisture measurement acc. to DIN EN 13183-2:2002
Temperature:	
external:	thermocouple, NiCr-Ni (type K)
internal:	NTC
Characteristic curves :	494 material characteristics
Measuring range:	
Moisture:	0.0 …. 100 % u (material moisture) 0.0 … 50 % w (water content, wet basis) (depends on selected characteristic)
Temperature:	-40.0 ... +200.0 °C (-40.0 ... +392.0 °F)
Moisture rating:	9 steps (dry ... wet)
Resolution:	0.1 % or 0.1 °C (0.1 °F)
Device accuracy: (at nominal temperature)	
Wood:	±0.2 % material moisture (deviation from corresponding characteristic curve in range 6 ... 30 %)
Building material:	±0.2 % material moisture (deviation from corresponding characteristic curve)
Temperature:	(external) ± 0.2 % of m.v. ± 0.3 °C
Temperature compensation:	automatic or manual
Sensor connection:	
Moisture:	BNC
Temperature:	thermovoltage-free type K (NiCr-Ni) socket
Permitted working temperature:	-25 ... +50 °C

Display:	two 4-digit LCD displays (12.4 mm and 7 mm high), additional indicator arrows
Output:	3-pole jack connector Ø 3.5 mm, either with serial interface or analog output
Serial interface:	connectable to RS232 or USB interface of PCs via electrically isolated interface converter GRS 3100, GRS 3105 or USB 3100 N (accessories).
Analog output:	0 - 1 V, freely scalable
Average value:	of 3 measurements, e.g. for professional firewood moisture measurements
Power supply:	9 V battery, additional socket for external 10.5 ... 12 V direct current power supply (adequate PSU: GNG10/3000).
Battery life:	approx. 120 h
Housing:	impact-resistant ABS, integrated pop-up clip for table top or suspended use.
Dimensions:	142 x 71 x 26 mm (H x W x D)
Weight:	155 g
Scope of supply:	Device, battery, manual

weitere Funktionen bei GMH 3851:

User specific characteristics: 4, freely programmable

Interpolation points per curve: 20
By means of the gratis software GMHKonfig the interpolation points can be comfortably edited and stored to the instrument (Required accessories: interface converter)

Sort limitaion of different materials (up to 8)

Data logger:
This instrument is essential for the documentation of material state by quality assurance systems, etc. By means of the integrated data logger there can be up to 10.000 measuring values recorded and processed on demand. Additionally it is possible to individually program 4 material curves (e.g. with dry oven or CM-method). This instruments finally makes paper correction tables unnecessary.
Logger function
manual: 99 data sets (fetch data via buttons or interface)
cyclic: 10.000 data sets (fetch data via interface)
adjustable cycle time: 1 s … 1 h
The logger is started or stopped by keypad or interface.
The software GSOFT3050 (see accessories) is available for comfortable read-out of logger data.

Accessories and spare parts:

GSOFT 3050
Art. no. 601336
Logger operation software

GRS 3100
Art. no. 601097
RS232 interface converter

USB 3100 N
Art. no. 601092
Interface converter

additional accessories: see next page

Optional accessories

1

GMK 38
Art. no. 601261

Connection cable

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

2

GHE 91
Art. no. 601262

Reciprocating piston electrode *

to drive measuring nails into material without auxiliary devices

3

GSE 91
Art. no. 601266

Impact electrode *

to drive measuring nails into material

4

GEG 91
Art. no. 601268

Handle

suitable for GSE 91

5

GSG 91
Art. no. 601270

Penetration electrode *

adequate for steel nails and measuring rods

6

GST 91
Art. no. 601273

steel nails

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

GST 91/40
Art. no. 601275

steel nails

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

7

GST 45i
Art. no. 601277

steel nails

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

GST 60i
Art. no. 601279

steel nails, as above, 60 mm long

8

GOK 91
Art. no. 601287

Measuring cap

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

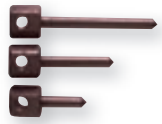
9

GMS 300/91
Art. no. 601289

Measuring rods

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

10



GST 15B
Art. no. 601281

steel nails *

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

GST 25B
Art. no. 601283

steel nails * as above, Ø 3.8 x 25 mm

GST 40B
Art. no. 601285

steel nails * as above, Ø 3.8 x 40 mm

11

GBSK 91
Art. no. 601293

Wire brush (pair) short *

for depths up to approx. 100 mm

12

GBSL 91
Art. no. 601294

Wire brush (pair) long *

for depths up to approx. 300 mm

13

GEF 38
Art. no. 601296

Flat electrode (pair) *

for screed, paper, etc.

14

GLP 91
Art. no. 601299

conducting pase

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

15

GSP 91
Art. no. 601301

sensor for surface measurements *

on paper, textiles etc.

GSP 91 ES
Art. no. 601303

spare sensor element

for GSP 91

16

GMZ 38
Art. no. 605783

Measuring clamp *

for measurements of veneers or thin wood
(up to approx. 10 mm)

17

GSF 50 (110 cm)
Art. no. 601306

GSF 50K (43 cm)
Art. no. 601308

Injection probe

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

18

GSF 50TF (110 cm)
Art. no. 601312

GSF 50TFK (43 cm)
Art. no. 601314

Injection probe

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

** Measuring cable GMK 38 necessary for GHE 91, GSE 91, GSG 91, GST 15B / 25B / 40B, GBSK 91, GBSL 91, GEF 38, GSP 91, GMZ 38*

Optional accessories

19

GSF 40 (67 cm)
Art. no. 601316

Injection probe

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

20

GSF 40TF (67 cm)
Art. no. 601319

Injection probe

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

21

GTF 38
Art. no. 601347

NiCr-Ni temperature probe

potential free, Ø 2.2 x 25 mm, 1 m cable
(recommended for wood moisture measurements)

22

GES 38
Art. no. 601350

NiCr-Ni injection probe

potential free, Ø 4 x 150 mm, 1 m cable
(recommended for wood moisture measurements)

23

GPAD 38
Art. no. 601328

Test adapter

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

24

GKK 3500
Art. no. 601052

Plastic case

(394 x 294 x 106 mm) with cut-outs for device and accessories (device and accessories are not included)

25

pict.: GMH3831 in ST-RN

ST-RN
Art. no. 601074

Protection bag

with blanked out sensor connections
(suitable for GMH 3831, GMH 3851)

Accessories-Sets

SET 38 HF
Art. no. 602071
Wood moisture set

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

Application:
wood

SET 38 BF
Art. no. 602073
Wood and building moisture set

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

Application:
wood, concrete, screed, plaster

SET 38 MPA
Art. no. 602075
MPA wood moisture set

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

Application:
wood, gluelam

Moisture complet set

GMH 38-LW1-TF
Art. no. 606470

GMH 38-LW1-TFK
Art. no. 606462

GMH 38-LW2-TF
Art. no. 606471

GMH 38-LW2-TFK
Art. no. 606463
Moister complete set for for agricultural use.

General:

Measuring device for fast moisture analysis in lumps and bulks. Universally applicable tool damage prevention and quality assurance. The more than 1 m long insertion probe with integrated temperature sensor is very good for measuring in hay and straw lump and bulk suitable. Material humidity and temperature can be easily determined by piercing the object.

Application:
- Hay, flax
- Straw, cereals
- Wood chips
- Wheat
- Barley

the simple humidity indication is done in nine steps.

Specifications:

Device:	GMH 3831 GMH 3851 respectively, see page 39
Penetration:	GSF 50, GSF 50K, GSF 50TF, GSF 50TFK, see page 40
Scope of supply:	
GMH 38-LW1-TF	GMH 3831, GSF 50 TF, battery, manual
GMH 38-LW1-TFK	GMH 3831, GSF 50 TFK, battery, manual
GMH 38-LW2-TF	GMH 3851, GSF 50 TF, battery, manual
GMH 38-LW2-TFK	GMH 3851, GSF 50 TFK, battery, manual

Resistive material-moisture measuring device

HIGHLIGHTS:

- *494 characteristic curves*
- *incl. calibration protocol*

GMH 3810

Art. no. 600350

Resistive material-moisture measuring device with integrated measuring pins

General:

The measuring pins integrated on the reinforced front numerous measurings can be done without additional accessories.
For measuring of very hard materials we suggest the components shown at the accessories section.

Specifications:

Measuring principle:	
Moisture:	resistive material-moisture-measuring according to DIN EN 13183-2:2002
Temperature internal:	NTC
Curves:	494 material characteristics
Measuring range:	
Moisture:	0.0 ... 100.0 % moisture content 0.0 ... 50.0 % water content (depending on characteristic curve)
Temperature:	-25.0 ... +50.0 °C (-13.0 ... +122.0 °F)
Estimation:	in 9 steps (dry ... wet)
Resolution:	0.1 % resp. 0.1 °C (0.1 °F)
Accuracy device: (at nominal temperature = 25 °C)	
wood:	±0.2 % moisture content (deviation from characteristic curve at range 6 ... 30 %)
building material:	±0.2 % moisture content (deviation from characteristic curve)
Temperature compensation	automatically or manual
Measuring probe:	2 pin holders M6 x 0.75 with 19 mm pins (12 mm utilisable)
Perm. working temperature	0 ... 50 °C (not frozen)
Storage temperature:	-25 ... +70 °C
Rel. humidity:	0 ... 95 % RH (non-condensing)
Display:	two 4-digit LCDs
Sort:	the material selection is restricted to up to 8 favorites
Power supply:	9 V battery
Battery life:	approx. 120 h
Housing:	Impact-resistant ABS plastic housing, membrane keyboard, transparent panel. Integrated pop-up clip
Dimensions:	142 x 71 x 26 mm (H x W x D)
Weight:	175 g
Scope of supply:	Device, battery, manual

Accessories and spare parts:

GST 3810
Art. no. 601392
replacement pins (10 pcs.)

GMK 3810
Art. no. 603070
1 m connection cable with 2 x banana plugs and 2 adapters. Allows connection of accessories (except GSF38..., GTF38 and GES38) on GMH3810 / GMR110.

Resistive material-moisture measuring device

rear side of device

GMR 110

Art. no. 600101

Resistive material moisture measuring device with integrated measuring needles.

General:

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

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

Specifications:

Measuring principle:	resistive material moisture measurement acc. to DIN EN 13183
Characteristic curves:	3 different wood groups (h.01, h.02, h.03) for a total of 130 wood types and 8 different building material curves (c.01, c.02, c.03, c.04, c.05, c.06, c.07, c.08)
Measuring range:	0.0 ... 100 % material moisture (depends on selected characteristics)
Moisture rating:	in 6 steps (wet … dry)
Resolution:	0.1 % (<20 %), 1 % (>20 %)
Accuracy: (at nominal temperature = 25 °C)	
wood:	±0.2 % material moisture (Deviation to wood characteristic curve in range 6 … 20 %)
building materials:	±0.2 % material moisture (Deviation to corresponding characteristic curve)
Temperature compensation:	automatically or manual
Measuring probe:	2 needle holder M6 x 0.75 with 19 mm measuring needles (12 mm usable length)
Perm. working temperature:	-5 ... +50 °C (not frozen)
Storage temperature:	-25 ... +70 °C
Rel. humidity:	0 ... 95 % RH (non condensing)
Display:	2 LCD displays for characteristic and measuring value
Power supply:	9 V battery
Battery life:	approx. 170 h
Housing:	Impact-resistant ABS plastic housing, membrane keyboard, transparent panel
Dimensions:	110 x 67 x 30 mm + needles 26 mm
Weight:	approx. 155 g
Scope of supply:	device, 2 needle protection caps, battery, calibration protocol, manual

Characteristic curves:

3 wood groups:

h.01	spruce, pine
h.02	maple, birch, beech, larch (EUR), ash (EUR), fir
h.03	oak, ash (AM), poplar, douglas fir

a lot of additional wood types can be determined with the table of the instruction manual

8 building material curves:

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

Accessories and spare parts:

GST 3810
Art. no. 601392
replacement pins (10 pcs.)

GMK 3810
Art. no. 603070
1 m connection cable with 2 x banana plugs and 2 adapters. Allows connection of accessories (except GSF38..., GTF38 and GES38) on GMH3810 / GMR110.

additional special accessories at page 40.

GB 9 V
Art. no. 601115
spare battery

GKK 252
Art. no. 601056
case (235 x 185 x 48 mm) with foam lining

Hay and straw humidity measuring device

HIGHLIGHTS:

- *robust 60 cm V4A measuring rod*
- *characteristics for hay, straw and grain*

BaleCheck 100

Art. no. 600103

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

General:

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

Application:

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

Specifications:

Measuring range:	0.0 …. 100 % u (material moisture) 0.0 … 50 % w (water content)
Resolution:	0.1 % (till 19,9 %) and 1 % (from 20 %)
Characteristics:	hay, straw, grain, reference characteristics
Moisture rating:	6-step bar graph (wet … dry)
Temperature compensation:	manual
Display:	2 displays for characteristics and measuring value
Working conditions:	-25 … +50 °C (device), 0 … +100 °C (rod), 0 … 95 % RH (non condensing)
Measuring rod:	V4A stainless steel, 600 mm x Ø 10 mm, 1 m connection cable with BNC-plug, 260 g, design of probe handle offers comfortable operation
Power supply:	9 V battery
Battery life:	approx. 170 h
Housing:	impact-resistant ABS
Dimensions:	110 x 67 x 30 mm (H x W x D)
Weight:	155 g
Scope of supply:	Device, measuring rod GSF 40, protective bag, battery, calibration protocol, manual

Hay and straw humidity measuring device incl. temperature measurement

HIGHLIGHTS:

- *fast temperature measurement integrated*
- *robust 60 cm V4A measuring rod*
- *characteristics for hay, straw and grain*

BaleCheck 200

Art. no. 600354

Hay and straw humidity measuring device incl. temperature measurement, measuring rod 620 mm

General:

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

Application:

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

Specifications:

Measuring range:	0.0 …. 100.0 % u (material moisture) 0.0 … 50.0 % w (water content) -40.0 … +200.0 °C (device)
Resolution:	0.1 %, 0.1 %
Characteristics:	hay, straw, grain, reference characteristics approx. 480 additional material moisture characteristics
Moisture rating:	9-step bar graph (wet … dry)
Temperature compensation:	automatic or manual
Display:	two 4-digit LCD displays (12.4 mm and 7 mm)
Working conditions:	-25 … +50 °C (device), 0 … +100 °C (rod), 0 … 95 % RH (non condensing)
Measuring rod:	V4A stainless steel, 600 mm x Ø 10 mm, 1 m connection cable with BNC-/type K- plug, temperature 0 … 100 °C, 260 g
Features:	interface, analog output (0 ... 1 V), power supply terminal (10.5 ... 12 VDC)
Sort:	the material selection is restricted to up to 8 favorites
Power supply:	9 V battery
Battery life:	approx. 120 h
Housing:	impact-resistant ABS
Dimensions:	142 x 71 x 26 mm (H x W x D)
Weight:	155 g
Scope of supply:	Device, measuring rod GSF 40 TF with temperature sensor, protective bag, battery, calibration protocol, manual

Variants:

BaleCheck 200 - 1000
Art. no. 607147
Hay and straw humidity measuring device incl. measuring rod 1000 mm

BaleCheck 200 - 1500
Art. no. 607146
Hay and straw humidity measuring device incl. measuring rod 1500 mm

CONDUCTIVITY

Application:	GMH 5430	GMH 5450	GMH 3431	GMH 3451	GLF 100	GLF 100 RW	G 1410	G 1420
Waters measuring, fishkeeping, aquafarming (fresh- / marine waters)	●	●	●	●	●		●	
Drinking water-, process monitoring, ground measurements	●	●	●	●	●		●	
Cleaning processes	●	●	●	●	●	●	●	●
Ultrapure water	●	●				●		●
Food production and -control	●	●	●	●	●		●	
Quality management	●	●	●	●	●	●	●	●
Water-proof	●	●					●	●
Electrodes for replacement	●	●						
Equipment:								
Measuring range Conductivity / Temperature esp. Resistance TDS / Salinity	● ● ●	● ● ●	● ● ●	● ● ●	● ●	● ●	● ●	● ●
Sensor connection	7-pole bayonet	7-pole bayonet	fixed	fixed	fixed	fixed	fixed	fixed
Electrode	2- or 4-pole	2- or 4-pole	2-pole graphite	4-pole graphite	2-pole graphite	2-pole stainless steel	2-pole graphite	2-pole stainless steel
General functions	Min/Max, Hold, Auto-Off, Illumination	Min/Max, Hold, Auto-Off, Calibration memory, Illumination	Min/Max, Hold, Auto-Off	Min/Max, Hold, Auto-Off	Min/Max, Hold, Auto-Off	Min/Max, Hold, Auto-Off	Min/Max, Hold, Auto-Off, Illumination	Min/Max, Hold, Auto-Off, Illumination
Interface	●	●	●	●				
Alarm / Data logger		●		●				
Device information:								
Catalogue page	page 45	page 45	page 47	page 47	page 48	page 48	page 49	page 49

Water-proof handheld device for conductivity measurement

HIGHLIGHTS:

- *Measurement of conductivity, resistance, salinity, TDS*
- *Large double display with background illumination*
- *Automatic cell correction with reference solutions*
- *incl. calibration protocol*

ADDITIONAL FUNCTIONS GMH 5450:

ALARM LOGG

GMH 5430

Art. no. 600035
Water-proof handheld device without electrode

GMH 5450

Art. no. 600037
Water-proof handheld device with analog output and data logger, without electrode

Application:

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

Additional applications at laboratory:
- medicine, pharmacy, chemistry

Specifications:

Measuring range:	
Number of meas. ranges:	5
Smallest range:	0.000 ... 5.000 µS/cm * or 0.0 ... 500.0 µS/cm **
Biggest range:	0 ... 5000 µS/cm * or 0 ... 1000 mS/cm **
Resistivity:	0.005 ... 500.0 kOhm * cm (depends on cell constant)
TDS:	0 ... 5000 mg/l (depends on cell constant)
Salinity:	0.0 ... 70.0 (g salt / kg water)
Temperature:	-5.0 ... +100.0 °C, Pt1000 or NTC (10 k)
Supported cell constants:	4.000 ... 15.000 / cm - 0.4000 ... 1.5000 / cm - 0.04000 ... 0.15000 / cm - 0.004000 ... 0.015000 / cm
Accuracy (at nominal temperature = 25 °C):	
Conductivity:	±0.5 % of m.v. ±0.1 % FS (depends on electrode)
Temperature:	±0.2 K
Connection:	
Conductivity, temperature:	1 x 7-pole bayonet connector for connection of different measuring cells, supported temperature sensors: Pt1000 or NTC (10 k)
Interface / ext. supply:	4-pole bayonet connector for serial interface and supply (with accessory: USB adapter USB 5100)
Analog output: (only GMH 5450)	0 ... 1 V, freely adjustable, connection with 4-pole bayonet connector, resolution 13 bit, accuracy 0.05 % at nominal temperature
Data logger: (GMH 5450)	cyclic: 10.000 data sets, adjustable cycle time: 1 s … 60 min manual: 1000 data sets (with measuring point input, 40 adjustable measuring point texts or measuring point numbers)
Display:	4 ½ digit 7-segment, illuminated (white)
Operating conditions:	Device: -25 ... +50 °C, 0 ... 95 % RH (non-condensing)
Storage temperature:	-25 ... +70 °C
Background illumination:	duration adjustable (off, 5 s ... 2 min.)
Power supply:	2 x AAA battery (included), power consumption 6.25 mA
Battery life:	approx. 160 h (without background illumination)
Protection class:	IP65 / IP67
Housing:	Impact-resistant ABS plastic housing, integrated pop-up clip
Dimensions:	160 x 86 x 37 mm (H x W x D) incl. silicone protection cover
Weight:	approx. 250 g incl. battery and protection cover
Scope of supply:	Device, K 50 BL, battery, calibration protocol, manual

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

weitere Funktionen:

Cell correction
Manually or automatically with reference solution

Automatic temperature compensation:
As conductivity depends strongly on temperature, each conductivity value is only valid at the corresponding temperature. Therefore the device supports temperature compensation, i.e. referring the conductivity to a reference temperature (selectable: 20 °C or 25 °C).

Supported types of compensation:
- nLF: Non-linear function of natural waters acc. to DIN EN 27888 (ISO 7888) (Reference temperature 25 °C)
- Lin: adjustable linear compensation
- off: no compensation

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

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

GLP (Good Laboratory Practice)
adjustable calibration intervals
GMH 5450: Calibration memory: latest 16 calibrations

Accessories and spare parts:

GKL 10... Conductivity control solution see next page

EBS 20M
Art. no. 601158
Software for long-term monitoring (p.r.t. page 96)

GSOFT 3050
Art. no. 601336
Software for operation of logger devices (p.r.t. page 97)

USB 5100
Art. no. 601095
Electrically isolated interface converter, supplied via USB

GNG 5 / 5000
Art. no. 602287
Plug-in power supply 5 V DC, suitable for devices of the series GMH 5000 (p.r.t. page 94)

GKK 3500
Art. no. 601052
Device case (394 x 294 x 106 mm) with eggcrate foam and cut-outs for 1 device (p.r.t. p. 92)

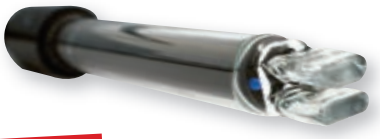
Conductivity electrodes

PURE AND ULTRA PURE WATER

LF 200 RW

Art. no. 602841
Conductivity electrode stainless steel

Specifications:	
Measuring range:	0 ... 100 µS/cm
Temperature range:	-5 ... +100 °C
Cell constant *:	approx. 0.1
Temperature measurement:	NTC 10 k
Shaft:	Stainless steel, Ø 12 mm x 75 mm
Electrode:	2-pole stainless steel
Application:	Pure and ultra pure water
cable length:	1 m



ALCOHOL, FUEL, DIESEL

LF 210

Art. no. 602969
Conductivity electrode glass / platinum

Specifications:	
Measuring range:	0 ... 1000 µS/cm
Temperature range:	-5 ... +100 °C
Cell constant *:	approx. 1
Temperature measurement:	NTC 10 k
Shaft:	Glass, Ø 12 mm x 120 mm
Electrode:	2-pole glass / platinum
Application:	Alcohol, fuel, diesel
cable length:	1 m

FOR UNIVERSAL APPLICATION

LF 400

Art. no. 602968
Conductivity electrode 4-pole graphite

Specifications:	
Measuring range:	0 ... 200 mS/cm
Temperature range:	0 ... 100 °C
Cell constant *:	approx. 0.55
Temperature measurement:	NTC 10 k
Dimensions:	Epoxide, Ø 12 mm x 120 mm
Characteristics:	4-pole graphite
Applications:	Universal application, Economy Class
cable length:	2 m

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

TIGHT TOLERANCES, ROBUST AND PRECISE

LF 425

Art. no. 602840
Leitfähigkeitsmesszelle Graphit 4-pol.

Specifications:	
Measuring range:	0 ... 1000 mS/cm
Temperature range:	-10 ... +80 °C (90 °C - max. 5 min)
Cell constant *:	approx. 0.42
Temperature measurement:	Pt 1000
Dimensions:	PVC-C, Ø 16 mm x 145 mm
Characteristics:	4-pole graphite
Applications:	Tight tolerances, robust and precise for highest demands, High End Class
Cable length:	1 m

Accessories and spare parts:

GEH 1
Art. no. 601089
Electrode holder for measuring electrodes with plastic handle (p.r.t. page 92)

GKL 100
Art. no. 601396
Conductivity control solution (100 ml bottle with 1413 µS/cm according to DIN EN 27888)

GKL 101
Art. no. 601398
Conductivity control solution (250 ml bottle with 84 µS/cm)

GKL 102
Art. no. 601400
Conductivity control solution (100 ml bottle with 50 µS/cm)

Handheld instruments incl. electrode

i.e. GMH 5450

READY-TO-USE

LF 400

LF 425

GMH 5430-400

Art. no. 602752
Handheld instrument incl. electrode LF 400

GMH 5450-400

Art. no. 602754
Handheld instrument incl. electrode LF 400, with data logger

GMH 5430-425

Art. no. 602753
Handheld instrument incl. electrode LF 425

GMH 5450-425

Art. no. 602755
Handheld instrument incl. electrode LF 425, with data logger

General:

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

Accessories and spare parts:

GKK 3500
Art. no. 601052
Case with foam lining and cut-outs for 1 device (394 x 294 x 106 mm) (p.r.t. page 92)

Conductivity measuring device

HIGHLIGHTS:

- *Display of resistivity, salinity or TDS (total dissolved solids)*
- *Conform to the regulations of the drinking water ordinance (TrinkwV 2001) and DIN EN 27888*

ADDITIONAL FUNCTIONS GMH 3451:

ALARM LOGG

GMH 3431

Art. no. 601917

Conductivity measuring device incl. 2-pole measuring cell

GMH 3451

Art. no. 601919

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

General:

Intelligent set with 2-pole measuring cell for tap water, etc., 4-pole worry-free package also suitable for continuous measurement in high conductivity ranges (e.g. salt water)

Specifications:

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 0 ... 400 mS/cm **(only GMH 3451)** manually selectable or AutoRange
Temperature:	-5.0 ... +100.0 °C
Resistivity:	0.005 ... 100.0 kOhm * cm
Salinity:	0.0 ... 70.0 g/kg water
TDS:	0 ... 1999 mg/l
Accuracy: (±1 digit) (at nominal temperature = 25 °C)	
Conductivity:	±0.5% of m.v ±0.3 % FS or ±2 µS/cm
Temperature:	±0.2% of m.v ±0.3 K
Cell correction:	adjustable 0.800 ... 1.200 cm^{-1}, manually or automatically with selectable reference solution
Temperature compensation:	off or automatically (by temperature sensor integrated to electrode)
Type of compensation:	-nLF: Non-linear function of natural waters acc. to DIN EN 27888 (ISO 7888) (Reference temperature selectable: 20 °C or 25 °C) -Lin: linear compensation from 0.3 ... 3.0 %/K (Reference temperature selectable: 20 °C or 25 °C) -off: no compensation.
Display:	two 4-digit LCD displays (12.4 and 7 mm high) for current conductivity (resistivity, salinity, TDS) and temperature, or for min-, max- value, hold function, etc. and additional indicator arrows.
Measuring cell:	Conductivity measuing cell with integrated temperature sensor in shaft. Electrode material: graphite. Shaft material: PPE, PS (GMH 3431), Epoxide (GMH 3451). The graphite electrodes are the optimum solution for sewage and can be cleaned easily. GMH 3431: 2-pole; GMH 3451: 4-pole
Warranty for sensor element:	12 months
Working conditions:	device: -25 ... +50 °C, 0 ... 95 % RH; measuring cell: -5 ... +80 °C (permanent), up to +100 °C (short-term)
Relative humidity:	0 ... +95 % RH (non condensing)
Interface:	serial interface; connectable to RS232 or USB interface of PCs via electrically isolated interface converter GRS 3100, GRS 3105 or USB 3100 N (accessories).
Operation buttons:	6 membrane keys for ON/OFF-switch, selection of meas. range, min- and max-value memory, hold-function, etc.
Power supply:	9 V-battery as well as additional PSU connector (internal pin Ø 1.9 mm) for external 10.5 ... 12 V DC supply. (suitable power supply: GNG10/3000)
Battery life:	approx. 150 h
Housing:	Impact-resistant ABS housing, membrane keyboard, transparent panel. Integrated pop-up clip for table top or suspended use.
Dimensions:	Device: 142 x 71 x 26 mm (L x W x D) Dimensions (electrode shaft): approx. 120 mm long, Ø approx. 12 mm, 1 m of fixed connection cable between electrode and device
Weight:	approx. 230 g (incl. battery and measuring cell)
Scope of supply:	Device incl. measuring cell, battery, calibration protocol,manual

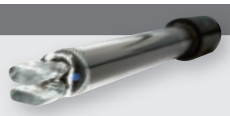
Additional functions:

Salinity determination:
Salinity is understood to be the sum of concentrations of all salts dissolved in water. Displayed in g/kg.
TDS-determination (total dissolved solids):
The dry residue of filtrate is understood to be the concentration of substances dissolved in a liquid. Displayed in mg/l

Additional functions GMH 3451:

Analog output:
0 - 1 V, freely scalable, connection via 3-pole jack socket
Ø 3.5 mm, resolution 13 bit, accuracy 0.05 % at nominal temperature
4-pole measuring cell:
Better long-term stability at high conductivity values (>20 mS/cm) and for harsh environments, stable measuring values even in polluted media (e.g. sewage, salt water)
data logger:
cyclic 10,000 data sets, manual: 1,000 data sets (with measuring point input, 40 adjustable measuring point texts or measuring point numbers)

Variants:



GMH 3431-LTG
Art. no. 608399
GMH 3451-LTG
Art. no. 610028
for organic matter (alcohol, petrol, diesel) up to 1000 µS/cm with glass shaft, platinum electrodes, 1.35 m PUR-cable permanently connected to device

Accessories and spare parts:

GKL 100
Art. no. 601396
100 ml conductivity test solution
(100 ml bottle with 1413 µS/cm, acc. to DIN EN 27888)

Conductivity measuring devices

HIGHLIGHTS:

- *Automatic measuring range change-over*
- *Automatic temperature compensation via integrated temperature sensor*
- *Incl. measuring cell*

GLF 100

Art. no. 600109
Universal conductivity measuring device (incl. calibration protocol)

Application:

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

GLF 100 RW

Art. no. 600111
Conductivity meter for ultra-pure water

Application:

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

Specifications:	GLF 100	GLF 100 RW
Measuring ranges:		
Conductivity:	0 ... 2000 µS/cm 0.00 ... 20.00 mS/cm 0.0 ... 100.0 mS/cm	0.000 ... 2.000 µS/cm 0.00 ... 20.00 µS/cm 0.0 ... 100.0 µS/cm
Temperature:	-5.0 ... +100.0 °C	-5.0 ... +100.0 °C
TDS:	0 ... 2000 mg/l	--
Salinity:	0.0 ... 50.0	--
Resistivity:	-- -- --	0.0100 ... 0.2000 MΩ*cm 0.010 ... 2.000 MΩ*cm 0.01 ... 20.00 MΩ*cm
Accuracy: (±1 digit, at nominal temperature = 25 °C)		
Conductivity:	±0.5 % of m.v. ±0.5 % FS	typ. ±1 % of m.v. ±0.5 % FS
Temperature:	±0.3 °C	±0.3 °C
Temperature-compensation:	off: deactivated nLF: non-linear, acc. to EN 27888 -- --	off: deactivated nLF: non-linear, acc. to EN 27888 LIN: linear, with adjustable coefficients NaCl: compensation for weak NaCl-solutions acc. to EN 60746-3
Reference temperatures:	20 and 25 °C	20 and 25 °C
Measuring cell:	2-pole measuring cell, Ø 12 mm (graphite) Cable length: 1.2 m, with integrated temperature sensor	2-pole measuring cell, Ø 12 mm (stainless steel: 1.4404, 1.4435) Cable length: 1.2 m with integrated temperature sensor
Warranty for sensor element:	12 months	
Display:	approx. 11 mm high, 4½-digit LCD-display	
Working conditions:	Device: -25 ... +50 °C, 0 ... 95 % RH (non condensing) Measuring cell: -5 ... +80 °C (for short-time: 100 °C)	
Power supply:	9 V battery	
Battery life:	approx. 200 h	
Housing:	impact resistant ABS, membrane keyboard, transparent panel	
Dimensions (device):	110 x 67 x 30 mm (H x W x D)	
Weight:	approx. 155 g	
Scope of supply:	Device incl. measuring cell, battery, calibration protocol (only GLF 100), manual	

The measuring cell:

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

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

GLF 100 RW:
Universal applicability at highest standards is made possible by the use of stainless steel electrodes (1.4404).

Accessories and spare parts:

GKL 100
Art. no. 601396
Conductivity control solution
(100 ml bottles with 1413 µS/cm acc. to DIN EN 27888)

GKL 101
Art. no. 601398
Conductivity control solution
(250 ml bottles with 84 µS/cm)

GKL 102
Art. no. 601400
Leitfähigkeits-Kontrolllösung
(100 ml Flasche mit 50 mS/cm)

GEH 1
Art. no. 601089
Swivel-arm electrode-retainer
(for up to 4 electrodes / probes)

GWZ-01
Art. no. 603499
Flow-through chamber (for measuring cell with Ø 12 mm, hose connection Ø 6 mm)

Precise conductivity measuring device

HIGHLIGHTS:

- *Modern and functional housing*
- *Outstanding price/performance ratio*
- *3-line display / overhead display at the push of a button*
- *Backlighting*
- *Waterproof (IP67)*
- *Durable, long battery life*
- *High-quality measuring cell for wider range of application included*

AVAILABLE STARTING IN QUARTER 2 OF 2017

G 1410

Art. no. 610006

Precise wide-range measuring device for conductivity of up to 100 mS/cm, incl. graphite measuring cell

G 1420

Art. no. 610007

High-resolution measuring device for the purest water with up to 100 µS/cm, incl. stainless steel measuring cell

General:

The primary focus in the development of the new GMH 1000 series was place on the essential functions of the measurement technology. Pure measurement with a focus on precision, speed and reliability packaged in a compact housing distinguish an impressive price/performance ratio, Made in Germany.
The new handheld measuring devices also impress with their ergonomic design, dust and water-protected design in accordance with IP 65/67 and the illuminated display. The compact conductivity measuring device as a G 1410 is a precise and durable wide-range measuring cell for universal use from DI water to salt water. As a G 1420, it has a specialised measuring cell for high-resolution clean/cleanest water applications.

Application:

Freshwater and salt water aquariums, reverse osmosis and similar filters, cleaning processes, cooling/lubricating processes, plant cultivation and agriculture; laboratories, quality assurance, service

Specifications:	G 1410	G 1420
	Wide-range measuring device, incl. graphite measuring cell	Cleanest water version, incl. stainless steel measuring cell
Measurement:	Conductivity, salinity, TDS	conductivity, specific resistance
Metering ranges:	With automatic measuring range shifting	
Conductivity:	0 … 2000 µS/cm 0.00 … 20.00 mS/cm 0.0 … 100.0 mS/cm	0.000 … 2.000 µS/cm 0.00 … 20.00 µS/cm 0.0 … 100.0 µS/cm
Specific resistance:	--	0.0100 ... 0.2000 MOhm*cm 0.010 ... 2.000 MOhm*cm 0.01 ... 20.00 MOhm*cm
TDS:	0 ... 2000 mg/l	--
Salinity (PSU):	0.0 ... 50.0 g/kg water	--
Temperature:	-5.0 ... +100.0 °C	-5.0 ... +100.0 °C
Accuracy		
Conductivity:	±0.5 % of m.v. ±0.5 % FS	Typ. ±1 % of m.v. ±0.5 % FS
Temperature:	±0.3 °C	±0.3 °C
Temperature compensation:	off: deactivated nLF: non-linear, according to EN 27888	off: deactivated nLF: non-linear, according to EN 27888 LIN: linear with variable coefficients NaCl: For weak NaCl solutions in accordance with EN 60746-3
Reference temperatures:	20 and 25 °C	20 and 25 °C
Sensors / measuring inputs:	permanently connected 2-pole measuring cell with integrated temperature sensor	
Measuring cell:	2-pole measuring cell, Ø 12 mm (graphite), cable 1.2 m (others available for surcharge)	2-pole measuring cell, Ø 12 mm (stainless steel 1.4404, 1.4435), cable 1.2 m (others available for surcharge)
Range of application:	-5 ... +80 °C (short-term 100 °C)	
Display:	3-line unit with battery status indicator, background light, protected by an unbreakable pane, overhead display at the push of a button	
Operation:	4 long-lasting, easy-to-operate buttons	
Additional functions:	Hold, min/max value, automatic measuring range shifting, automatic temperature compensation	
Display unit environment:	-20 … +50 °C, 0 … 95 % RH	
Battery life:	2 x AA battery, approx. 500 h	
Protection rating:	IP65 / IP67	
Housing:	Break-proof ABS housing	
Dimensions:	108 x 54 x 28 mm (H x W x T) without sensor connection	
Weight:	approx. 200 g (G 1410) approx. 230 g (G 1420)	
Scope of supply:	Device with measuring cell, calibration log, 2 x battery, manual	

Accessories and spare parts:

GKL 100
Art. no. 601396
Conductivity control solution (100 ml bottle with 1413 µS / cm, in accordance with DIN EN 27888)

GKL 101
Art. no. 601398
Conductivity control solution (250 ml bottle with 84 µS / cm)

GKL 102
Art. no. 601400
Conductivity control solution (100 ml bottle with 50 mS / cm)

GEH 1
Art. no. 601089
Pivot arm electrode holder (for up to 4 electrodes / sensors)

GWZ-01
Art. no. 603499
Flow-through vessel (for measuring cells with Ø 12 mm, hose connection Ø 6 mm)

GB AA
Art.-Nr: 610049
Spare battery AA (2 batteries required)

PH/REDOX/O_2 DISSOLVED

Application:	GMH 5530	GMH 5550	GMH 3511	GMH 3531	GMH 3551	GPH 114	G 1500	HD-3456-2	GMH 5630	GMH 5650	GMH 3611	GMH 3651	GOX 20	G 1610	HD-3409-2
Waters measuring, fish-keeping, aquafarming	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
Drinking water-, process monitoring, ground measurement	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Food production and -control	●	●	●	●	●	●	●	●							
Precision measurement	●	●	●	●	●			●	●	●					●
Laboratory (GLP)	●	●		●	●			●		●		●			●
Quality management	●	●	●	●	●		●	●		●		●			●
Water-proof	●	●					●		●	●				●	
incl. air pressure measuring									●	●	●	●			●

Equipment:

Measuring range	pH, mV, rH, T		pH, mV, T	pH, mV, rH, T		pH	pH	pH, mV, χ, Ω, TDS, Sal, °C/°F	mg/l, ppm, % O_2, T, hPa		mg/l, ppm, % O_2, T, hPa		mg/l	mg/l, % O_2	mg/l O_2, %O_2, mbar, °C/°F
Connections **Temperature**	BNC-socket 2 banana-jack		BNC-socket 2 banana-jack			BNC-socket --	BNC-socket --	8-pole male connector	7 pin bayonet connection		6-pin Mini-DIN-socket		Electrode permanenty connected to device	Electrode permanenty connected to device	8-pole male connector
Temperature compensation	automatic and manual (Pt1000, NTC 10k)		automatic and manual (Pt1000)			manual	manual	auto-matic	automatic		automatic		auto-matic	auto-matic	auto-matic
General functions	Min/Max, Hold, Auto-Off, adjustable calibration interval		Min/Max, Hold, Auto-Off				Min/ Max, Hold, Auto-Off	Min/ Max, average value, Hold, Auto-Off	Min/Max, Hold, Auto-Off, calibration, adjustable calibration interval		Min/Max, Hold, Auto-Off, adjustable calibration interval	Min/Max, Hold, Auto-Off, salinity corr, adjustable calibration interval		Min/ Max, Hold, Auto-Off	Min/ Max, average value, Hold, Auto-Off
Interface	●	●		●	●			●	●	●	●	●			●
Analog output		●	●	●	●				●	●		●			
Calibration history		●			●			●				●			●
Data logger, alarm		●			●			●		●		●			●

Device information:

Catalogue page	Page 52	Page 52	Page 51	Page 51	Page 51	Page 53	Page 54	Page 57	Page 59	Page 59	Page 61	Page 61	Page 59	Page 60	Page 62

pH / ORP / Temperature measuring devices

HIGHLIGHTS:

- *ORP mode allows for automatic conversion to hydrogen system electrodes*
- *Automatic or manual temperature compensation*
- *Automatic buffer detection*
- *Rating function of electrode's quality*
- *New: analog output for all variants*

ADDITIONAL FUNCTIONS GMH 3551:

ALARM LOGG

GMH 3511
Art. no. 604953
pH / ORP / temp. measuring device w/o accessories

GMH 3531
Art. no. 602076
pH / ORP / temp. measuring device w/o accessories

GMH 3551
Art. no. 602817
pH / ORP / temperature measuring device with data logger w/o accessories

Specifications:

Measuring ranges:	
Temperature:	-5.0 ... +150.0 °C or 23.0 ... +302.0 °F
pH:	0.00 ... 14.00 pH
Redox (ORP):	-1999 ... +2000 mV Based on hydrogen system: -1792 ... +2207 mV_H (DIN38404)
rH:	0.0 ... 70.0 rH (not GMH 3511)
Accuracy (device):	±1 digit at nominal temperature = 25 °C
Temperature:	±0.2 °C (at range -5 ... 100 °C)
pH:	±0.01 pH
Redox (ORP):	±0.1% FS (mV or mV_H)
rH:	±0.1 rH (not GMH 3511)
Sensor connections:	
Temperature:	2 x 4 mm banana socket for Pt1000, 2-wire
pH, Redox:	BNC socket
Display:	two 4-digit LCD displays (12.4 and 7 mm high)
Working temperature:	0 ... +50 °C
Storage temperature:	-20 ... +70 °C
Interface:	serial interface; connectable to RS232 or USB interface of PCs via electrically isolated interface converter GRS 3100, GRS 3105 or USB 3100 N (accessories).
Power supply:	9 V battery, additional socket for external 10.5 ... 12 V direct current power supply (adequate PSU: GNG10/3000).
Battery life:	approx. 300 h
Housing:	Impact-resistant ABS housing, membrane keyboard, transparent panel. Integrated pop-up clip for table top or suspended use.
Dimensions:	142 x 71 x 26 mm (H x W x D)
Weight:	approx. 170 g
Scope of supply:	Device, battery, calibration protocol, manual

Functions:

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

pH calibration:
Buffer selection, temperature compensation and sensor rating according to calibration result (from 10 ... 100 %) is done automatically.
GMH 3511: 2-point calibration with Greisinger buffer capsules (GPH 4, 7, 10)
GMH 3531, GMH 3551: Either 1-, 2- of 3- point calibration with Greisinger standard buffer, buffer according to DIN19266 (A, C, D, F, G) or manual buffer selection.

Calibration interval (not for GMH 3511):
The device asks for a recalibration after a selectable time period (1 ... 365 days or inactive)
GMH 3551: Calibration history additional

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

rH measurement: (except GHM 3511):
Calculation of the rH value by means of a ORP measurement and by manually entering the pH-value. The pH-value may also be taken from a previous pH measurement.

Analog output:
0 ... 1 V, not changeable 0 ... 1 V ≙ 0 ... 14 pH or -2000 ... 2000 mV, connection via 3-pole jack socket Ø 3.5 mm, resolution 13 bit, accuracy 0.05 % at nominal temperature
GMH 3551: Analog output freely scalable

Data logger (GMH 3551 only):
cyclic 10,000 data sets, manual: 1,000 data sets (with measuring point input, 40 adjustable measuring point texts or measuring point numbers)

Accessories and spare parts:

GMH 55 ES
Art. no. 603066
Additional set: pH-electrode GE 100 BNC, temperature probe GTF 55 B (Pt1000), case GKK3500, GAK1400

GTF 55 B
Art. no. 602764
Temperature probe, Pt1000 (see page 53)

GE 100-BNC
Art. no. 600704
Standard electrode, BNC plug

GE 117-BNC
Art. no. 600730
pH electrode with integrated Pt1000 sensor (see p. 55)

GNG 10/3000
Art. no. 600273
Plug-in power supply

GKK 3000
Art. no. 601048
Case with cut-outs for GMH 3xxx

USB 3100 N
Art. no. 601092
Interface converter to USB, electrically isolated

EBS 20M
Art. no. 601158
Software for read-out, recording and archiving of measuring data (see page 96).

GMH 3511-Set
Art. no. 605021
Full set for pH / temperature measurements

General:

For comfortable measurements of pH value and temperature. Even easier operation ensured by a menu reduced to 5 points for GMH 3511. Minimal measuring effort because of maintenance-free gel-electrode and automatic temperature compensation.

Specifications:

p.r.t. GHM 3511

Scope of supply: GMH 3511, pH electrode GE 114, temperature probe GTF 55 B, buffer capsules 5 x GPH 4, 5 x GPH 7, 2 plastic wide mouth bottles GPF 100

Accessories:

GKK 1105
Art. no. 601050
appropriate case

Waterproof handheld measuring device for pH / Redox

HIGHLIGHTS:

- *GLP-features (Good Laboratory Practice)*
- *Big dual display with background illumination*
- *High resolution (0.001pH / 0.1 mV)*
- *Incl. calibration protocol*

ADDITIONAL FUNCTIONS GMH 5550:

ALARM LOGG

GMH 5530

Art. no. 600041
Waterproof handheld measuring device without electrode

GMH 5550

Art. no. 600043
Waterproof handheld measuring device with analog output and data logger, without electrode

Application:

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

Specifications:

Measuring ranges:	
pH:	-2.000 ... 16.000 pH (resolution selectable)
Redox / mV:	-2000.0 ... 2000.0 mV (resolution selectable) (for hydrogen system DIN38404: -1792 ... +2207 mV_H)
Temperature:	-5.0 ... +150.0 °C, 23.0 ... 302.0 °F
rH:	0.0 ... 70.0 rH
Accuracy:	
pH:	±0.005 pH
Redox / mV:	±0.05 % FS (mV or mV_H)
Temperature:	±0.2 °C (in the range of -5.0 ... +100.0 °C)
rH:	±0.1 rH
Connections:	
pH, Redox:	BNC-female connector, compatible to standard BNC-plugs and waterproof BNC-plugs, additional banana-jack (4 mm) for separate reference electrode, input resistance: 10^{12} Ohm
Temperature:	2 banana-jacks (4 mm) for temperature probes (Pt1000 or NTC 10K)
Interface / Supply:	4-pole bayonet connector for serial interface and supply (with accessory USB 5100)
Arbeitsbedingungen	-25 ... +50 °C; 0 ... 95 % r.F. (nicht betauend)
Display:	zwei 4½ stellige 7-Segment Anzeigen (15 mm und 12 mm)
pH-Calibration	
Automatically:	1-, 2- or 3- point calibration, GREISINGER standard buffer or buffer to DIN19266 (A, C, D, F, G)
Manually:	1-, 2- or 3- point calibration
Power supply:	2 x AAA-battery, power consumption: <1.0 mA
Battery life:	1000 hours
Housing:	impact resistant ABS housing with pop-up clip
Protection class:	IP65 / IP67
Dimensions:	160 x 86 x 37 mm (H x W x D) incl. protection cover
Weight:	250 g incl. battery and protection cover
Scope of supply:	Device, battery, calibration protocol, manual

Additional functions:

Additional Display for pH-Electrode and Battery: Bar graph display
Background illumination: duration adjustable (off, 5 s ... 2 min)
Automatic Temperature Compensation: There is an automatic temperature compensation (ATC) in the range of 0 ... 105 °C for operation mode “pH” and if a temperature probe is connected. Without connected probe the temperature can be input manually.
pH-Calibration: 1-, 2- or 3- point calibration with characteristics bend for GREISINGER standard buffer, buffer to DIN 19266 or manual buffer input. The used buffer is detected automatically. The temperature dependency of the buffer is automatically compensated. Permissible electrodes’ data: Asymmetry: ±55 mV / Slope: 45 ... 62 mV/pH
The condition of pH-Electrode is checked at each calibration.
Redox-Measurement (ORP): 2 choices:
„mV“ Standard-redox-, ORP or mV- measurement
„mV_H“ Conversion to hydrogen systems according to DIN38404 part 6
rH-Measurement: The rH-value is calculated from a measured Redox-value and a manually input pH-value.
Calibration interval:
The device asks for a recalibration after a selectable time period (1 - 365 days or inactive)
Calibration memory (GMH 5550):
last 16 calibrations
Analog output (GMH 5550):
0 ... 1 V, freely adjustable, connection with 4-pole bayonet connector, resolution 13 bit, accuracy 0.05 % at nominal temperature
data logger (only GMH 5550):
with measuring point input, adjustable cycle time: 1 s ... 1 h
recording time: 416 days at intervall 1 h,
data logger: cyclic: 10000 data sets, manual: 1000 data sets

Accessories and spare parts:

EBS 20M
Art. no. 601158
Software for long-term monitoring (p.r.t. page 96)

GSOFT 3050
Art. no. 601336
Software for operation of logger devices (p.r.t. page 97)

USB 5100
Art. no. 601095
Electrically isolated interface converter with supply of device via USB

GNG 5 / 5000
Art. no. 602287
Plug-in power supply 5 V DC, suitable for GMH 5000-series (p.r.t. page 94)

GKK 3500
Art. no. 601052
Device case (394 x 294 x 106 mm) with punched lining for 1 device (p.r.t. page 92)

pH / Redox accessories

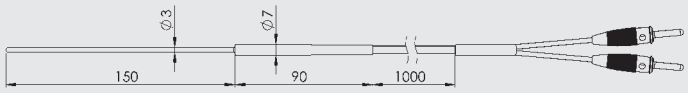
Supplementary set GMH 55 ES

Accessories and spare parts:

GMH 55 ES
Art. no. 603066
Supplementary set, including pH-electrode (GE 100 BNC), temperature probe (GTF 55 B), case (GKK 3500), working and calibration set (GAK 1400)

GE 125-BNC
Art. no. 600732
waterproof pH-electrode with integrated Pt1000 temperature sensor incl. waterproof BNC-plug and two banana plugs (p.r.t. page 55)

GTF 55 B
Art. no. 602764
Pt1000 temperature immersion sensor for liquids
1 m PVC-cable with two banana plugs1 m



GE 100-BNC
Art. no. 600704
pH-electrode (p.r.t. page 55)

GR 105-BNC
Art. no. 607798
Redox-electrode (p.r.t. p.56)

PHL 4
Art. no. 601370
ready-to-use buffer solution (pH 4.01 / 25 °C), 250 ml

PHL 7
Art. no. 601371
ready-to-use buffer solution (pH 7.00 / 25 °C), 250 ml

PHL 10
Art. no. 601373
ready-to-use buffer solution (pH 10.01 / 25 °C), 250 ml

KCL 3 M
Art. no. 602477
3 mol KCl electrolyte for refill or storage (filled in the protective cap) of electrodes with 3 mol KCl electrolyte. 100 ml plastic vial.

CaCl
Art. no. 603254
1000 ml, solution for measuring the pH value of soil

GRL 100
Art. no. 601422
Pepsin cleaning solution, 100 ml

GRP 100
Art. no. 601424
ORP buffer solution (220 mV at 25 °C), 100 ml

GAK 1400

Art. no. 603523
Working and calibration set

General:

Working and calibration set consisting of:
5 buffer capsules each GPH 4.0, GPH 7.0 and GPH 10.0, 3 x 100 ml-plastic bottle GPF100, 1 x 3 mol KCL-electrolyte KCL3M and 1 x Pepsin-cleaning agent GRL 100. GAK 1400 is required if no buffer solutions are existing.

pH-Meter

GAK 1400 RECOMMENDED!

GPH 114

Art. no. 604700
pH-meter ready for use incl. pH-electrode type GE 114 and battery.

Specifications:	
Measuring range:	0.00 ... 14.00 pH with standard pH-electrode type GE 114
Resolution:	0.01 pH
Accuracy (device):	±0.02 pH ±1 digit (at nominal temperature 25 °C)
Working conditions:	0 ... 45 °C; 0 ... 80 % RH (non condensing)
Storage temperature:	-20 ... +70 °C
Connection:	BNC Bajonett
pH-electrode:	GE 114 (standard electrode), Combination electrode with GEL-electrolyte. Measuring range: 0 ... 14 pH, temperature 0 ... 60 °C, conductivity >200 µS/cm
Input resistance:	approx.10^{12} Ohm
Display:	3½-digit LCD display, 13 mm high
Calibration:	3 turning knobs for: 1. temperature compensation 0-90 °C, 2. pH 7 value and 3. pH X value (e.g. pH 1.09, pH 4, pH 10 or pH 12, depends on working range)
Power supply:	9 V battery
Battery life:	approx. 200 h
Housing:	Impact resistant ABS
Dimensions:	106 x 67 x 30 mm (H x W x D)
Weight:	approx. 200 g (incl. battery and electrode)
Scope of supply:	Device, pH-electrode GE 114, battery, manual

Accessories and spare parts:

GE 114-BNC
Art. no. 604701
Spare electrode

GPH 114 GL
Art. no. 600119
Loose device (without accessories)

GE 100-BNC
Art. no. 600704
Universal electrode (0 ... 14 pH, 0 ... 80 °C)

GE 101-BNC
Art. no. 600693
Injection electrode (2 ... 11 pH, 0 ... 60 °C)

GE 104-BNC
Art. no. 602063
pH-electrode for low-ion water (as of 25 µS/cm)

GKK 252
Art. no. 601056
Case (235 x 185 x 48 mm) with foam lining

GKK 1100
Art. no. 601060
Case (340 x 275 x 83 mm) with foam lining

GB 9 V
Art. no. 601115
Spare battery

additional accessories p.r.t. p. 56

Precise pH measuring device

HIGHLIGHTS:

- *Modern and functional housing*
- *Outstanding price/performance ratio*
- *3-line display / overhead display at the push of a button*
- *Backlighting*
- *Waterproof (IP65 / IP67)*
- *Durable, long battery life*
- *BNC connection for alternating electrodes*

Connection G 1500

G 1500

Art. no. 609850

Precise pH measuring device, incl. pH electrode GE 114 WD

General:

The primary focus in the development of the new GMH 1000 series was place on the essential functions of the measurement technology.
Pure measurement with a focus on precision, speed and reliability packaged in a compact housing distinguish an impressive price/performance ratio, Made in Germany.
The new handheld measuring devices also impress with their ergonomic design, dust and water-protected design in accordance with IP 65/67 and the illuminated display.
The compact pH-meter is an alternative to pH sticks and elaborate middle-class devices.

Application:

Aquariums and aquaculture, plant cultivation and agriculture, laboratories, quality assurance, service, foods, etc.

Specifications:

Measurement range:	0.00 ... 14.00 pH
Resolution:	0.01 pH
Accuracy (device):	±0.02 pH ±1 digit (at nominal temperature 25 °C)
Display / backlighting:	3-line unit, with background light, protected by an unbreakable pane, overhead display at the push of a button
Sensors / measuring inputs:	pH electrode connectible via BNC, Standard GE 114 WD Temperature compensation which can be set on the device Electrode range of application: 0 … 60 °C
Working temperature:	Display unit -20 ... +50 °C
Power supply:	2 x AA battery, approx. 3000 h operating time
Housing:	Break-proof ABS housing
Dimensions:	108 x 54 x 28 mm (H x W x T) without sensor connection
Weight:	130 g (without electrode)
Scope of supply:	Device, electrode, calibration log, 2 x battery, operating manual

Accessories and spare parts:

G 1500-GL
Art. no. 609851
Device without electrode

GE 114-BNC-WD
Art. no. 610460
Spare pH electrode with waterproof BNC-connector, IP 67

GE 114-BNC
Art. no. 604701
Spare pH electrode

GE 100-BNC
Art. no. 600704
pH electrode

for additional electrodes, see the next page

GKK 252
Art. no. 601056
with nap foam for universal application (235 x 185 x 48 mm)

GKK 1100
Art. no. 601060
with nap foam for universal application (340 x 275 x 83 mm), suitable to accommodate accessories

PHL 4
Art. no. 601370
ready-to-use buffer solution (pH 4.01 / 25 °C), 250 ml

PHL 7
Art. no. 601371
ready-to-use buffer solution (pH 7.00 / 25 °C), 250 ml

PHL 10
Art. no. 601373
ready-to-use buffer solution (pH 10.01 / 25 °C), 250 ml

GAK 1400
Art. no. 603523
Working and calibration set consisting of: 5 of each of GPH 4.0, GPH 7.0 and GPH 10.0 buffer capsules, 3 x 100 ml plastic bottle GPF 100, 1 x 3 mol KCL electrolyte KCL3M and 1 x pepsin cleaning solution GRL 100.

GB AA
Art.-Nr: 610049
Spare battery AA (2 batteries required)

pH electrodes

	GE 100	GE 101	GE 104	GE 108	GE 114	GE 117	GE 120	GE 125	GE 151	GE 171	GE 173
Measuring range	0 ... 14 pH 0 ... 80 °C	2 ... 11 pH 0 ... 60 °C	0 ... 14 pH 0 ... 80 °C	0 ... 14 pH 0 ... 80 °C	0 ... 14 pH 0 ... 60 °C	0 ... 14 pH 0 ... 80 °C	0 ... 14 pH 0 ... 60 °C	0 ... 14 pH 0 ... 70 °C	0 ... 14 pH 0 ... 80 °C	0 ... 14 pH 0 ... 140 °C	0 ... 14 pH 0 ... 80 °C
Conductivity	> 100 µS/cm	> 100 µS/cm	> 20 µS/cm	> 100 µS/cm	> 200 µS/cm	> 100 µS/cm	> 200 µS/cm	> 200 µS/cm	> 100 µS/cm	> 100 µS/cm	> 50 µS/cm
Temperature measuring	no	no	no	no	no	integr. Pt1000 4 mm banana	no	integr. Pt1000 4 mm banana	no	no	no
Water-proof	no	no	no	no	no	no	no	ja	no	no	no
Pressure resistant	no	no	no	6 bar	no	6 bar	no	1 bar	no	10 bar	6 bar
Cable	1 m [1]	1 m [1]	1 m [1]	2 m [1]	1 m	2 m [2]	1 m	2 m	1 m [1]	ohne	1 m [1]
Electrolyte	3 mol/l KCl	3 mol/l KCl	3 mol/l KCl	gel electrolyte	gel electrolyte	gel electrolyte	gel electrolyte	gel electrolyte	3 mol/l KCl	gel electrolyte	gel electrolyte
Diaphragm	2 x ceramic	2 x ceramic	moving joint	2 x ceramic	1 x Pellon	2 x ceramic	2 x ceramic	1 x ceramic	1 x ceramic	2 x ceramic	joint
Thread	without	without	without	PG 13.5	without	PG 13.5	without	without	without	PG 13.5	PG 13.5
Electrode shaft	Tyril, Ø 12 mm x 120 mm	glass, Ø 12 bzw. 6 mm x 120 mm	glass, Ø 12 mm x 120 mm	PSU, Ø 12 mm x 120 mm	epoxide, Ø 12 mm x 120 mm	PSU, Ø 12 mm x 120 mm	PVC, Ø 22 mm x 110 mm	epoxide, Ø 12 mm x 120 mm	glass, Ø 12 mm x 120 mm	glass, Ø 12 mm x 120 mm	glass, Ø 12 mm x 120 mm
Features	universal electrode	tip Ø 6 mm, small sample volume	for low-ion media	low- maintenance	Low-cost low- maintenance	temperature compensated	insertion electrode, blade Ø 13 mm x 60 mm	submersible, water-proof IP67 (also BNC-plug)	chemicals- resistant glass shaft	for extreme conditions, sterilizable, autoclavable	for process chemistry, bio-chemistry, alkali-resistant
Connection:											
BNC *Art. no.*	*600704*	*600693*	*602063*	*600713*	*604701*	*600730*	*600698*	*600732*	*600727*	-	*600735*
Cinch *Art. no.*	*600702*	*600690*	*604504*	*600711*	-	-	*600696*	-	*600724*	-	*600734*
S7*) *Art. no.*	-	-	-	*606089*	-	-	-	-	-	*606375*	*606572*

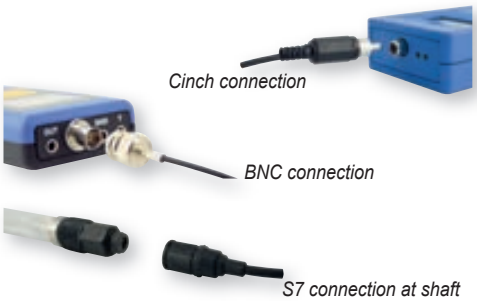
**) Note: cable GEAK-2S7-BNC or GEAK-5S7-BNC is needed for connection S7, for devices with cinch connection adapter GAD 1 BNC is necessary.*
Electrodes are consumption objects. Lifetime under careful treatment: > 2 years; warranty: 12 months

Optionen:

Longer cable for [1] [2]
(available cable lengths: up to 5 m)
Special designs
(electrodes with thread, other lengths, special applications etc.)

Accessories and spare parts:

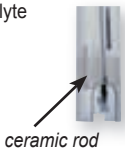
Kabel-BNCM/BNCF
Art. no. 606158
Extension cables for electrodes with BNC connector, Cable length: 3 m



Diaphragma:

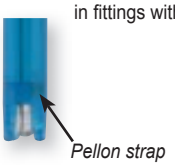
The diaphragm makes the electric connection between reference system and sample. Additionally it should prevent the spoiling of the reference electrolyte by the measured medium.

Ceramic diaphragm
Porous ceramic rods ensure low leak rates.
Application:
General applications in clean till lightly soiled media.



Joint / movable joint
The roughened surface between the cut glass of the electrode and a cut glass sleeve permits a electrolyte flow of several ml/h.
Application:
low-ion or heavily soiled samples

Pellon diaphragm
A permeable diaphragm made of Pellon texture is used for fast response times and stable measuring values
Application:
Clean till lightly soiled media.



Reference electrolyte:

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

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

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

Electrodes with S7 connection:

The electrodes are offered with an S7 industrial screw plug fitted, also known as industrial-S8 Plug head. In contrast to S7 lab plug head this one is for direct installation in fittings with PG 13.5 suitable thread.

Application areas: Electrodes

Application	GE 100	GE 101	GE 104	GE 108	GE 114	GE 117	GE 120	GE 125	GE 151	GE 171	GE 173	GR 105	GR 175
Sewage											•		
Aquarium water	•		•	•	•	•			•			•	•
Soil testing		•											
Emulsions		•	•										
On-site measurements				•	•	•		•				•	
Fish farming	•		•	•	•	•		•	•			•	•
Galvanic baths											•		•
Beverages								•	•		•	•	•
Low-ion media			•								•		
Cosmetics			•										
Food sample		•					•						
Sea water	•	•	•	•	•	•	•	•	•	•	•	•	•
Online measuring										•	•		•
Process chemistry									•	•	•		•
Swimming pool water	•			•	•	•		•			•	•	•
Suspensions		•	•										•
Drinking water	•		•	•	•	•		•			•	•	•
Water-based lacquers			•								•		

Note: The set information are to provide general recommendations. It needs to be checked, which electrodes for each area of application are suitable.

ORP electrode

GR 105-BNC
Art. no. 607798
with BNC connection

GR 105-Cinch
Art. no. 607797
with Cinch connection

GR 175-BNC
Art. no. 607801
with BNC connection

GR 175-S7
Art. no. 607802
incl. S7 connector - without connecting cable ***)**

**) Note: cable GEAK-2S7-BNC or GEAK-5S7-BNC is needed for connection S7, for devices with cinch connection adapter GAD 1 BNC is necessary.*
Electrodes are consumption objects. Lifetime under careful treatment: > 2 years; warranty: 12 months

Specifications:	GR 105	GR 175
Measuring unit:	ORP	
Measuring range:	± 2000 mV, 0 ... 80 °C	
Conductivity:	> 100 µS/cm	
Temperature measurement:	no	
Water-proof:	no	
Pressure resistant:	no	6 bar
Cable:	1 m [1)]	without/1 m
Electrolyte:	3 mol/l KCL	gel electrolyte
Diaphragm:	2 x ceramic	1 x ceramic
Metal electrode:	Platin dome Ø 5 mm	
Thread:	no	PG 13.5
Electrode shaft:	Tyril, Ø 12 mm x 120 mm	Glass, Ø 12 mm x 120 mm
Minimal depth of immersion:	15 mm	
Scope of supply:	ORP electrode, manual	

Optionen:

Longer cable for [1) 2)]
(available cable lengths: up to 5 m)

Accessories:

GRP 100
Art. no. 601424
ORP test solution (220 mV at 25 °C), 100 ml

Electrodes - accessories

Accessories and spare parts:

GEAK-2S7-BNC
Art. no. 601996
Adapter cable S7-BNC, 2 m

GEAK-5S7-BNC
Art. no. 601998
Adapterkabel S7-BNC, 5 m

VD120
Art. no. 601380
Pricker for insertion electrode GE 101

GAD 1 BNC
Art. no. 601382
Adapter to connect electrodes with Cinch plug to devices with BNC socket.

GPF 100
Art. no. 601417
Plastic wide mouth bottle, 100 ml

GPH 4,0 / 5
Art. no. 602614
Buffer capsules (5 pieces), pH 4.0

GPH 4,0 / 10
Art. no. 602615
Buffer capsules (10 pieces), pH 4.0

GPH 7,0 / 5
Art. no. 602616
Buffer capsules (5 pieces), pH 7.0

GPH 7,0 / 10
Art. no. 602617
Buffer capsules (10 pieces), pH 7.0

GPH 10,0 / 5
Art. no. 602618
Buffer capsules (5 pieces), pH 10.0

GPH 10,0 / 10
Art. no. 602619
Buffer capsules (10 pieces), pH 10.0

GPH 12,0 / 5
Art. no. 602620
Buffer capsules (5 pieces), pH 12.0

GPH 12,0 / 10
Art. no. 602621
Buffer capsules (10 pieces), pH 12.0

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

GAK 1400
Art. no. 603523
Working and calibration set; GPH 4.0, GPH 7.0, GPH 10.0 (5 capsules of each type); 3 x GPF 100; 1 x KCL3M; 1 x GRL 100

PHL 4
Art. no. 601370
ready-to-use buffer solution (pH 4.01 / 25 °C), 250 ml

PHL 7
Art. no. 601371
ready-to-use buffer solution (pH 7.00 / 25 °C), 250 ml

PHL 10
Art. no. 601373
ready-to-use buffer solution (pH 10,01 / 25 °C), 250 ml

KCL 3 M
Art. no. 602477
3 mol KCl electrolyte for refilling and storage (fill into protective cap) of electrodes with 3 mol KCl electrolyte, injection bottle, 100 ml

CaCl
Art. no. 603254
1000 ml, solution for measuring the pH value of soil

GRL 100
Art. no. 601422
Pepsin cleaning solution, 100 ml

GWA1Z
Art. no. 602914
Thread adapter PG13.5 to G1“, plastic

PG 13.5
Art. no. 603205
Plug-on thread adapter for pressure-less use, for any electrode

GWA 11 PG
Art. no. 605379
Thread adapter from PG11 external thread to PG 13.5 internal thread incl. sealing and PG11 counter nut, material: polyamide, fiber glass reinforced, O-ring: NBR, temperature range: -10 ... +100 °C

Bench-top pH and conductivity meter

HIGHLIGHTS:

- *Primary water treatment*
- *Chemicals laboratories general use*
- *Water purification, water softening*
- *Multi-channel laboratory instrument*

HD-3456-2

Art. no. 700042

Bench-top pH and conductivity meter

General:

The HD-3456-2 is a bench top instrument for electrochemical measures: pH, conductivity and temperature. The displayed data can be stored (datalogger) and can be transferred to PC or serial printer. The storing and printing parameters can be set from menu. The HD-3456-2 measures pH, mV, redox potential (ORP), conductivity, resistivity in liquids, total dissolved solids (TDS), and salinity using combined 4-ring and 2-ring conductivity/temperature probes. Temperature is measured by Pt100 or Pt1000 immersion, penetration or contact probes.

Specifications:

Display ranges:	pH, mV, χ, Ω, TDS, Sal, °C/°F measurement
Gerät	
Abmessungen:	55 x 120 x 220 mm (H x W x D)
Material:	ABS, rubber
Display:	2 x 4½ characters plus symbols, visible area: 52 x 42 mm
Operating conditions	
Working temperature:	-5 ... +50 °C
Storage temperature:	-25 ... +65 °C
Working relative humidity:	0 ... 90 % RH without condensation
Protection degree:	IP66
Power	
Batteries:	3 batteries 1.5 V type AA
Autonomy (only batteries):	100 h with 1800 mAh alkaline batteries
Mains (cod. SWD-10):	Output mains adapter 100-240 V AC/12 V DC-1A
Storage of measured values	
Quantity:	20,000 terns of measures made up of [pH or mV], [χ or Ω or TDS or salinity] and temperature.
Connections	
Serial interface and USB:	8-pole MiniDin connector, 1.1 - 2.0 electrically isolated
Mains adapter (cod. SWD-10):	2-pole connector (positive at centre) 12 V DC/1 A
Connections	
pH / mV input:	Female BNC connector
Conductivity input:	8-pole male DIN45326 connector
Input for temperature probes:	8-pole male DIN45326 connector
Measurement of pH by Instrument	
Measurement range:	-2.000 ... +19.999 pH
Resolution:	0.01 or 0.001 pH selectable from menu
Accuracy:	±0.001 pH ±1 digit
Automatic / manual temperature compensation	-50 ... +150 °C
Measurement of mV by Instrument	
Measurement range:	-1999.9 ... +1999.9 mV
Resolution:	0.1 mV
Accuracy:	±0.1 mV ±1 digit
Standard solutions automatically detected (@25 °C):	1.679 pH – 2.000 pH – 4.000 pH – 4.008 pH – 4.010 pH – 6.860 pH – 6.865 pH – 7.000 pH – 7.413 pH – 7.648 pH – 9.180 pH – 9.210 pH – 10.010 pH
Measurement of conductivity by Instrument	
Measurement range (SPT-01G) (Kcell=0.1):	0.00 ... 19.99 µS/cm, resolution 0.01 µS/cm
Measurement range (SP-T06-01G) (Kcell=1):	0.0 ... 199.9 µS/cm, resolution 0.1 µS/cm 200 ... 1999 µS/cm, resolution 1 µS/cm 2.00 ... 19.99 mS/cm, resolution 0.01 mS/cm 20.0 ... 199.9 mS/cm, resolution 0.1 mS/cm
Accuracy (conductivity):	±0.5 % ±1 digit
Measurement of resistivity by instrument, resolution	
Measurement range (Kcell=0.1):	Up to 100 MΩcm, resolution (*)
Measurement range (Kcell=1):	5.0 ... 199.9 Ω·cm, resolution 0.1 Ω·cm 200 ... 999 Ω·cm, resolution 1 Ω cm 1.00 k ... 19.99 kΩ·cm, resolution 0.01 kΩ·cm 20.0 k ... 99.9 kΩ·cm, resolution 0.1 kΩ·cm 100 k ... 999 kΩ·cm, resolution 1 kΩ·cm 1 ... 10 MΩ·cm, resolution 1 MΩ·cm
Accuracy (resistivity):	±0.5 % ±1 digit
Measurement of total dissolved solids (with coefficient χ/TDS=0.5)	
Measurement range (Kcell=0.1):	0.00 ... 19.99 mg/l 0.05 mg/l
Measurement range (Kcell=1):	0.0 ... 199.9 mg/l 0.5 mg/l 200 ... 1999 mg/l 1 mg/l 2.00 ... 19.99 g/l 0.01 g/l 20.0 ... 99.9 g/l 0.1 g/l
Accuracy (total dissolved solids):	±0.5 % ±1 digit
Measurement of salinity	
Measurement range:	0.000 ... 1.999 g/l 1 mg/l 2.00 ... 19.99 g/l 10 mg/l 20.0 ... 199.9 g/l 0.1 g/l
Accuracy (salinity):	±0.5 % ±1 digit
Automatic/manual temperature compensation	0 ... 100 °C with αT that can be selected from 0.00 ... 4.00 %/°C
Reference temperature:	20 or 25 °C selectable from menu
χ/TDS conversion factor:	0.4 ... 0.8
Cell constant K (cm^{-1}):	0.01 - 0.1 - 0.7 - 1.0 - 10.0
Standard solutions automatically detected (@25 °C):	1413 µS/cm
Measurement of temperature by Instrument	
Resolution:	0.1 °C
Accuracy:	±0.25 °C
Scope of supply:	Instrument HD-3456-2, 3 1.5 V alkaline batteries, operating manual and DeltaLog9 version 2.0. ***pH/mV electrodes, conductivity probes, temperature probes, standard reference solutions for different measurement types, connection cables for pH electrodes with S7 connector, cables for data download to PC or printer have to be ordered separately.***

(*) The resistivity measurement is obtained from the reciprocal of conductivity measurement.

Accessories:

SP-06-T
Art. no. 700043
Conductivity and temperature probe, measuring range: 5 µS/cm ... 200 mS/cm

SP-T01-G
Art. no. 700044
Conductivity and temperature probe, measuring range: 0.1 µS/cm ... 500 µS/cm

TP47-100
Art. no. 700045
PT100 without SICRAM module (DIN cl. AA), Ø 3 mm, length 230 mm, measuring range: -50 ... +250 °C

SWD-10
Art. no. 700039
Stabilized power supply at 100 ... 240 V AC/12 V DC/1 A mains voltage.

HD-22-3
Art. no. 700040
Laboratory electrode holder with metal basis plate. Flexible electrode holder for free positioning. For Ø 12 mm probes.

HD-2101-USB
Art. no. 700038
Connection cable USB 2.0 connector type A - 8-pole Mini Din for connection to PC with USB input.

HD-40-1
Art. no. 700056
Portable, serial input, 24 column thermal printer, 57 mm paper width, 4 NiMH 1.2 V rechargeable batteries, SWD-10 power supply, instruction manual, 5 thermal paper rolls. Requires the cable HD-2110-CSNM (optional).

HD-2110-CSNM
Art. no. 700041
RS232C 8-pole MiniDin - 9-pole D Sub female null-modem cable for connecting the printer to instruments with MiniDIN connector (HD21xx.1 and HD21xx.2 series, HD34xx.2, HD98569, etc.).

Waterproof handheld measuring device for measuring dissolved oxygen in water

HIGHLIGHTS

- *Waterproof and durable (protective silicone case)*
- *Large double display with background lighting*
- *New oxygen sensor GWO 5610*
- *Environmental pressure compensation with integrated barometer*

ADDITIONAL HIGHLIGHTS GMH 5650

- *Data logger and alarm function*
- *Analogue output, pressure connection*

ADDITIONAL FUNCTIONS - GMH 5650:

ALARM LOGG

GMH 5630

Art. no. 606880
Waterproof dissolved O_2 handheld measuring device without accessories

GMH 5650

Art. no. 606882
Waterproof dissolved O_2 handheld measuring device without accessories with data logger and alarm

Application:

Oxygen monitoring in aquaculture and aquaria. Testing of well water, sewer systems and in wastewater treatment plants, also suitable for harsh environments. Delivery can take place ready for use (filled) or dry. Electrodes delivered try are long lasting and ready for use within about 1 h after filling.

Specifications:	GMH 5630	GMH 5650
Measuring channels:	O_2, T, air pressure (integrated)	O2, T, air pressure (integrated) / measuring depth *1)
Measuring ranges:		
O_2-concentration:	0.00 ... 70.00 mg/l (ppm) (Variable resolution)	
O_2-saturation:	0.0 ... 600.0 % O_2 (Variable resolution)	
O_2-partial pressure:	0 ... 1200 hPa O_2 (0.0 ... 427.5 mmHg)	
Temperature:	0.0 ... 50.0 °C	
Air pressure:	10 ... 1200 hPa abs	300 ... 5000 hPa abs
Measuring depth:	-	0 ... 40.0 m water column *1)
Accuracy:		
Oxygen:	±1.5 % of MW ±0.2 mg/l (0 ... 25 mg/l) or ±2.5 % of MW ±0.3 mg/l (25 ... 70 mg/l)	
Temperature:	0.0 ... 50.0 °C	
Air pressure:	10 ... 1200 hPa abs	300 ... 5000 hPa abs
Sensor:	GWO 5610, active diaphragm type with platinum cathode, Ø 12 mm, standard cable length 2 m, 7 pin bayonet connection	
Response time:	90 % in 10 s	
Service life:	approx. 3 years, depending on usage and care	
Display:	4 ½ digit, 7-segment, illuminated (white)	

Working temperature:	Device: -25 ... +70 °C Sensor: 0 ... 40 °C
Sensor operating pressure:	max. 3 bar corresponds to max. 30 m water depth
Inward flow:	min. 20 cm/s
Power supply:	2 x AAA battery, power consumption: 0.9 mA
Battery life:	approx. 1000 h (without lighting)
Ingress protection:	IP65 / IP67
Housing:	Impact-resistant ABS, with stand/ hanging bracket
Dimensions:	160 x 86 x 37 mm (H x W x D) including protective silicone case
Weight:	approx. 250 g, including battery and protective case
Scope of supply:	Device incl. batteries (2xAAA), protective silicone case, calibration protocol, manual, quick guide

Additional Functions:

Salinity correction: 0.0 ... 70.0

Pabs / height correction:
Automatic with integrated sensor

Measuring depth (only GMH 5650): Hydrostatic depth measurement *1)

Output / external supply:
OUT jack: 38400 baud interface, 5 V external supply
Additional with GMH 5650: Analogue output 0 ... 1 V, adjustable

Calibration: 1 point air
Additional with GMH 5650: 1 point water, 2 point or 3 point (air and zero point and 100 % O_2)

GLP: Calibration interval
Additional with GMH 5650: Calibration history

Data logger (only GMH 5650): Cyclical: 10,000, Single: 1000, single value logger with measuring point input

Alarm (only GMH 5650): 2 alarm channels (O_2 and temperature) with separate alarm thresholds
Alarm notification horn / visual / interface

**1) A simple hydrostatic depth measurement can be made with special accessories. For instance, oxygen profiles in waste water can be recorded very conveniently together with the logger function.*

HIGHLIGHTS:

- *Significantly lower inward flow required than with the predecessor model*
- *Dry storage possible for long-term storage needs*
- *Compact 12 mm diameter retained!*

GWO 5610-L02

Art. no. 607386
Dissolved oxygen sensor with 2 m cable

General:

Standard, for laboratory use, electrode is delivered filled, dry delivery available on request

Accessories and spare parts:

GWO 5610-L04
Art. no. 607764
Spare sensor GWO 5610 with 4 m cable (field use)

GWO 5610-L10
Art. no. 607765
Spare sensor GWO 5610 with 10 m cable (field use)

GWO 5610-L30
Art. no. 607766
Spare sensor GWO 5610 with 30 m cable (field use)

GSKA 3600
Art. no. 601414
Protective PVC cap, submerged, for use in still bodies of water

GSKA 3610
Art. no. 607267
Protective cap made of gunmetal, salt water resistant, submerged, also suitable for use with greater depths or with a flow

GWOK 02
Art. no. 608012
Spare membrane cap

GAS 5610
Art. no. 608032
Work set (3 spare membrane caps, 100 ml of electrolyte)

TMV 3600
Depth measuring device

KOH 100
Art. no. 603356
Spare electrolyte, 100 ml

Handheld measuring device sets

GMH 5630-L02

Art. no. 607470

Waterproof dissolved O_2 handheld measuring device, including sensor GWO 5610, 2 m cable

GMH 5650-L02

Art. no. 607474

Waterproof dissolved O_2 handheld measuring device, including sensor GWO 5610, 2 m cable, with data logger and alarm

Variants:

GMH 5630-L04
Art. no. 606881
GMBH 5630 handheld measuring device with sensor with 4 m cable length

GMH 5630-L10
Art. no. 607471
GMBH 5630 handheld measuring device with sensor with 10 m cable length

GMH 5630-L30
Art. no. 607472
GMBH 5630 handheld measuring device with sensor with 30 m cable length

GMH 5650-L04
Art. no. 606883
GMBH 5650 handheld measuring device with sensor with 4 m cable length

GMH 5650-L10
Art. no. 607478
GMBH 5650 handheld measuring device with sensor with 10 m cable length

GMH 5650-L30
Art. no. 607479
GMBH 5650 handheld measuring device with sensor with 30 m cable length

Accessories and spare parts:

GKK 1105
Art. no. 601050
with punched lining for 1 device of the GMH 3xxx- or 5xxx-series (340 x 275 x 83 mm)

GKK 5240
Art. no. 602068
Durable case, suitable for universal applications with individual configuration of the foam insert, pressure equalisation possible, waterproof.
Dimensions: 520 x 415 x 200 mm

Oxygen measuring devices

BAT

READY-TO-USE

GOX 20

Art. no. 600126

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

Specifications:	
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 = 25 °C) ±1 digit	
Temperature:	±0.3 °C (in range 0 ... 30 °C)
Oxygen:	±2 % o. m.w. ±0.2 mg/l
Electrode:	active diaphragm type. Electrode-Ø front: approx. 12 mm, length: approx. 170 mm, connecting cable approx. 2 m permanently connected to device.
Response time:	95 % in 10 s, depending on temperature.
Operation life:	approx. 3 years or more depending 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, 13 mm high
Working temperature:	0 ... 50 °C
Power supply:	9 V battery
Battery life:	approx. 300 h
Dimensions:	106 x 67 x 30 mm (H x W x D), impact-resistant ABS housing
Weight:	approx. 250 g (ready for use)
Scope of supply:	device incl. electrode, battery, GWOK01 and KOH electrolyte, manual

Accessories and spare parts:

GWOK 01
Art. no. 601411
Spare diaphragm head

KOH 100
Art. no. 603356
Spare electrolyte 100 ml

GSKA 3610
Art. no. 607267
Protective cap made of gunmetal, salt water resistant, submerged, also suitable for use with greater depths or with a flow

Precisely Precise dissolved oxygen measuring devices (DO)

BAT HOLD MIN MAX O/S-CORR

NEW!

DURABLE AND AFFORDABLE

HIGHLIGHTS:

- *Modern and functional housing*
- *Outstanding price/performance ratio*
- *3-line display / overhead display at the push of a button*
- *Backlighting*
- *Waterproof (IP65 / IP67)*
- *Durable, long battery life*
- *Including galvanic oxygen sensor*
- *Easy calibration to air at the push of a button*

AVAILABLE STARTING IN QUARTER 3 OF 2017

G 1610
Art. no. 610003
Waterproof dissolved oxygen measuring device (DO) with sensor, 2 m cable

G 1610-05
Art. no. 610004
Waterproof dissolved oxygen measuring device (DO) with sensor, 5 m cable

General:

The primary focus in the development of the new GMH 1000 series was place on the essential functions of the measurement technology. Pure measurement with a focus on precision, speed and reliability packaged in a compact housing distinguish an impressive price/performance ratio, Made in Germany.
The new handheld measuring devices also impress with their ergonomic design, dust and water-protected design in accordance with IP 65/67 and the illuminated display.
The Oxymeter with maintenance-friendly galvanised sensor is an entry-level device suitable for everyday use. Concentrations in mg/l(ppm) and saturation in percentage can be read directly without using tables.
Calibration with environmental air takes place at the push of a button. Use of a GSKA protective cap is recommended for field use in bodies of water in order to protect the membrane.

Application:

Freshwater and salt water aquariums, aquaculture/fish breeding, monitoring of wells and bodies of water

Specifications:

Measuring range / resolution:	0.0 … 20.0 mg/l (or ppm) O_2 concentration 0 ... 200 % O_2 saturation
Accuracy	
Oxygen:	±1.5 % of m.v. ±0.2 mg/l or ±1.5 % of m.v. ±2 % O_2 saturation
Temperature:	±0.3 °C
Sensors / measuring inputs:	Galvanic sensor (active membrane type), KOH electrolyte 2 m cable, permanently connected to the device, with integrated temperature sensor
Activation time T_{95}:	10 s at nominal temperature
Operating pressure:	max. 3 bar (~30 m water depth)
Sensor range of application:	0 … 60 °C
Compensation:	
Temperature:	automatic with integrated temperature measurement
Air pressure:	Compensation possible with manual input (normally not necessary)
Salinity:	with manual entry
Display:	3-line unit with battery status indicator, background light, protected by an unbreakable pane, overhead display at the push of a button
Operation:	4 long-lasting, easy-to-operate buttons
Additional functions:	Hold, min/max value, stability recognition, automatic adjustment to environmental air
Display unit environment:	-20 ... +50 °C, 0 ... 95 % RH
Battery/service life:	2 x AA battery, >3000 h
Protection rating:	IP65 / IP67
Housing:	Break-proof ABS housing
Dimensions:	108 x 54 x 28 mm (H x W x T) without sensor
Weight:	approx. 240 g (device incl. sensor)
Scope of supply:	Device, sensor, GWOK 01 spare membrane cap and KOH 100 spare electrolyte, 2 x battery, manual

Accessories and spare parts:

GWOK 01
Art. no. 601411
Spare membrane head

KOH 100
Art. no. 603356
Spare electrolyte 100 ml

GSKA 3600
Art. no. 601414
PVC protective cap, submerged, for use in still bodies of water

GSKA 3610
Art. no. 607267
Red brass protective cap, salt water resistant, submerged, also suitable for use with greater depths or with a flow

GB AA
Art.-Nr: 610049
Spare battery AA (2 batteries required)

GSKA 3600 mounted on the sensor

Oxygen measuring devices for dissolved oxygen in liquids

HIGHLIGHTS:

- *Automatic air pressure compensation*
- *Salinity correction*
- *Simple calibration in atmospheric air*

ADDITIONAL FUNCTIONS GMH 3651:

ALARM LOGG

MEAS. UNITS: O_2-CONCENTRATION O_2-SATURATION AND O_2-PARTIAL PRESSURE (GMH3651 ONLY)

GMH 3611

Art. no. 605922

Oxygen measuring device incl. oxygen electrode, with 4 m cable

GMH 3651

Art. no. 605924

Oxygen measuring device incl. oxygen electrode with data logger, with 4 m cable

Specifications:

Measuring ranges: (device)	
O_2-concentration:	0.00 ... 70.00 mg/l (ppm) (resolution selectable)
O_2-saturation:	0.0 ... 600.0 % O_2 (resolution selectable)
O_2-partial pressure:	3651: 0 ... 1200 hPa O_2 (0.0 ... 427.5 mmHg)
Temperature:	0.0 ... 50.0 °C
Pressure:	3611: 10 ... 1200 hPa abs. 3651: 10 ... 11000 hPa abs. or 0 ... 100.0 m water column* (with pressure port)
Accuracy: (at nominal temperature = 25 °C)	
Oxygen:	±1.5 % of m.v. ±0.2 mg/l (0 ... 25 mg/l) or ±2.5 % of m.v. ±0.3 mg/l (25 ... 70 mg/l)
Temperature:	± 0.1 °C ± 1 digit
Pressure:	±0.5 % FS ± 1 digit ±3 hPa or 0.1 % of m.v. ±2 hPa (750 ... 1100 hPa)
Sensor connection:	6-pin screened Mini-DIN-socket
Sensor:	Active membrane type. Electrode-Ø front: approx. 12 mm, overall length: approx. 220 mm, anti buckling glanding, neck collar: Ø approx. 20 mm, 4 m connection cable with Mini-DIN-plug
Response time:	95 % in 10 s, depends on temperature
Operation life:	approx. 3 years, depends on maintenance
Working temperature:	0 ... +40 °C
Working pressure:	max. 3 bar Operating pressure sensor GWO 3600 max. 3000 hPa rel. or 4000 hPa pay attention to abs.!
Flow rate:	min. 30 cm/s
Display:	2 x 4 digit LCDs (12.4 / 7 mm high)
Interface:	serial interface, direct connection to RS232 or USB interface of a PC via electrically isolated interface converter.
Power supply:	9 V-battery as well as additional d.c. connector for external 10.5-12 V direct voltage supply. (suitable power pack: GNG10/3000)
Battery life:	approx. 500 h
Housing:	impact-resistant ABS, integrated pop-up clip for table top or suspended use.
Dimensions:	142 x 71 x 26 mm (H x W x D)
Weight:	approx. 300 g (incl. battery and probe)
Scope of supply:	Device incl. electrode, GWOK01 and KOH electrolyte, battery, manual

Additional functions:

Temperature compensation:
automatic via temperature sensor integrated in electrode.

Air pressure compensation:
automatic via integrated pressure sensor. Display of current air pressure.

Correction of salinity:
autom. salinity value can be set via keyboard from 0.0 ... 70.0

Calibration:
1-point calibration: extremely simple quick calibration in atmospheric air.
additional at GMH 3651: 2- and 3-point-calibration

Calibration interval:
The device asks for a recalibration after a selectable time period (1 - 365 days or inactive).
GMH 3651: additional calibration history

Analog output (GMH 3651 only):
0 ... 1 V, freely adjustable

Alarm (GMH 3651 only):
2 Alarm (O2 and temperature) with separate alarm limits, Alarm horn / visual / interface

Data logger (GMH 3651 only):
cyclic: 10.000 data sets, manual: 1.000 data sets (with measuring point input, 40 adjustable measuring point texts or measuring point numbers)

** There is the possibility for hydrostatic depth measurements with special accessories (upon request / pressure connection). This allows in combination with the logger function e.g. comfortable recordings of oxygen profiles in waters.*

Variants:

GMH 3611-L10
Art. no. 606233
Device GMH 3611 with sensor with 10 m cable length

GMH 3611-L30
Art. no. 607086
Device GMH 3611 withsensor with 30 m cable length

GMH 3651-L10
Art. no. 606105
Device GMH 3651 with sensor with 10 m cable length

GMH 3651-L30
Art. no. 606106
Device GMH 3651 with sensor with 30 m cable length

Accessories and spare parts:

GMH 3611-GL
Art. no. 606310
Oxygen measuring device without accessories

GMH 3651-GL
Art. no. 606312
Oxygen measuring device without accessories

GWO 3600-L04
Art. no. 603895
Spare sensor with 4 m cable

GWO 3600-L10
Art. no. 603258
Spare sensor with 10 m cable

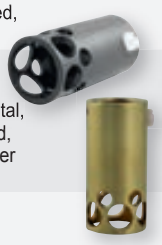
GWO 3600-L30
Art. no. 603259
Spare sensor with 30 m cable

GWOK 01
Art. no. 601411
Spare diaphragm head

GAS 3600
Art. no. 603497
Working set (consisting of 3 spare diaphragm heads and 100 ml KOH-electrolyte)

GSKA 3600
Art. no. 601414
Protective PVC cap, submerged, for use in still bodies of water

GSKA 3610
Art. no. 607267
Protective cap made of gunmetal, salt water resistant, submerged, also suitable for use with greater depths or with a flow



KOH 100
Art. no. 603356
Spare electrolyte 100 ml

Bench-top dissolved oxygen meter

NEW!

HIGHLIGHTS:

- *Primary water treatment*
- *Chemicals laboratories general use*
- *Laboratory instrument*

HD-3409-2

Art. no. 700034
Bench-top dissolved oxygen meter

General:

The HD-3409-2 is a bench top instrument for electrochemical measures: dissolved oxygen and temperature. The displayed data can be stored (datalogger) and can be transferred to PC or serial printer. The storing and printing parameters can be set from menu. The HD-3409-2 measures the concentration (in mg/l) of dissolved Oxygen in liquids, the saturation index (in %) and the temperature. Thanks to an internal pressure sensor, the instruments automatically compensate for barometric pressure.

Specifications:

Display ranges:	mg/l O_2, %O_2, mbar, °C/°F measurement
Instrument	
Dimensions:	55 x 120 x 220 mm (H x W x D)
Materials:	ABS, rubber
Display:	2 x 4½ characters plus symbols, visible area: 52 x 42 mm
Operating conditions	
Working temperature:	-5 ... +50 °C
Storage temperature:	-25 ... +65 °C
Working relative humidity:	0 ... 90 % RH without condensation
Protection degree:	IP66
Power	
Batteries:	3 batteries 1.5 V type AA
Autonomy (only batteries):	100 h with 1800 mAh alkaline batteries
Mains (cod. SWD-10):	Output mains adapter 100 ... 240 V AC/ 12 V DC-1 A
Storage of the measured values	
Quantity:	18,000 measures made up of the four parameters mg/l O_2, % O_2, mbar, [°C or °F]
Connections	
Serial interface and USB:	8-pole MiniDin connector, 1.1 - 2.0 electrically isolated
Mains adapter (cod. SWD-10)	2-pole connector (positive at centre) 12 V DC/1 A
Measurement connections	
Input for Oxygen probes:	8-pole male DIN45326 connector
Input for temperature probes with SICRAM module or TP47 module:	8-pole male DIN45326 connector
Measurement of the concentration of dissolved oxygen	
Measurement range:	0.00 ... 90.00 mg/l
Resolution:	0.01 mg/l
Accuracy:	±0.03 mg/l ±1 digit (0 ... 90 % RH, 1013 mbar, 20 ... 25 °C)
Measurement of the saturation index of dissolved oxygen	
Measurement range:	0.0 ... 600.0 %
Resolution:	0.1 %
Accuracy:	±0.3 % ±1 digit (in the range 0.0 ... 199.9 %) ±1 % ±1 digit (in the range 200.0 ... 600.0 %)
Automatic/manual temperature compensation:	0 ... 50 °C
Measurement of barometric pressure	
Measurement range:	0.0 ... 1100.0 mbar
Resolution:	0.1 mbar
Accuracy:	±2 mbar ±1 digit between 18 ... 25 °C
Salinity setting	
Setting range:	0.0 ... 70.0 g/l
Resolution:	0.1 g/l
Temperature measurement with the sensor inside the dissolved oxygen probe	
Measurement range:	0.0 ... 45.0 °C
Resolution:	0.1 °C
Accuracy:	±0.1 °C ±1 digit
Scope of supply:	Instrument HD-3409-2, calibrator HD9709/20 (for polarographic probe) or DO9709/21 (for galvanic probe), 3 1.5 V alkaline batteries, operating manual and DeltaLog9. ***Dissolved oxygen probes, temperature probes, standard reference solutions, connection cables, cables for data download to PC or printer have to be ordered separately.***

Accessories:

DO9709-SS-0-0
Art. no. 700035
Polarographic combined oxygen and temperature probe, incl. 2 membranes, electrolyte and zero point solution, cable length 2 m

DO9709-SS-1
Art. no. 700036
Galvanic oxygen and temperature probe, incl. 2 membranes, electrolyte and zero point solution, cable length 2 m

DO9709-SS-1-5
Art. no. 700037
Galvanic oxygen and temperature probe, incl. 2 membranes, electrolyte and zero point solution, cable length 5 m

HD2101-USB
Art. no. 700038
Connection cable USB 2.0 connector type A - 8-pole Mini Din for connection to PC with USB input.

SWD-10
Art. no. 700039
Stabilized power supply at 100 ... 240 V AC/12 V DC/1 A mains voltage.

HD-22-3
Art. no. 700040
Laboratory electrode holder with metal basis plate. Flexible electrode holder for free positioning. For Ø 12 mm probes. (see picture)

HD-40-1
Art. no. 700056
Portable, serial input, 24 column thermal printer, 57 mm paper width, 4 NiMH 1.2 V rechargeable batteries, SWD-10 power supply, instruction manual, 5 thermal paper rolls. Requires the cable HD-2110-CSNM (optional).

HD-2110-CSNM
Art. no. 700041
RS232C 8-pole MiniDin - 9-pole D Sub female null-modem cable for connecting the printer to instruments with MiniDIN connector.

GAS

Application:	GMH 5690	GMH 5695	GMH 3692 +Sensor	GMH 3695 +Sensor	ResOx	GOX 100	GOX 100T	GCO 100	HD21-ABE-17
Measurement of atmospheric oxygen	●	●	●	●	●	●	●		
O_2-concentration	●		●	●	●	●	●		●
Temperature, atmospheric pressure, relative humidity									●
O_2-partial pressure	●	●	●	●	●				
CO-concentration (carbon monoxide)								●	●
Protective gases	●	●	●	●	●				
Diving *	●		●				●	●	
Exhaust gas monitoring								●	●

Equipment:

Measuring ranges ambient pressure	O_2-concentration 0 ... 100 % O_2-partial pressure 0 ... 1100 hPa Temperature -5 ... +50 °C 10 ... 1200 hPa 0 ... 11000 hPa		O_2-concentration 0 ... 100 % O_2-partial pressure 0 ... 1100 hPa Temperature -5 ... +50 °C 10 ... 1200 hPa 0 ... 11000 hPa		O_2-concentration 0 ... 100 % O_2-partial pressure 0 ... 1100 hPa Temperature -5 ... +50 °C ambient pressure 0 ... 11000 hPa	O_2-concentration 0 ... 100 %		CO-concentration 0 ... 1000 ppm 0 ... 1250 mg/m³ 0 ... 60 % COHb	CO_2: 0 ... 5.000 ppm CO: 0 ... 500 ppm Atmospheric pressure (Patm): 750 ... 1.100 hPa Rel. humidity (RH): 0 ... 100 % RH Temperature T: -20 ... +60 °C
Electrode / sensor	external sensor, order sensor separately		external sensor, order sensor separately		complete set	in external sensor housing		Sensor internal	Sensor internal
Sensor connection cable	7-pol. Bajonett		6-pole mini-DIN socket		7 pin bayonet connection	0.7 m cable with jack plug		-	-
General functions	Min/Max, Hold, Auto-Off, background illumination		Min/Max, Hold, Auto-Off		Set with gas pump GS 150	Min- / Max, Hold, Auto-Off	Min/Max, Hold, Auto-Off, MOD-display	Max, Hold, Auto-Off	Min/Max, Hold, Auto-Off, background illumination
Alarm / Interface	●	●	●	●	●			●	●
Logger		●		●	●				●

Device information:

Catalogue page	Page 64	Page 64	Page 65	Page 65	Page 68	Page 67	Page 67	Page 69	Page 70

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

Waterproof handheld measuring device

HIGHLIGHTS

- *High display resolution (0.01 % O_2 concentration)*
- *Waterproof and durable (protective silicone case)*
- *Large double display with background lighting*
- *Multi-point calibration for precision measurements*
- *Environmental pressure compensation with integrated barometer*
- *Alarm function*

ADDITIONAL HIGHLIGHTS GHM 5695

- *Data logger*
- *Analogue output*
- *Pressure connection*

ADDITIONAL FUNCTIONS GHM 5695:

THE DEVICE IS ONLY INTENDED FOR CONTROL PURPOSES FOR THESE APPLICATIONS. IT IS NOT A REPLACEMENT FOR A MONITORING DEVICE SUBJECT TO AUTHORISATION!

GMH 5690

Art. no. 607466

Waterproof air oxygen measuring device without sensor

GMH 5695

Art. no. 607468

Waterproof air oxygen measuring device without sensor with data logger and alarm

Application:

Protective gas measurements for
- Welding and soldering
- Food production/packaging technology (MAP, see also the Resox 5695-H/-L)
- For storage of foods, semiconductor components, etc.
- Immersion gas testing: Checking of oxygen concentration in nitrox, trimix or similar gas compositions

***Note:** Not suitable for use in 'underwater applications' (rebreather, etc.)*

Specifications:	**GMH 5690**	**GMH 5695**
Measuring channels:	O_2, T, air pressure (integrated)	O_2, T, air pressure (integrated, with external connection)
Measuring ranges:		
O_2 concentration:	0.0 ... 100.0 % O_2 vol. or 0.00 ... 100.00 % O_2 vol. (resolution can be selected in menu)	
O_2 partial pressure:	0 … 1100 hPa O_2 / 0 … 825 mmHg O_2, 0.0 … 1100,0 hPa O_2 / 0.0 … 825,0 mmHg O_2 (resolution can be selected in menu)	
Temperature:	-5.0 ... +50.0 °C	
Air pressure:	10 ... 1200 hPa abs	300 ... 5000 hPa abs *)
Accuracy: (device at nominal temperature = 25 °C)		
O_2 concentration:	±0.1 % ±1 Digit	
Temperature:	±0.1 °C ±1 Digit	
Air pressure:	±3 hPa or 0.1 % of mw (higher applies)	
Compatible sensors	GGO5 / GOO5 with elements GOEL 370, 381 etc.	GGA5 / GGO5 / GOO5 with elements GOEL 370, 381 etc.
Connections		
Sensor:	7-pin bayonet connection	7-pin bayonet connection Port for pressure connection*)
Output / ext. Power supply:	OUT jack: - 38400 baud interface - 5 V external supply	OUT jack: - 38400 baud interface - Analogue output 0 ... 1 V, adjustable - 5 V external supply
Display:	4 ½ digit, 7-segment, illuminated (white)	
Working conditions:	-25 ... +50 °C; 0 ... 95 % r.h. (non-condensing, sensor min. -5 °C)	
Power supply:	2 x AAA battery, power consumption: 0.9 mA	
Battery life:	approx. 1000 h (without lighting)	
Ingress protection:	IP65 / IP67	

Housing:	Impact-resistant ABS, with stand/hanging bracket
Dimensions:	160 x 86 x 37 mm (H x W x D) including protective silicone case
Weight:	approx. 250 g, including battery and protective case
Scope of supply:	Handheld measuring device incl. batteries (2xAAA), protective silicone case, manual, quick guide

*) Optimal air pressure compensation with GGA 570 /GGA 580

Additional functions:

Backlighting: Adjustable light duration (off, 5 s ... 2 min.)

Calibration: 1 point air, 2 point or 3 point (air and zero point and 100 % O_2)

GLP: Calibration interval
Only GMH 5695: Calibration history

Data logger (only GMH 5695): Cyclical: 10,000, Single: 1000
Single value logger with measuring point input

Alarm: 2 alarm channels (O_2 and temperature) with separate alarm thresholds
Alarm notification horn / visual / interface

Accessories and spare parts:

See page 66/67 for matching sensors

GKK 3600
Art. no. 601062
Case with napped foam for universal application (394 x 294 x 106 mm)

USB 5100
Art. no. 601095
Interface converter GMH 5xxx <=> PC

GSOFT 3050
Art. no. 601336
Windows software for GMBH 3000 and GMH 5000 handheld measuring devices with logger function

Air oxygen measuring device

HIGHLIGHTS:

- *Alarm detector with integrated horn*
- *Automatic compensation of ambient air*

ADDITIONAL FUNCTIONS GMH 3695:

ALARM LOGG

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

THE DEVICE IS ONLY INTENDED FOR CONTROL PURPOSES FOR THESE APPLICATIONS. IT IS NOT A REPLACEMENT FOR A MONITORING DEVICE SUBJECT TO AUTHORISATION!

GMH 3692

Art. no. 605919
Air oxygen measuring device w/o sensor

GMH 3695

Art. no. 605921
Air oxygen measuring device w/o sensor with data logger

Application:

Bio chemistry:
Oxygen monitoring in breeding chambers for cell cultures. Monitoring of fermenting process of fruits in fermentation plants etc.
Medicine:
Monitoring of oxygen concentration in respirators; checking of breathing, monitoring of oxygen concentration in incubators, oxygen tents etc.
Food technology:
Monitoring of residual oxygen in packages (e.g. coffee, tea, etc.).
Monitoring of oxygen content during production processes.
Air conditioning and ventilation technology:
Oxygen measurements, air quality monitoring, measuring of oxygen concentration in enclosed air conditioning systems, etc.
Sport:
Checking of oxygen content in compressed air bottles (diving, etc.).
Note: *not suited for „under water"-applications (rebreather, etc.)*

Specifications:

Measuring ranges:	
Oxygen concentration:	0.0 ... 100.0 % O_2 (gaseous) 0 ... 1100 hPa O_2
Temperature:	-5.0 ... +50.0 °C
Air pressure:	GMH 3692: 10 ... 1200 hPa GMH 3695: 10 ... 11000 hPa
Accuracy: (device) (at nominal temperature = 25 °C)	
Oxygen concentration:	±0.1 % ±1 digit
Temperature:	±0.1 °C ±1 digit
Air pressure:	±3 hPa or 0.1 % v. mw (whichever is higher)
Oxygen sensor:	for suitable sensores p.r.t. page 66 Observe permissible operating pressure of oxygen sensor e.g. GOEL 370/381: 500 ... 2000 hPa abs.
Sensor connection:	6-pin screened Mini-DIN-socket. GMH 3695: additional pressure ports
Display:	two 4 digit LCDs (12.4 mm or 7 mm high), as well as additional arrows.
Pushbuttons:	6 membrane keys for ON/OFF-switch, selection of meas. range, min- and max- value memory, hold-function, calibration etc.
Working temperature:	0 ... +50 °C
Relative humidity:	0 ... +95 % RH (non-condensing)
Storage temperature:	-20 ... +70 °C
Interface:	serial interface, direct connection to RS232 or USB interface of a PC via electrically isolated interface converter GRS 3100 or GRS 3105 resp. USB 3100 N (p.r.t. accessories).
Power supply:	9 V-battery as well as additional d.c. connector for external 10.5-12 V direct voltage supply. (suitable power supply: GNG10/3000)
Battery life:	approx. 300 h
Housing:	impact-resistant ABS plastic housing, membrane keyboard, transparent panel. Integrated pop-up clip.
Dimensions:	142 x 71 x 26 mm (H x W x D)
Weight:	approx. 160 g (incl. battery)
Scope of supply:	Device, battery, manual

Additional functions:

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

Air pressure compensation: The O_2 concentration will be compensated according to the absolute atmospheric pressure set.

Calibration:
1-point calibration: extremely simple quick calibration in atmospheric air. (press button to compensate unit to 20.9 %).

2-/3-point calibration: first point at atmospheric air (20.9 %), second and third point 0 or 100 %.

Calibration interval:
The device asks for a recalibration after a selectable time period (1 - 365 days or inactive). GMH 3695: additional calibration history

Analog output (GMH 3695 only): 0 ... 1 V, freely scalable

Pressure nozzles for pressure compensation

Data logger (GMH 3695 only):
cyclic: 8000 data sets, adjustable cycle time: 1 s … 60 min
manual: 1000 data sets, with measuring point input

Accessories and spare parts:

Suitable sensores p.r.t. next page

GKK 3000
Art. no. 601048
Case (275 x 229 x 83 mm) with punched lining suitable for GMH3xxx

USB 3100 N
Art. no. 601092
Interface converter, electrical isolated

GRS 3105
Art. no. 601099
Interface converter with 5 connection points, electrical isolated, for the connection of 5 devices to one PC (RS232).

GSOFT 3050
Art. no. 601336
Windows software for GMH 3000 and GMH 5000 handheld measuring devices with logger function

ST-R1
Art. no. 601066
Device protection bag with cut-out for probe connection

Atmospheric oxygen sensores for GMH 569x and GMH 369x

Closed sensor type GGO

GGO 581
Art. no. 610029
For low oxygen concentrations, fast response time,
suitable for GMH 569x

GGO 570
Art. no. 607480
Universal application, diving gas, longlife, suitable for GMH 569x

GGO 381
Art. no. 610030
For low oxigen-concentration, fast response time
suitable for GMH 369x

GGO 370
Art. no. 601224
Universal applications, diving, longlife, suitable for GMH 369x

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

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

longer cable length 4 m and 10 m on demand

Open sensor type GOO

GOO 581
Art. no. 610033
For low oxygen concentrations, fast response time,
suitable for GMH 569x

GOO 570
Art. no. 607482
Universal application, diving gas, longlife, suitable for GMH 569x

GOO 381
Art. no. 610034
for low oxigen-concentration, fast response time,
suitable for GMH 369x

GOO 370
Art. no. 601228
universal applications, diving, longlife, suitable for GMH 369x

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

Application:
Because of the special sensor construction the measuring gas streams optimally around the sensor and escapes through holes in the housing into the air. No pressure build-up at slight streaming of the probe, that falsify the result of measurement. Particularly suitable for measuring of gas out of gas-bottle etc. Even measuring indoor-gas concentration is possible.

longer cable length 4 m and 10 m on demand

Closed sensor type with pressure connection GGA

GGA 581
Art. no. 610031
Pressure connection, suitable for GMH 569x

GGA 570
Art. no. 607486
Pressure connection, suitable for GMH 569x

GGA 381
Art. no. 610032
Pressure connection, suitable for GMH 369x

GGA 370
Art. no. 607484
Pressure connection, suitable for GMH 369x

General:
For devices with external pressure port (GMH 5695/3695) is this housing optimal. Especially for systems with high or low pressure or with existing back pressure by flow.

Application:
It can be screwed airtight (Attention: Observe permissible operating pressure!). The device-pressure port is connected to the sensor pressure port. The device measures and compensates for the actual pressure at the sensor.

longer cable length 4 m and 10 m on demand

Specifications:	GGA/GGO/GOO 570/370	GGA/GGO/GOO 581/381
Specific features:	Stronger membrane, coated electronics, temperature compensation	for low oxigen-concentration, fast response time
Measuring range:		
Partial oxygen pressure:	0 ... 1100 hPa O_2	0 ... 300 hPa O_2
Oxygen concentration:	0.0 ... 100.0 % O_2	0.0 ... 25.0 % O_2
Response time: T_{90}	<10 s	<5 s
Accuracy (at 25 °C, 1013 hPa):		
<2 % O_2	±0.2 % O_2	±0.1 % O_2
<25 % O_2	±0.5 % O_2	±0.5 % O_2
>25 % O_2	±0.5 % O_2	no information
Operating conditions:	0 ... 45 °C 0 ... 95 % RH (non-condensing)	0 ... 50 °C 0 ... 95 % RH (non-condensing)
Ambient pressure:	0.5 ... 2.0 bar abs.	0.7 ... 1.75 bar abs.
Over-/under-pressure:	max. 0.25 bar (pressure difference sensor membrane to ambient - sensor screwed-in)	
Storage temperature:	-15 ... +60 °C	
Operation life:	on air: >4 years (warranty for sensor element: 12 months)	on air: >2 years (warranty for sensor element: 12 months)
Sensorelement:	GOEL 370	GOEL 381
	Oxygen-partial pressure probe, mounted in external sensor housing replaceable (temperature sensor mounted in housing)	
Connection:	**GGA/GGO/GOO 3...:** approx. 1.2 m cable with Mini-DIN-plug. **GGA/GGO/GOO 5...:** approx. 1 m cable with 7-pole bayonet connector	
Dimensions of housing:	GGA..: approx. Ø 36 mm x 95 mm (150 mm incl. anti-buckl. glanding), GGO..: approx. Ø 36 mm x 95 mm (150 mm incl. anti-buckl. glanding), GOO..: approx. Ø 40 mm x 105 mm (160 mm incl. anti-buckl. glanding) Housing with M16 x 1-screw thread (sensor can be connected to line tubes by means of an additional adapter)	
Weight:	approx. 135 g (GGO...) or approx. 145 g (GOO.../GGA...)	
Scope of supply:	GGA.../GGO... : sensor, flow diverter, T-piece GOO... : sensor, flow diverter	

Note: not suited for „under water"-applications (rebreather, etc.)

Accessories

GOEL 370
Art. no. 601490
Sensor element (acidic electrolyte)

General:

Integrated into GGO 370, GGA 370, GOO 370 (for GMH 3690/91/92/95) or GGO 570, GGA 570, GOO 570 (for GMH 5690/95)
Universal sensor element with special precautionsparticularly for immersion applications ("nitrox"),very long life, even for applications withelevated CO_2 concentration.

Note: not suited for „under water"-applications (rebreather, etc.)

GOEL 381
Art. no. 610035
Sensor element (alkaline electrolyte)

General:

Integrated into GGO 381, GGA 381, GOO 381 (for GMH 3690/91/92/95) or GGO 581, GGA 581, GOO 581 (for GMH 5690/95); Fast sensor element especially for low oxygen concentrations below 1 %, measuring range up to 25 %, e. g. a protective gas atmosphere. For application without permanently higher CO_2 concentration

Note: not suited for „under water"-applications (rebreather, etc.)

Accessories and spare parts:

GZ-11
Art. no. 603144
Flow rate adapter to measure the oxygen concentration with 6/4 mm tube

ESA 369
Art. no. 603058
Spare tube-adapter M16x1, for tubes with a inner-diameter of 15 mm

ZOT 369
Art. no. 603094
T-piece

SUPPLEMENT FOR GAS ANALYSIS AND AIR QUALITY MEASURING DEVICES

NEW!

GS 150
Art. no. 610005
Gas pump for gas sampling

HIGHLIGHTS:

- *Easy to use*
- *Durable membrane pump*
- *Quiet*
- *Low quantity of conveyed gas*
- *Mobile operation with battery*
- *Battery charge indicator*

Application:

e.g. in combination with residual oxygen measuring devices for protective gas applications, etc.

Specifications:

Functional principle:	Motorised membrane pump with input/output ports, battery-operated
Max. negative pressure:	approx. -360 mbar
Delivery rate:	open: approx. 380 ml/min, with GDZ 29: approx. 80 ml/min
Connection:	Universal pressure port for 6/4 mm hoses (inside Ø 4 mm)
Range of application:	10 ... 50 °C
Applicable gases:	Non-corrosive, dust-free gases, a condensate trap is recommended for gases with high humidity
Operation:	On / Off slide switch
Environmental conditions:	10 ... 50 °C, 0 ... 95 % RH
Battery/service life:	9 V block battery, approx. 10 h
Battery charge indicator:	2 LEDs: full / low
Scope of supply:	Device, battery, manual

Accessories and spare parts:

GDZ-29
Art. no. 601599
Filter-Membrane incl. Luer-Locks (GDZ-25 and GDZ-26), prevents contamination with even the finest particles or liquids

Compact air oxygen measuring device

ISO
AUTO OFF
BAT

GOX 100
Art. no. 600142
For universal applications

General:

- 1-button calibration
- Automatic power-off
- Min-/max- value memory
- Incl. sensor GOEL 370

Note: not suited for „under water"-applications (rebreather, etc.)

GOX 100T
Art. no. 600157
For diving applications

General:

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

Note: not suited for „under water"-applications (rebreather, etc.)

Specifications:

Measuring range:	0.0 ... 100.0 % O_2
Accuracy typ.:	±0.1 % O_2 ±1 digit, calibrated device (range from 15 ... 40 % O_2)
MOD (GOX 100T):	0 ... 100 m / 0 ... 199 ft
Sensor Connection:	0.7 m jack-connector cable
Sensor	Electrochemical oxygen-partial pressure probe, mounted in external sensor housing
Warranty:	12 months
Working pressure:	0.5 ... 2.0 bar abs.
Over-/under-pressure:	max. 0.25 bar (pressure difference)
Working temperature:	0 ... 45 °C (sensor), -20 ... +50 °C (device)
Relative humidity:	0 ... 95 % RH
Power supply:	9 V battery
Power consumption:	approx. 120 µA (over 2500 h)
Display:	3½-digit, 13 mm high LCD-display
Housing:	ABS-enclosure
Dimensions:	approx. 106 x 67 x 30 mm (H x W x D)
Weight:	approx. 185 g
Scope of supply:	Device incl. sensor, tube-adaper, t-piece, battery, manual

Variants:

GOX 100-LACK
Art. no. 602047
with encapsulated PC board (for applications where condensation is possible)

GOX 100-T-LACK
Art. no. 604660
with encapsulated PC board (for applications where condensation is possible)

ResOx residual oxygen measuring system

ResOx 5695-H

Art. no. 610040

Residual oxygen measuring system (for gases with elevated CO_2 percentage GOEL 370)

ResOx 5695-L

Art. no. 610041

Residual oxygen measuring system (with recommended sensor element GOEL 381)

General:

New measuring system with gas pump for more measuring comfort - can now also be used in rigid packages and packages with low quantities of gas.

Application:

Quality control for MAP food packaging and comparable applications

Specifications:

Measuring channels:	O_2, T, air pressure
Measurement ranges	
O_2:	0.0 … 100.0 % O_2 or displayed in hPa O_2/mmHg O_2
Temperature:	0.0 … 50.0 °C
Air pressure:	300 … 5000 hPa (Sensor: 500 ... 2000 hPa)
Additional functions:	Min/max function – for comfortable measurement of the limit value Pressure compensation in the gas path – negative pressure in the package/on the sensor is compensated for
Applicable sensors:	GOEL 370, 381 etc.
Connections on the device	
Sensor:	7-pin bayonet Pressure port for hoses with inside Ø 4 mm
Output/ext. power supply:	OUT socket: - 38400 baud interface - Analogue output 0 ... 1 V, adjustable - External 5 V power supply
Calibration:	Quick calibration on air at the push of a button or 2-point / 3-point (Air +0 % and 100 %)
GLP:	Calibrating interval, calibration history
Data logger:	Cyclical: 10000, Single: 1000 Single value logger with measuring point entry
Pump:	Motorised membrane pump with input/output ports, battery-operated
Max. negative pressure:	approx. -360 mbar
Delivery rate:	with GDZ 29 Filter: approx. 80 ml/min
Connection:	Pressure port for hoses with inside Ø 4mm
Additional features:	Waterproof device and sensor (IP65, IP67), protective armouring, backlighting

Scope of supply:	Ready-to-operate system: Display GMH 5695, incl. battery, sensor housing with pressure connection, incl. sensor, gas pump GS 150, incl. battery, connection lines, hoses/T-piece, 2 GDZ 29 filters, 2 GOG-N puncture needles Ø 0.9 mm, 1 GOG-B: 45 pcs. adhesive seal, carry case GKK 1420

QUICK MEASUREMENT:
- Apply adhesive seal
- Puncture with needle
- Switch on the pump
- Read the minimum value after approx. 20 s

With very rigid packages in which greater negative pressure arises during the measuring process, additional sealing must be provided. For this purpose, please observe the instructions in the measuring system operating manual

Accessories and spare parts:

GOG-A
Art. no. 603043
Adhesive cellular foam (40 pcs.)

GOG-B
Art. no. 610013
Adhesive seal (45 pcs.)

GOG-N
Art. no. 603047
Puncture needle, Ø 0.9 mm (5 pcs.)

GDZ-29
Art. no. 601599
Filter membrane, including Luer locks (GDZ-25 and GDZ-26)

GS 150
Art. no. 610005
Gas pump

GOEL 370
Art. no. 601490
Spare sensor element, universal range, immersion gas, long-life

GOEL 381
Art. no. 610035
Spare sensor

USB 5100
Art. no. 601095
Interface adapter

GSOFT 3050
Art. no. 601336
Logger operating software

Compact CO-measuring device

AUTO OFF
HOLD
MAX ALARM
MIN MAX

HIGHLIGHTS:

- *3 display units selectable (ppm, mg/m³ and % CO Hb)*
- *Alert at exceeding the maximum concentration at work (MAK/AGW)*
- *incl. interface*
- *incl. calibration protocol*

THE DEVICE IS ONLY INTENDED FOR CONTROL PURPOSES FOR THESE APPLICATIONS. IT IS NOT A REPLACEMENT FOR A MONITORING DEVICE SUBJECT TO AUTHORISATION!

GCO 100

Art. no. 600062
CO-measuring device with alarm

General:

Carbon monoxide (CO) is created by the combustion of carbon. Depending on the effectiveness of the combustion (oxygen supply) and the temperature of the combustion more or less CO gas is created. The gas is inflammable and highly toxic. It is invisible, tasteless and scentless.
Even smallest concentrations are dangerous for humans!
Therefore a directive exists in Germany, which limits the maximum concentration of CO gas at work (MAK / AGW) to 30 ppm.

Application:

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

Specifications:

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

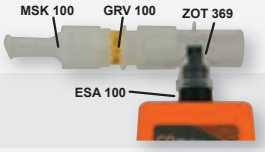
Interference: (extract)

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

Display:	approx. 11 mm high, 4½-digit LCD-display
Pushbuttons:	3 membrane keys
Nominal temperature:	25 °C
Ambient condition:	-10 ... +50 °C, 15 ... 90 % RH (non condensing)
Storage temperature:	-10 ... +50 °C
Serial interface:	Serial interface, direct connection to RS232 or USB interface of a PC via electrically isolated interface adapter
Power supply:	9 V-battery as well as additional d.c. connector for external 10.5 - 12 V direct voltage supply. (suitable power supply: GNG 10 / 3000)
Battery life:	>1000 h
Housing:	impact-resistant ABS plastic housing, membrane keyboard, transparent panel. Integrated pop-up clip for table top or suspended use.
Dimensions:	142 x 71 x 26 mm (H x W x D)
Gewicht:	approx. 155 g
Scope of supply:	Device, battery, calibration protocol, manual

Accessories and spare parts:

ESA 100
Art. no. 603013
Tube-adapter/flow diverter to screw in front plates.



ZOT 369
Art. no. 603094
T-piece

GRV 100
Art. no. 603093
Non return valve

MSK 100
Art. no. 603012
Mouth peace of plastic

GAS 100
Art. no. 603587
Extension set for exhaled air control (consisting of ESA 100, ZOT 369, GRV 100 and 5 x MSK100)

GZ-10
Art. no. 603133
Test gas cap GCO (for controlled flow with test gas)

GZ-02
Art. no. 603569
Gas bottle with 12l test gas: 30 ppm CO

GZ-03
Art. no. 603123
Gas bottle with 12l test gas: 300 ppm CO

GZ-04
Art. no. 603570
Gas valve unit MiniFlo for gas bottles with 12l

GB 9 V
Art. no. 601115
spare battery 9 V / approx. 300mA/h

GKK 3000
Art. no. 601048
Case (275 x 229 x 83 mm) with punched lining

USB 3100 N
Art. no. 601092
Interface converter to USB, electrical isolated

GAM 3000
Art. no. 601132
switching module for 230 VAC/10 A

Indoor air quality monitors

NEW!

AIR QUALITIY

HD21-ABE-17

Art. no. 700049
Indoor air quality monitors

HIGHLIGHTS:

- *Indoor air qualitiy permitting calculation of automatic ventilation rate by CO_2 analysis correlate to the real presence of people in the rooms*

General:

HD21-AB-17 IAQ Monitor is a bench-top/portable instrument manufactured by Delta Ohm for the analysis of indoor air quality (IAQ, Indoor Air Quality).
The instrument simultaneously measures the parameters:
- Carbon Dioxide CO_2
- Carbon Monoxide CO
- Atmospheric Pressure
- Temperature
- Relative Humidity

and it calculates:
- Dew Point
- Wet Bulb Temperature
- Absolute Humidity
- Mixing Ratio
- Enthalpy

These regulations apply to all confined spaces that could be used by people. Kitchens, baths, changing rooms and swimming pools are included, due to their high humidity. You should take into account, in regard to air quality, possible chemical, physical and biological contaminants. The instruments have a wide Dot Matrix graphic display with a resolution of 160 x 160 dots.
The instruments typical applications are:
- Measurement of IAQ (Indoor Air Quality) and comfort conditions in schools, offices and indoor spaces.
- Analysis and study of the Sick Building Syndrome, and of the resulting consequences.
- Checking the HVAC (Heating, Ventilation and Air Conditioning) system efficiency.
- Examination of IAQ conditions in factories to optimize microclimate and improve productivity.
- Building Automation checks.

Specifications:

Instrument	
Dimensions:	300 x 90 x 40 mm (H x W x D) (with probe)
Materials:	ABS, rubber
Display:	Backlit, Dot Matrix, 160 x 160 dots, visible area 52 x 42 mm
Operating conditions	
Operating temperature:	-5 ... +50 °C
Warehouse temperature:	-25 ... +65 °C
Working relative humidity:	0 ... 85 % RH without condensation
Protection degree:	IP30
Instrument uncertainty:	±1 digit @ 20 °C
Power supply	
Mains adapter (code SWD-10):	12 V DC/1 A
Batteries:	4 x 1.2 V Ni-MH rechargeable batteries AA type
Autonomy:	8 h of continuous use in measure mode
Serial interface	
Socket:	mini-USB
Type:	USB 1.1 or 2.0 not insulated
Storage capacity:	67.600 recordings
Scope of supply:	IAQ Monitor datalogger kit. Complete with: DeltaLog10 software (version 0.1.5.3 and later), monitor, and data processing on Personal Computer, 4 x 1.2 V NiMH rechargeable batteries, operating manual, case.

CO_2 Carbon Dioxide

Sensor:	NDIR Dual Wavelength (two frequences)
Measurement range:	0 … 5000 ppm
Sensor working range:	-5 … +50 °C
Accuracy:	±50 ppm ±3 % of measurement
Resolution:	1 ppm
Temperature dependence:	0.1 % f.s./°C
Response time (T_{90}):	<120 s (air speed = 2 m / s)

CO Carbon Monoxide

Sensor:	Electrochemical cell
Measurement range:	0 ... 500 ppm
Sensor working range:	-5 ... +50 °C
Accuracy:	±3 ppm ±3 % of measurement
Resolution:	1 ppm
Response time (T_{90}):	<50 s
Service life:	>5 years in normal environment conditions

Atmospheric Pressure Patm

Type of sensor:	Piezo-resistive
Measurement range:	750 … 1100 hPa
Accuracy:	±1.5 hPa @ 25 °C
Resolution:	1 hPa
Temperature drift:	±3 hPa with temperature -20 ... +60 °C

Relative Humidity RH

Type of sensor:	Capacitive
Sensor protection:	Stainless steel grid filter (on request 10 µm sintered filter P6 in AISI 316 or 20 µm sintered filter P7 in PTFE)
Measurement range:	0 ... 100 % RH
Sensor working range:	-20 ... +60 °C
Accuracy:	±1.5 % RH (0 ... 90 % RH) ±2 % RH (elsewhere) for T=15 ... 35 °C ±(1.5 +1.5 % of the measure) % RH for T= -20 ... +60 °C
Resolution:	0.1 °C
Temperature dependence:	±2 % on all temperature range
Hysteresis and repeatability:	1 % RH
Response time (T_{90}):	< 20 s (air speed = 2 m / s) without filter

Temperatur T

Type of sensor:	NTC 10 kΩ
Measurement range:	-20 ... +60 °C
Accuracy:	±0.2 °C ±0.15 % of measurement
Resolution:	0.1 °C
Response time (T_{90}):	<30 s (air speed = 2 m / s)

Accessories:

SWD-10
Art. no. 700039
Stabilized power supply at 100-240 V AC/12 V DC-1 A mains voltage.

CP-23
Art. no. 700050
Connection cable with type B MiniUSB connector on instrument's side and USB 2.0 connector on PC's side.

BAT-40
Art. no. 700051
Spare batteries with built-in temperature sensor.

ECO-SURE-2E-CO
Art. no. 700052
CO spare sensor

MINICAN-12-A-0
Art. no. 700059
Nitrogen can for CO and CO_2 calibration at 0 ppm. 20 litres

HD-37-36
Art. no. 700053
Connection tube kit for CO calibration

HD-37-37
Art. no. 700054
Connection tube kit for CO_2 calibration

HD-33-0
Art. no. 700055
33 % RH saturated solution for checking the relative humidity sensor

Application:	GMH 5130 GMH 5150 GMH 5155	GMH 3111 GMH 3151 GMH 3156	GMH 3161-12 GMH 3181-12	GMH 3161-002 / -01 / -07... / -13	GMH 3181-002 / -01 / -07... / -13	GDH 200-07 GDH 200-13	GDH 200-14	GPB 3300 GTD 1100	GDUSB 1000
Relative pressure meas. (over, under- and pressure difference)	● ● ●	● ● ●		●	●	● ●			●
Absolute pressure measuring	● ● ●	● ● ●	● ●				●	● ●	●
Heating, ventilation, climate	● ● ●	● ● ●	● ●	●	●	● ●	●	● ●	●
Measuring in liquids	● ● ●	● ● ●							●
Vacuum measuring	● ● ●	● ● ●	● ●				●		●
Meteorology			● ●				●		
Altitude measuring (sports)								●	
Water-proof application	● ● ●								
Optionally EX-protection		● ● ●	● ●	●	●				
Equipment:									
Plug-in probe	1 1 2	1 1 2							1
Min/Max, Zero	● ● ●	● ● ●	● ●	●	●	● ●	●	● ●	●
Alarm / Data logger / Analog output	● ●	● ●	●		●				
Device information:									
Catalogue page	Page 72	Page 73/74	Page 80	Page 79/80	Page 79/80	Page 81	Page 81	Page 82	Page 75

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

GMH 5130 / 50

GMH 5155

WATER-PROOF DEVICE AND PLUG-IN CONNECTIONS

HIGHLIGHTS:

- *Peak value detection (1000 measurements / s)*
- *Large double display with background illumination*
- *Calibrated and fully interchangeable pressure probes*
- *incl. calibration protocol*

ADDITIONAL FUNCTIONS GMH 5150 AND 5155:

ALARM LOGG

ADDITIONAL FUNCTIONS GMH 5155:

- *2 GMSD/MSD-probes connectable.*
- *Difference measurement of two probes*

suitable pressure probes
p. r. t. page 76/77

GMH 5130

Art. no. 600027

Pressure measurement device with 1 sensor connection, without sensor

GMH 5150

Art. no. 600031

Pressure measurement device with 1 sensor connection, analog output and data logger, without sensor

GMH 5155

Art. no. 600033

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

General:

This handheld instrument is a valuable tool for demanding pressure measurements. Extremely robust plug connections, the silicone protection cover, backlight and a water-proof design allow its usage in harsh industrial and field environments.

Application:

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

Specifications:	GMH 5130
Sensor connections:	1
Suitable probes:	GMSD / MSD sensors, available ranges (resolutions) from -1.999 … 2.500 mbar (0.001 mbar) to 0 … 1000 bar (1 bar)
Display range max.:	-19999 ... +19999 digit
Display unit: *	depends on measuring range selection and sensor: mbar, bar, Pa, kPa, MPa, mmHg, inHg, PSI, mH_2O
Measuring frequency:	4 measurements / s or 1000 measurements / s with peak value memory
Average filter:	adjustable: 1 ... 120 s
Accuracy:	±0.1 % FS ±1 digit
Connections	
Sensor	1x 7-pole bayonet connector
Output / external supply	4-pole bayonet connector for serial interface,* supply (with accessories: USB adapter USB 5100)
Display:	4 ½ digit 7-segment, illuminated (white)
Working temperature:	-25 ... +50 °C, 0 ... 95 % RH (non-condensing)
Storage temperature:	-25 ... +70 °C
Power supply:	2 x AAA-battery, battery life 500 h (without illumination, 4 measurings / s)
Housing:	impact resistant ABS housing with pop-up clip
Protection class	IP65 / IP67
Dimensions:	160 x 86 x 37 mm (H x W x D) incl. silicone protection cover (red)
Weight:	approx. 250 g incl. battery and protection cover
Scope of supply:	Device, battery, calibration protocol, manual

Specifications:	GMH 5150 and GMH 5155
Sensor connections:	1, GMH 5155: 2
Suitable probes:	GMSD / MSD sensors, available ranges (resolutions) from -1.999 … 2.500 mbar (0.001 mbar) to 0 … 1000 bar (1 bar)
Display range max.:	-19999 ... +19999 digit
Display unit: *	depends on measuring range selection and sensor: mbar, bar, Pa, kPa, MPa, mmHg, inHg, PSI, mH_2O, user
Measuring frequency:	4 measurements / s or 1000 measurements / s with peak value memory
Average filter:	adjustable: 1 ... 120 s
Accuracy:	±0.1 % FS ±1 digit
Connections:	
Sensor:	1 x 7-pole bayonet connector GMH 5155 only: 2 x 7-pole bayonet connector
Output / external supply	4-pole bayonet connector for serial interface, * supply (with accessories: USB adapter USB 5100)
Analog output:	0 ... 1 V, freely adjustable, connection with 4-pole bayonet connector, resolution 12 bit
Display:	4 ½ digit 7-segment, illuminated (white)
Working temperature:	-25 ... +50 °C, 0 ... 95 % RH (non-condensing)
Storage temperature:	-25 ... +70 °C
Power supply:	2 x AAA-battery (included), battery life 500 h (without illumination, 4 measurings / s)
Housing:	impact resistant ABS housing with pop-up clip
Protection class:	IP65 / IP67
Dimensions:	160 x 86 x 37 mm (H x W x D) incl. silicone protection cover (red)
Weight:	approx. 250 g incl. battery and protection cover
Scope of supply:	Device, battery, calibration protocol, manual

Additional functions:

Additional Display for Battery: Bar graph display
Background Illumination: duration adjustable (off, 5 s ... 2 min.)
Adjustment: offset / slope adjustable in menu
User-defined displayed unit: (user/GMH 5150/55)
conversion to any unit with help of linear factor
Leakage test function (GMH 5150/55):
leak rate display, leak rate alarm (/s, /min, /h)
Air velocity / flow volume (GMH 5150/55):
Pitot tube measurement (accessories)
peak-detect (Peak value memory):
The min- / max- value memory stored unfiltered pressure peaks ≥1 ms
Logger function
with measuring point input, adjustable cycle time: 1 s ... 1 h,
recording time: 416 days at intervall 1 h, data logger: cyclic: 10.000 data sets (GMH 5150), 8.000 data sets (GMH 5155); manual: 1.000 data sets (with measuring point input, 40 adjustable measuring point texts or measuring point numbers)

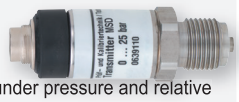
= Note to the pressure unit selection:
The choice of a specific pressure unit is possible, if its whole measuring range is displayable within the display of the device and the sensor is supporting these resolution.

Accessories

Accessories and spare parts:

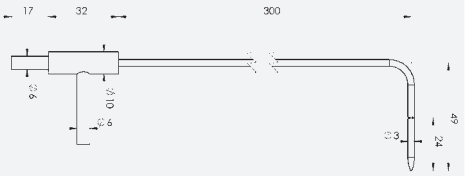
GMSD ... - K51
pressure sensors
(p.r.t. page 76)
Application field:
non-aggressive gases
for over / under pressure and difference pressure meas. or absolute pressure meas.

MSD ...
pressure sensors / stainless steel (p.r.t. page 77)
Application field: air,
aggressive gases for over / under pressure and relative pressure meas. or absolute pressure meas.



MSD-K51
Art. no. 603809
1 m connection cable for MSD sensors

Prandtl-Staurohr
Art. no. 604150
(made of stainless steel)
for air velocity / flow volume measurement
Ø = 3 mm, NL = 300 mm, max. 600 °C
GMSD 2,5 MR-K51 or GMSD 25 MR-K51 are required



GDZ-01
Art. no. 601541
PVC tube 6/4 (6 mm outer Ø, 4 mm inner Ø)
(5 bar at 23 °C)

GDZ-30
Art. no. 601601
Adapter G1/2“ inner to tube 6/4

EBS 20M
Art. no. 601158
software for long-term monitoring (p.r.t. page 96)

GSOFT 3050
Art. no. 601336
Software for operation of logger devices (p.r.t. page 97)

USB 5100
Art. no. 601095
Electrically isolated interface converter, supplied via USB

GNG 5 / 5000
Art. no. 602287
Plug-in power supply 5 V DC, suitable for GMH 5000 series (see p. 94)

GKK 3500
Art. no. 601052
Device case (394 x 294 x 106 mm) with eggcrate foam and cut-outs for 1 device (p.r.t. page 92)

Hand-held pressure measuring device

HIGHLIGHTS:

- *one device for any measuring range (2.500 mbar ... 1000 bar)*
- *calibrated and fully interchangeable pressure probes*

Suitable pressure probes
p.r.t.p. 76/77

GMH 3111

Art. no. 600374
Hand-held pressure measuring device with 1 sensor connection, without sensor

GMH 3111-EX

Art. no. 600380
Hand-held pressure measuring device with 1 sensor connection, without sensor, ex

Specifications:	
Max. display range:	-19999 ... +19999 digit
Measuring range:	corresponding to used probe
Overload:	corresponding to used probe
Resolution:	corresponding to used probe
Accuracy: (device)	±0.1 % FS ±1 digit (at nominal temperature = 25 °C)
Pressure units: *	mbar, bar, Pa, kPa, MPa, mmHg, PSI, mH_2O, can be selected.
Probe connection:	1 sensor socket 6-pin lockable Mini-DIN-socket(s) for GMSD/MSD-sensors. Automatic probe detection and setting of measuring range upon plugging in of probe.
Display:	2 x 4½ digit LCD
Output:	interface
serial interface:	direct connection to RS232 or USB interface of a PC via electrically isolated interface converter GRS 3100, GRS 3105 or USB 3100 N.
Power supply:	9 V-battery, d.c. connector for external 10.5 ... 12 V direct voltage supply. (suitable power supply: GNG10/3000)
Sensor adjustment:	digital offset and scale input
Measuring cycle:	4 measurements / s
Battery life:	approx. 120 h
Working condition:	-25 ... 50 °C, 0 ... 95 % RH, **GMH 3111-ex:** -10 ... +50 °C, 0 ... 95 % RH
Housing:	impact-resistant ABS plastic housing, Front side IP65 **GMH 3111 only:** integrated pop-up clip for table top or suspended use.
Dimensions:	142 x 71 x 26 mm (H x W x D)
Weight:	approx. 150 g, **GMH3111-EX:** approx. 190 g (incl. leather case)
Scope of supply:	Device, battery, calibration protocol, manual

Note to Ex-design types:

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

Ex qualification:: II 2 G Ex ib IIC T4 Gb

Ref. document: EPS 09 ATEX 1 227 X

Standards:
The device meets the standards for electric resources in explosion endangered areas according to EN 60079-0 : 2012, EN 60079-11 : 2012

Probe:
(GMH 3111-EX, GMH 3151-EX, GMH 3156-EX) All GMSD sensors with option ‚Ex type‘ can be used.

Interface:
suitable interface adapter are USB 3100 N, GRS 3100 and GRS 3105
Please note: The operation of the interface is not allowed within the Ex area!

Working temperature: -10 ... +50 °C

Power supply: 9 V-battery, d.c. connector
Please note: the use of d.c. connector is not allowed within the Ex area! Just d.c. connectors of type GNG10/3000 can be used.

Alarm function:
(GMH 3151-EX, GMH 3156-EX, GMH 3181-EX)
The device is without a horn, in the alarm settings are only the parameter „no.so“ and „off“ adjustable.

Scope of supply:
device with associated leather case.

Note to the pressure unit selection: (information for all GMH 31xx)
The choice of a specific pressure unit is possible, if its whole measuring range is displayable within the display of the device and the sensor is supporting these resolution.

Pressure measuring device with logger

LOGGER FUNCTION

GMH 3151

GMH 3156

HIGHLIGHTS:

- *4½-digit display, probes with higher resolution up on request*
- *Peak value memory 1000 measurments / s*
- *Analog output 0 ... 1 V*
- *Digital adjustmentable*
- *Integrated horn*

ADDITIONAL FUNCTIONS GMH 3156:

- *2 GMSD/MSD-probes connectable.*
- *Difference measurement of two probes*

Suitable pressure probes p.r.t. p. 76/77

GMH 3151

Art. no. 600381

Pressure measuring device with 1 sensor connection, analog output and data logger, without sensor

GMH 3156

Art. no. 600386

Pressure measuring device with 2 sensor connections, analog output and data logger, without sensor

GMH 3151-EX

Art. no. 600383

EX-Pressure measuring device with 1 sensor connection, analog output and data logger, without sensor

GMH 3156-EX

Art. no. 600394

EX-Pressure measuring device with 2 sensor connections, analog output and data logger, without sensor

Specifications:	
Max. display range:	-19999 ... +19999 digit
Measuring range:	corresponding to used probe
Overload:	corresponding to used probe
Resolution:	corresponding to used probe
Accuracy: (device)	±0.1 % FS ±1 digit (at nominal temperature = 25 °C)
Pressure units:**	mbar, bar, Pa, kPa, MPa, mmHg, PSI, mH_2O, can be selected.
Probe connection:	1, **GMH 3156/-ex:** 2 6-pin screended lockable Mini-DIN-socket(s) for GMSD/MSD-sensors. Automatic probe detection and setting of measuring range upon plugging in of probe.
Display:	2 x 4½-digit LCD
Output:	serial interface or AAG *
serial interface:	direct connection to RS232 or USB interface of a PC via electrically isolated interface converter GRS 3100, GRS 3105 or USB 3100 N.
analog output:	0 ... 1 V, freely adjustable (resolution 12 bit)
Power supply:	9 V-battery, d.c. connector * for external 10.5 ... 12 V direct voltage supply. (i. e. GNG10/3000)
Sensor adjustment:	digital offset and scale input
Measuring cycle: „slow“	4 measurements / s
„fast“ / „peak-detect“	≥1000 measurements / s
peak-detect:	The min- / max- value memory stored unfiltered pressure peaks ≥1 ms
Logger functions	
manually data sets:	99 data sets
cycle data sets:	10000, **GMH 3156/-ex:** 4000 (max. 64 recording sequences)
adjustable cycle time:	1 ... 3600 s
Averaging function:	x
Battery life:	approx. 180 h (4 measurements/s) approx. 40 h (1000 measurements/s)
Working conditions:	-25 ... +50 °C, 0 ... +95 % RH (non-condensing), **GMH 315x-EX:** -10 ... +50 °C, 0 ... 95 % RH (non-condensing)
Housing:	impact-resistant ABS plastic housing. **GMH315x only:** pop-up clip for table top or suspended use.
Dimensions:	142 x 71 x 26 mm
Weight:	approx. 150 g, **GMH 315x-ex:** approx. 190 g (incl. case)
Scope of supply:	Device, battery, calibration protocol, manual

** refer to note to EX-design types at page before*

Additional functions:

Averaging function: integrates the meas. values during a selectable period of time and then calculates the average display value.

Sea-Level-correction: when connecting an abs. pressure probe the barom. air pressure can also be displayed corrected to sea level „zero“. (Air pressure compensation achieved by entering the meters above sea level „zero“)

Logger Functions:
- manual: 99 data sets
- cyclic: 10000 data sets (GMH 3151)
4000 data sets (GMH 3156)

(max. 64 recording sequences), adjustable cycle time:
1 ... 3600 s; The logger is started or stopped by keypad or interface. The software GSOFT3050 (see accessories) is available for comfortable read-out of logger data.

***** Hinweis zur Druckeinheiten-Einstellung: (für alle GMH 31xx gültig)***
Die Auswahl unterschiedlicher Druckeinheiten ist nur dann möglich, wenn sich der gesamte Messbereich dieser Einheit auch auf dem Display darstellen lässt und der Sensor auch diese Auflösung unterstützt.

Tube, tube clips, adapter, couplings, etc.

for GMH31xx, GMSD, MSD, GDHs and pressure measuring transducers.

GDZ-01
Art. no. 601541
PVC-tube 6/4 (6 mm outside-Ø, 4 mm inside-Ø) (5 bar @ 23 °C)

GDZ-02
Art. no. 601543
PE (polyethylene) 6/4 (6 mm outside-Ø, 4 mm inside-Ø) (10 bar @ 23 °C)

GDZ-03
Art. no. 601545
PUR (polyurethane) 6/4 (6 mm outside-Ø, 4 mm inside-Ø) (9 bar @ 23 °C)

GDZ-04
Art. no. 601547
PA (polyamide) 6/4 (6 mm outside-Ø, 4 mm inside-Ø) (25 bar @ 23 °C)

GDZ-05
Art. no. 601549
Screw-type glanding for 6/4 tube with outside thread G1/8

GDZ-06
Art. no. 601551
Increaser glanding for 6/4 tube with inside thread G1/8“

GDZ-08
Art. no. 601555
Double adapter for 6/4 tube to 6/4 tube

GDZ-09
Art. no. 601557
Coupling adapter (NW5) made of brass with inside thread G1/4“ (suitable for GDZ-12)

GDZ-10
Art. no. 601559
Coupling adapter (NW5) made of brass for tube with 6 mm inside-Ø (suitable for GDZ-12)

GDZ-11
Art. no. 601561
Coupling adapter (NW5) made of brass with outside thread G1/4“ (suitable for GDZ-12)

GDZ-12
Art. no. 601564
Coupler socket (NW5) made of brass (single-hand use) with inside thread G1/4“

GDZ-13
Art. no. 601566
Increaser/reducer made of brass with G1/2“ outside thread and G1/8“ inside thread

GDZ-14
Art. no. 601568
Screw-in nozzle for 6/4 tube with outside thread G1/8“

GDZ-15
Art. no. 601570
Screw-in nozzle for tube with 6 mm inside-Ø with outside thread G1/4“

GDZ-16
Art. no. 601572
Screw-in nozzle for 6/4 tube with outside thread G1/4“

GDZ-17
Art. no. 601574
Screw-in connection for 6/4 tube with outside thread G1/4“

GDZ-18
Art. no. 601576
Tube clamp for 6/4 tube

GDZ-19
Art. no. 601578
Tube clamp for 8/6 tube (8 mm outside-Ø and 6 mm inside-Ø)

GDZ-20
Art. no. 601580
Screw-on connection made of brass for 6/4 tube with inside thread G1/4“

GDZ-21
Art. no. 601582
T-piece for 6/4 tubes

GDZ-22
Art. no. 601584
Coupling adapter (NW5) made of brass with tube connection 6/4 (suitable for GDZ-12)

GDZ-23
Art. no. 601586
Adapter G1/2“ Innen auf G1/4“ Außen, aus Messing

GDZ-27
Art. no. 601594
Manometer profile gasket (thickness 3mm, Cu) for G1/4" hread

GDZ-28
Art. no. 601597
Flat gasket (thickness 5 mm, Cu) for thread G1/2“

GDZ-29
Art. no. 601599
Filter-Membrane incl. Luer-Locks (GDZ-32 and GDZ-33)

GDZ-30
Art. no. 601601
Adapter G1/2“ inside thread to tube 6/4 (w/o picture)

GDZ-31
Art. no. 606070
Silicone tube 8/5 (8 mm outer / 5 mm inner) (2 bar at 23 °C) temperature-resistant up to 200 °C, very flexible (figure similar to GDZ-04)

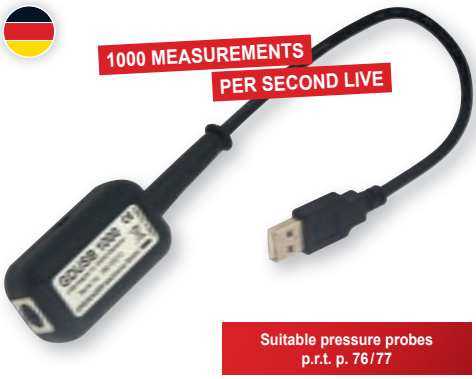
GDZ-32
Art. no. 607951
Luer-lock male to hose 6/4

GDZ-33
Art. no. 607952
Luer-lock female to hose 6/4

GWA 1214
Art. no. 603979
Adapter G1/2“ inside thread to G1/4“ outside thread (without picture)

GOG-N
Art. no. 603047
needle, Ø 0.9 mm - suitable to Luer-Lock male (5 pieces) (without picture)

Universal pressure measurement system



Suitable pressure probes p.r.t. p. 76/77

HIGHLIGHTS:

- *complete package incl. software for up-to-date Windows systems*
- *live display before and live diagram display*

GDUSB 1000

Art. no. 600271
Full set incl. software for high-speed live measurement data logging GDUSB FastView (p.r.t. page 98)

Applications:

- Test rigs and laboratory experiments
- Detection of pressure peaks
- Monitoring system pressure curves e.g. for process technology, engineering, etc.
- Live and offline displaying of measuring data of several GDUSB 1000 e.g. for data evaluation and logging, for optimization of processes and other statistics
- Multi-channel measurements with high recoding rate
- Test setups or on-site recordings with GDUSB 1000

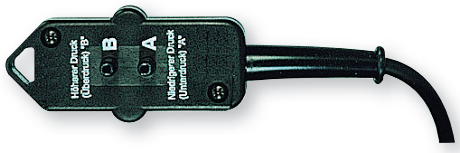
Functions:

The GDUSB 1000 adapter allows to connect a standard pressure sensor of type GMSD / MSD directly to the USB interface of a PC. It provides 4 channels, i.e. currently measured value, average value, max and min value. There are two operation modes:
Fast mode:
A GDUSB 1000 in fast mode can output up to 1000 measured values per second. The provided software displays the data and records for later usage. The software can be configured to start or stop the recording with several selectable trigger conditions
Standard mode:
A GDUSB 1000 in standard mode can be responded similarly to GMH handheld devices or EASYBus modules (up to 32 measurements per second). Then a long term recording can be archived with the software EBS 20M / EBS 60M (2 measurements per second).

Specifications:

Measuring ranges:	depends on connected sensor
Max. range:	-19999 ... +19999 digit
Pressure units:	mbar, bar, Pa, kPa, MPa, mmHg, PSI, mH_2O, selectable, depending on connected sensor
Measuring rate:	1000 measurements / s (= 1 ms)
Accuracy:	±0.2 % FS (at nominal temperature = 25 °C)
Recording interval:	1 ms (FAST mode) ... 10 s, adjustable via software
Connections	
PC:	standard USB plug (type A)
GMSD/MSD:	6-pole screened mini-DIN socket with locking
Power supply:	supplied by USB interface
Dimensions:	56 x 31 x 24 mm
Cable length (USB):	approx. 20 cm

Plastic pressure sensors with tube connection



FOR AIR AND NON AGGRESSIVE GASES

General:
for use with **GMH 31xx, GDUSB:** type GMSD ... -K31, **GMH 51xx:** type GMSD ... - K51

Application:
air and non aggressive gases *Plastic pressure sensors are not suitable for water / liquids.*

Sensors for measuring pressure difference

for differential pressure measuring (both pressures are connected) as well as for relative pressure measuring (pressure / vacuum, one terminal is left open)

	GMSD 2,5 MR ..	GMSD 25 MR ..	GMSD 350 MR ..	GMSD 2 BR ..	GMSD 10 BR ..
Measuring range:	-1.999 ... +2.500 mbar	-19.99 ... +25.00 mbar	-199.9 ... +350.0 mbar	-1000 ... +2000 mbar	-1.00 ... +10.00 bar
Overload:	max. 200 mbar	max. 300 mbar	max. 1 bar	max. 4 bar	max. 10.34 bar
Resolution:	0.001 mbar (0.1 Pa)	0.01 mbar (1 Pa)	0.1 mbar	1 mbar	10 mbar
Accuracy (typ.)					
Hysteresis / linearity:	± 0.2 % FS	± 0.2 % FS	± 0.2 % FS	± 0.2 % FS	± 0.2 % FS
temperature influence (from 0 - 50 °C)	± 1.0 % FS	± 0.5 % FS	± 0.4 % FS	± 0.4 % FS	± 0.4 % FS
OPTION Higher probe accuracy:			±0.1 % / ±0.2 % FS	±0.1 % / ±0.2 % FS	±0.1 % / ±0.2 % FS
GMSD ... - K31 *Art. no.*	*601039*	*601148*	*601154*	*601170*	*601183*
GMSD ... - K51 *Art. no.*	*601038*	*601149*	*601157*	*601171*	*601184*

Absolute pressure sensors

for absolut pressure measuring (one terminal is without functionality)

	GMSD 1,3 BA ..	GMSD 2 BA ..	GMSD 7 BA ..
Measuring range:	0 ... 1300 mbar abs.	0 ... 2000 mbar abs.	0.00 ... 7.00 bar abs.
Overload:	max. 4 bar abs.	max. 4 bar abs.	max. 10,34 bar abs.
Resolution:	1 mbar	1 mbar	10 mbar
Accuracy (typ.)			
Hysteresis / linearity:	± 0.2 % FS	± 0.2 % FS	± 0.2 % FS
Temperature influence (from 0 - 50 °C)	± 0.4 % FS	± 0.4 % FS	± 0.4 % FS
OPTION Higher probe accuracy:	±0.1 % FS (hysteresis.. linearity); ±0.2 % FS (temperature influence 0 ... 50 °C)		
GMSD ... - K31 *Art. no.*	*601192*	*601196*	*601200*
GMSD ... - K51 *Art. no.*	*601193*	*601197*	*601201*

Specifications:	
Sensor:	piezoresistive pressure sensor
Pressure connection:	2 connection pins for tubes 6 x 1 mm (6 mm inside-Ø and 4 mm outside-Ø)
Electronics:	PC board with amplifier and data memory for sensor data (measuring range / calibration etc.) integrated in sensor housing
Working temperature:	0 ... +50 °C
Relative humidity:	0 ... +95 % RH (non condensing)
Storage temperature:	-25 ... +70 °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 connection pin: 68 x 32.5 x 27.5 mm.
Weight:	approx. 75 g (...-K51: approx. 82 g)
Device connection:	
GMSD ... - K31: **GMSD ... - ex:**	1.2 m PVC connection cable, screened with integral 6-pin Mini-DIN-plug, lockable
GMSD ... - K51:	1 m PVC connection cable, screened with 7-pin bayonet plug

Options:
Ex-protection
Higher probe accuracy by multi point calibration Additional individual linearisation points are stored in sensor memory. (not possible for GMSD 2,5 MR and GMSD 25 MR!)
ISO-WPD5 *Art. no. 602514* Certificate of calibration: 5 points ascending, 5 points descending

Stainless steel pressure sensors

FOR AIR, AGGRESSIVE GASES AND LIQUIDS

Follow-on type für GMSD-stainless-steel-sensors

MSD...

Stainless steel pressure sensors without cable
Connection cable MSD-K31 or MSD-K51 has to be ordered separatly (accessories)

General:

for use with GMH31xx, GMH 51xx and GDUSB 1000

Application:

Air, aggressive gases, aggressive liquids / water, etc.

Abs. pressure	Measuring range	Overload	Resolution
MSD 1 BAE *Art. no. 600583*	0 ... 1000 mbar abs.	max. 5 bar abs.	1 mbar
MSD 2,5 BAE *Art. no. 600585*	0 ... 2500 mbar abs.	max. 10 bar abs.	1 mbar
MSD 4 BAE *Art. no. 600587*	0 ... 4000 mbar abs.	max. 17 bar abs.	1 mbar
MSD 6 BAE *Art. no. 600592*	0 ... 6000 mbar abs.	max. 35 bar abs.	1 mbar
MSD 10 BAE *Art. no. 600594*	0 ... 10.00 bar abs.	max. 35 bar abs.	10 mbar
MSD 16 BAE *Art. no. 600596*	0 ... 16.00 bar abs.	max. 80 bar abs.	10 mbar
MSD 25 BAE *Art. no. 600598*	0 ... 25.00 bar abs.	max. 50 bar abs.	10 mbar
Rel. pressure	**Measuring range**	**Overload**	**Resolution**
MSD 100 MRE *Art. no. 600600*	0.0 ... 100.0 mbar rel.	max. 1 bar rel.	0.1 mbar
MSD 250 MRE *Art. no. 600604*	0.0 ... 250.0 mbar rel.	max. 2 bar rel.	0.1 mbar
MSD 400 MRE *Art. no. 600606*	0.0 ... 400.0 mbar rel.	max. 2 bar rel.	0.1 mbar
MSD -1/1.5 BRE *Art. no. 600608*	-1000 ... +1500 mbar rel.	max. 10 bar rel.	1 mbar
MSD -1/3 BRE *Art. no. 600610*	-1000 ... +3000 mbar rel.	max. 17 bar rel.	1 mbar
MSD 1 BRE *Art. no. 600612*	0 ... 1000 mbar rel.	max. 5 bar rel.	1 mbar
MSD 2,5 BRE *Art. no. 600614*	0 ... 2500 mbar rel.	max. 10 bar rel.	1 mbar
MSD 4 BRE *Art. no. 600616*	0 ... 4000 mbar rel.	max. 17 bar rel.	1 mbar
MSD 6 BRE *Art. no. 600618*	0 ... 6000 mbar rel.	max. 35 bar rel.	1 mbar
MSD 10 BRE *Art. no. 600620*	0.00 ... 10.00 bar rel.	max. 35 bar rel.	10 mbar
MSD 25 BRE *Art. no. 600622*	0.00 ... 25.00 bar rel.	max. 50 bar rel.	10 mbar
MSD 40 BRE *Art. no. 600624*	0.00 ... 40.00 bar rel.	max. 80 bar rel.	10 mbar
MSD 60 BRE *Art. no. 600627*	0.00 ... 60.00 bar rel.	max. 120 bar rel.	10 mbar
MSD 100 BRE *Art. no. 600629*	0.0 ... 100.0 bar rel.	max. 200 bar rel.	0.1 bar
MSD 160 BRE *Art. no. 600631*	0.0 ... 160.0 bar rel.	max. 320 bar rel.	0.1 bar
MSD 250 BRE *Art. no. 600639*	0.0 ... 250.0 bar rel.	max. 500 bar rel.	0.1 bar
MSD 400 BRE *Art. no. 600633*	0.0 ... 400.0 bar rel.	max. 800 bar rel.	0.1 bar
MSD 600 BRE *Art. no. 600635*	0.0 ... 600.0 bar rel.	max. 1200 bar rel.	0.1 bar
MSD 1000 BRE *Art. no. 600637*	0 ... 1000 bar rel.	max. 1500 bar rel.	1 bar

MSD 25 MRE
MSD -20/60 MRE

not suited for aggressive media, water, etc., no Ex design and no option „higher accuracy“ available

Rel. pressure	Measuring range	Overload	Resolution
MSD 25 MRE *Art. no. 606904*	0.00 ... 25.00 mbar	max. 500 mbar	0.01 mbar
MSD -20/60 MRE *Art. no. 606765*	-20.00 ... +60.00 mbar	max. 500 mbar	0.01 mbar

Specifications:

Sensor:	stainless steel pressure sensor (parts coming into contact with media). Suitable for aggressive media, water, etc.. (does not apply to MSD 25 MRE and MSD -20/60 MRE)
Accuracy: (typ. values)	±0.2 % FS (hysteresis and linearity) ±0.02 % FS / K (TC for zero or slope)
Electronics:	PC board with amplifier and data memory for sensor data (meas. range, etc.) integrated in sensor housing, sealed sensor electronic
Reaction time:	1 ms
Medium temperature:	-25 ... +100 °C (compensated range: 0 ... 80 °C); -25 ... +80 °C at MSD 25 MRE and MSD -20/60 MRE
Working conditions:	-20 ... +80 °C
Storage temperature:	-40 ... +80 °C
Pressure connection:	connection thread G1/2B (other on request).
Cable connection:	M16 built-in plug
Housing:	CrNi-steel or elgiloy (parts coming into contact with media) length: 88.5 mm, Ø 27 mm, approx. 220 g
Protection class:	IP 67 (sensor)
Scope of supply:	pressure sensor, manual; **Note: Connection cable has to be ordered separatly.**

Options:

Higher probe accuracy
by multi point calibration. Additional individual linearisation points are stored in sensor memory. (not available for MSD 25 MRE and MSD -20/60 MRE)

ISO-WPD5
Art. no. 602514
Certificate of calibration: 5 points ascending, 5 points descending

Accessories:

MSD-K31
Art. no. 600657
Connection cable for use with GMH 31xx / GDUSB 1000
1.2 m PVC connection cable, screened with integral 6-pin Mini-DIN-plug and M16-socket (IP 54)

MSD-K51
Art. no. 603809
Connection cable for use with GMH 51xx
1 m PVC connection cable, screened with 7-pin bayonet plug cabel and plug connection water proof acc. to IP 67 and M16-socket

MSD-K31-xx
Longer connection cable (as MSD-K31); Length 2 ... 10 m please specify

MSD-K51-xx
Longer connection cable (as MSD-K51); Length 2 ... 10 m please specify

Ex-Protection:

MSD ... - ex
Stainless steel pressure sensor (without cable) with Ex-protection

MSD-K31 - ex
Art. no. 600871
Connection cable with Ex-protection
Connection to GMH 31xx, 1 m onnection cable, screened with integral 6-pin Mini-DIN-plug and M12-socket

A series of hand-held measuring devices with integrated sensor

HIGHLIGHTS:

- *integrated pressure sensor*
- *sturdy metal connection pin*
- *tare function / zero point offset*
- *model with Ex protection available*

ADDITIONAL FEATURES GMH 3181-...:

ALARM LOGG

Type specific data:	GMH 3161 - ...	GMH 3181 - ...	GMH 3161 - ... -EX	GMH 3181 - ... -EX
Display:	2 x 4½-digit LCD	2 x 4½-digit LCD	2 x 4½-digit LCD	2 x 4½-digit LCD
Sensor:	piezoresistive differential pressure sensor internally built into the instrument. Suitable for air and non-aggressive gases. *(Note: Not suited for water!)*			
Pressure connection:	2 pressure port for universal 6 x 1 mm (4 mm hose inside diameter) or 8 x 1 mm (6 mm hose inside diameter) plastic tubing			
Output:	interface	interface or AAG	interface *	interface or AAG*
serial interface:	x	x	x	x
analog output:	--	0 ... 1 V, freely adjustable (resolution 12 bit)	--	0 ... 1 V, freely adjustable (resolution 12 bit)
Power supply:	9 V-battery, d.c. connector	9 V-battery, d.c. connector	9 V-battery, d.c. connector *	9 V-battery, d.c. connector *
	suitable 9 V-battery, d.c. connector for external 10.5 ... 12 V direct voltage supply. (suitable power supply: GNG10/3000)			
Sensor adjustment:	digital offset and scale input	digital offset and scale input	digital offset and scale input	digital offset and scale input
Peak value memory:	--	≥1 ms	--	≥1 ms
Measuring cycle: „slow“	4 measurements / s	4 measurements / s	4 measurements / s	4 measurements / s
„fast“ (with filter)	--	≥1000 measurements / s	--	≥1000 measurements / s
„peak-detect“	--	≥1000 measurements / s The min- / max- value memory stored unfiltered pressure peaks ≥1 ms.	--	≥1000 measurements / s The min- / max- value memory stored unfiltered pressure peaks ≥1 ms.
Averaging function:	--	x	--	x
Battery life:	approx. 500 h	approx. 500 h (slow mode) approx. 120 h (fast = 1000 Hz)	approx. 500 h	approx. 500 h (slow mode) approx. 120 h (fast = 1000 Hz)
Working condition:	-25 ... +50 °C, 0 ... +95 % RH (non-condensing)		-10 ... +50 °C, 0 ... 95 % RH (non-condensing)	
Housing:	142 x 71 x 26 mm (without pressure connection pin - pin approx. 11 mm protruding at front side of device), impact-resistant ABS plastic housing. Integrated pop-up clip for table top or suspended use.			
Weight:	approx. 165 g	approx. 170 g	approx. 205 g (incl. leather case)	approx. 210 g (incl. leather case)
Scope of supply:	Device, battery, manual	Device, battery, manual	Device, battery, manual	Device, battery, manual

* Please refer to note to Ex-design types (p. 73)

Additional functions:

Serial interface: direct connection to RS232 or USB interface of a PC via electrically isolated interface adapter GRS 3100, GRS 3105 or USB 3100 N.

GMH 3181:
Low power logger mode: (only in measuring cycle „slow“) Only one measurement carried out at the end of the respective logger cycle. The battery life is considerably prolonged. For long-term recordings (e.g. leaktest).
Averaging function: integrates the meas. values during a selectable period of time and then calculates the average display value.
Controlling function: with the help of the switching module GAM3000 (optionally) electric equipment can be switched on/off or alarm monitored (see accessories)
LoggerFunctions:
- manual: 99 data sets
- cyclic: 10000 data sets (max. 64 recording sequences), adjustable cycle time: 1 ... 3600 s

Note to the pressure unit selection: (information for all GMH31xx)
The choice of a specific pressure unit is possible, if its whole measuring range is displayable within the display of the device and the sensor is supporting these resolution.

Finest manometer / manometer for over / under pressure and pressure difference

GMH 3161-002
Art. no. 600469
Gerät -500,0 ... +500,0 Pa (±500,0 Pa*2)

GMH 3181-002
Art. no. 600470
Gerät -500,0 ... +500,0 Pa (±500,0 Pa*2), Logger

GMH 3161-002-EX
Art. no. 606685
Device type with Ex-protection

GMH 3181-002-EX
Art. no. 609063
Device type with Ex-protection

Specifications:	
Measuring range:	-500.0 ... +500.0 Pa (-5.000 ... +5.000 mbar)
Overload:	max. 250 hPa (mbar)
Resolution:	0.1 Pa (0.001 mbar)
Additional pressure units:	kPa, PSI, mmHg, mH_2O
Accuracy: (typ. values)	
Hysteresis and linearity: 0.3 % FS	
Temperature-influence from 0 - 50 °C: 0.4 % FS	
Option higher accuracy available: no	
Pressure connection: 2	

For type specific data please refer to page 78.
**1 measuring range possible by changing the pressure connection ports*
**2 without changing the pressure connection ports*

Special design type:

Ex-protection (Ex II 2 G Ex ib IIC T4 Gb)
Device type with Ex-protection

GMH 3161-01
Art. no. 600397
Device -100 ... 2500 Pa (±2500 Pa *1)

GMH 3181-01
Art. no. 600411
Device -100 ... 2500 Pa (± 2500 Pa *1), Logger

GMH 3161-07H
Art. no. 600405
Device -1.00 ... 70.00 mbar (± 70.00 mbar *1)

GMH 3181-07H
Art. no. 600417
Device -1.00 ... 70.00 mbar (± 70.00 mbar *1), Logger

GMH 3161-01-EX
Art. no. 607458
Device type with Ex-protection

GMH 3181-01-EX
Art. no. 600796
Device type with Ex-protection

GMH 3161-07H-EX
Art. no. 610042
Device type with Ex-protection

GMH 3181-07H-EX
Art. no. 604074
Device type with Ex-protection

Specifications:	... - 01	... - 07H
Measuring range:	-100 ... 2500 Pa (-1.00 ... 25.00 mbar)	-1.00 ... +70.00 mbar
Overload:	max. 100 mbar	max. 1000 mbar
Resolution:	1 Pa (0.01 mbar)	0.01 mbar
additional pressure units:	bar, kPa, PSI, mmHg, mH_2O	bar, Pa, kPa, PSI, mmHg, mH_2O
Accuracy (typ. values)		
Hysteresis and linearity:	±0.3 % FS	±0.1 % FS
temperature-influence from 0 - 50 °C:	±0.4 % FS	±0.4 % FS
Option higher accuracy available:	no	already integrated
Pressure connection: 2		

For type specific data please refer to page 78.
**1 measuring range possible by changing the pressure connection ports*

GMH 3161-07
Art. no. 600400
Device -10.0 ... +350.0 mbar (±350.0 mbar *1)

GMH 3181-07
Art. no. 600413
Device -10.0 ... +350.0 mbar (±350.0 mbar *1), Logger

GMH 3161-07B
Art. no. 600402
Device -10.0 ... 420.0 mbar (-7.5 ... 315.0 mmHg)

GMH 3181-07B
Art. no. 600415
Device -10.0 ... 420.0 mbar (-7.5 ... 315.0 mmHg), Logger

GMH 3161-07-EX
Art. no. 604435
Device type with Ex-protection

GMH 3181-07-EX
Art. no. 601386
Device type with Ex-protection

GMH 3161-07B-EX
Art. no. 609064
Device type with Ex-protection

GMH 3181-07B-EX
Art. no. 604724
Device type with Ex-protection

Specifications:	... - 07	... - 07B
Measuring range:	-10.0 ... +350.0 mbar	-10.0 ... +420.0 mbar (-7.5 ... 315.0 mmHg)
Overload:	max. 1 bar	max. 1 bar
Resolution:	0.1 mbar	0.1 mbar (0.1 mmHg)
Additional pressure units:	bar, kPa, MPa, PSI, mmHg, mH_2O	bar, kPa, MPa, PSI, mH_2O
Accuracy: (typ. values)		
Hysteresis and linearity:	±0.2 % FS (±0.1 % FS)*3	±0.1 % FS
Temperature-influence from 0 - 50 °C:	±0.4 % FS	±0.4 % FS
Option higher accuracy available:	yes	already integrated
Pressure connection: 2		

For type specific data please refer to page 78.
**1 measuring range possible by changing the pressure connection ports*
**2 without changing the pressure connection ports*
**3 Option higher accuracy*

Manometer for over/under pressure and pressure difference.

GMH 3161-13
Art. no. 600409
Device -100 ... 2000 mbar (± 2000 mbar *1)

GMH 3181-13
Art. no. 600421
Device -100 ... 2000 mbar (± 2000 mbar *1), with data logger

GMH 3161-13-EX
Art. no. 600647
Device type with Ex-protection

GMH 3181-13-EX
Art. no. 602263
Device type with Ex-protection

Specifications:	
Measuring range:	-100 ... 2000 mbar (optional: -1000 ... 2000 mbar)
Overload:	max. 4 bar
Resolution:	1 mbar
additional pressure units:	bar, kPa, MPa, PSI, mmHg, mH_2O
Accuracy: (typ. values)	
hysteresis and linearity: ±0.2 % FS	
temperature-influence from 0 - 50 °C: ±0.4 % FS	
Option higher accuracy available: yes	
Pressure connection: 2	

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

For type specific data please refer to page 78.
**1 measuring range possible by changing the pressure connection ports*
**2 without changing the pressure connection ports*
**3 Option higher accuracy*

Vakuum- or Barometer

FOR ABSOLUTE PRESSURE MEASUREMENT

GMH 3161-12
Art. no. 600407
Device 0 ... 1300 mbar abs.

GMH 3181-12
Art. no. 600419
Device 0 ... 1300 mbar abs., with data logger

GMH 3161-12-EX
Art. no. 610043
Device type with Ex-protection

GMH 3181-12-EX
Art. no. 610044
Device type with Ex-protection

Specifications:	
Measuring range:	0 ... 1300 mbar abs.
Overload:	max. 4 bar abs.
Resolution:	1 mbar
Pressure units:	mbar, bar, kPa, MPa, PSI, mmHg, mH_2O
Accuracy: (typ. values)	
Hysteresis and linearity: ±0.2 % FS; (±0.1 % FS)*3	
Temperature-influence from 0 - 50 °C: ±0.4 % FS	
Option higher accuracy available: ja	
Pressure connection: 1	

Special function:
SeaLevel-Korrektur:
The barometric air pressure can also be related to sea level „zero“. (Correction of air pressure is achieved by entering m above „zero“)

For type specific data please refer to page 78.

**3 Option higher accuracy*

Special design type:
Ex-protection (Ex II 2 G Ex ib IIC T4 Gb)
Device type with Ex-protection

Complete Solutions

GMH 3161-07-WPD5
Art. no. 602684
Complete Solution incl. certificate of calibration ISO-WPD5 (5 points ascending / descending) and case GKK 3000.

GMH 3161-12-WPD5
Art. no. 602685
Complete Solution incl. certificate of calibration ISO-WPD5 (5 points ascending / descending) and case GKK 3000.

GMH 3161-13-WPD5
Art. no. 602686
Complete Solution incl. certificate of calibration ISO-WPD5 (5 points ascending / descending) and case GKK 3000.

Accessories

Options:

Higher sensor accuracy
by multi point calibration
Note: not possible for all device types!

ISO-WPD5
Art. no. 602514
ISO Certificate of calibration: 5 points increase, 5 points decrease.

ISO-WPD10
Art. no. 602565
ISO Certificate of calibration: 10 points increase, 10 points decrease.

Accessories and spare parts:

GNG 10/3000
Art. no. 600273
plug-in power supply

GRS 3100
Art. no. 601097
interface converter, RS232, electrically isolated

USB 3100 N
Art. no. 601092
interface converter, USB, electrically isolated

GDZ-01
Art. no. 601541
PVC-tube (5 bar) 6/4 (6 mm outside-Ø, 4 mm inside-Ø)

GDZ-08
Art. no. 601555
Double adapter for 6/4 tube to 6/4 tube

GDZ-18
Art. no. 601576
tube clamp for 6/4 tube

GDZ-21
Art. no. 601582
T-piece for 6/4 tubes

GKK 3000
Art. no. 601048
case (275 x 229 x 83 mm) with cut-outs for GMH3xxx

for miscellaneous accessories p.r.t. page 75

Fine manometer

FOR OVER/UNDER PRESSURE OR PRESSURE DIFFERENCE

GDH 200-07

Art. no. 601254

0.00 ... 19.99 / 199.9 mbar (±199.9 mbar)*1

Functions:

- Differential and relative pressure measurement
- Autorange
- Excellent zero point stabilisation
- Manual slope adjustment
- 4 selectable measuring units: Pa, mbar, mmHg, PSI
- automatic off-function: 1 ... 120 min

Specifications:

Measuring range:	0.00 ... 19.99 or 20.0 ... 199.9 mbar (hPa) 0.00 ... 19.99 or 20.0 ... 150.0 mmHg 0.000 ... 1.999 PSI / 0 ... 1999 Pa
Resolution:	automatic change 0.1 / 0.01
Overload:	max. 500 mbar
Accuracy: (at nominal temperature = 25 °C and automatic zero point-adjustment)	
Measuring range: up to 200 mbar	±0.2 % f.s. hysteresis and linearity, ±0.4 % f.s. temperature drift from 0 ... 50 °C
Measuring range: up to 20 mbar	±1 % f.s. hysteresis and linearity ±2 % f.s. temperature drift from 0 ... 50 °C
Sensor:	piezoresistive relative pressure sensor
Pressure connection:	2 pressure port sockets made of nickel-plated brass, for pressure tubings 6 x 1 mm (4 mm inner-diameter)
Working temperature:	-25 ... +50 °C, 0 ... 95 % RH (non-condensing)
Display:	3½ digit LCD display, approx. 13 mm high
Pushbuttons:	3 membrane keys
Power supply:	9 V battery
Battery life:	approx. 1200 h
Housing:	impact resistant ABS plastic housing, approx. 106 x 67 x 30 mm (H x W x D) +11 mm pressure port sockets
Weight:	approx. 135 g (incl. battery)
Zero point-adjustment:	automatically
Slope-adjustment:	manually
Scope of supply:	Device, battery, manual

**1 measuring range possible by changing the pressure connection ports*

Tubes, clamps, adapters, accessories, etc. p.r.t. page 78

Manometer

FOR OVER/UNDER PRESSURE OR PRESSURE DIFFERENCE

GDH 200-13

Art. no. 601256

0.0 ... 199.9 / 1999 mbar (±1999 mbar) *1

Functions:

- Differential and relative pressure measurement
- Autorange
- Excellent zero point stabilisation
- Manual slope adjustment
- 3 selectable measuring units: mbar, mmHg, PSI
- automatic off-function: 1 ... 120 min

Specifications:

Measuring range:	0.0 ... 199.9 or 200 ... 1999 mbar (hPa) 0.0 ... 199.9 or 200 ... 1500 mmHg 0.00 ... 19.99 PSI
Resolution:	automatic change 1 / 0.1
Overload:	max. 4000 mbar
Accuracy: (at nominal temperature = 25 °C and automatic zero point-adjustment)	
Measuring range: up to 2000 mbar	±0.2 % f.s. hysteresis and linearity ±0.4 % f.s. temperature drift from 0 ... 50 °C
Measuring range: up to 200 mbar	±1 % f.s. hysteresis and linearity ±2 % f.s. temperature drift from 0 ... 50 °C
Sensor:	piezoresistive relative pressure sensor
Pressure connection:	2 pressure port sockets made of nickel-plated brass, for pressure tubings 6 x 1 mm (4 mm inner-diameter).
Working temperature:	-25 ... +50 °C, 0 ... 95 % RH (non-condensing)
Display:	3½ digit LCD display, approx. 13 mm high
Pushbuttons:	3 membrane keys
Power supply:	9 V battery
Battery life:	approx. 1200 h
Housing:	impact resistant ABS plastic housing, approx. 106 x 67 x 30 mm (H x W x D) +11 mm pressure port sockets
Weight:	approx. 135 g (incl. battery)
Zero point-adjustment:	automatically
Slope-adjustment:	manually
Scope of supply:	Device, battery, manual

**1 measuring range possible by changing the pressure connection ports*

Tubes, clamps, adapters, accessories, etc. p.r.t. page 78

Vakuum- / Barometer or Manometer

FOR ABSOLUTE PRESSURE

GDH 200-14

Art. no. 601258

0 ... 11000 mbar abs.

Functions:

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

Specifications:

Measuring range:	0 ... 11000 mbar (hPa) abs. 0 ... 8250 mmHg abs. 0.000 ... 11.000 bar abs. 0.00 ...160.00 PSI abs.
Resolution:	1 mbar, 1 mmHg, 0,001 bar, 0.02 PSI
Overload:	max. 13 bar abs.
Accuracy: (at nominal temperature = 25 °C)	± 3 mbar or 0.10 % of m.v. (whichever is higher) ± 0.3 % f.s. temperature drift from 0 ... 50 °C
Sensor:	piezoresistive absolute pressure sensor
Pressure connection:	pressure port socket made of nickel-plated brass, for pressure tubings 6 x 1 mm (4 mm inner-diameter)
Working temperature:	-25 ... 50 °C, 0 ... 95 % RH (non-condensing)
Display:	4½ digit LCD display, approx. 12 mm high
Pushbuttons:	3 membrane keys
Power supply:	9 V battery
Battery life:	approx. 7500 h
Sea level correction:	Barometric values can be converted to sea level (therefore the input of the current altitude is needed).
Housing:	impact resistant ABS plastic housing, approx. 106 x 67 x 30 mm (H x W x D) +11 mm pressure port sockets
Weight:	approx. 135 g (incl. battery)
Zero point-adjustment:	manually
Slope-adjustment:	manually
Scope of supply:	Device, battery, manual

Tubes, clamps, adapters, accessories, etc. p.r.t. page 78

Barometer

Altimeter / Barometer / Thermometer / Precision barometer

FOR PROFESSIONAL USAGE IN MEASUREMENT TECHNOLOGY AS WELL AS IN SPARE TIME SPORTS

GPB 3300

Art. no. 600129
300.0 ... 1100.0 mbar abs.

Functions:

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

Specifications:

Measuring ranges:	300.0 ... 1100.0 mbar (hPa) abs. 225.0 ... 825.0 mmHg abs.
Max. Overload:	4000 mbar or 3000 mmHg
Accuracy: (at nominal temperature)	± 2.0 mbar (typ. at 0 - 50 °C)
Sensor:	piezoresistive abs. pressure sensor integrated in housing.
Nominal temperature:	25 °C
Operating temperature:	-25 ... 50 °C, 0 ... 95 % RH (non-condensing)
Display:	4½-digit, 12 mm high LCD-display
Pushbuttons:	3 membrane key for ON/OFF, min-/max-value memory, tara, etc.
Power supply:	9 V battery
Battery life:	approx. 5000 h
Zero point-adjustment:	manually
Slopeadjustment:	manually
Sea level correction:	Barometric values can be converted to sea level (therefore the input of the current altitude is needed).
Housing:	impact resistant ABS housing
Dimensions:	approx. 106 x 67 x 30 mm (H x W x D)
Weight:	approx. 135 g (incl. battery)
Scope of supply:	Device, battery, manual

Accessories and spare parts:

GKK 252
Art. no. 601056
small case (235 x 185 x 48 mm) with foam lining

GB 9 V
Art. no. 601115
spare battery

GTD 1100

Art. no. 600132
300.0 ... 1100.0 mbar abs. + Altimeter

General:

Device for simple determination of a building size (steeples, skyscrapers, bridges, etc.)

Application:

hiking, hang gliding, cycling, motorsports, etc.

Specifications:

Measuring ranges	
Temperature:	-10.0 ... +50.0 °C, or 14.0 ... +122.0 °F,
Pressure:	300.0 ... 1100.0 mbar abs. or 225.0 ... 825.0 mmHg abs.
High:	-500 ... -200 m, res. 1 m or -1640 ... -655 ft, res. ~5 ft -200 ... 2000 m, res. 0.5 m or -654 ... 1999 ft, res. ~2 ft 2000 ... 9000 m, res. 1 m or 2000 ... 19999 ft, res. ~5 ft
Measuring units:	hPa / mbar, mmHg, °C, °F, m, ft
Max. Overload:	pressure: 4000 mbar or 3000 mmHg
Accuracy: (at nominal temperature = 25 °C)	
Temperature:	±1 % FS ±1 digit
Absolute pressure:	±1.5 mbar ±1 digit (750 ... 1100 mbar), with certificate of calibration: ±0.5 mbar ±1 digit
Sensor:	absolute pressure sensor, integrated in housing.
Operating conditions:	-10 ... +50 °C; 0 ... 80 % RH (non condensing)
Storage temperature:	-20 ... +70 °C
measuring frequency:	1 measuring / s
Display:	approx. 12 mm high, 4½-digit LCD-display
Sum function:	The covered altitude can be displayed (ascent, descent, total)
Tendency indicator (for barometer):	Air pressure rising/falling
Sea level correction:	Barometric values can be converted to sea level (therefore the input of the current altitude is needed).
Pushbuttons:	keypad (3 push-buttons) for On/off, min/max-value, tara-function, zero-, slope-,and sea level-adjustment slide switch for unit selection.
Power supply:	9 V battery
Battery life:	approx. 6.000 h
System Notifications:	permanent self-diagnosis and error indication.
Housing:	impact resistant ABS housing
Dimensions:	approx. 106 x 67 x 30 mm (H x W x D)
Weight:	approx. 135 g (incl. battery)
Scope of supply:	Device, battery, manual

Functions:

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

Accessories and spare parts:

GB 9 V
Art. no. 601115
Spare battery

ISO-WPD 5
Art. no. 602514
5 points rising, 5 points falling

GKK 252
Art. no. 601056
Small case (235 x 185 x 48 mm) with foam lining

calibration certificate, p.r.t. page 7

Integrating sound level meter

NEW!

HIGHLIGHTS:

- *Acoustic normative IEC61672, IEC 61260, IEC61094-4*

HD-2010-UC-1

Art. no. 700060
Integrating sound level meter

General:

HD-2010-UC-1 is an integrating portable sound level meter performing statistical analysis. The instrument has been designed combining maximum low cost and simplicity of use. Attention has been paid to the possibility of adjusting the instrument and adding options at any time to the HD-2010-UC-1 so to extend its applications. The user can upgrade the firmware directly by means of the Noise Studio programme supplied with the instrument. HD-2010-UC-1 is equipped with a backlit graphic display.

Anwendungsbereiche:

- Assessment of the environmental noise level
- Optional "advanced data logging"
- Optional capture and analysis of sound events
- Statistical analysis with the calculation of 3 percentile level and optional full statistical analysis
- Noise monitoring ("Advanced data logger" option required)
- Identification of impulsive noises
- Measurements in workplaces (Analysis of the noise and vibrations exposure)
- Selection of personal protective equipment (SNR and HML methods)
- Production quality control
- Measurement of machine noise, sound power measurements
- Vehicles noise emission

With HD-2010-UC-1 sound level meter it is possible to measure the sound pressure level by programming 3 parameters with the possibility of freely selecting the frequency weightings and the time constants. The measured sound levels can be recorded in the large non-volatile memory in order to be transferred to a PC using the supplied Noise Studio software package.
The class 1 HD-2010-UC-1 sound level meter with the "Advanced Data Logger" option is suitable for performing noise monitoring and acoustic mapping and, also assessments of the acoustic climate with capture and analysis of sound events function. When measuring traffic noise in the proximity of airports, railways and roads, the sound level meter can be used as a multi-parameter sound recorder, combining statistical analyzer features. Remote electrical calibrations and diagnostic tests can be executed by using its remote control capabilities.

Specifications:

½" Microphone:	UC52 free field, pre-polarized, condenser type
Dynamic range:	30 dBA ... 143 dB Peak
Linearity range:	80 dB
Acoustic Parameters:	Spl, L_{eq}, L_{eq}I, SEL, $L_{EP,d}$, L_{max}, L_{min}, L_{pk}, Dose, L_n
Frequency Weightings:	simultaneous A, C, Z (only C and Z for L_{pk})
Time Weightings:	simultaneous FAST, SLOW, IMPULSE
Integration:	from 1 s ... 99 h with erasing function (Back-Erase)
Statistical Analysis:	It displays up to 3 percentile levels, from L_1 to L_{99} Probability distribution and percentile level calculation from L_1 to L_{99} • Parameter: L_{Fp}, L_{eq}, L_{pk} weighted A, C or Z (only C or Z for L_{pk}) • Sampling frequency: 8 samples/s • Classification: Classes of 0.5 dB
Display:	Graphic LCD backlit display 128 x 64 • 3 parameters in numeric format
Memory:	• 4 MB internal, memory for more than 500 records.
Input / Output:	• RS232 serial and USB interfaces • AC output (LINE) • DC output
PC Programs:	Noise Studio (provided with the instrument): PC interface for data download, set up and instrument management. Licensed software modules to be enabled by hardware key. • NS4 "Monitor" module. PC based real time acquisition. Synchronized audio recording. Remote monitoring and data capture. Remote connection also via Modem. The program allows programming of measurements and calibrations with timer and performs events audio recording with programmable triggers levels.
Operating conditions:	• Working temperature -10 ... 50 °C, 25 ... 90 % RH (without condensation), 65 ... 108 kPa. Protection degree: IP64
Power Supply:	• 4 alkaline or rechargeable NiMH type AA batteries or external 9 ... 12 V DC 300 mA
Dimension:	445 x 100 x 50 mm equipped with preamplifier (H x W x D)
Scope of supply:	Class 1 sound level meter HD-2010-UC-1, HD2010PNE2 preamplifier, UC52/1 free field prepolarized microphone, windscreen, USB connection cable. Noise Studio PC software, carrying case and paper instruction manual. Supplied with DAkkS individual calibration Certification, according to IEC 61672.

NECESSARY ACCESSORY:
HD-2020
Art. no. 700062
Class 1 sound calibrator (p.r.t. page 84)

Accessories:

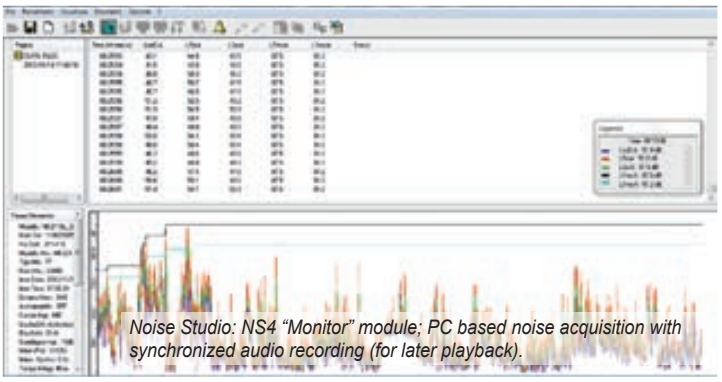
HD-2110-USB
Art. no. 700038
serial USB cable for PC connection.

SWD-10
Art. no. 700039
Stabilized mains power supply V_{in}=100 ... 230 V AC / V_{out}=12 V DC / 1000 mA.

CPA/10
Art. no. 700061
10 m microphone extension cable

HD-40-1
Art. no. 700056
Portable thermal serial printer with 57 mm paper rolls equipped with SWD-10 power supply

HD2110-RS
Art. no. 700057
M12 - 9-pole D Sub connectors cable for connecting the printer to instruments with M12 connector



Noise Studio: NS4 "Monitor" module; PC based noise acquisition with synchronized audio recording (for later playback).

Noise Studio NS4

Monitor' module (in scope of supply)

General:

This software module allows to control the sound level meter with PC in remote location. The main features are:
- Real time display of acquired data, in graphical and tabular form
- Possibility to remotely connect to the sound level meter via modem
- Acquisition of sound level data directly into the mass memory of the PC (monitor function)
- Management of diagnostic and calibration functions
- Automatic acquisition and monitoring programme
- Possibility to log synchronized audio along with the sound level meter measurements, by using the easy trigger function

IMPORTANT INFORMATION:
Device supply with calibration certificate. Customer must be specified when ordering.

Acoustic calibrator

HD-2020

HIGHLIGHTS:

- *The 1000 Hz frequency allows calibrating sound level meters with any weighting*
- *Independent of atmospheric pressure*
- *The 114 dB sound level allows performing calibrations even in high background noise environments*
- *Simple to use*

HD-2020

Art. no. 700062
Acoustic calibrator

General:

The HD-2020 sound level calibrator is a portable, battery operated sound source, suitable for sound level meters (portable and laboratory) and acoustic stations. It allows calibrating ½" microphones with mechanical dimensions. The calibration pressure levels of 94 dB and 114 dB can be selected by the keypad. If the microphone is absent or not inserted correctly into the calibrator cavity, the sound level will blink on the display. The clock/calendar allows you to set the number of years and months of validity of the calibration from the date of adjusting: at the expiration time, an appropriate symbol flashes on the display.

Specifications:

Coupling cavity:	for standard 1/2" microphones (12.7 ±0.03 mm) according to IEC 61094-1 and IEC 61094-4
Frequency:	1000 Hz
Frequency tolerance:	1 % in the range -10 ... +50 °C and 10 ... 90 % RH
Sound pressure level:	94.0 dB and 114.0 dB ±0.2 dB at 1 kHz (referred to 101.3 kPa, 23 °C ±3 °C and 65 % RH)
Reference conditions:	20 °C, 50 % RH, 101.3 kPa, 10 mm³ cartridge volume
Stabilization time:	10 s
Total distortion:	<1 %
Ambient condition influence	
Temperature and humidity influence:	<0.3 dB in the range -10 ... +50 °C and 10 ... 90 % RH
Static pressure influence:	<0.1 dB in the range 65 ... 108 kPa
Operating conditions	
Working temperature:	-10 ... +50 °C
Relative humidity:	≤90 % RH
Storage temperature:	-25 … +70 °C
Microphone equivalent volume:	5 ... 250 mm
Power supply:	9 V alkaline battery IEC type 6LR61. 9 V rechargeable batteries are also allowed.
9 V battery autonomy:	48-hour continuous functioning with good quality alkaline batteries.

Display:	3½ LCD, battery symbol
Watch/date-indicator:	internal with 3 V lithium buffer battery
Case material:	ABS
Dimensions:	83 x 43 x 53 mm (H x W x D)
IP Protection degree:	IP64
Effects of electro-magnetic fields:	<0.3 dB
Scope of supply:	HD-2020 calibrator, 1x 9 V alkaline battery, instruction manual. ACCREDIA individual calibration certification included.

IMPORTANT INFORMATION:
Device supply with calibration certificate. Custome must be specified when ordering.

Photo-radiometer

ILLUMINANCE, LUMINANCE
PHOTONS FLOW
UVA-, UVB-, UVC-IRRADIANCE
IRRADIANCE IN SPECTRAL BAND OF BLUE LIGHT
GLOBAL SOLAR RADIATION

HIGHLIGHTS:

- *Measurement of many different light values*
- *Wide range of sensors*

HD-2302-0

Art. no. 700063
Photo-radiometer

General:

The HD-2302-0 is a portable instrument with a large LCD display. It measures illuminance, luminance, PAR and irradiance (across VIS-NIR, UVA, UVB and UVC spectral regions or measurement of irradiance effective according to the UV action curve). The probes are equipped with the SICRAM automatic detection module: in addition to detection, the unit of measurement selection is also automatic. The factory calibration data are already memorized inside the instruments.

Application:

For museum and not destructive testing, for tanning/aestethic centers, photovoltaic and aging chamber

Specifications:

Instrument	
Dimensions:	140 x 88 x 38 mm (H x W x D)
Materials:	ABS
Display:	2 x 4½ digits plus symbols - 52 x 42 mm (visible area)
Operating conditions	
Operating temperature:	-5 ... +50 °C
Storage temperature:	-25 ... +65 °C
Working relative humidity:	0 ... 90 % RH without condensation
Protection degree:	IP67
Power	
Batteries:	3 1.5 V type AA batteries
Autonomy:	200 h with 1800 mAh alkaline batteries
Power absorbed with the instrument off:	20 µA
Measuring unit:	lux – fcd – µmol/m²·s – cd/m² – W/m² – µW/cm² – µW/lumen
Connections:	Input module for the probes 8-pole male DIN45326 connector
Scope of supply:	Instrument HD-2302-0, 3 1.5 V alkaline batteries, operating manual, case. ***The probes must be ordered separately.***

Accessories:

LP471-PHOT
LP471-LUM2
LP471-PAR
LP471-UVA
LP471-UVB
LP471-UVC
LP471-P-A
LP471 BLUE
LP SILICON-PYRA

Specification see following pages

ILLUMINANCE

LP-471-PHOT

Art. no. 700064
Probe for the measure of Illuminance

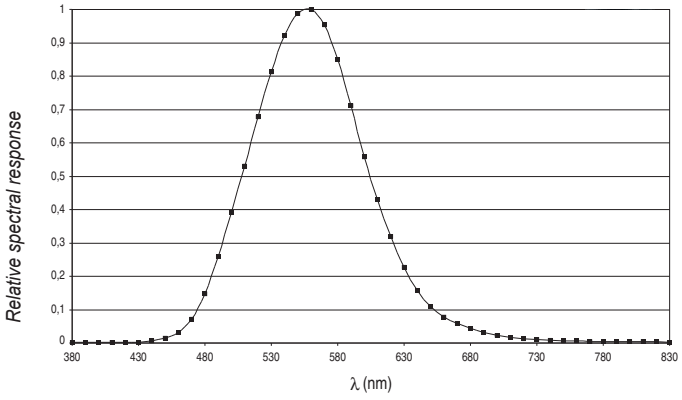
Application:

Special light control for jewelers works to apply local regulation, Escape and traffic routes workplaces and stations

Specifications:

Measuring range (lux):	0.10…199.99	…1.999.9	…19.999	…199.99·10³
Resolution (lux):	0.01	0.1	1	0.01·10³
Spectral range:	in agreement with standard photopic curve V(λ)			
α (temp. coefficient) f_6 (T):	<0.05 % K			
Calibration uncertainty:	<4 %			
f'₁ (in agreement with photopic response V(λ)):	<6 %			
f_2 (response according to the cosine law):	<3 %			
f_3 (linearity):	<1 %			
f_4 (instrument reading error):	<0.5 %			
f_5 (fatigue):	<0.5 %			
Class:	B			
Working temperature:	0 ... 50 °C			

Typical response curve: LP-471-PHOT



photometric and radiometric probes

HIGHLIGHTS:

- *Photosysthesis activity, radiation (PAR) measure, langley radiation measurement*

LP-471-LUM 2

Art. no. 700065

Probe for the measure of Luminance

General:

Spectral response according to the photopic curve, angular field 2°.
Measuring range: 1.0 cd/m² ... 2000·10³ cd/m².

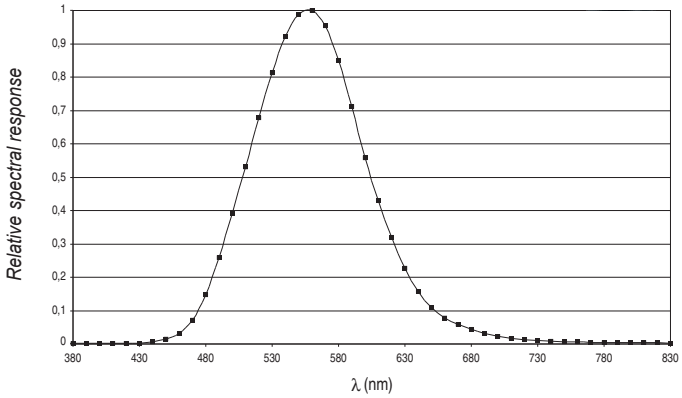
Application:

Sensor measures luminance like a human eye, e. g. monitors and lamps, etc. Diaphanoscop, X Ray plates reader, PC monitors light radiations and reflection by white surfaces

Specifications:

Measuring range (cd/m²):	1.0 ... 1.999.9	... 19.999	... 199.99·10³	... 1999.9·10³
Resolution (cd/m²):	0.1	1	0.01·10³	0.1·10³
Optical angle:	2°			
Spectral range:	in agreement with standard photopic curve V(λ)			
α (temp. coefficient) f_6 (T):	<0.05 % K			
Calibration uncertainty:	<5 %			
f'$_1$ (in agreement with photopic response V(λ)):	<8 %			
f_3 (linearity):	<1 %			
f_4 (instrument reading error):	<0.5 %			
f_5 (fatigue):	<0.5 %			
Class:	C			
Drift after 1 year:	<1 %			
Working temperature:	0 ... 50 °C			
Reference Standards:	CIE n.69 - UNI 11142			

Typical response curve: LP-471-LUM 2



LP-471-PAR

Art. no. 700066

Quantum radiometric probe

General:

For measuring the photons flow in the chlorophyll field PAR (Photosynthetically Active Radiation 400 ... 700 nm), µmol m⁻²s⁻¹ measure, cosine correction diffuser.
Measuring range 0.10 µmol m⁻²s⁻¹ ... 10·10³ µmol m⁻²s⁻¹

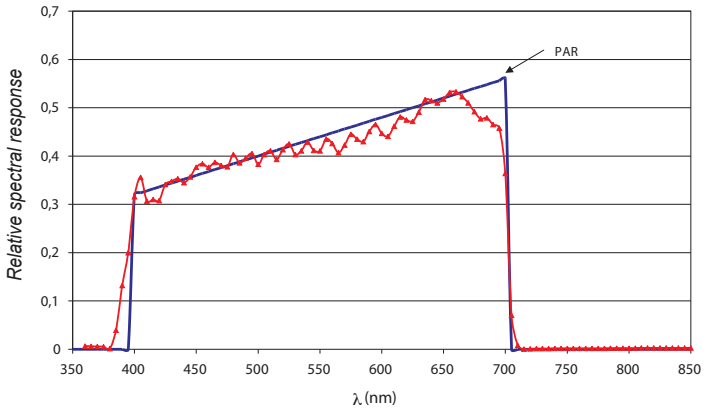
Application:

Plants, agriculture, greenhouses

Specifications:

Measuring range (µmol·m⁻²s⁻¹):	0.10 ... 199.99	200.0 ... 1999.9	2000 ... 10000
Resolution (µmol·m⁻²s⁻¹):	0.01	0.1	1
Spectral range:	400 ... 700 nm		
Calibration uncertainty:	<5 %		
f_2 (response according to the cosine law):	<6 %		
f_3 (linearity):	<1 %		
f_4 (instrument reading error):	±1 digit		
f_5 (fatigue):	<0.5 %		
Drift after 1 year:	<1 %		
Working temperature:	0 ... 50 °C		

Typical response curve: LP-471-PAR



photometric and radiometric probes

HIGHLIGHTS:

- *Control of UV lamps in cosmetic tanning systems*
- *To check the control of cosmetic tanning systems*

UVA IRRADIANCE

LP-471-UVA

Art. no. 700067

Probe for the measure of UVA irradiance

General:

Radiometric probe for measuring the irradiance in the UVA spectral range 315 ... 400 nm, peak at 360 nm, quartz diffuser for cosine correction. Measuring range: $1.0 \cdot 10^{-3}$ W/m² ... 2000 W/m².

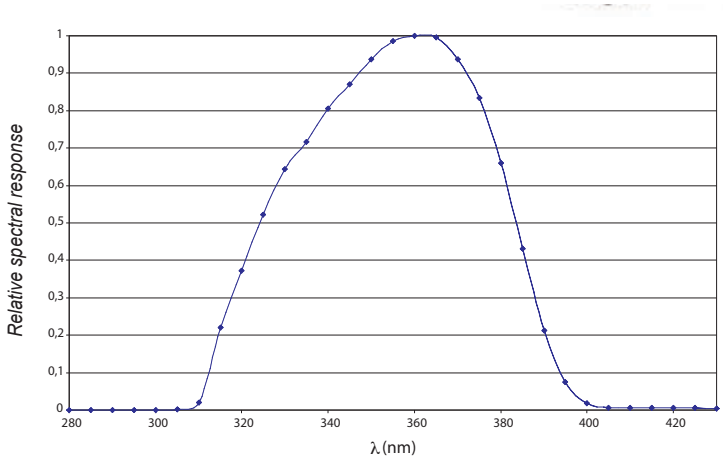
Application:

Timing Light to ward off eye problems. For casting and welding control, Polymerization of varnishes, resins, adhesives

Specifications:

Measuring range (W/m²):	$1.0 \cdot 10^{-3}$ ... $999.9 \cdot 10^{-3}$ 1.000 ... 19.999 20.00 ... 199.99 200.0 ... 1.999.9
Auflösung (W/m²):	$0.1 \cdot 10^{-3}$ 0.001 0.01 0.1
Spectral range:	315 ... 400 nm (Peak 360 nm)
Calibration uncertainty:	<5 %
f_3 (linearity):	<1 %
f_4 (instrument reading error):	±1 digit
f_5 (fatigue):	<0.5 %
Drift after 1 year:	<2 %
Working temperature:	0 ... 50 °C

Typical response curve: LP-471-UVA



HIGHLIGHTS:

- *Psoriasis light treatment by UVB lamps*

UVB IRRADIANCE

LP-471-UVB

Art. no. 700068

Probe for the measure of UVB irradiance

General:

Radiometric probe for measuring the irradiance in the UVB spectral range 280 ... 315 nm, peak at 305 ... 310 nm, quartz diffuser for cosine correction. Measuring range: $1.0 \cdot 10^{-3}$ W/m² ... 2000 W/m².

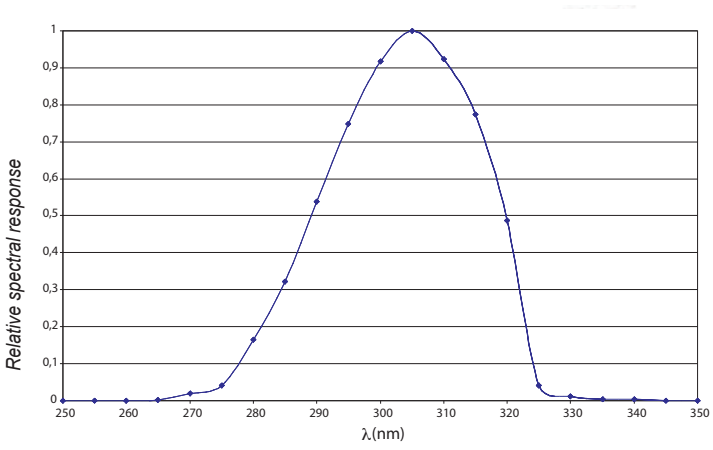
Application:

Polymerization of varnishes, resins, adhesives. Quality control by UV Lamps. For Offset and lithography & electronic, Casting and welding control, Timing light to ward off eye problems

Specifications:

Measuring range (W/m²):	$1.0 \cdot 10^{-3}$ ... $999.9 \cdot 10^{-3}$ 1.000 ... 19.999 20.00 ... 199.99 200.0 ... 1.999.9
Resolution (W/m²):	$0.1 \cdot 10^{-3}$ 0.001 0.01 0.1
Spectral range:	280 ... 315 nm (Peak 305 nm ... 310 nm)
Calibration uncertainty:	<5 %
f_3 (linearity):	<2 %
f_4 (instrument reading error):	±1 digit
f_5 (fatigue):	<0.5 %
Drift after 1 year:	<2 %
Working temperature:	0 ... 50 °C

Typical response curve: LP-471-UVB



photometric and radiometric probes

UVC IRRADIANCE

HIGHLIGHTS:

- *Control of UV Lamps during pasteurization, air and water sterilization*

IRRADIANCE IN SPECTRAL BAND OF BLUE LIGHT

LP-471-UVC

Art. no. 700069

Probe for the measure of UVC irradiance

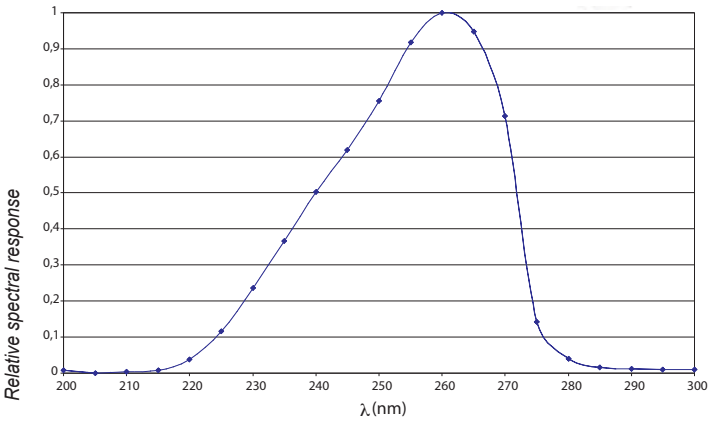
General:

For measuring in the UVC spectral range 220 ... 280 nm, peak at 260 nm, quartz diffuser for cosine correction.
Measuring range: $1.0 \cdot 10^{-3}$ W/m² … 2000 W/m².

Specifications:

Measuring range (W/m²):	$1.0 \cdot 10^{-3}$ ... $999.9 \cdot 10^{-3}$ 1.000 ... 19.999 20.00 ... 199.99 200.0 ... 1.999.9
Resolution (W/m²):	$0.1 \cdot 10^{-3}$ 0.001 0.01 0.1
Spectral range:	220 ... 280 nm (Peak 260 nm)
Calibration uncertainty:	<5 %
f_3 (linearity):	<1 %
f_4 (instrument reading error):	±1 digit
f_5 (fatigue):	<0.5 %
Drift after 1 year:	<2 %
Working temperature:	0 ... 50 °C

Typical response curve: LP-471-UVC



LP-471-BLUE

Art. no. 700070

Probe for the measure of irradiance in spectral band of blue light

General:

The radiometric probe LP471-BLUE measures irradiance (W/m²) in spectral band of blue light. The probe consists of a photodiode plus an appropriate filter and it is provided with diffuser for proper measure in accordance with the cosine law.

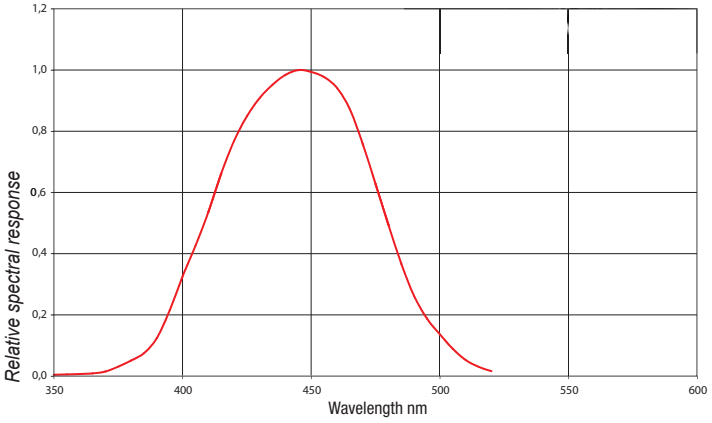
Application:

The spectral response curve of the probe allows to measure the radiation effective for damages caused by blue light (curve B(λ) according to the standards ACGIH / ICNIRP) in the spectral range from 380 ... 550 nm. The radiation optics in this portion of the spectrum can produce photochemical damage to the retina. Another field of application is the monitoring of the probe irradiance from blue light used in the treatment of neonatal jaundice.

Specifications:

Measuring range (W/m²):	$1.0 \cdot 10^{-3}$ ... $999.9 \cdot 10^{-3}$ 1.000 ... 19.999 20.00 ... 199.99 200.0 ... 1.999.9
Resolution (W/m²):	$0.1 \cdot 10^{-3}$ 0.001 0.01 0.01
Spectral range:	380 … 550 nm. Action curve for damages of Blue light B(λ)
Calibration uncertainty:	<10 %
f_2 (response according to the cosine law):	<6 %
f_3 (linearity):	<3 %
f_4 (instrument reading error):	±1 digit
f_5 (fatigue):	<0.5 %
Drift after 1 year:	<2 %
Working temperature:	0 ... 50 °C

Typical response curve: LP-471-BLUE



photometric and radiometric probes

HIGHLIGHTS:

- *Non destructive material measurement by ISO 3059:2001*

LP-471 P-A

Art. no. 700071

Combined probe LP 471 P-A with two sensors for the measure of illuminance and UVA irradiance

General:

Combined probe for measuring illuminance (lux), with standard photopic response, and irradiance (µW/cm²) in the UVA spectral range (315 ... 400 nm, with peak at 360 nm). Both the sensors are equipped with diffuser for the correction according to the cosine law.
Illuminance measuring range: 0.10 lux ... 200·10³ lux
Irradiance measuring range: 1.0 mW/m² ... 2000 W/m².
This probe provides the ratio between UVA irradiance and illuminance in µW/lumen (quantity of interest in museums). The probe is equipped with SICRAM module and cable 2 m long.

Application:

Museum (see regulation), Not Destructive Testing (see regulation). For casting and welding control, Museum object damage (CIE 157) for paper and wood safety.

Specifications Illuminance:

Measuring range (lux):	0.10…199.99	…1.999.9	…19.999	…199.99·10³
Resolution (lux):	0.01	0.1	1	0.01·10³
Spectral range:	in agreement with standard photopic curve V(λ)			
α (temp. coefficient) f_6 (T):	<0.05 % K			
Calibration uncertainty:	<4 %			
f'₁ (in agreement with photopic response V(λ)):	<6 %			
f_2 (response according to the cosine law):	<3 %			
f_3 (linearity):	<1 %			
f_4 (instrument reading error):	<0.5 %			
f_5 (fatigue):	<0.5 %			
Class:	B			
Drift after 1 year:	<1 %			
Working temperature:	0 ... 50 °C			
Reference Standards:	CIE n.69 - UNI 11142			

Please refer to the spectral response of the LP-471-PHOT probe

Specifications UVA Irradiance:

Measuring range (µW/cm²):	0.10…199.99	…1.999.9	…19.999	…199.99·10³
Resolution (µW/cm²):	0.01	0.1	1	0.01·10³
Spectral range:	315 ... 400 nm (Peak 360 nm)			
Calibration uncertainty:	<5 %			
f_2 (response according to the cosine law):	<6 %			
f_3 (linearity):	<1 %			
f_4 (instrument reading error):	±1 digit			
f_5 (fatigue):	<0.5 %			
Drift after 1 year:	<2 %			
Working temperature:	0 ... 50 °C			

Please refer to the spectral response of the LP-471-UVA probe

LP-SILICON-PYRA

Art. no. 700072

probe for the measure of global solar radiation

General:

Solarmeter with silicon photodiode for measuring the global solar irradiance, diffuser for cosine correction. Spectral range 400 ... 1100 nm.
Measuring range: 1.0·10⁻³ ... 2000 W/m². Fixed cable 5 m long, terminated with open wires.

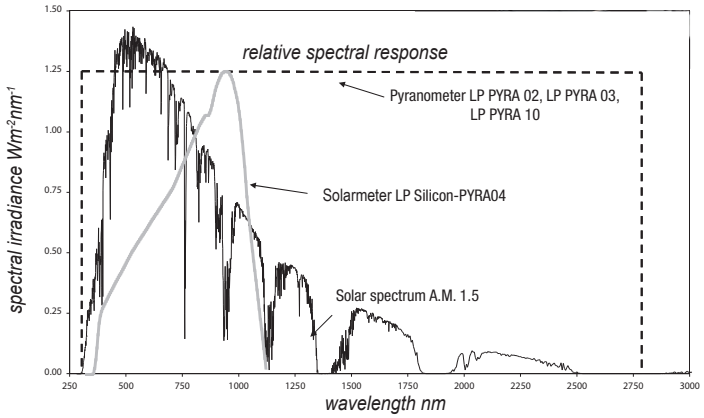
Application:

Private/Home photovoltaic panel efficiency control

Specifications:

Measuring range (W/m²):	1.0·10⁻³ ... 999.9·10⁻³ 20.00 ... 199.99	1.000 ... 19.999 200.0 ... 1.999.9		
Resolution (W/m²):	0.1·10⁻³	0.001	.01	0.01
Spectral range:	400 … 1100 nm			
Calibration uncertainty:	<3 %			
f_2 (response according to the cosine law):	<3 %			
f_3 (linearity):	<1 %			
f_4 (instrument reading error):	±1 digit			
f_5 (fatigue):	<0.5 %			
Drift after 1 year:	<2 %			
Working temperature:	0 ... 50 °C			

Typical response curve: LP-SILICON-PYRA



Thermo-Anemometer

HD-2303-0

Art. no. 700073

Thermo-Anemometer

General:

The HD-2303-0 is designed for use in the fields of air conditioning, heating, ventilation and environmental comfort. It uses hotwire or vane probes to measure air speed, flow rate, and temperature inside pipelines and vents. Temperature only is measured by immersion, penetration air or contact probes. The temperature sensor used can be chosen from the Pt100, Pt1000. The probes are equipped with the SICRAM module, with the factory calibration data stored inside.

Specifications:	
Instrument	
Dimensions:	140 x 88 x 38 mm (H x W x D)
Materials:	ABS
Display:	2 x 4½ digits plus symbols, Visible area: 52 x 42 mm
Operating conditions	
Operating temperature	-5 ... +50 °C
Storage temperature:	-25 ... +65 °C
Working relative humidity:	0 ... 90 % RH without condensation
Protection degree:	IP67
Power supply	
Batteries:	3 1.5 V type AA batteries
Autonomy:	200 h with 1800 mAh alkaline batteries
Power absorbed with instrument off:	< 20 µA
Measuring unit:	°C – °F – m/s – km/h – ft/min – mph – knot – l/s m^3/min – m^3/h – ft^3/s – ft^3/min
Connections	
Input module for the probes:	8-pole male DIN45326 connector
Measurement of temperature by Instrument	
Pt100 measurement range:	-200 ... +650 °C
Pt1000 measurement range:	-200 ... +650 °C
Resolution:	0.1 °C
Accuracy:	±0.1 °C
Scope of supply:	Instrument HD-2303-0, 3 1.5 V alkaline batteries, operating manual, case. ***Probes must be ordered separately.***

AP-471-S1

Art. no. 700074

AP-471-S2

Art. no. 700075

Wind speed measurement probes

Specifications:	AP-471-S1	AP-471-S2
Type of measure:	Air speed, calculated flow rate, air temperature	
Type of sensor		
Speed:	NTC thermistor	Omnidirectional NTC thermistor
Temperature:	NTC thermistor	NTC thermistor
Measurement range		
Speed:	0.1 ... 40 m/s	0.1 ... 5 m/s
Temperature:	-25 ... +80 °C	-25 ... +80 °C
Measurement resolution		
Speed:	0.01 m/s – 0.1 km/h – 1 ft/min – 0.1 mph – 0.1 knot	
Temperature:	0.1 °C	
Measurement accuracy		
Speed:	±0.2 m/s (0 ... 0.99 m/s) ±0.4 m/s (1.00 ... 9.99 m/s) ±0.8 m/s (10.00 ... 40.0 m/s)	±0.2 m/s (0 ... 0.99 m/s) ±0.3 m/s (1.00 ... 5.00 m/s)
Temperature:	±0.8 °C (-10 ... +80 °C)	±0.8 °C (-10 ... +80 °C)
Maximum speed:	0.1 m/s	
Air temperature compensation:	0 ... 80 °C	
Sensor working conditions:	Clean air, RH <80 %	
Battery life:	Approx. 20 hours @ 20 m/s with alkaline batteries	Approx. 30 hours @ 5 m/s with alkaline batteries
Unit of Measurement		
Speed:	m/s – km/h – ft/min – mph – knot	
Flow rate:	l/s - m^3/s - m^3/min - m^3/h - ft^3/s - ft^3/min	
Pipeline section for flow rate calculation:	0.0001 ... 1.9999 m^2	
Cable length:	~2 m	
Scope of supply:	Hot-wire telescopic probe	Omnidirectional hot-wire probe

AP-472-S2

Art. no. 700076

Vane probe

Specifications:	
Type of measure:	Air speed, calculated flow rate
Diameter:	60 mm
Type of measurement	
Speed:	Vane
Measurement range	
Speed (m/s):	0.5 ... 20
Temperature (°C):	-25 ... +80 (*)
Resolution	
Speed:	0.01 m/s - 0.1 km/h - 1 ft/min - 0.1 mph - 0.1 knot
Accuracy	
Speed:	±(0.4 m/s +1.5 % f.s.)
Maximum speed:	0.5 m/s
Unit of Measurement	
Speed:	m/s – km/h – ft/min – mph – knot
Flow:	rate l/s - m^3/s - m^3/min - m^3/h - ft^3/s - ft^3/min
Pipeline section for flow rate calculation:	0.0001 ... 1.9999 m^2
Cable length:	~2 m
Scope of supply:	Vane probe

(*) The indicated value refers to the vane's working range.

Phonometer

GSH 8922

Art. no. 602739

Phonometer

General:

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

Specifications:

Measuring ranges:	30 - 130 dB (6 ranges) 30 - 80, 40 - 90, 50 - 100, 60 - 110, 70 - 120, 80 - 130 dB manual or automatic selection of range
Resolution:	0.1 dB
Accuracy:	±1.5 dB
Norms:	ANSI S1.4 and IEC 651 Type 2
Frequency rate weighted:	31.5 Hz ... 8 kHz
Evaluation weight filter:	2, selectable
Type A:	evaluation of the spectrum in accordance with the perceptive faculties of the human ear. (Sound insolation establishment, environmental analysis)
Type C:	linear evaluation of spectrum (sonic-analysis of engines or machines)
Weight of time factor:	fast or slow
Microphone:	6 mm Electret condensator microphone
Display:	3½-digit LCD-backlight display, additionally quasi-analog bar graph
Analog output:	AC: 0.707 Vrms, DC: 10 mV DC / dB
Working temperature:	4 ... +50 °C
Relative humidity:	10 ... +90 % RH
Storage temperature:	-20 ... +60 °C
Interface:	RS232, (2400BD8N1)
Power supply:	9 V battery, external 9 V power supply
Operating time:	20 hours (with alkaline)
Housing:	256 x 80 x 38 mm (H x W x D)
Weight:	approx. 240 g (device)
Scope of supply:	Device with analog output, battery, case, manual

Rotation speed measuring device

VELOCITY AND LENGTH MEASUREMENT
VIA MEASURING WHEEL

rotaro 3

Art. no. 603861

Rotation speed measuring device via light and reflecting label or measuring tip

Application:

The handheld tachometer rotaro 3 is useful at the installation and setup of plants and machinery as well as for service application, monitoring production processes or use at development laboratory. The rotaro 3 can measure rotary speed of for example motors, turbines, pumps as well as stirring devices, centrifuges and haulage installations, foil or textile manufacturing units, coil and transformer winding machines, machine tools, etc. Furthermore it can measure running speed and length of foils and band of all kind.

Specifications:

Measuring range:	
rpm:	1.00 ... 99.999 min^{-1} (optical measurement) 1 ... 19.999 min^{-1} (mechanical measurement)
Velocity:	Ø 0.1 m: 0.10 ... 1999 m/min Ø 6“: 0.10 ... 1524 m/min (other units possible: m/sec, ft/min, in/min ...)
Length:	0 ... 99999 m / ft / in
Accuracy:	
rpm:	±0.02 % of m.v. (±1 digit)
Measuring distance:	max. 600 mm
Measuring principle:	optical / mechanical
Memory function:	min- / max- value memory, average and last value
Power-off:	automatically after 30 s
Display:	5-digit LCD display with 10 mm height of digits and floating point at range change
Power supply:	2 x AA battery or accumulator
Working temperature:	0 ... 50 °C
Storage temperature:	-20 ... +70 °C
Housing:	plastic ABS
Approval:	CE
Dimensions:	175 x 60 x 28 mm (H x W x D)
Weight:	250 g
Scope of supply:	Rotation speed measuring device incl. reflecting labels, measuring tip, hollow tip, measuring wheels (Ø 0.1 m and Ø 6“), extension shaft, calibration certificate, case, battery, manual

Rotation speed measuring device

VIA LIGHT AND
REFLECTING LABEL

ecotach

Art. no. 603673

Rotation speed measuring device via light and reflecting label

Application:

The handheld tachometer ecotach is useful at the installation and setup of plants and machinery as well as for service application, monitoring production processes or use at development laboratory. It can measure rotary speed of for example motors, turbines, pumps as well as stirring devices, centrifuges and haulage installations.

Specifications:

Measuring range:	1 ... 60.000 rpm
Accuracy:	±0.02 % of m.w. (±1 digit)
Measuring distance:	max. 450 mm
Measuring principle:	optical
Power-off:	automatically after 30 s
Display:	5-digit LCD display for measuring value with floating point, measuring unit, trigger signal, low-battery warning, notification when battery is low
Power supply:	2 x AA battery or accumulator
Working temperature:	0 ... 50 °C
Housing:	plastic ABS
Approval:	CE
Dimensions:	145 x 60 x 28 mm (H x W x D)
Weight:	147 g
Scope of supply:	Rotation speed measuring device incl. reflecting labels, transportation slip case, battery, manual

Handheld instruments - general accessories

Device case

GKK 3000

GKK 1105

GKK 3500

GKK 1420

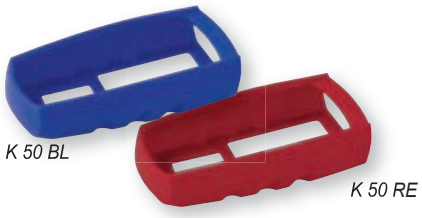
GKK 3000
Art. no. 601048
with punched lining for 1 device of the GMH 3xxx-series (275 x 229 x 83 mm)

GKK 1105
Art. no. 601050
with punched lining for 1 device of the GMH 3xxx- or 5xxx-series (340 x 275 x 83 mm)

GKK 3500
Art. no. 601052
with punched lining for 1 device of the GMH 3xxx- or 5xxx-series (394 x 294 x 106 mm)

GKK 1420
Art. no. 601054
with punched lining for 2 devices of the GMH 3xxx-series (450 x 360 x 123 mm)

Silicone protection cover



K 50 BL

K 50 RE

K 50 BL
Art. no. 601352
Silicone protection cover blue,
suitable for: GMH 5xxx, GMH 2710

K 50 RE
Art. no. 607456
Silicone protection cover red,
suitable for: GMH 5xxx, GMH 2710

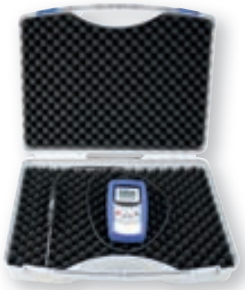
Universal case

GKK 252

GKK 3100

GKK 1100

GKK 3600



GKK 3700

GKK 252
Art. no. 601056
with foam lining for universal use
(235 x 185 x 48 mm)

GKK 3100
Art. no. 601058
with foam lining for universal use
(275 x 229 x 83 mm)

GKK 1100
Art. no. 601060
with foam lining for universal use
(340 x 275 x 83 mm)

GKK 3600
Art. no. 601062
with foam lining for universal use
(394 x 294 x 106 mm)

GKK 3700
Art. no. 601064
with foam lining for universal use
(450 x 360 x 123 mm)

Universal case

Color may vary.

GKK 4400

GKK 5240 with foam lining for individual adaption

GKK 4400
Art. no. 602067
robust case for up to 10 devices or accessories, foam for water analysis (closed cell structure), with bottle and electrode retainer.
Dimensions: 500 x 405 x 140 mm

GKK 5240
Art. no. 602068
robust case, suitable for universal applications due to possibility of individual adaption of its foam lining, pressure balance possible, water-protected.
Dimensions: 520 x 415 x 200 mm

Mount

GMH 1300

GEH 1 with probe

GMH 1300
Art. no. 601091
Magnetic mount for hanging up devices with integrated suspension clip

GEH 1
Art. no. 601089
Electrode retainer for measuring electrodes and probes suitable for our electrodes (pH/redox, conductivity, oxygen, ...) and temperature probes with plastic handle

Handheld instruments - general accessories

Protection bag

ST-R1 *ST-R2* *ST-KO* *ST-KF*

ST-R1
Art. no. 601066
Nappa leathern device protection bag with 1 round cut-out for sensor connection
suitable for:
GMH 3111, GMH 3151, GMH 3161-12, GMH 3181-12, GMH 3431, GMH 3451, GMH 3611, GMH 3651, GMH 3692, GMH 3710, GMH 3750, GMH 175

ST-R1-US
Art. no. 605929
Nappa leathern device protection bag with 1 round cut-out for sensor connection with strap

ST-R2
Art. no. 601068
Nappa leathern device protection bag with 2 round cut-outs for sensor connection
suitable for:
GMH 3156, GMH 3161-002, GMH 3161-01, GMH 3161-07, GMH 3161-13, GMH 3181-002, GMH 3181-01, GMH 3181-07, GMH 3181-13

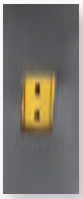
ST-R3
Art. no. 605931
Nappa leathern device protection bag with 2 round cut-outs for sensor connection
suitable for:
GMH 3511/31/51

ST-N1
Art. no. 601070
Nappa leathern device protection bag with 1 rectangular cut-out for sensor connection
suitable for:
GMH 3210, GMH 1150, GMH 1170

ST-N2
Art. no. 601072
Nappa leathern device protection bag with 2 rectangular cut-outs for sensor connection
suitable for:
GMH 3230, GMH 3250

ST-RN
Art. no. 601074
Nappa leathern device protection bag with 2 round cut-outs for sensor connection (1 x round, 1 x rectangular)
suitable for:
GMH 3330, GMH 3350, GMH 3831, GMH 3851

ST-KO
Art. no. 601078
device protection bag, without cutouts
suitable for:
GTD 1100, GPB 3300



ST-KN
Art. no. 601080
device protection bag with rectangular cut-out for sensor connection
suitable for:
GTH 1150, GTH 1170

ST-KR
Art. no. 601082
device protection bag with round cut-out (central)
suitable for:
GTH 175, GOX 20, GOX 100, GLF 100, GLF 100 RW

ST-KF
Art. no. 601084
device protection bag with punched-out slot for a sensor head
suitable for:
GFTH 95, GFTH 200, GFTB 200, GTH 200 air

ST-KD
Art. no. 601086
device protection bag with 2 round cut-outs
suitable for:
GDH 200-07, GDH 200-13, GDH 200-14, GMR 110

Devices and accessories are not included in scope of supply.

Remote operation

WLAN 3100 *LAN 3200*

LAN 3200
Art. no. 609253
Gigabit Ethernet to USB converter

General:
For inquiring EASYBus modules, GMH handheld devices with interface or GDUSB 1000 via network. 2 USB ports for direct connection of EBW 3, USB 3100 N or GDUSB 1000 (up to 15 with USB hub). Connection of EBW 1, EBW 64 or EBW 240 via USB adapter (included to scope of supply)
Accessories: LAN 3200, power supply unit, USB adapter, manual, driver CD

WLAN 3100
Art. no. 606061
Gigabit-Ethernet or Wireless-LAN to USB converter

General:
For accessing EASYBus modules, GMH handheld devices with interface or GDUSB 1000 via local network or via WiFi. With 2 USB ports for direct connection of one or more EBW 3, USB 3100N or GDUSB 1000 (up to 15 with an USB hub). With an USB to serial converter for connection of an EBW 1, EBW 64 or EBW 240.
Scope of delivery:
WLAN 3100, mains adapter, USB to serial converter, manual, CD

Portable thermal printer

HD-40-1
Art. no. 700056
Portable thermal printer that is connected to instruments or PC through the RS232 serial input.

Specifications:	
Printing method:	Thermal
Resolution:	203 DPI (8 dot / mm)
Printing speed:	Up to 90 mm/s (depending on battery charge and ambient conditions)
Dimensions:	53 x 165 x 105 mm (H x W x D)
Material:	ABS
Scope of supply:	Device, 4 x NiMH 1.2 V rechargeable batteries, SWD-10 power supply, manual, 5 thermal paper rolls

Accessories:

HD-2110-CSNM
RS232C 8-pole MiniDin - 9-pole D Sub female null-modem cable for connecting the printer to instruments with MiniDIN connector

HD-2110-RS
M12 - 9-pole D Sub connectors cable for connecting the printer to instruments with M12 connector

SWD-10
100 ... 240 V AC/12 V DC-1A Mains battery charger.

BAT-40-1
Spare battery pack for HD-40-1 printer with in-built temperature sensor.

RCT
The kit includes 4 thermal paper rolls 57 mm wide and 32 mm diameter.

Interface


USB 3100 N


USB 5200


GRS 3100


GRS 3105


USB Adapter

USB 3100 N
Art. no. 601092
nterface converter GMH 3xxx <=> PC, for electrically isolated connection of a GMH 3xxx to the USB-interface of your PC. (Converter supplying from PC interface)

USB 5100
Art. no. 601095
nterface converter GMH 5xxx <=> PC, for electrically isolated connection of a GMH 5xxx to the USB-interface of your PCs. (Converter supplying from PC interface)

USB 5200
Art. no. 607177
USB level converter for GMH 5000 Handheld Instruments (such as USB 5100). With additional analog output, can be set on the device.

GRS 3100
Art. no. 601097
Interface converter GMH 3xxx <=> PC for electrically isolated connection of a GMH 3xxx to the RS232-interface.

GRS 3105
Art. no. 601099
5-point interface converter GMH 3xxx <=> PC, connection of 5 GMH 3xxx to the RS232-interface of your PC. (Converter supply achieved via permanently connected power supply) Device delivered with 9-pin Dsub extension cable and 5 connection cables VEKA3105.

VEKA 3105
Art. no. 601103
Spare connection cable GMH 3xxx <=> GRS 3105

GSA 25S-9B
Art. no. 601105
Connection adapter (25-pin Dsub-adapter <=> 9-pin Dsub-socket)

GSA 9S-25B
Art. no. 601107
Connection adapter (9-pin Dsub-adapter <=> 25-pin Dsub-socket)

USB-Adapter
Art. no. 601109
for connection of a RS232-interface converter to the USB-interface

Switching modules

GAM 3000

GAM 3000
Art. no. 601132
Switching module for the GMH 3xxx-series with alarm

General:

The GAM 3000 is an alarm or control output for the devices of the GMH 3xxx-series with alarm output function. The GAM 3000 is controlled via the serial interface of the GMH 3xxx. The setting of the alarm/switching limits are carried out the GMH 3xxx as usual.
You can choose between 2 different switching modes:
- **Alarm output:** Relay switches when the measuring value is no longer within the min / max alarm limit values or an error state occurs at the set channel.
- **Control output:** In this case the min / max values are not used as alarm points but as on/off switching points. In case of an error state the relay switches in its preferred state "off".

The desired switching function can be selected via an externally accessible miniature switch.

Specifications:	
Power supply:	220 / 240 V, 50 / 60 Hz
Switching output:	controlled power socket, selector switch to choose switching state normally-open or normally-closed
Switching power:	10 A (ohmic load)
GMH-connection:	Interface connection and voltage supply are each connected with cable that is 1 m long which is permanently connected to the GAM 3000.
Dimensions:	(controller) 112 x 71 x 48 mm (H x W x D)

Power supply


GNG 10


GLG 1300

GB 9 V
Art. no. 601115
Spare battery 9 V, type IEC 6F22

GAK 9 V
Art. no. 601118
NiMH accu 9 V

AAA-AKKU
Art. no. 601121
AAA accu, 1.2 V, 2 pieces, NiMH accu

GLG 1300
Art. no. 601126
Rechargeable battery charger for two 9 V accus, AA- or AAA-batteries at the same time

GNG 10
Art. no. 600272
Plug-in power supply (220 / 240 V, 50 / 60 Hz), output voltage: 10.5 V / 10 mA, suitable for devices with 2.5 mm jack connector (e.g. for devices of the series GDH ...)

GNG 5 / 5000
Art. no. 602287
Plug-in power supply (220 / 240 V, 50 / 60 Hz), output voltage: 5 VDC, suitable for devices with BNC (e.g. for devices of the series GMH5xxx)

GNG 10 / 3000
Art. no. 600273
Plug-in power supply (220 / 240 V, 50 / 60 Hz), output voltage: 10.5 V / 10 mA, suitable for devices with power supply socket (e.g. for devices of the series GMH3xxx)

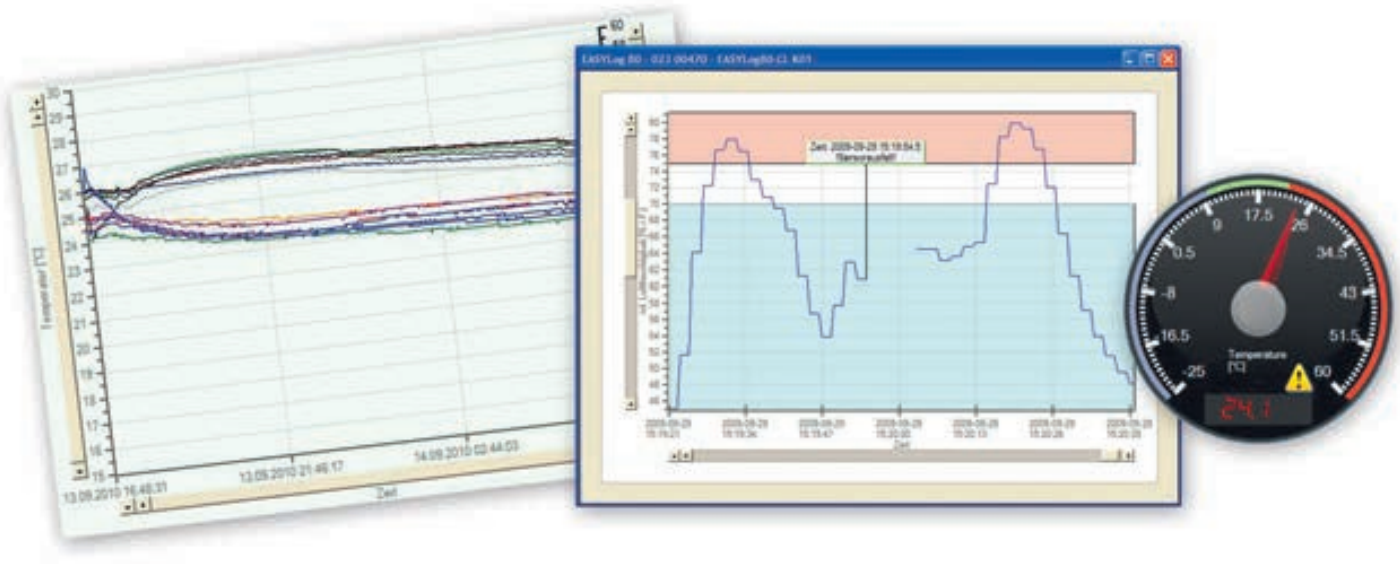
Plug and Cable

MINIDIN 4S
Art. no. 601111
Mini-DIN plug, 4-pin, with lock and for self installation

AAG2M
Art. no. 601112
2 m analog output cable for GMH3xxx-series, 2 x banana plug and 3.5 mm jack connector

AAG 5000
Art. no. 603871
Cable for analog output, with cable length 1 m, connectors: 1 x bayonet socket LTW 4-pole, 1 x loose ends, with ferrules
Application: GMH 5xxx.

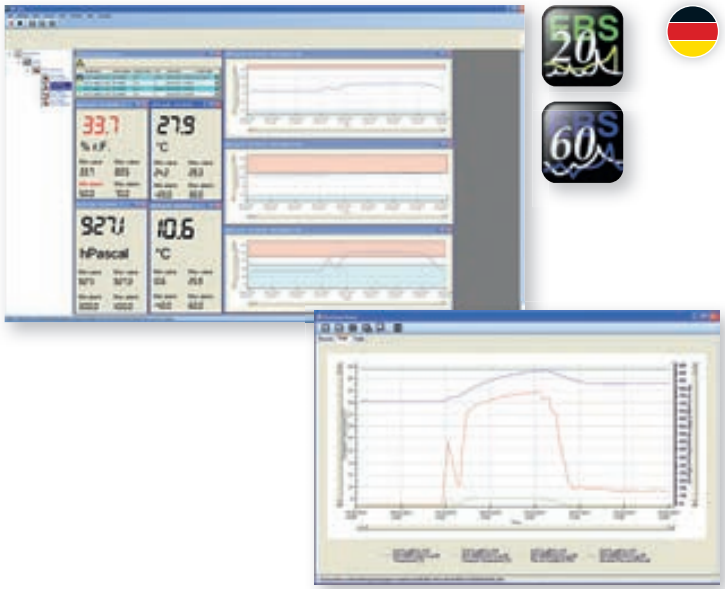
Software



Application:	EBS 20M EBS 60M	EASYControl net	GSOFT 3050	GSOFT 40k	MINISOFT (o. Abb)	EASYBus Configurator (o. Abb)	GDUSB FastView
GMH 3xxx and GMH 5xxx	●	●	●				
EASYBus and EASYLog	●	●		●		●	
T-Logg				●	●		
GDUSB 1000							●
Executable from / support from Windows	7	7	XP/7	XP/7	XP/7	7	7
Several interfaces usable at the same time	● *	● *					● ***
Live measuring value recoding and displaying	●	●					●
Number of data points (recommendation)	up to 1 Mio.	up to 1 Mio.					up to 1 Mio.
Stop logger and delete memory			●	●	●	●	
Read-out logger			●	●	●		
Change alarm boundaries		●		●	●	●	
Change correction (offset, slope)			●		●	●	
Change label		●		●	●	●	
Network compatible (Simultaneous access to data by several PCs)		●					
Access via SQL queries possible		●					
Pilot EBB Out		● **					
Subject to a charge	●	●	●	●			
Application	Lab, test rig	Long-term monitoring	Read-out data logger			Start-up	Lab, test rig

* GMH 3xxx/5xxx and EASYBus can be used simultaneously.
** Interface-spanning, alarm of GMH 3xxx/5xxx can be assigned to EBB-Out of EASYBus.
*** Recommended up to 5 GDUSB 1000 at full measuring speed, depending on CPU performance.

Software for measurement data acquisition



EASYBus - Software

EBS 20M

Art. no. 601158

20 Kanal Messdatenerfassung

EBS 60M

Art. no. 601160

60 Kanal Messdatenerfassung

General:

This software makes up a low-price and comfortable multi-channel acquisition program for measuring data. The program is suitable for recording, monitoring, visualization and documentation.
Simultaneous use of different serial Bus-Systems: EASYBus, GMH handheld devices, GDUSB 1000

Application:

- On-site recording
- Process and system control, monitoring of climate and buildings
- Real time monitoring of measuring data i.e for data evaluation and logging for cost listings, overview of consumption, optimisation of processes, and other statistics

Functions:

- Simultaneous use of several serial interfaces
- Simultaneous use of different serial converters
- Quick and easy installation and handling
- Freely scaleable diagrams and alarm limits
- Visualization of actual measurements values
- Trusted data storage via SQL database
- Data export

Measuring Cycle:

smallest possible measuring cycle: 500 ms

System requirements:

1GHz CPU, 1GB RAM, 100 MB HDD, 1 available USB Port
Microsoft Windows 7 SP1 (32 or 64 Bit)
(not executable with Windows RT, ARM or Intel Itanium based Windows systems)

EASYControl net

Art. no. 601152

Netzwerkfähige Messdatenerfassung

General:

This software allows cost-efficient network-compatible data logging and monitoring systems. The visualization can be done by any computer in the network. EASYBus as well as GHM hand-held instruments are supported at the same time.

Secured:

- User accounts (with secured password transmission).
- Stored data can't be modified or manipulated later

Live:

- Constantly updating data
- Time assignment of the data
- Load ancient data and complete them with „live" data

Peripheral:

- Uncoupling of data acquisition, data storage and visualisation
- Component communication via LAN
- Data visualisation by local network

Controlled:

- Trigger EBB Out switching channels via EASYBus

Clear:

- Different kinds of visualisation (table, digital, tachometer, chart)
- Display multiple graphs "live" in one chart
- Tooltips (with status information) for each measuring point in the chart
- Blinking symbols on error or status message in the visualisation
- Displaying error- and status messages.
- Displaying min- max- and mean value of the sensors
- Generate reports and store them as PDF, Excel or Word file

System requirements:

1GHz CPU, 1GB RAM, 100 MB HDD, 1 available USB Port
Microsoft Windows 7 SP1 (32 or 64 Bit)
(not executable with Windows RT, ARM or Intel Itanium based Windows systems)

Logger-Software

GSOFT 40K

Art. no. 601145

Windows-software for EASYLog and T-Logg with logger.

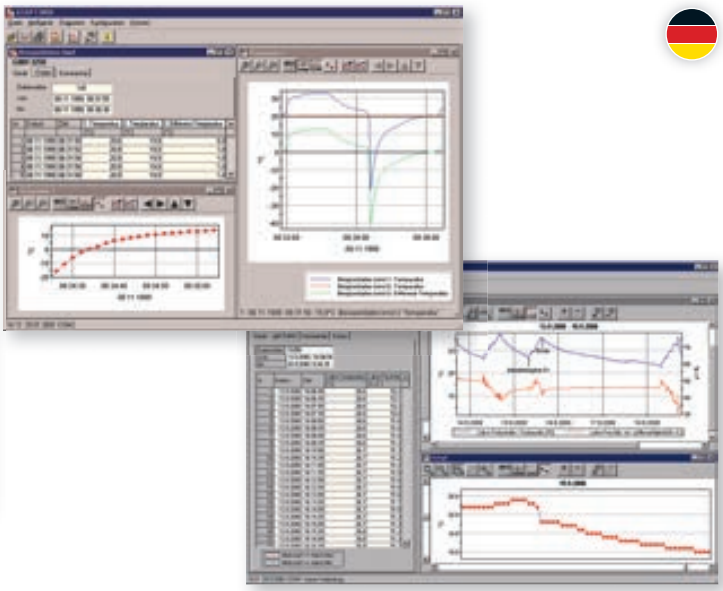
Functions:

- Display of the device status information
- Setting the alarm function
- Operation of the logger function
  - Start
  - Stop
  - Cycle time
  - Read data
  - Delete data
- Chart display
  - Various measuring sequences in one diagram
  - Real-time axis
  - Zoom function
  - Measurement points, legend and measurement cursor displayed or hidden
  - Add comments
  - Storing the window position
- Export function
  - Data export of series of measurements as a CSV file
- Print function
  - Print out the data as a table and/or trace
- Multilingual
  - German, English, Czech and French
- Automated retrieval and archiving
  - Readout of all connected data loggers to be fixed times
  - Automatic storage of measured values on the hard disk
  - Automatic export of measurement values as a CSV file
  - Automatic printout

System Requirements:

1 GHz CPU, 1 GB RAM, 100 MB HDD
Windows 7 SP 1 (32 or 64 Bit)
interface converter
for GMH 3000: GRS 3100, GRS 3105 or USB 3100 N
for GMH 5000: USB 5100
(executable from Windows XP, not executable with Windows RT, ARM or Intel Itanium based Windows systems)

Logger-Software



GSOFT 3050

Art. no. 601336

Windows-software for GMH3xxx- and GMH5xxx-series with logger.

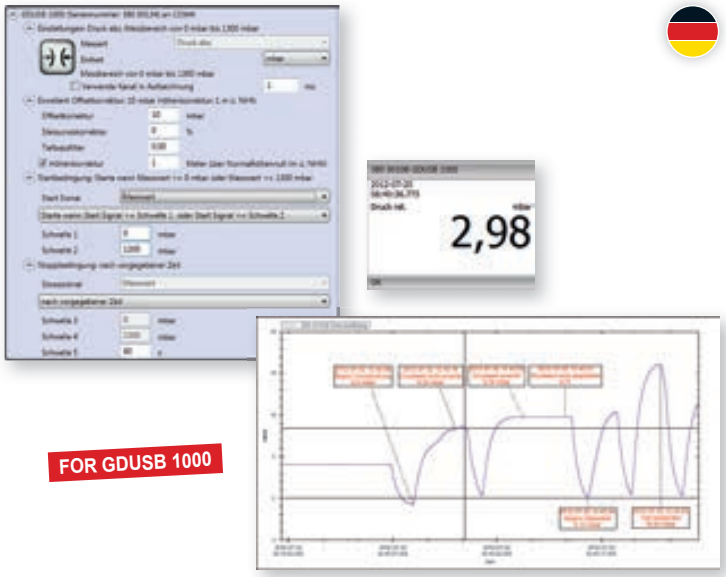
Functions:

- Display of the GMH-information
- Setting of the alarm function
- Operation of the logger function
  - start
  - stop
  - Cycle time
  - Read data
  - Delete data
- Diagram display
  - The Logger data can be displayed in the form of a diagram
  - Real-time axis
  - Zoom function
  - Display of legend and marking of measuring points can be switched on / off
  - Add comments
  - Storing the window position
- Export function
  - Data export of series of measurements as a CSV file
- Logger data print-out
  - Data can be printed as tables or as diagram
- Multilingual
  - German, English, Czech and French

System Requirements:

1 GHz CPU, 1 GB RAM, 100 MB HDD
Windows 7 SP 1 (32 or 64 Bit)
interface converter
for GMH 3000: GRS 3100, GRS 3105 or USB 3100 N
for GMH 5000: USB 5100
(executable from Windows XP, not executable with Windows RT, ARM or Intel Itanium based Windows systems)

High-speed live measurement



GDUSB FastView

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

Functions:

- Serveral GDUSB 1000 usable at one PC at the same time
- Measuring rates up to 1000 measurements per second
- Live display with current value and measurement diagram, even for highest measuring rates
- Different measuring rates for each sensor selectable
- Safe storage of measurement and sensor data in a SQL based data base
- Fast diagram display
- Comment function for measured values
- Data export as CSV file and as picture
- Multi-language software (German, English, French, Italian, Czech)
- 32-bit or 64-bit application

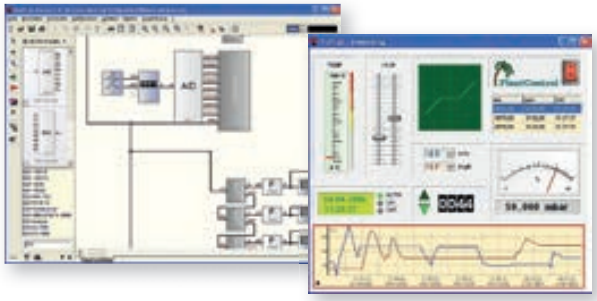
System requirements:

1GHz CPU, 1GB RAM, 100 MB HDD, 1 available USB Port
Microsoft Windows 7 SP1 (32 or 64 bit)
(not executable with Windows RT, ARM or Intel Itanium based Windows systems)

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

Software connection

	GMH 3000-DLL (windows library)	EASYBus-DLL (windows library)	GDUSB 1000-DLL (windows library) (w/o picture)	Connection for PROFILAB Expert 4.0	Plug-in for IPETRONIK - IPEmotion (www.IPETRONIK.de) (w/o picture)	inray - inMOVE GPL-Router-Plug-in (www.inray.de) (w/o picture)	Protocol description (www.greisinger.de) (w/o picture)
GMH 3xxx GMH 5xxx	●			●	●		●
EASYBus and EASYLog		●		●	●	●	●
TLogg		●					●
GDUSB 1000			●				
Start, stop, delete, read-out logger	●	●					
Program examples	Visual Studio, Excel VBA, Lab View		Visual Studio	data logging			
subject to costs	●	●	●			●	



ProfiLab-Expert 4.0

Art. no. 603510

Development of metrological control

General:

The software ProfiLab-Expert allows you to develop your own digital or analog measuring technology requirement. It doesn't matter if you want to create analog measurements or digital controls - you can realize it all. And for all this you don't have to write a single program-line!
ProfiLab-Expert supports our devices of the GMH3xxx-Serie with serial interface, GCO100, GFTB100/GRS, as well as all EASYBus-devices. Every device will be displayed in your project like a normal component. You only have to connect his inputs and outputs.
Compiler inclusive!
ProfiLab-Expert is equipped with an integrated compiler. The compiler can create executable files for stand-alone applications that run on systems without ProfiLab-Expert. The distribution of these compiled applications is unlimited, so ProfiLab-Expert become a complete and professional developers system.

System requirements:

Windows 7 SP 1 (32 or 64 Bit)
interface converter
for GMH 3000: GRS 3100, GRS 3105 or USB 3100 N
for GMH 5000: USB 5100
(executable from Windows XP, not executable with Windows RT, ARM or Intel Itanium based Windows systems)

GMH 3000.DLL

Art. no. 603027

Windows-functional library for interface communication to integrate all GMH 3xxx/5xxx device functions.

EASYBUS.dll

Art. no. 609174

Windows-function library for interface communication EASYBus - PC

Display

Application:	GIA ... N	GIA ... N - ex	GIA 2448	GTH2448/1	GTH2448/2 ../3 ../4 ../5	GIA 2000	TA 9648	pH 9648	ET 2011	EDT 24...	GIA 0420 VO(-T)	GIA 0420 VO-T-EX	GIA 0420 WK-T	GIA 0420 WK-T-EX
Dimensions	24x48	24x48	24x48	24x48	24x48	48x96	48x96	48x96	35x77	35x77	Special size			
Measuring input normalized signal	●	●	●			●	●				●	●	●	●
Measuring input temperature (Pt100 / Pt1000)					●	●			●					
Measuring input temperature (thermo elements)				●		●			●					
Measuring input NTC										●				
Measuring input frequency						●								
Universal input						●								
Messeingang PH / LF								●						
Ex - Protection		●										●		●
Device information:														
Catalogue page	Page 100	Page 100	Page 101	Page 101	Page 101	Page 109	Page 110	Page 112	Page 118	Page 118	Page 120	Page 120	Page 120	Page 120

Controller

Application:	GIA 20 EB	GIR 230 ...	GIR 230 DIF...	GIR 300	GIR 360	GIR 2002/... PID	GIR 2002 NS / DIF ...	GIR 2000 Pt ...	UZ 9648	LF 9648	V 9648	A 9648	MAXVU 16/8	SD 9648	KM	GRA ... VO	GRA ... WK
Dimensions	24x48	24x48	24x48	36x72	36x72	48x96	48x96	48x96	48x96	48x96	48x96	48x96	46x46 46x92	48x96	48x48	Special size	
Measuring input normalized signal		●	●	●		●	●						●	●	●	●	●
Measuring input temperature (Pt100 / Pt1000)		●	●	●		●		●					●		●		
Measuring input temperature (thermo elements)		●		●		●							●		●		
Temperature (NTC, PTC)		●	●														
Measuring input frequency		●		●	●	●			●					●			
Universal input	●			●		●							●				
Measuring input Voltage / current											●	●					
Measuring input PH / LF										●							
Device information:																	
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µP-display with freely adjustable scale

HIGHLIGHTS:

- *time-saving on-site scaling without any additional auxiliary modules*
- *large display range from -1999 to +9999 digits*
- *smallest housing dimensions possible*
- *monitoring of probe damage, probe short-circuit, values no longer within measuring range.*
- *measurands: Moisture, pH, Redox, Oxygen, Conductivity, Gas, Temperature, Pressure, Distance, Revolutional Speed, Flow rate, Flow, Fill level, Power*

GIA 0420 N

Art. no. 601026

µP-display with freely adjustable scale, without auxiliary energy, input 4-20 mA

GIA 010 N

Art. no. 601031

µP-display with freely adjustable scale, input 0-10 V

Specifications:	GIA 0420 N ..	GIA 010 N ..
Input signal:	4 ... 20 mA 2-wire	0 ... 10 V 3-wire
Voltage load:	approx. 3.5 V	-
Input resistance:	-	approx. 100 kOhm
Max. input:	25 mA	15 V
Power supply:	-	12 ... 28 V DC
Power consumption:	from current loop	< 10 mA
Display:	LCD display, approx. 10 mm high	
Display range:	-1999 ... +9999	
Decimal point:	any position selectable	
Scaling:	scale freely adjustable via 3 keys at the back side of the unit	
Accuracy:	<0.2 % FS ±1 digit (at 25 °C)	
Temperature drift:	<100 ppm / K	
Measuring rate:	approx. 5 measurements / s	
Filter:	adjustable: 0.1 ... 2.0; off	
Storage:	min- / max-value memory selectable via button	
Switching output:	electrically isolated open collector	
Switching capacity:	28 V DC / 50 mA	
Working temperature:	-20 ... +50 °C	
Storage temperature:	-20 ... +70 °C	
Electric connection:	**GIA 0420 N ..:** 2 x 2-pin screw-type/plug-in terminal max. terminal range up to 1.5 mm² **GIA 010 N ..:** 1 x 2-pin., 1 x 3-pin. screw-type/plug-in terminal, max. terminal range up to 1.5 mm²	
Protection rating:	IP 20, with front flush installation IP 54	
Housing:	fibre-reinforced Noryl, front panel: polycarbonate	
Dimensions:	48 x 24 mm (W x H, front dimensions)	
Mounting depth:	approx. 65 mm incl. terminal	
panel cutout:	$45^{+0,5}$ x $21,7^{+0,5}$ mm (W x H)	
Scope of supply:	Device, manual	

GIA 0420 N-EX

Art. no. 601033

Display, input 4-20 mA,
with EX-protection for all potentially explosive atmospheres
Ex qualification: II 2G Ex ia/ib IIC/IIB T4
(Further Information please refer to our homepage www.greisinger.de)

GIA 010 N-EX

Art. no. 601034

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

Ex-design types:

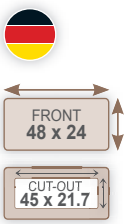
Ex protection: II 2 G Ex ia IIC T4
EC type examination: BVS 11 ATEX 1 333 X

Connection data:
U_{max}: 28 V
I_{max}: 100 mA
P_{max}: 1.2 W (for GIA 0420 N-EX) or 0.95 W (for GIA 010 N-EX)

max. effective internal capacitance:
Ci = 13 nF (for GIA 0420 ...) or 26 nF (for GIA 010 ...)
additionally for the switching output: Ci = 4.5 nF
max. effective internal inductance: negligible small

Please keep in mind for the circuit of the optionally available switching output that the wiring has to be done from the same intrinsically safe circuit as the measuring signal!

Universal display for standard signals



GIA 2448
Art. no. 600090 (standard model)
Display for Standard Signals (for self-adjustment)

GIA 2448 WE [1)]
Display for Standard Signals (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. GIA 2448 WE: 4-20 mA, 4 mA=-50.0, 20 mA = 100.0, 12 VDC)

Specifications:

Measuring input:	0 ... 20 V, 0 ... 10 V, 0 ... 2 V, 0 ... 1 V, 0 ... 200 mV, 0 ... 20 mA and 4 ... 20 mA (select via soldering jumpers)
Display range:	-1999 ... +1999 digit (adjustable via soldering jumpers and potentiometer)
Decimal point:	any position by means of soldering jumpers (soldering jumpers accessible after removal of front panel)
Accuracy:	±0.2 % ±1 digit (at nominal temperature = 25 °C)
Scan rate:	approx. 3 measurements / s
Display:	3½-digit, red 10 mm high LED display
Working temperature:	0 ... 50 °C (permissible ambient temperature)
Relative humidity:	5 ... 95 % RH (non-condensing)
Storage temperature:	-20 ... +70 °C
Voltage supply:	8 ... 20 V DC or 18 ... 29 V DC (standard) (set via soldering jumper)
Current supply:	max. 20 mA
Panel mounting:	with VA-spring clamp. allowed panel thicknesses from 1 ... approx. 10 mm
Connection terminal:	4-pin screw-type/plug-in terminal for wire cross sections from 0.14 ... 1.5 mm²
Protection class:	front side IP54
Housing:	glass fibre reinforced Noryl, front panel PC
Dimensions:	48 x 24 mm (W x H) (front frame)
Mounting depth:	approx. 65 mm (incl. screw-type/plug-in terminal)
Panel cut-out:	$45^{+0.5}$ x $21{,}7^{+0.5}$ mm (W x H).
Scope of supply:	Device, manual

Option:

VAC
voltage supply 8 ... 20 V AC or 18 ... 29 V AC set via soldering jumper

G12
11 ... 13 V DC, electrically isolated

G24
22 ... 27 V DC, electrically isolated

Accessories and spare parts:

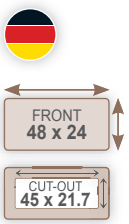
GNG 220/2-12V
Art. no. 600305
power supply for GIA 2448 and GTH 2448
(Input: 230 VAC; output: 2 x 12 VDC regulated, 30 mA each)

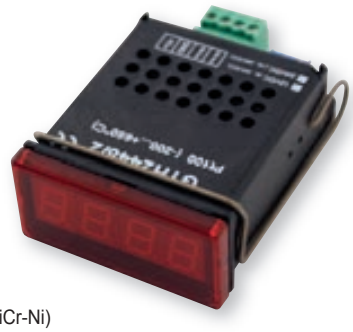
GNG 12 / 24
Art. no. 600276
DC/DC-converter to electrically isolate 12 V DC-supply voltages

GNG 24 / 24
Art. no. 600277
DC/DC-converter to electrically isolate 24 V DC-supply voltages

for additional accessories, transmitter, probes p.r.t. chapters transmitter and temperature probe

Universal Display for Temperature





GTH 2448/1
Art. no. 600083
Display for temperature (NiCr-Ni)

GTH 2448/2
Art. no. 600084
Display for temperature (Pt100)

GTH 2448/3
Art. no. 600085
Display for temperature (Pt100)

GTH 2448/4
Art. no. 600086
Display for temperature (Pt1000)

GTH 2448/5
Art. no. 600087
Display for temperature (Pt1000)

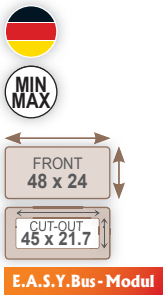
Specifications:

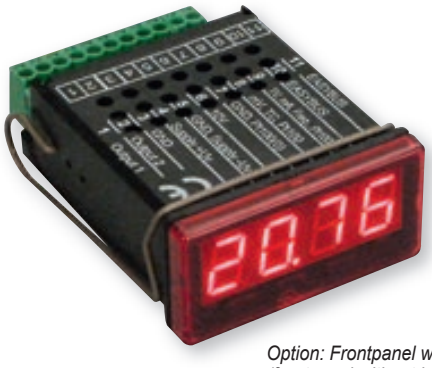
Measuring input, Resolution:	
GTH 2448/1:	-50 ... +1150 °C (NiCr-Ni)
GTH 2448/2:	-200 ... +650 °C (Pt100, 2-wire), 1 °C
GTH 2448/3:	-60,0 ... +199,9 °C (Pt100, 2-wire), 0.1 °C
GTH 2448/4:	-200 ... +650 °C (Pt1000, 2-wire), 1 °C
GTH 2448/5:	-60,0 ... +199,9 °C (Pt1000, 2-wire), 0.1 °C
Accuracy: (at nominal temperature = 25 °C)	
NiCr-Ni:	±1 % ±1 digit (from -20 ...+550 °C and 920 ...1150 °C) ±1.5 % ±1 digit (from 550 ... 920 °C)
Pt100, Pt1000:	±0.5 °C ±1 digit or ±1 °C ±1 digit
Offset compensation: (only for Pt100 and Pt1000)	The zero point offset of the sensor (e.g. due to long cables) can be compensated for by means of the spindle trimmer on the backside of the device.
Display:	3½-digit, red 10 mm high LED display
Scan rate:	approx. 3 measurements / s
Working temperature:	0 ... 50 °C (permissible ambient temperature)
Relative humidity:	5 ... 95 % RH (non-condensing)
Storage temperature:	-20 ... +70 °C
Voltage supply:	8 ... 20 V DC or 18 ... 29 V DC (standard) (set via soldering jumper)
Current supply:	max. 20 mA
Panel mounting:	with VA-spring clamp. allowed panel thicknesses from 1 ... approx. 10 mm
Connection terminal:	4-pin screw-type/plug-in terminal for wire cross sections from 0.14 ... 1.5 mm²
Protection rating:	front side IP54
Housing:	glass fibre reinforced Noryl, front panel PC
Dimensions:	48 x 24 mm (W x H) (front frame)
Mounting depth:	approx. 65 mm (incl. screw-type/plug-in terminal)
Panel cut-out:	$45^{+0.5}$ x $21{,}7^{+0.5}$ mm (W x H)
Scope of supply:	Device, manual

System solution - complete packages:

KFZ 2000
Art. no. 603241
Exhaust gas temperature set for measurement of exhaust gas temperatures up to 1000 °C in motor vehicles (e.g. motorsports). The set consists of:
GTH 2448/1 12 V DC:
Art. no. 601017
NiCr-Ni thermometer with additional over-voltage protection.
GTF 101-5-30-0150-L03-S:
Art. no. 601317
temperature probe with jacket material: Nimonic 75 (view p.r.t. page 187)
Cable length = 3 m (extended cable against upcharge available)
GKV 4:
Art. no. 602891
clamping ring screw connection (p.r.t. p. 199)

Universal display and regulating device





HIGHLIGHTS:

- *Universal inputs for normalized signals, frequency, Pt100, Pt1000 and thermocouples*
- *Configurable as display or controller (5 switching functions)*
- *extensive self-monitoring and diagnostic system*
- *Limit functions, digital filter, min-/max value memory*
- *Alarm delay selectable*

Option: Frontpanel with push buttons
(frontpanel without buttons included in delivery)

GIA 20 EB

Art. no. 601832 (Standardausführung)
Universal display and regulating device

Specifications:	
Measuring input:	universal input for
Normalized signal:	4 ... 20 mA, 0 ... 20 mA, 0 ... 1 V, 0 ... 2 V, 0 ... 10 V, 0 ... 50 mV
Resistance thermometer:	Pt100 (3-wire), Pt1000 (2-wire)
Thermocouples:	types J, K, N, S, T
Frequency, Rotational speed:	TTL-signal, switching contact
Counter up / down:	TTL-signal, switching contact
Serial interface	
Measuring rate:	approx. 100 measurings / s (for normalized signal) resp. approx. 4 measurings / s (for temperature and frequency)
Measuring resp. display ranges, resolution:	
Temperature:	(display unit selectable: °C or °F) **Pt100:** -200 ... +850 °C or -50.0 ... +200.0 °C; **Pt1000:** -200 ... +850 °C; **Type J:** -170 ... +950 °C; **Type K:** -270 ... +1350 °C; **Type N:** -270 ... +1300 °C; **Type S:** -50 ... +1750 °C; **Type T:** -270 ... +400 °C
Normalized signals:	-1999 ... 9999 digit, start and end value and DP freely scaleable
recommended range:	≤2000 digit
Frequency:	0.000 Hz ... 10 kHz, display freely scaleable
Rotational speed:	0.000 U/min ... 9999 U/min, selectable prescaler: 1-1000
Counter up/down:	countervalue remains on power loss 0 ... 9999 (10 Mio. with prescaler), pulse frequency: < 10 kHz, selectable prescaler: 1-1000
Serial interface:	Displaying and controlling from values coming via the serial interface.
Accuracy: (at nominal temperature = 25 °C)	
Normalized signal:	<0.2 % FS ±1 digit (at 0 ... 50 mV: <0.3 % FS ±1 digit)
Resistance thermometer:	<0.5 % FS ±1 digit
Thermocouples:	<0.3 % FS ±1 digit (at type S: <0.5 % FS ±1 digit)
Point of comparison:	±1 °C
Frequency, rotational speed, counter:	<0.1 % FS ±1 digit
Outputs:	2 switching outputs, not electrically isolated
Switching behavior:	Low-Side, High-Side or Push-Pull (selectable)
Connection data:	Low-Side: 28 V/1 A; High-Side: Ub/200 mA
Controller state:	2-point, 3-point, 2-point with alarm, min/max alarm to 1 output, min/max alarm to 2 outputs
Switching point, hysteresis:	freely adjustable
Reaktionszeit:	≤ 20 ms bei Normsignal ≤ 0,5 s bei Temperatur und Frequenz
Response time:	≤20 ms at normalized signals ≤0.5 s at temperature and frequency
Display:	approx. 10 mm high, 4-digit red LED-display
Service:	with 3 push-buttons (after disassembly of the frontpanel)
Optional:	FS3T, frontpanel with 3 push-buttons for comfortable configuration. Trouble-free replacement is possible (refer accessories)
Interface:	serial interface, electrical isolated, EASYBus compatible
Voltage supply:	9 ... 28 V DC (Standard)
Option:	electrical isolated voltage supply 11 ... 13 V (G12) or 22 ... 27 V (G24)
Power consumption:	max. 30 mA (without outputs)
Nominal temperature:	25 °C
Operating temperature:	-20 ... +50 °C
Relative humidity:	0 ... 80 % RH (non condensing)
Storage temperature:	-30 ... +70 °C
Panel mounting:	with VA-spring clamp
Allowed panel thicknesses:	from 1 ... approx. 10 mm.
Connection terminal:	screw-type/plug-in terminal: 2-pin for interface and 9-pin for other connections. For wire cross sections from 0.14 ... 1.5 mm²
Protection rating:	front side IP54
Housing:	glass fibre reinforced Noryl, front panel polycarbonate
Dimensions:	48 x 24 mm (W x H) (front frame)
Mounting depth:	approx. 65 mm (incl. screw-type/plug-in terminal)
Panel cut-out:	$45^{+0.5}$ x $21{,}7^{+0.5}$ mm (W x H)
Scope of supply:	device, manual

Standard variants:

GIA 20 EB-G12
Art. no. 604305
type with insulated power supply: 11 ... 13 V DC

GIA 20 EB-G24
Art. no. 601983
type with insulated power supply: 22 ... 27 V DC

Accessories and spare parts:

FS3T
Art. no. 603215
Frontpanel with 3 push-buttons for comfortable configuration, for adjustments at variable switching points, calling of min- and max-values etc.

GNR 10
Art. no. 603680
Power supply and relay module for one GIA20EB (p.r.t. page 123)
(Input: 230VAC, Power supply for device + transducer, 2 relay outputs)

Temperature probes **p.r.t. page 185-200**
Transducer **p.r.t. page 151-183**

Special design types:

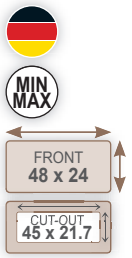
GIA 20 EB / PK

Art. no. 600968
Universal display and regulating device with individual programmable linearization characteristic.

General:

Even heavily bent sensor characteristics/value curves can be approximated by a straightened curve with 30 freely programmable linearization points.
The adjustment to the measurement is done via the integrated interface with the (free) configuration software. For the connection with a PC, an additional serial converter EBW 1 or EBW 3 will be needed. Therefore only the input values (in mA, V, Ω or Hz) and the corresponding displayed values have to be entered.
For detailed information please refer to our homepage www.greisinger.de

The displaying and regulating device for 230 V



HIGHLIGHTS:

- *5 input executions for choice:*
- *2 integrated switching outputs*
- *Display or controller*
- *Comprehensive self-monitoring*
- *Limit function*

GIR 230 NS
Art. no. 600972

GIR 230 Pt
Art. no. 600976

GIR 230 TC
Art. no. 600978

GIR 230 FR
Art. no. 600970

GIR 230 NT
Art. no. 600974

Version GIR 230 NS (normalized signal):	
Measuring input:	4 ... 20 mA, 0 ... 20 mA, 0 ... 10 V
Display range:	-1999 ... 9999 digit, initial value, final value and DP freely adjustable
Recommended range:	≤2000 digit
Accuracy:	<0.2 % FS ±1 digit (at nominal temperature = 25 °C)
Measuring rate:	approx. 100 measurings / s

Version GIR 230 Pt (resistor):	
Measuring input:	Pt100 (3-wire), Pt1000 (2-wire)
Measuring ranges, resolution:	**Pt100:** -200 ... +850 °C (1°) or -50.0 ... +200.0 °C (0.1°) **Pt1000:** -200 ... +850 °C
Accuracy:	<0.5 % FS ±1 digit (at nominal temperature = 25 °C)
Measuring rate:	approx. 4 measurings / s

Version GIR 230 TC (thermo couple):	
Measuring input:	types J, K, N, S, T and 0 ... 50 mV
Measuring ranges, resolution:	**Type J:** -170 ... +950 °C, **Type K:** -270 ... +1350 °C, **Type N:** -270 ... +1300 °C, **Type S:** -50 ... +1750 °C, **Type T:** -270 ... +400 °C
Accuracy:	<0.3 % FS ±1 digit (type S: <0.5 % FS ±1 digit) (at 25 °C)
Point of comparison:	±1 °C
Measuring rate:	approx. 4 measurings / s

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

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

Accessories and spare parts:

GTF 230 S
Art. no. 603014
NTC-temperature probe, -40 ... +120 °C, sensor sleeve made of stainless steel, Ø 5 x 50 mm, approx. 1 m silicone-cable

GTF 230 S-L03
Art. no. 605910
see above, approx. 3 m silicone cable

GTF 230 S-L05
Art. no. 604620
see above, approx. 5 m silicone cable

GIR 230 DIF-PT...
Art. no. 600982
Difference controller with 2 measuring inputs for Pt1000

GIR 230 DIF-NT...
Art. no. 600984
Difference controller with 2 measuring inputs for NTC

GIR 230 DIF-NS...
Art. no. 600980
Difference controller with 2 measuring inputs for 4 ... 20 mA, 0 ... 20 mA or 0 ... 10 V

Version GIR 230 DIF-PT1000, GIR 230 DIF-NT:	
Measuring inputs:	2 x Pt1000 (2-wire) or 2 x NTC
Measuring ranges, resolution:	Pt1000: -200 ... +850 °C, 1 °C NTC: -40.0 ... +120.0 °C, 0.1 °C
Display:	difference temperature sensor 1 - sensor 2
Accuracy:	<0.5 % FS ±1 digit (at nominal temperature = 25 °C)
Measuring rate:	approx. 4 measurings / s

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

Specifications:	
Relay output:	2 (1) closing contacts (GIR 230 NTC: 1 relay output), 230 V~ switching, switching power: 5 A, 230 V AC
Alarm output:	NPN, open collector, switching power: 30 mA, max. 28 V
Controller states:	2-point, 3-point*, 2-point with alarm, min / max alarm to 1 output, min / max alarm to 2 outputs* *(* = not available at GIR 230 NT)*
Switching points, hysteresis, alarm points:	freely selectable
Display:	approx. 10 mm high, 4-digit red LED-display
Operating conditions:	-20 ... +50 °C, 0 ... 80 % RH (non condensing)
Power supply:	230 V, 50 / 60 Hz, approx. 2 VA
Panel mounting:	with VA-spring clamp
Allowed panel thicknesses:	from 1 ... approx. 10 mm
Connection terminal via screw-type/plug-in terminal:	
4-pin (...NTC: 3-pin)	for power supply and relay outputs
4-pin (...NTC: 3-pin)	for measuring input and alarm output
For wire cross selections:	from 0.14 ... 1.5 mm2.
Protection rating:	front side IP54
Housing:	glass fibre reinforced Noryl, front panel polycarbonate
Dimensions:	48 x 24 mm (W x H) (front frame)
Mounting depth:	approx. 65 mm (incl. screw-type/plug-in terminal)
Panel cut-out:	$45^{+0.5}$ x $21{,}7^{+0.5}$ mm (W x H)
Scope of supply:	device, manual

Options:

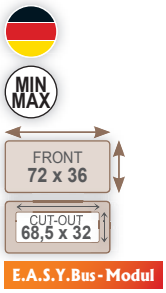
SA1
power supply 12 ... 28 V DC, Outputs: 2 (1) relay outputs, +Ub switching

SA2
power supply 12 ... 24 V DC

SA3
power supply 12 V DC, electrically isolated

SA4
power supply 24 V DC, electrically isolated

Universal displaying and controlling device



HIGHLIGHTS:

- *Universal input for standard signals, frequency, Pt100, Pt1000 and thermocouples*
- *2 integrated switching outputs (electrically isolated)*
- *Configurable as display or controller (5 switching functions)*
- *Fast controlling and monitoring*
- *Comprehensive self-test and diagnostic system*

GIR 300

Art. no. 604692 (standard model)
Universal displaying and controlling device

Specifications:	
Measuring input:	universal input for
Standard signals:	4 ... 20 mA, 0 ... 20 mA, 0 ... 1 V, 0 ... 2 V, 0 ... 10 V, 0 ... 50 mV
Resistance thermometer:	Pt100 (3-wire), Pt1000 (2-wire)
Thermocouples:	types J, K, N, S, T
Frequency, rotational speed:	TTL signal, switching contact
Up- / down- counter:	TTL signal, switching contact
Serial interface	
Measuring rate:	approx. 100 measurements / s (standard signal) or approx. 4 measurements / s (temperature and frequency)
Measuring and display range, resolution:	
Temperature: (unit switchable between °C and °F)	**Pt100:** -200 ... +850 °C or -50.0 ... +200.0 °C; **Pt1000:** -200 ... +850 °C; **Type J:** -170 ... +950 °C; **Type K:** -270 ... +1350 °C; **Type N:** -270 ... +1300 °C; **Type S:** -50 ... +1750 °C; **Type T:** -270 ... +400 °C
Standard signals:	-1999 ... 9999 digit, decimal point, start and end value freely selectable
recommanded range:	≤2000 digit
Frequency:	0.000 Hz ... 10 kHz, display freely scalable
Rotational speed:	0.000 U/min ... 9999 U/min, selectable prescaler: 1-1000
Up- / down- counter:	The counter reading is stored also in power-down state. 0 ... 9999 (10 million with prescaler), pulse frequency: ≤10 kHz, selectable prescaler: 1 ... 1000
Serial interface:	Display and control functions with values obtained via serial interface
Accuracy: (at nominal temperature = 25 °C)	
Standard signals:	<0.2 % FS ±1 digit (at 0 ... 50 mV: <0.3 % FS ±1 digit)
Resistance thermometer:	<0.5 % FS ±1 digit
Thermocouples:	<0.3 % FS ±1 digit (for type S: <0.5 % FS ±1 digit)
Point of comparison accuracy:	±1 °C
Frequency, rotational speed, counter:	<0.1 % FS ±1 digit
Outputs:	2 volt-free relay switching outputs relay 1: normally-open contact relay 2: normally-closed contact
Switching functions:	2-point, 3-point, 2-point with alarm, combined min-/max-alarm with 1 output, separate min-/max- alarm with 2 outputs
Switching points, switching hysteresis:	freely selectable
Response time:	≤20 ms for standard signals ≤0.5 s for temperature and frequency
Display:	approx. 13 mm high, 4-digit red LED display
Interface:	serial interface, electrically isolated, compatible to EASYBus
Miscellaneous:	continuous self-diagnostics, digital filter function, measuring range limitation

Supply voltage:	9 ... 28 V DC (standard)
Optional:	G24: 22 ... 28 V DC, electrically isolated
Current consumption:	max. 70 mA
Nominal temperature:	25 °C
Working temperature:	-20 ... +50 °C
Relative humidity:	0 ... 80 % RH (non condensing)
Storage temperature:	-30 ... +70 °C
Panel mounting:	with fixing clamps
Electric connection:	via screw-type/plug-in terminals cable cross section: 0.14 ... 1.5 mm^2.
Housing	
Dimensions:	72 x 36 mm (W x H) (front frame)
Installation depth:	approx. 75 mm (incl. screw-type/plug-in terminals)
Panel mounting:	$68,5^{+0.5}$ x $32,0^{+0.5}$ mm (W x H)
Scope of supply:	device, manual

Variants:

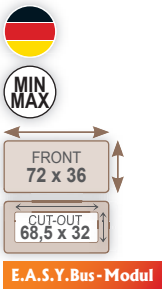
GIR 300-G24
Art. no. 605203
GIR 300 with electrically isolated supply 9 ... 28 V DC

Accessories and spare parts:

APG-7
Art. no. 606825
Housing for surface mounting incl. seal GGD4896

EAK 36
Art. no. 603227
Unit stickers (black with white text) for 36 different units for lettering of display devices.

Universal counter and frequency device



HIGHLIGHTS:

- *6-digit display*
- *Assembly, dismantling, sum and difference counter*
- *2 integrated switching outputs (galvanically isolated)*
- *Configurable as display or controller (5 switching functions)*
- *Extensive self-monitoring and diagnostic system*

GIR 360

Art. no. 607953

Freely selectable universal counter and frequency meter

Specifications:	
Inputs:	
Input 1:	frequency, rotational speed, counter input A
Input voltage:	0 ... 5 V (0 ... 28 V with dropping resistor)
Input level:	Low <0.5 V; High >2.2 V
NPN:	pullup resistor 7 kohms to 3.3 V
PNP:	pulldown resistor 7 kohms against GND
Min. pulse width:	50 us
Input 2:	count input B, Gate, direction
Input voltage:	0 ... 5 V (0 ... 28 V with dropping resistor)
Input level:	Low <0.5 V; High >2.2 V
NPN:	pullup resistor 7 kohms to 3.3 V
PNP:	pulldown resistor 7 kohms against GND
Min pulse width:	50 us
Input 3:	reset input
Input level:	Low <1 V; High >8 V
Min pulse width:	50 ms
Measuring / counting areas:	
Frequency:	0 ... 10 kHz
Speed:	max. 10000 U/min, switchable prescaler: 1 ... 1000
Counter:	-2.147.483.647 … 2.147.483.646
Display area:	
Frequency / Speed:	-1999 ... 9999 digit, decimal point freely selectable
Counter:	-1999999 ... 999999 digit, decimal point freely selectable
Functions:	Frequency measurement Speed measurement, Up counter, down counter Up / down counter with direction input Totalizer A + B, Difference counter A-B, phase discriminator
Display:	approx. 10 mm high, 6-digit red LED display
Outputs:	2 volt-free relay switching outputs relay 1: normally-open contact relay 2: normally-closed contact
Switching functions:	2-point, 3-point, 2-point with alarm, combined min-/max-alarm with 1 output, separate min-/max- alarm with 2 outputs
Switching points, switching hysteresis:	freely selectable
Interface:	serial interface, electrically isolated, compatible to EASYBus
Miscellaneous:	continuous self-diagnostics, digital filter function, measuring range limitation
Supply voltage:	9 ... 28 V DC (standard)
Optional:	G24: 9 ... 28 V DC, electrically isolated

Current consumption:	max. 70 mA
Nominal temperature:	25 °C
Working temperature:	-20 ... +50 °C
Relative humidity:	0 ... 80 % r.F. (non condensing)
Storage temperature:	-30 ... +70 °C
Panel mounting:	with fixing clamps
Electric connection:	via screw-type/plug-in terminals cable cross section: 0.14 ... 1.5 mm².
Housing	
Dimensions:	72 x 36 mm (W x H) (front frame)
Installation depth:	approx. 75 mm (incl. screw-type/plug-in terminals)
panel cutout:	$68{,}5^{+0.5}$ x $32{,}0^{+0.5}$ mm (W x H)
Scope of supply:	device, manual

Variants:

GIR 360-G24
Art. no. 607954
GIR 300 with electrically isolated supply 9 ... 28 V DC

Accessories and spare parts:

APG-7
Art. no. 606825
Housing for surface mounting incl. seal GGD4896

EAK 36
Art. no. 603227
Unit stickers (black with white text) for 36 different units for lettering of display devices.

Universal displaying and regulating device

HIGHLIGHTS:

- *2 relay switching outputs*
- *1 analog output (0(4) ... 20 mA or 0 ... 10 V) (optional)*
- *5 programmable switching modes*
- *electrical isolated power supply for a transmitter (24 V / 22 mA)*
- *serial interface, bus operation*

ADDITIONAL FUNCTIONS GIR 2002 PID:

- *P, I, PI, PD or PID control mode*
- *3-point motorized valve control*
- *continuous regulating output (optional)*

GIR 2002

Art. no. 600948 (Standard types)
Universal displaying and regulating device with on/off-control mode

GIR 2002 PID

Art. no. 600951 (Standard types)
Universal displaying and regulating device with PID-control mode

General:

The universal controller GIR 2002 is the ideal device for simple control systems (on/off switching, relay outputs, ...), because of its compact construction and its high ease of use.
The GIR 2002 PID (basic version) supplies one control output for a 2-point-control the types of control P, I, PI, PD or PID and a second control output for on/off switching. The device can also be configured as a 3-point motorized valve controller or as controller with continuous output (optionally).
Due to the universal input and the various switching functions the controller can be optimally adapted to the requirements of the system. The structured menu navigation allows a straightforward handling and a fast adjustment of the parameters.
A LED switching position display gives information to the user about the current status of the switching outputs. The automatic self-test and diagnostic system ensures maximum operational safety and reports systems errors by conclusive error codes. The parameters are automatically saved, so that all data will be maintained even in case of a power blackout.
Among others most of the Greisinger transmitters, rpm sensors and flow rate sensors can be connected directly to the integrated transmitter power supply (24 VDC/22 mA) of the controller.
If the device is used as a thermocouple or resistance thermometer, the measuring value can be alternatively displayed in °C or °F. By means of an offset correction the measured value can be scaled i.e. to the resistivity of the wires. The current and voltage inputs can be arbitrarily scaled in the range of -1999 ... +9999.
The GIR 2002 has a serial, bus-compatible interface by default, by which a comfortable adjustment of the parameters as well as recording of measured values is possible. With the optionally available Windows library EASYBUS.dll up to 240 devices can be integrated into own programs (i.e. LabView).

Application:

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

Specifications:

Measuring input	Measuring / display ranges:	Accuracy (at nominal temperature):
Thermocouples (4 measurings / s)		
FeCu-Ni (type J, IEC 584)	-70.0 ... +300.0 °C or -170 ... +950 °C	<0.3 % FS ±1 digit *
NiCr-Ni (type K, IEC 584)	-70.0 ... +250.0 °C or -270 ... +1372 °C	<0.3 % FS ±1 digit *
NiCrSi-NiSi (type N, IEC 584)	-100.0 ... +300.0 °C or -270 ... +1350 °C	<0.3 % FS ±1 digit *
Pt10Rh-Pt (type S, IEC 584)	-50 ... +1750 °C	<0.5 % FS ±1 digit *
Cu-CuNi (type T, IEC 584)	-70.0 ... +200.0 °C or -270 ... +400 °C	<0.3 % FS ±1 digit *
	** = Point of comparison: ±1 °C*	
Resistance thermometer (4 measurings / s)		
Pt 100 (3-wire, DIN EN 60751)	-50.0 ... +200.0 °C or -200 ... +850 °C	<0.3 % FS ±1 digit
Pt1000 (2-wire, DIN EN 60751)	-200 ... +850 °C	<0.3 % FS ±1 digit

Action signals / normalized signal (100 measurings / s)		
0 ... 1 V, 0 ... 2 V, 0 ... 10 V:	-1999 ... +9999 digit, scale freely adjustable	<0.2 % FS ±1 digit
0 ... 20 mA, 4 ... 20 mA:	-1999 ... +9999 digit, scale freely adjustable	<0.2 % FS ±1 digit
0 ... 50 mV:	-1999 ... +9999 digit, scale freely adjustable	<0.3 % FS ±1 digit
Frequency		
TTL-signal:	0.000 Hz ... 10 kHz, scale freely adjustable	<0.1 % FS ±1 digit
Switching contact NPN:	0.000 Hz ... 3 kHz, scale freely adjustable	<0.1 % FS ±1 digit
Switching contact PNP:	0.000 Hz ... 1 kHz, scale freely adjustable	<0.1 % FS ±1 digit
Rotational speed:	0.000 ... 9999 U/min.	selectable prescaler: 1-1000, pulse frequency: max. 600.000 Imp./min. at TTL
Flow:	0 ... 9999 l/s, 0 ... 9999 l/min or 0 ... 9999 l/h	
Counter up / down		
TTL-signal, switching contact (NPN, PNP):	0 ... 9999 or 0 ... 999 000 (with prescaler) selectable prescaler: 1 ... 1000, pulse frequency: max. 10.000 Imp./s at TTL	<0.1 % FS ±1 digit
Serial interface:	displaying and controlling from values coming via the serial interface	
Outputs: Please note: Not all options are available for both device types and not all options can be combined with each other. Please see therefore the matrix on next page..		
Output 1 R1: (standard version)	voltage free relay output (standard) normally-open contact, switching power: 5 A (ohmic load), 250 V AC	
Optional:	H1: control output for semiconductor relay (6 VDC / 15 mA) AA1: freely scalable analog output 0(4)-20 mA AV1: 0 ... 10 V SA1: continuous output 0(4) ... 20 mA SV1: 0 ... 10 V	
Output 2 R2: (standard version)	voltage free relay output (standard) change-over contact, switching power: 10 A (ohmic load), 250 V AC	
Optional:	H2: control output for semiconductor relay (6 V DC / 15 mA)	
Output 3:	(not available at standard device type)	
Optional:	R3: voltage free relay output (chance-over contact) switching power: 1 A / 40 V AC or 30 V DC H3: control output for semiconductor relay (14 VDC / 15 mA) N3: electrical isolated NPN-switching contact (max. 1 A / 30 V DC) AA3: freely scalable analog output 0(4) ... 20 mA AV3: 0 ... 10 V SA3: continuous output 0(4) ... 20 mA SV3: continuous output 0 ... 10 V	
Controller states:	5 or 6, selectable (e.g. 2-point regulator, 3-point regulator, ...)	
Switching point, hysteresis:	freely adjustable	
Response time:	≤25 ms at normalized signals ≤0.5 s at temperature and frequency	
Display:	approx. 13 mm high, 4-digit red LED-display	

Universal displaying and regulating device

Interface:	serial interface, electrical isolated, EASYBus compatible
Power supply for sensor:	24 V DC ±5 %, 22 mA (for DC-supply 18 V DC)
Miscellaneous:	permanent self-monitoring, digital filter function, measuring range boundary (limit)
Voltage supply:	230 V AC, 50/60 Hz (standard)
Optional:	012D: voltage supply: 12 V DC (11 ... 14 V) 024D: voltage supply: 24 V DC (22 ... 27 V) 115A: voltage supply: 115 V AC ±5 %
Power consumption:	approx. 6 VA
Operating conditions:	-20 ... +50 °C, 0 ... 80 % RH (non condensing)
Panel mounting:	with fixing clamps
Electrical connection:	via screw-type/plug-in terminals cable diameters from 0.14 ... 1.5 mm².
Protection class:	front side IP54, with optional sealing IP65
Housing:	standard rack type housing
Dimensions:	96 x 48 mm (W x H) (front frame)
Panel mounting:	approx. 115 mm (with fixing clamps)
Panel cutout:	$90{,}5^{+0.5}$ x $43{,}0^{+0.5}$ mm (W x H)
Scope of supply:	Device, 2 fixing clamps, 1 sealing GGD4896, unit stickers EAK 36, screw-type/plug-in terminals, mounting- and operation manual

Accessories and spare parts:

GGD4896
Art. no. 603042
additional sealing for panel mounting IP65

EAK 36
Art. no. 603227
Unit stickers (black with white text) for 36 different units for lettering of display devices (p.r.t. page 105)

Temperature probes **p.r.t. page 185-200**

for other accessories p.r.t. page 96, 138-140

Matrix:

Outputs		GIR 2002			GIR 2002 PID		
		out 1	out 2	out 3	out 1	out 2	out 3
Standard type:		normally-open contact	chance-over contact	--	normally-open contact	chance-over contact	--
available output options							
output 1 = control output	**H1:**	•			•		
output 2 = control output	**H2:**		•			•	
output 3 = relay (chance-over contact)	**R3:**			•			•
output 3 = control output	**H3:**			•			•
output 3 = NPN-switching output	**N3:**			•			•
output 1 = analog output 0(4) ... 20 mA	**AA1:**	•		no out3 possible			
output 1 = analog output 0 ... 10 V	**AV1:**	•					
output 3 = analog output 0(4) ... 20 mA	**AA3:**			•			•
output 3 = analog output 0 ... 10 V	**AV3:**			•			•
output 1 = continuous output 0(4)...20 mA	**SA1:**				•		no out3 possible
output 1 = continuous output 0 ... 10 V	**SV1:**				•		
output 3 = continuous output 0(4)...20 mA	**SA3:**						•
output 3 = continuous output 0 ... 10 V	**SV3:**						•

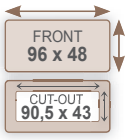
GIR2002 - 1 - 2 - 3 - 4 - 5 - 6

Greisinger		
1.	Supply voltage	
	230A	230 V AC
	012D	12V DC
	012DA	12V DC for analog output or NPN or REL3 or HLR3
	024D	24V DC
	024DA	24V DC
	115A	115V AC
2.	Output 1	
	-R1	Relay, NO switch
	-H1	Solid-State-Relais
	-AA1	Analog output 0(4)..20mA
	-AV1	Analog output 0-10V
3.	Output 2	
	-R2	Relay, NO switch
	-H2	Solid-State-Relais
4.	Output 3	
	-00	No third output
	-R3	Relay, NO switch
	-H3	Solid-State-Relais
	-N3	NPN switch output
	-AA3	Analog output 0(4)..20mA
	-AV3	Analog output 0-10V
5.	Option	
	-00	Without option
	-NS/DIF1	Differential Controller 2x 4-20 mA
	-NS/DIF2	Differential Controller 2x 0-10V
	-NS/DIF3	Differential Controller 2x 0-20 mA
	-SW	Setpoint controller 0-10V
6.	Option	
	-IP	Protection IP65

GIR2002PID - 1 - 2 - 3 - 4 - 5 - 6

Greisinger		
1.	Supply voltage	
	230A	230 V AC
	012D	12V DC
	012DA	12V DC
	024D	24V DC
	024DA	24V DC
	115A	115V AC
2.	Output 1	
	-R1	Relay, NO switch
	-H1	Solid-State-Relais
	-SA1	Continuous output 0(4)..20 mA
	-SV1	Continuous output 0 to 10V
3.	Output 2	
	-R2	Relay, NO switch
	-H2	Solid-State-Relais
4.	Output 3	
	-00	No third output
	-R3	Relay, NO switch
	-H3	Solid-State-Relais
	-N3	NPN switch output
	-AA3	Analog output 0(4)..20mA
	-AV3	Analog output 0-10V
	-SA3	Continuous output 0 (4) .. 20 mA
	-SV3	Continuous output 0 to 10 V
5.	Input option	
	-00	Without option
	-SW	Setpoint controller 0-10V
6.	Option	
	-IP	Protection IP65

2-channel difference controller



E.A.S.Y.Bus-Modul

GIR 2002 NS / DIF - 020

Art. no. 604871 (Standard model)
2-channel difference controller, input signal (2x) 0 ... 20 mA

GIR 2002 NS / DIF - 420

Art. no. 600960 (Standard model)
2-channel difference controller, input signal (2x) 4 ... 20 mA

GIR 2002 NS / DIF - 010

Art. no. 601846 (Standard model)
2-channel difference controller, input signal (2x) 0 ... 10 V

General:

The GIR 2002 NS / DIF is a display, control and regulating device for difference measurements. The measuring inputs are designed for standard signals. Please state your desired input signal at order transaction.

Application:

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

Specifications:

Measuring inputs:	(2x) 4 ... 20 mA, (2 x) 0 ... 20 mA or (2 x) 0 ... 10 V Please state your desired input signal at order transaction!
Display range:	-1999 ... 9999 digit, decimal point, initial and final values freely selectable
Recommended range:	≤2000 digit
Accuracy:	<0.2 % FS ±1 digit (at nominal temperature = 25 °C)
Measuring rate:	approx. 100 measurings / s
Display/regulation:	difference: input 1 - input 2
Outputs:	1 normally open contact, 1 change-over contact output options like HLR-control output, analog output or continuous output available - p.r.t. previous page
Controller states:	5 or 6, selectable (e.g. 2-point-regulator, 3-point-regulator, ...)
Limit values:	freely selectable
Display:	approx. 13 mm high, 4-digit red LED-display
Operating conditions:	-20 ... +50 °C, 0 ... 80 % RH (non condensing)
Voltage supply:	230 V AC, 50/60 Hz, approx. 6 VA
Panel mounting:	with fixing clamps
Electrical connection:	via screw-type/ plug-in terminals: cable diameters from 0.14 ... 1.5 mm².
Protection class:	front side IP54 (IP65 on request)
Housing:	standard rack type housing
Dimensions:	96 x 48 mm (W x H) (Front)
Installation depth:	approx. 115 mm (incl. screw-type/ plug-in terminals)
panel cutout:	$90,5^{+0.5}$ x $43,0^{+0.5}$ mm (W x H)
Scope of supply:	Device, 2 fixing clamps, 1 sealing GGD4896, unit stickers EAK 36, screw-type/plug-in terminals, mounting- and operation manual

for further technical date refer to GIR 2002 (page 106)

Option:

Output for control output, analog output and other voltage supply p.r.t. previous page

Accessories and spare parts:

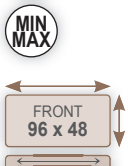
EBW 3
Art. no. 601137
Interface converter for connection of one EASYBus-module to the USB interface of your PC. (Power supply: from the USB port)

EBS 20M
Art. no. 601158
20 channel measurement data acquisition software

GIA 20 EB / GIR 2002 - Configuration-Software
Software for easy configuration of the types GIA 20 EB, GIR 2002, GIR 2002 PID, download under www.greisinger.de

Temperature regulator

MIN MAX



MEASURING INPUT FOR PT100 (3-WIRE)

GIR 2000 Pt

Art. no. 601701 (Standard model)
Temperature regulator complete with sensor

GIR 2000 Pt OF

Art. no. 601703 (Standard model)
Temperature regulator complete without sensor

Specifications:

Measuring input:	Pt100 (3-wire)
Measuring range:	-50.0 ... +200.0 °C
Resolution:	0.1 °C
Measuring rate:	approx. 4 measurings / s
Accuracy:	<0.3 % FS ±1 digit (at nominal temperature = 25 °C)
Temperature probe:	GTF200 Pt100 / 3-wire *Art. no. 600018* Pt100-probe, DIN class B (±0.3 °C at 0 °C), V4A-tube Ø 5 mm 50 mm length, approx. 1 m silicone cable.
Output:	voltage free relays output, change-over-contact, switching power: 10 A (ohmic load), 250 V AC
Controller state:	2-point, min-/max-alarm
Switching point:	freely adjustable
Response time:	≤0.5 s
Display:	approx. 13 mm high, 4-digit red LED-display
Miscellaneous:	permanent self-monitoring, digital zero point and scale adjustment
Voltage supply:	230 V AC, 50/60 Hz (standard) optionally other supply voltages are possible
Power consumption:	approx. 5 VA
Operating temperature:	-20 ... +50 °C
Relative humidity:	0 ... 80 % RH (non condensing)
Storage temperature:	-30 ... +70 °C
Panel mounting:	by fixing clamps
Electrical connection:	via screw-type/plug-in terminals cable diameters from 0.14 ... 1.5 mm².
Protection class:	front side IP54, IP65 upon request
Housing:	standard rack type housing
Dimensions:	96 x 48 mm (W x H) (front frame)
Installation depth:	approx. 115 mm (incl. screw-type/plug-in terminals)
Panel cutout:	$90,5^{+0.5}$ x $43,0^{+0.5}$ mm (W x H)
Scope of supply:	Device, 2 fixing clamps, 1 sealing GGD4896, unit stickers EAK 36, screw-type/plug-in terminals, mounting- and operation manual, GIR 2000 Pt only: probe

Accessories and spare parts:

GGD4896
Art. no. 603042
additional sealing for panel mounting IP65

APG-4
Art. no. 602827
Housing for surface mounting (incl. seal GGD4896)
Device assembled in housing, Dimensions: 125 x 75 x 127 mm (H x W x D)
(without screw connections), Cable insert: screw connections M12 x 1.5 and M16 x 1.5

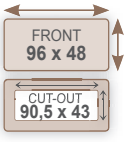
additional suitable temperature probes **p.r.t. page 185-200**

Standard variant:

GIR2000-PT-024D
Art. no. 603491
GIR 2000 PT with voltage supply 24 V DC (22 ... 27 V)

GIR2000-PT-OF-024D
Art. no. 602280
GIR 2000 PT with voltage supply 24 V DC (22 ... 27 V)

Universal Displaying Device



E.A.S.Y.Bus-Modul

HIGHLIGHTS:

- *Universal inputs for normalized signals, frequency, Pt100, Pt1000 and thermocouples, freely adjustable*
- *Integrated isolated power supply for measuring transducer (24V / 22 mA)*
- *Extensive self-monitoring and diagnostic system*
- *Serial interface - EASYBus*
- *Limit functions, digital filter, min-/max value memory*

GIA 2000

Art. no. 600963 (Standard version)
Universal Displaying Device

Specifications:

Measuring input: universal input (freely adjustable) for	
Normalized signal:	4 ... 20 mA, 0 ... 20 mA, 0 ... 1 V, 0 ... 2 V, 0 ... 10 V, 0 ... 50 mV
Resistance thermometer:	Pt100 (3-wire), Pt1000 (2-wire)
Thermocouples:	types J, K, N, S, T
Frequency:	TTL-signal, switching contact
Flow, Rotational speed:	TTL-signal, switching contact
Counter up / down:	TTL-signal, switching contact
Serial interface	
Measuring rate:	approx. 100 measurings / s (for normalized signal and frequency) or approx. 4 measurings / s (for temperature)
Measuring resp. display ranges, resolution:	
Temperature: (display unit selectable: °C or °F)	**Pt100:** -200 ... +850 °C or -50.0 ... +200.0 °C; **Pt1000:** -200 ... +850 °C; **Type J:** -170 ... +950 °C or -70.0 ... +300.0 °C; **Type K:** -270 ... +1372 °C or -70.0 ... +250.0 °C; **Type N:** -270 ... +1350 °C or -100.0 ... +300.0 °C; **Type S:** -50 ... +1750 °C; **Type T:** -270 ... +400 °C or -70.0 ... +200.0 °C
Normalized signals:	-1999 ... 9999 digit, decimal point, start and end value freely selectable
recommended range:	≤2000 digit
Frequency:	0.000 Hz ... 10 kHz, display freely scalable
Rotational speed:	0.000 U/min ... 9999 U/min, selectable prescaler: 1 ... 1000
Flow:	0 ... 9999 l/s, 0 ... 9999 l/min, 0 ... 9999 l/h
Counter up/down:	counter value remains on power loss 0 ... 9999 (10 mio. with prescaler), pulse frequency: ≤10 kHz
Serial interface:	Displaying and controlling from values coming via the serial interface.
Accuracy: (at nominal temperature = 25 °C)	
Normalized signal:	<0.2 % FS ±1 digit (at 0 ... 50 mV: <0.3 % FS ±1 digit)
Resistance thermometer:	<0.3 % FS ±1 digit
Thermocouples:	<0.3 % FS ±1 digit (at type S: <0.5 % FS ±1 digit)
Point of comparison:	±1 °C
Frequency, rotational speed, counter:	<0.1 % FS ±1 digit
Analog output: (option)	freely scalable analogue output 0 ... 20 mA / 4 ... 20 mA or 0 ... 10 V
Display:	approx. 13 mm high, 4-digit red LED-display
Interface:	serial interface, electrical isolated, EASYBus compatible
Power supply for sensor:	integrated isolated power supply for measuring transducer: 24 V DC ±5 %, 22 mA (for DC-supply 18 V DC)
Miscellaneous:	permanent self-monitoring, digital filter function, measuring range boundary (limit)
Voltage supply:	230 V AC, 50/60 Hz (standard)
Power consumption:	approx. 5 VA
Operating temperature:	-20 ... +50 °C
Relative humidity:	0 ... 80 % RH (non condensing)
Storage temperature:	-30 ... +70 °C
Panel mounting:	with fixing clamps
Electrical connection:	via screw-type/plug-in terminals cable diameters from 0.14 ... 1.5 mm².
Protection class:	front side IP54, IP65 upon request
Housing:	rack type housing
Dimensions:	96 x 48 mm (W x H) (front frame)
Installation depth:	approx. 115 mm (incl. screw-type/plug-in terminals)
panel cutout:	$90{,}5^{+0{,}5}$ x $43{,}0^{+0{,}5}$ mm (W x H)
Scope of supply:	Device, 2 fixing clamps, 1 sealing GGD4896, unit stickers EAK 36, screw-type/plug-in terminals, mounting- and operation manual

Variants:

GIA 2000-012D
Art. no. 602103
GIA 2000 with voltage supply: 12 VDC (11 ... 14 V)

GIA 2000-024D
Art. no. 601501
GIA 2000 with voltage supply: 24 VDC (22 ... 27 V)

GIA 2000-230A-AA
Art. no. 601405
GIA 2000 with analog output 0 ... 20 mA, 4 ... 20 mA (changeable)

GIA 2000-230A-AV
Art. no. 602725
GIA 2000 with analog output 0 ... 10 V

Accessories and spare parts:

GGD 4896
Art. no. 603042
additional sealing for panel mounting IP65

EAK 36
Art. no. 603227
Unit stickers (black with white text) for 36 different units for lettering of display devices.

EBW 3
Art. no. 601137
Interface converter for connection of one EASYBus-module (e. g. EASYLog) to the USB-interface of your PC. (Power supply via USB)

EBS 20M
Art. no. 601158
software for recording and archiving of the measuring values (p.r.t. page 96).

Temperature probes p.r.t. page 185-200

for other accessories p.r.t. page 138-140

Tank Display

FRONT
96 x 48

HIGHLIGHTS:

- *Inputs for standard signals 0/4 ... 20 mA or 0/2 ... 10 V*
- *2nd input for pressure transmitter at pressure loaded tanks*
- *Input automatic level correction*
- *6 standard- and custom sized tanks selectable*
- *Variable tank shape*

TA 9648

Tank Display

Application:

The tank display TA 9648 offers content measurement of tanks with no linear connection between level and content. Measurement will be realized by hydrostatic pressure or distance sensors. The device offers the possibility to connect a level sensor. Reaching a certain level, the displayed value will be corrected automatically to the value according to the position of the installed sensor.

Specifications:

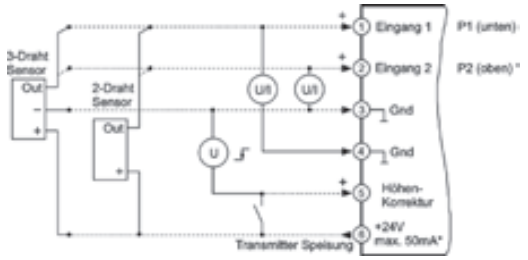
Power supply:	
Supply voltage:	230 V AC ±10 %; 115 V AC ±10 %, 24 V AC ±10 % or 24 V DC ±15 %
Power consumption:	max. 3.5 VA, with analog output 5 VA
Working temperature:	-10 ... +55 °C
CE-conformity:	EN 55022, EN 60555, IEC 61000-4-3/4/5/11/13
Input	
Current:	0/4 ... 20 mA; R_i = 10 Ω overload 2-times; 4-times for max. 5 s
Voltage:	0/2 ... 10 V DC; R_i = 100 kΩ overload max. 100 V
Accuracy:	<0.1 % ±2 Digit
Transmitter supply:	U0 approx. 24 V; R_i approx. 150 Ω; max. 50 mA
Display:	LED rot, 14.2 mm
Indicating range:	999999 Digit with leading zero suppression
Parameter display:	LED 2 digit red, 7 mm (parameter - and output indicating)
Output	
Relay:	SPDT <250 V AC <250 VA <2 A, <300 V DC <50 W <2 A
Analog:	0/4..20 mA burden ≤500 Ω; 0/2 ... 10 V, burden >500 Ω, isolated, automatic output changing
- Accuracy:	0.1 %; TK 0.01 %/K
Housing:	panel case DIN 96 x 48 mm, material PA6-GF; UL94V-0
Dimensions:	Front 96 x 48 mm, mounting depth 100 mm
Weight:	max. 390 g
Connection:	clamp terminals, 0.08 ... 1.5 mm², AWG28 ... AWG14
Protection class:	Front IP65, terminals IP20 acc. to BGV A3
Scope of supply:	Device, manual

Accessories and spare parts:

A-10, S-10, S-11, S-20 **p.r.t. page 163**
Pressure transmitter

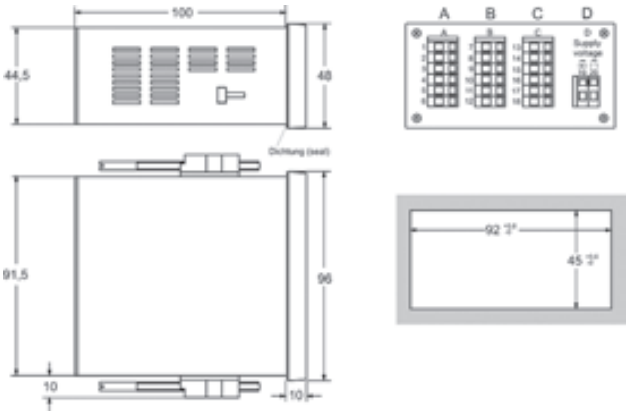
GBS01, GBS02 **p.r.t. page 164**
well probe

Connection:



** only for pressurised tanks*

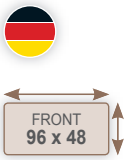
Dimensions:



TA9648- [1] - [2] - [3] - [4] - [5] - [6] - [7]

1.	**Terminal strip A**	
	1	inputs 0/4..20 mA, 1 input for level correction, Integrated, transmitter supply 24 V max. 50 mA
	2	wie 1, jedoch Ein as 1, but inputs 0/2 ... 10 V gänge 0/2 ... 10 V
2.	**Terminal strip B**	
	00	not installed
	2R	2 relay outputs
	2T	2 electronic outputs
3.	**Terminal strip C**	
	00	not installed
	2R	2 relay outputs
	2T	2 electronic outputs
	AO	analog output 0/4 ... 20 mA, 0/2 ... 10 V
4.	**Terminal strip D; supply voltage**	
	0	230 V AC ±10 % 50-60 Hz
	1	115 V AC ±10 % 50-60 Hz
	4	24 V AC ±10 % 50-60 Hz
	5	24 V DC ±15 %
5.	**Options**	
	00	without option
6.	**Unit** (appears in the unit field)	
7.	**Additional text** placed above the display (90 x 3 mm W x H)	

Universal Counter



HIGHLIGHTS:

- *Counting, length measurement, metering, positioning*
- *2 digital input channels for summation- and subtraction*
- *Integrated transmitter supply*
- *Max. 4 preselect outputs, relay SPDT or transistor*

UZ 9648

Universal Counter

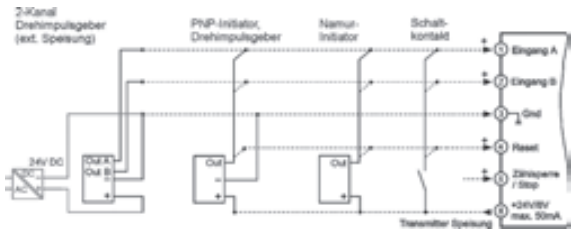
Application:

The universal counter UZ 9648 has been designed for field application in process control and automation. Parameters for operation mode can be programmed. The counter can be used wherever quantity processes should be measured, displayed and monitored.

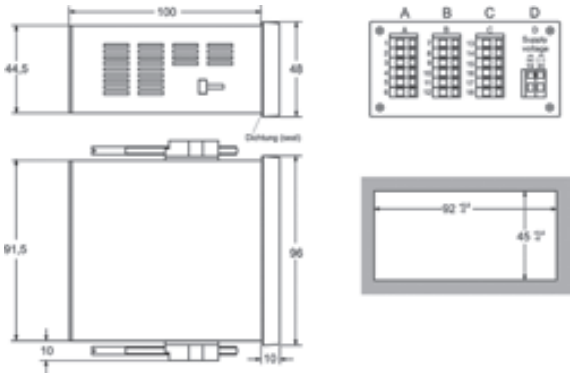
Specifications:

Power supply:	
Supply voltage:	230 V AC ±10 %; 115 V AC ±10 %; 24 V AC ±10 % or 24 V DC ±15 %
Power consumption:	max. 3.5 VA, with analog output 5 VA
Working temperature:	-10 ... +55 °C
CE- conformity:	EN 55022, EN 60555, IEC 61000-4-3/4/5/11/13
Input:	
PNP sensor:	R_i = 6.3 kΩ level: <4 V low; >8.5 V high; hysteresis >2.5 V; max. 35 V DC
Namur sensor:	R_i approx. 1 kΩ (< 4 mA) level: <1 mA low; >2.2 mA high; hysteresis > 0.5 mA; max. 35 V DC
Pulse frequency:	input A or B = 15 kHz, A and B together = 6 kHz, contact = 30 Hz debounced, 2-channel rotary encoder = 8 kHz
Counting loss:	100 µs at reset; 20 ms changing of preselect value
Min. pulse width:	electronic 50 µs, contact 5 ms
External reset:	reset impulse ≥10 ms
Transmitter supply:	8 V DC (Namur), 24 V DC (PNP), R_i approx. 150 Ω, max. 50 mA (25 mA with 4 relay outputs)
Display	LED red, 14.2 mm
Indicating range:	-99999 ... +999999 Digit with leading zero suppression
Additional display:	LED 2-digit red, 7 mm (parameter - and output indicator)
Output:	
Relay:	SPDT < 250 V AC < 250 VA < 2 A, < 300 V DC < 50 W < 2 A
Transistor:	max. 35 V AC/DC, 100 mA, with short circuit protection
Analog output:	0/4 ... 20 mA burden ≤500 Ω; 0/2 ... 10 V, burden > 500 Ω, with isolation
- Accuracy:	0.1 %; TK 0.01 %/K
Housing:	panel case DIN 96 x 48 mm, material PA6-GF; UL94V-0
Dimensions:	front 96 x 48 mm, mounting depth 100 mm
Weight:	max. 390 g
Connection:	clamp terminals, 0.08 ... 1.5 mm², AWG 28 ... AWG 14
Protection class:	front IP65, terminals IP20 acc. to BGV A3
Scope of supply:	Device, manual

Connection:



Dimensions:



UZ9648- [1] - [2] - [3] - [4] - [5] - [6] - [7]

1.	**Terminal strip A**	
	1	2 configurable count inputs, display conversion, wide range of count functions, integrated transmitter supply 24 V max. 50 mA
2.	**Terminal strip B**	
	00	not installed
	2R	2 relay outputs
	2T	2 electronic outputs
3.	**Terminal strip C**	
	00	not installed
	2R	2 relay outputs
	2T	2 electronic outputs
	AO	analog output 0/4 ... 20 mA, 0/2 ... 10 V DC
4.	**Terminal strip D; supply voltage**	
	0	230 V AC ±10 % 50-60 Hz
	1	115 V AC ±10 % 50-60 Hz
	4	24 V AC ±10 % 50-60 Hz
	5	24 V DC ±15 %
5.	**Options**	
	00	without option
6.	**Unit** (appears in the unit field)	
7.	**Additional text** placed above the display (90 x 3 mm W x H)	

pH and ORP Panelmeter

FRONT
96 x 48

HIGHLGHTS:

- *Measuring range programmable -1 ... +15 pH / ±1500 mV*
- *Temperature compensation via P100/Pt1000 sensor*
- *Analog output 0/4 ... 20 mA or 0/2 ... 10 V for pH/ORP*
- *Max. 4 alarm outputs relay or transistor*

pH 9648

pH and ORP panelmeter

Application:

The pH and ORP Panelmeter pH 9648 is suitable for pH and ORP measurement in food technology, chemistry within pharmaceutical and sewage-water technology. The pH 9648 operates with all common pH- and ORP electrodes. It is recommended to connect the Impedance-Converter pH40 for cable length >5 m.

Specifications:

Power supply	
Supply voltage:	230 V AC ±10 %; 115 V AC ±10 %; 24 V AC ±10 % or 24 V DC ±15 %
Power consumption:	max. 3.5 VA, with analog output 5 VA
Working temperature:	-10 ... +55 °C
CE- conformity:	EN 55022, EN 60555, IEC 61000-4-3/4/5/11/13
Input pH / ORP	
Measuring range:	1.00 ... +15.00 pH or -1500 ... +1500 mV
R_i:	$>10^{12}$ Ω
Input current:	$<10^{-12}$ A
Accuracy:	0.2 % measuring value, ±2 Digit
pH setup:	electrode zero point 4.00 ... 10.00 pH slope 40.0 ... 70.0 mV/pH
ORP setup:	±200 mV
Calibration mode:	- 1- or 2-point-calibration Buffer selection possible: - Schott - WTW - Ingold (Mettler Toledo) - Puffer acc. to DIN 19266 - or manual buffer input - Data entering for zero point and slope - ORP offset
Temperature	
Sensor:	Pt100 or Pt1000 (2- or 3-wire connection)
Unit:	programmable °C, °F
Measuring range:	-40.0 ... +160.0 °C (-40.0 ... +320.0 °F)
Accuracy:	±0.1 %, ±1 digit
Transmitter supply:	24 V DC, R_i approx. 150 Ω, max. 50 mA (25 mA with 4 relay outputs)
Display:	LED red, 14.2 mm
Parameter display:	LED 2-digit red, 7 mm (Parameter - and output indicator)
Output	
Relay SPDT:	<250 V AC <250 VA <2 A, <300 V DC <50 W <2 A
Transistor:	<35 V AC/DC, max.100 mA, short-circuit-proof
Analog output active:	0/4 ... 20 mA burden ≤500 Ω; 0/2 ... 10 V burden >500 Ω, isolated, automatic output changing (burden dependent)
Analog output passive:	4 ... 20 mA, ext. burden = RA[Ω]≤ (U_B-5 V) ÷0.02 A; supply voltage 5 ... 30 V DC
Accuracy:	0.1 %
Housing:	panel mounting DIN 96 x 48 mm, material PA6-GF; UL94V-0
Dimensions:	Front 96 x 48 mm, mounting depth 100 mm
Weight:	max. 390 g
Connection:	clamp terminals, 2.5 mm² single wire, 1.5 mm² flex wire, AWG14
Protection class:	Front IP65, terminals IP20, BGV A3
Scope of supply:	Device, manual

Accessories and spare parts:

GEAK-1S7
Art. no. 605652
Adapter cable S7, loose ends, 1 m

GEAK-2S7
Art. no. 609599
Adapter cable S7, loose ends, 2 m

GEAK-5S7
Art. no. 609600
Adapter cable S7, loose ends, 5 m

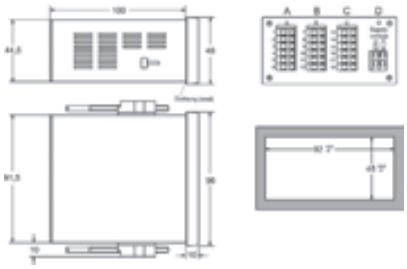
GE 108-S7
Art. no. 606097
pH electrodes, p.r.t. page 55

GE 171-S7
Art. no. 606375
pH electrodes, p.r.t. page 55

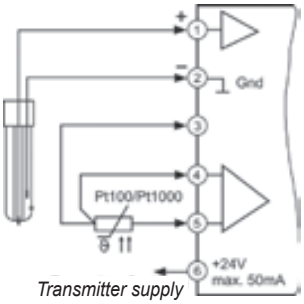
GE 173-S7
Art. no. 606572
pH electrodes, p.r.t. page 55

further electrodes and accessories p.r.t page 55/56

Dimensions:



Connection:

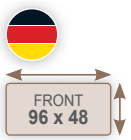


Transmitter supply

pH9648- [1] - [2] - [3] - [4] - [5] - [6] - [7]

1.	**Terminal strip A**	
	13	input pH / ORP electrode, temperature compensation via Pt100 / Pt1000
2.	**Terminal strip B**	
	00	not installed
	2R	2 relay outputs
	2T	2 electronic outputs
3.	**Terminal strip C**	
	00	not installed
	2R	2 relay outputs
	2T	2 electronic outputs
	AO	analog output 0/4 ... 20 mA, 0/2 ... 10 V DC
	2A	2 analog outputs 4 ... 20 mA passive
4.	**Terminal strip B supply voltage**	
	0	230 V AC ±10 % 50-60 Hz
	1	115 V AC ±10 % 50-60 Hz
	4	24 V AC ±10 % 50-60 Hz
	5	24 V DC ±15 %
5.	**Options**	
	00	without option
6.	**Unit** appears in the unit field	
7.	**Additional text** above the display (3 x 90 mm H x W)	

Conductivity Meter



HIGHLIGHTS:

- *Input for 2- or 4-electrode cells*
- *Temperature compensation via Pt100*
- *relay or Thyristor outputs*
- *Analog output 0/4 ... 20 mA or 0/2 ... 10 V for the LF-value*

LF 9648

Conductivity Meter

Application:

The Conductivity Meter LF 9648 has been designed for the measurement of conductivity, as a degree of the purity or concentration of a liquid. In connection with 4-electrode-conductivity cells a high accuracy and insensitivity of contamination can be achieved. A further advantage is a broad range of application with only one cell. Only for measurement in ultra-pure water a special 2-electrode conductivity cell must be used.

Specifications:

Power supply:	
Supply voltage:	230 V AC ± 10 %; 115 V AC ± 10 %; 24 V AC ± 10 % or 24 V DC ± 15 %
Power consumption:	max. 3.5 VA, 5 VA with analog output
Working temperature:	-10 ... +55 °C
CE-conformity:	EN55022, EN60555, IEC61000-4-3/4/5/11/13
Inputs	
MR conductivity:	0 ... 2.000(0) µS / cm up to 0 ... 2000 / 200(0) mS/cm (at 25 °C)
- Cell constant:	0.080 ... 9.999
- Accuracy:	0.5 % of the measuring value, ±2 digit
- Temperature compensation:	non linear for ultra pure water and natural water or linear programmable from 0.000 ... 9.999 % / K
MR temperature:	-50.0 ... +200.0 °C; Sensor Pt100 or Pt1000
- Accuracy:	±0.2 °C
Display:	LED red, 14.2 mm
Indicating range:	2000(0) Digit with leading zero suppression
Parameter display:	LED 2-digit red, 7 mm (parameter - and output indicator)
Outputs	
Relay:	SPDT <250 V AC < 250 VA <2 A, <300 V DC <50 W <2 A
Transistor:	transistor, <35 V AC/DC, max.100 mA, short circuit protected
Analog output:	
Active:	0/4 ... 20 mA burden ≤500 Ω; 0/2 ... 10 V burden >500 Ω, isolated, automatic burden changing (burden dependent)
Passive:	4..20 mA, ext. burden = RA[Ω]≤ (supply - 5 V) ÷ 0.02 A; supply voltage 5 ... 30 V DC
Accuracy	0.1 %; TK 0.01 %/K
Housing:	panel mounting DIN 96 x 48 mm, material PA6-GF; UL94V-0
Dimensions:	Front 96 x 48 mm, mounting depth 100 mm,
Weight:	max. 390 g
Connection:	clamp terminals, 0.08 ... 1.5 mm², AWG28 ... AWG14
Protection class:	Front IP65, terminals IP20, BGV A3
Scope of supply:	Device, manual

Accessories and spare parts:

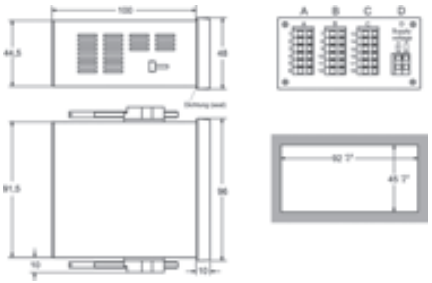
VKLF-M12-L05-LE
Art. no. 609601
Connection cable, 5 m length

LFE 230
Art. no. 607825
2-pole measuring cell (p.r.t page 172)

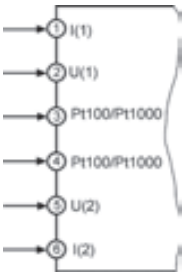
LFE 430
Art. no. 607827
4-pole measuring cell (p.r.t page 172)

LFE 220
Art. no. 607829
2-pole measuring cell (p.r.t page 172)

Dimensions:



Connection:



LF9648- [1] - [2] - [3] - [4] - [5] - [6] - [7]

1.	**Terminal strip A**	
	1	input for 2- or 4-electrode-cells, temperature compensation via Pt100
	3	as 1, but temperature compensation via Pt1000
2.	**Terminal strip B**	
	00	not installed
	2R	2 relay outputs
	2T	2 electronic outputs
3.	**Terminal strip C**	
	00	not installed
	2R	2 relay outputs
	2T	2 electronic outputs
	AO	analog output 0/4 ... 20 mA, 0/2 ... 10 V DC
	2A	2 analog outputs 4 ... 20 mA passive
4.	**Terminal strip D Supply voltage**	
	0	230 V AC ±10 % 50-60 Hz
	1	115 V AC ±10 % 50-60 Hz
	4	24 V AC ±10 % 50-60 Hz
	5	24 V DC ±15 %
5.	**Options**	
	00	without option
	01	min- and max-peak hold
	14	measuring/monitoring acc. to USP<645>
6.	**Unit** appears on the unit field	
7.	**Additional text** above the display (3 x 90 mm H x W)	

further electrodes and accessories p.r.t page 172

Voltage controller

FRONT
96 x 48

HIGHLGHTS:

- *Measuring and indicating range separate programmable*
- *LED display 14.2 mm red, indicating range ±9999(0) digit*
- *Max. 4 alarm outputs, relay SPDT or transistor*

V 9648

Digitales Voltmeter

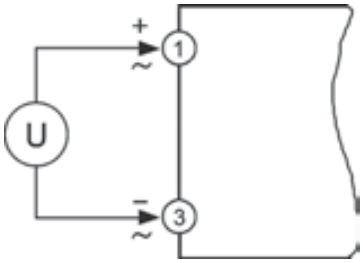
Application:

The Digital Voltmeter V 9648 has been designed to measure DC and AC (TRMS) voltage signals. Three basic models all are selectable and makes the possibility to measure voltages from 0 ... 30.00 mV up to 0 ... 999.9 V. Within a model the measurement range is free programmable. Measuring of bipolar voltages is also possible e.g. -5 ... +5 V; or -10 ... +10 V. Additional a free programmable display range within ± 9999(0) digit can be assigned to a programmed voltage measurement range.

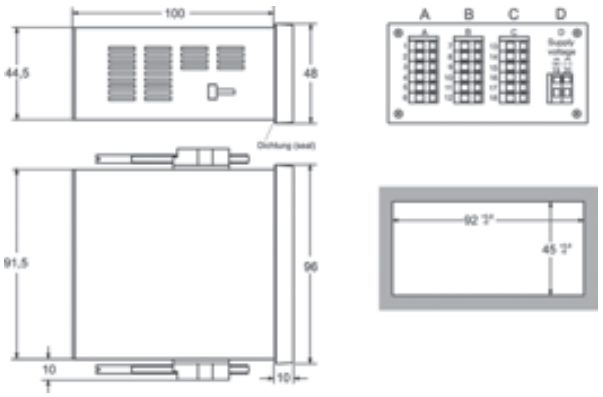
Specifications:

Power supply	
Supply voltage:	230 V AC ±10 %; 115 V AC ±10 %, 24 V AC ±10 % or 24 V DC ±15 %
Power consumption:	max. 3.5 VA, with analog output 5 VA
Working temperature:	-10 ... +55 °C
CE-conformity:	EN 55022, EN 60555, IEC 61000-4-3/4/5/11/13
Input	model 1: 0 ... 4000 mV DC/AC_{TRMS} model 2: 0 ... 250.0 V* DC/AC_{TRMS} model 3: 0 ... 999.9 V DC/AC_{TRMS}
Input resistance:	model 1 = 130 kΩ, model 2 = 1.3 MΩ, model 3 = 2.6 MΩ
Overload:	model 1 and 2 = 300 V DC/AC_{TRMS}, model 3 = 1200 V DC/AC_{TRMS}
Accuracy:	<0.1 % ±2 digit (DC); 0.5 % ±2 digit (AC) crest-factor < 3 → max. 2 % error, crest-factor < 5 → max. 5 % error
Display:	LED red, 14.2 mm
Indicating range:	±9999(0) digit with leading zero suppression
Additional display:	LED 2-digit red, 7 mm (parameter - and output indicator)
Output	
Relay:	SPDT <250 V AC <250 VA <2 A, <300 V DC <50 W <2 A
Transistor:	max. 35 V AC/DC, 100 mA, with short circuit protection
Analog output:	0/4 ... 20 mA burden ≤500 Ω; 0/2 ... 10 V, burden >500 Ω, with isolation automatic burden changing
- Accuracy:	0.1 %; TK 0.01 % / K
Housing:	panel case DIN 96 x 48 mm, material PA6-GF; UL94V-0
Dimensions:	front 96 x 48 mm, mounting depth 100 mm
Weight:	max. 390 g
Connection:	clamp terminals, 0.08 ... 1.5 mm², AWG28 ... AWG14
Protection class:	front IP65, terminals IP20 acc. to BGV A3
Scope of supply:	Device, manual

Connection:



Dimensions:



V9648- [1] - [2] - [3] - [4] - [5] - [6] - [7]

1.	**Terminal strip A**	
	Messbereich programmierbar von:	
	1	0 ... 4000 mV DC/AC_{TRMS}
	2	0 ... 250.0 V* DC/AC_{TRMS} * includes e.g ±5 V, ±10 V
	3	0 ... 999.9 V DC/AC_{TRMS}
2.	**Terminal strip B**	
	00	not installed
	2R	2 relay outputs
	2T	2 electronic outputs
3.	**Terminal strip C**	
	00	not installed
	2R	2 relay outputs
	2T	2 electronic outputs
	AO	analog output 0/4 ... 20 mA, 0/2 ... 10 V
4.	**Terminal strip D; supply voltage**	
	0	230 V AC ±10 % 50-60 Hz
	1	115 V AC ±10 % 50-60 Hz
	4	24 V AC ±10 % 50-60 Hz
	5	24 V DC ±15 %
5.	**Options**	
	00	without option
	01	min- and max-peak hold
	07	display brightness programmable, only measuring range 1 and 2
6.	**Unit** appears in the unit field	
7.	**Additional text** above the display (3 x 90 mm H x W)	

Digital Amperemeter

FRONT
96 x 48

HIGHLGHTS:

- *Measuring range programmable 0 ... 6/60 A*
- *LED-Display 14.2 mm red, indicating range ±9999(0) Digit*
- *Max. 4 alarm outputs, relay SPDT or electronic*

A 9648

Digital Amperemeter

Application:

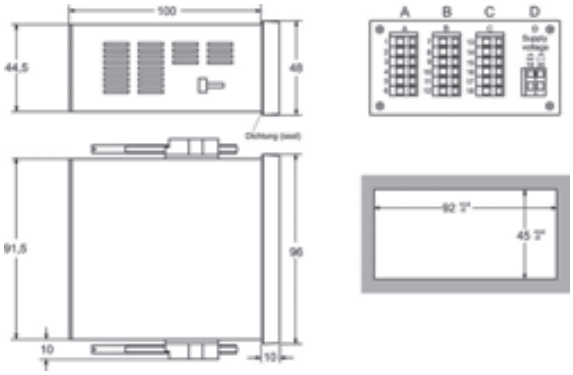
The digital amperemeter A 9648 has been designed to measure DC and AC current signals. Five basic models are selectable and possible to measure currents from 0 ... 0.900 mA to 0 ... 60.0 A. The measuring range is free programmable. Measuring of bipolar currents are possible. For example -20 ... +20 mA. Additional the free programmable display range within ± 9999(0) digit can be assigned to a programmed current measurement range.

Specifications:

Power supply	
Supply voltage:	230 V AC ±10 %; 115 V AC ±10 %, 24 V AC ±10 % or 24 V DC ±15 %
Power consumption:	max. 3.5 VA, with analog output 5 VA
Working temperature:	-10 ... +55 °C
Input	model 1-4 = 0 ... 0.9 mA up to 6 A DC/AC_{TRMS} model 5 = 0 ... 4.5 up to 60 A AC_{TRMS}
Input resistant:	model 1 = 20 Ω, model 2 = 2 Ω, model 3 = 0.2 Ω, model 4 = 0.02 Ω, model 5 = integrated current transformer
Basic accuracy:	<0.1 % ±2 Digit (DC); 0.5 % ±2 Digit (AC)
Display:	LED red, 14.2 mm
Indicating range:	±9999(0) digit
Parameter display:	LED 2-digit red, 7 mm
Output	
Relay:	SPDT <250 V AC <250 VA <2 A, <300 V DC <50 W <2 A
Transistor:	max. 35 V AC/DC max.100 mA
Analog output:	0/4 ... 20 mA, 0/2 ... 10 V, isolated
Housing:	panel case DIN 96 x 48, material PA6-GF; UL94V-0
Dimensions:	front 96 x 48 mm, mounting depth 100, 120 mm (with transformer)
Weight:	max. 390 g
Connection:	clamp terminals, 0.08 ... 1.5 mm², AWG28 ... AWG14
Protection class:	front IP65, terminals IP20 acc. to BGV A3
Scope of supply:	Device, manual

Connection:

Dimensions:



A9648- [1] - [2] - [3] - [4] - [5] - [6] - [7]

1.	**Terminal strip A**	
	1	0 ... 9.999 mA DC / AC_{TRMS} clamp terminal
	2	0 ... 99.99 mA DC / AC_{TRMS} clamp terminal
	3	0 ... 999.9 mA DC / AC_{TRMS} clamp terminal
	4	0 ... 6.000 A DC / AC_{TRMS} clamp terminal
	5	0 ... 60.00 A AC_{TRMS} winding transformer
2.	**Terminal strip B**	
	00	not installed
	2R	2 relay outputs
	2T	2 electronic outputs
3.	**Terminal strip C**	
	00	not installed
	2R	2 relay outputs
	2T	2 electronic outputs
	AO	analog output, 0/4 ... 20 mA, 0/2 ... 10 V
4.	**Terminal strip D; supply voltage**	
	0	230 V AC ±10 % 50-60 Hz
	1	115 V AC ±10 % 50-60 Hz
	4	24 V AC ±10 % 50-60 Hz
	5	24 V DC ±15 %
5.	**Options**	
	00	without option
	01	min- and max-peak hold
	07	display brightness programmable
6.	**Unit** appears in the unit field	
7.	**Additional text** above the display (90 x 3 mm W x H)	

Alarm-Display

SD 9648

Alarm-Display

Application:

The Alarm-Display SD 9648 will be used for indicating and evaluations of alarm signals as well as analog measured values. Activation with voltage free contacts, 0/24 V signals or 0/4 ... 20 mA for monitoring of analog measuring values.

Specifications:

Power supply	
Supply voltage:	230 V AC ±10 %, 115 V AC ±10 %, 24 V AC ±10 %, 24 V DC ±15 %
Frequency AC:	50 / 60 Hz
Power consumption:	max. 3.5 VA
Working temperature:	0 ... 50 °C
CE- conformity:	EN55022, EN60555, IEC61000-4-3/4/5/11/13
Inputs	
Digital:	0 / 24 V DC, R_i = 10 kΩ, switching threshold low <4 V, high >11 V max. 35 V
Impulse/pause:	min. 10 ms
Analog:	0 / 4 ... 20 mA, R_i = 100 Ω Spannungsabfall max. 2,2 V bei 20 mA Überlastbegrenzung ab ca. 23 mA (max. Spannung 35 V). Bei Ausschalten des Gerätes werden die Eingänge hochohmig
Accuracy:	0.1 %, ±1 digit
Transmitter supply:	Uo = 24 V, R_i 150 Ω, max. 50 mA
Display:	LCD-dot matrix display white / blue, character height 6.5 mm, with back-lite 2 lines 16 characters each
Display interval:	0.5 s (refresh time)
Output	
Relay:	SPDT <250 V AC <250 VA <2 A, <300 V DC <50 W <2 A
Housing:	panel case DIN 96 x 48, Material PA6-GF; UL94V-0
Dimensions:	front 96 x 48 mm, mounting depth 100 mm
Weight:	max. 390 g
Connection:	clamp terminals, 0.08 ... 1.5 mm², AWG28 ... AWG14
Protection class:	front IP65, terminals IP20 acc. to BGV A3
Scope of supply:	Device, manual

SD9648- [1] - [2] - [3] - [4] - [5]

1.	**Inputs**	
	1	20 digital inputs
	2	12 digital + 8 analog inputs
2.	**Real time clock**	
	0	without clock
	1	with clock
3.	**Supply voltage**	
	0	230 V AC ±10 % 50-60 Hz
	1	115 V AC ±10 % 50-60 Hz
	4	24 V AC ±10 % 50-60 Hz
	5	24 V DC ±15 %
4.	**Options**	
	00	without option
5.	**Additional text** above the display (3 x 90mm H x W)	

Solid State Relays

WD28D10
WD60D20
WD60D30
WD60D45

WS28D06

Art. no. 608512

Slimline DIN-Rail Mounted SSR

WS28D12

Art. no. 608513

Slimline DIN-Rail Mounted SSR

WS60D12

Art. no. 608514

Slimline DIN-Rail Mounted SSR

General:

The WS range offers slim-line products for greater space saving. These single phase solid state relays fit a standard DIN-rail in a reduced 12 mm or 18 mm width for a minimal panel footprint. The WS SSR is a self contained device with no need for an additional heat sink.

Application:

- 6 & 12 Amps output rating
- 24 ... 280 V and 48 ... 600 VAC load voltage ratings
- 4 ... 32 VDC control voltage
- DIN rail mounting
- IP20 housing
- CE and UL / cUL
- RoHS compliant

Specifications:	WS28D06	WS28D12	WS60D12
Max. rated current:	6 A	12 A	12 A
Control voltage:	4 ... 32 VDC	4 ... 32 VDC	4 ... 32 VDC
Load voltage:	24 ... 280 VAC	24 ... 280 VAC	48 ... 600 VAC
Scope of supply:	Device	Device	Device

WD28D10

Art. no. 608515

DIN-Rail Mounted SSR with Integral Heatsink

WD60D20

Art. no. 608516

DIN-Rail Mounted SSR with Integral Heatsink

WD60D30

Art. no. 608517

DIN-Rail Mounted SSR with Integral Heatsink

WD60D45

Art. no. 608518

DIN-Rail Mounted SSR with Integral Heatsink

General:

The West family of SSRs includes WD range of DIN-rail mounted single phase devices. The relays come in 22.5 mm and 45 mm width and range up to 45 A. The SSRs can be directly mounted or DIN-rail mounted. The series also benefit from built-in heat sink with small panel footprint.

Application:

- 10, 20, 30 and 45 Amps output rating
- 24 ... 280 V and 48 ... 600 VAC load voltage ratings
- 4 ... 32 VDC control voltage
- DIN-rail or panel mounting
- Epoxy-free design
- IP20 touch-safe housing
- CE and UL / cUL
- RoHS compliant

Specifications:	WD28D10	WD60D20	WD60D30	WD60D45
Max. rated current:	10 A	20 A	30 A	45 A
Control voltage:	4 ... 32 VDC	4 ... 32 VDC	4 ... 32 VDC	4 ... 32 VDC
Load voltage:	24 ... 280 VAC	48 ... 600 VAC	48 ... 600 VAC	48 ... 600 VAC
Scope of supply:	Device	Device	Device	Device

Temperature regulating device

FRONT
46 x 46

FRONT
46 x 92

HIGHLIGHTS:

- *Configuration in less than 60 s*
- *18 mm actual value display*
- *Short installation depth*
- *PID regulator with automatic optimisation*
- *Mini programmer*

MAXVU 16
Temperature regulating device

MAXVU 8
Temperature regulating device

General:
The new MAXVU is a cost-effective temperature regulating device that is easy to configure, has improved display legibility and costs related to wiring and spatial requirements are reduced to a minimum.
Save valuable time - configuration in less than 60 seconds. The MAXVU was specially designed for easy operability thanks to a simple configuration and adjustment menu accessible via the front keypad.
- Includes 10 of the most common parameter settings
- Setup in less than 60 seconds for many applications
- An expanded configuration menu can be added if necessary. The easy to use MAXVU PC software can also be used for quick configuration of multiple instruments.

Application:
MAXVU provides an affordable solution for applications with essential requirements for temperature regulation.
- Packaging lines
- Heat treatment
- General temperature control processes
- Food and beverage industry

Specifications:

Inputs:	Thermocouple: B, C, J, K, L, N, R, S, T, RTD: PT100 2-wire or 3-wire, linear ranges: 0/4 ... 20 mA, 0/1 ... 5 V, 0/2 ... 10 V
Outputs:	2 or 3 output relay or SSR
Functions:	PID or On/Off regulation, direction of action adjustable to ‚heating exclusively' or ‚heating and cooling' 2 alarms (absolute, deviation, band, loop alarm) Self-retaining or non-self-retaining alarm outputs One or two point calibration Ramping and dwelling modes with variable delay time Reset to standard values
Communication:	RS485 Modbus RTU Integrated configuration interface
Programming:	Front keys or software programming
Front panel & touch panel:	3 operating buttons
Messages:	Output status Heating, cooling, alarm
Display:	1/16 DIN: 18 mm top, 10.2 mm bottom 1/8 DIN: 18 mm top, 18 mm bottom
Scope of supply:	Device, manual

Accessories:
TTL / cable for MAXVU
9407-998-00003

Software
available for download free of charge at www.greisinger.de

MAXVU08 - 1 - 2 - 3 - 4

Greisinger		
1.	Type	
	0	Standard
2.	Supply voltage	
	-M	100 ... 240V 50Hz/60Hz AC
	-L	24V AC/DC
3.	Outout confi guration	
	-AA0	Logik SSR / Logik SSR
	-AR0	Logik SSR / Relais
	-RR0	Relais / Relais
	-AAR	Logik SSR / Logik SSR / Relais
	-ARR	Logik SSR / Relais / Relais
	-RRR	Relais / Relais / Relais
4.	Optionsmodul 2	
	-0	Without
	-C	RS485 Schnittstelle (ModBus RTU)

MAXVU16 - 1 - 2 - 3 - 4

Greisinger		
1.	Type	
	0	Standard
2.	Supply voltage	
	-M	100 ... 240V 50Hz/60Hz AC
	-L	24V AC/DC
3.	Outout confi guration	
	-AA0	Logik SSR / Logik SSR
	-AR0	Logik SSR / Relais
	-RR0	Relais / Relais
	-AAR	Logik SSR / Logik SSR / Relais
	-ARR	Logik SSR / Relais / Relais
	-RRR	Relais / Relais / Relais
4.	Optionsmodul 2	
	-0	Without
	-C	RS485 Schnittstelle (ModBus RTU)

CAL digital thermostat

ET 2011
Digital thermostat

General:

The series of CAL digital thermostats is a complete family of small-format devices for simple heating and cooling applications that are also equipped with displays and timers for corresponding monitoring and regulation.
The devices are easy to configure and use, are equipped with a large, easily legible display and have a compact design that enables quick installation.

Application:

Heating and cooling applications
- Thermocouple or PT100 inputs
- 2 outputs for control and for alarms
- Format 77 x 35 mm (B x H) (cutout 71 x 29 mm)

Specifications:

Input:	Thermocouples (J, K, T, S, R) or PT100
Temperature range:	PT100: -99.9 ... +300.0 °C (-99.9 ... +543.0 °F) PT100: -200 ... +600 °C (-328 ... +1112 °F) J T/C: 0 ... 600 °C (32 ... 1112 °F) K T/C: 0 ... 1300 °C (32 ... 2372 °F) T T/C: 0 ... 400 °C (32 ... 752 °F) S & R T/C: 0 ... 1700 °C (32 ... 3092 °F)
Regulation type:	On/Off, PID
Regulating strategy:	Heating or cooling regulation
Number of relay outputs (8A):	1
Number of SSR outputs:	1

ET2011 - [1] - [2] - [3]

Greisinger		
1.	Sensor type	
	RT-	PT100/RTD
	T-	Thermocouple
2.	Supply voltage	
	230	230 V AC 50/60Hz
	110	110VAC
	024	24 V AC
	SM	9-30 V DC / 7-24 V AC
3.	Power relay option	
	-R	8A relay
	-P	16A relay

NTC-Sensors

SUITABLE FOR EDT 24XX

E-NTC-APS
Art. no. 608933
NTC-Sensor
Air sensor, maximum 150 °C, stainless steel casing, 1.5 m silicone cable

E-NTC-LPS
Art. no. 608935
NTC-Sensor
Liquid sensor, maximum 150 °C, stainless steel casing, 1.5 m silicone cable

Defrosting thermostat

EDT 2411
Defrosting thermostat

EDT 2412
Defrosting thermostat

EDT 2423
Defrosting thermostat

General:

The series of CAL digital thermostats is a complete family of small-format devices. The devices are easy to configure and use, are equipped with a large, easily legible display and have a compact design that enables quick installation. The EDT defrosting models are provided with a variety of functions for the optimal regulation and performance of cooling systems, including compressor protection, real-time clock and communication.

Application:

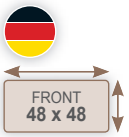
- Compressor, defrosting and fan regulation
- Up to two NTC inputs for main and defrosting temperature measurement
- Support of manual, time-controlled and evaporator-controlled defrosting modes
- Format 35 x 77 mm (cutout 29 x 71 mm)
- Real-time clock (optional)
- RS485 communication (optional)

Specifications:	EDT2411	EDT2412	EDT2423
Type and number of inputs:	NTC x 1	NTC x 1	NTC x 2
Temperature range:	-60 ... +150 °C (-76 ... +302 °F)	-60 ... +150 °C (-76 ... +302 °F)	-60 ... +150 °C (-76 ... +302 °F)
Defrosting function:	Manual (button or DI)/automatic timer	Manual (button or DI)/automatic timer	Manual (button or DI)/timer/ evaporator temperature
Number of relay outputs (8A):	1	2	3
High-current relay (optional) - compressor output (20A):	•	•	
Defrosting output:		•	•
Fan output:			•
Defrosting sensor input:			•
Real-time clock (optional):	•	•	•
RS485 Modbus communication (optional):	•	•	•

EDT 24- [1] - [2] - [3] - [4]

1.	**Number of inputs and outputs**	
	11	1x NTC input, 1 x relay output
	12	1x NTC input, 2 x relay output
	23	2x NTC input, 3 x relay output (2nd o/p for evap‘ temp‘)
2.	**Supply voltage**	
	230	230 V AC
	110	110 V AC
	12	12 V AC/DC
	24	24 V AC/DC
3.	**Compressor relay output**	
	R	8A
	P	20A output (not with EDT 2423)
4.	**Options**	
	none	(blank)
	RTC	real-time clock (only with 8A relay)
	RS	Modbus RTU

Temperature controller



HIGHLIGHTS:

- *Installation depth only 63 mm*
- *Plug-in connection terminals*
- *Clear visualization of the switching state*
- *Multifunction input*
- *Presetting via configuration code*
- *KM 3 with analog output*

KM

Temperaturregler

General:

Self-optimizing, microprocessor controlled digital controller with 2-, 3- point or PID control mode, timer function, programmer function, 3-point step control mode with selectable setpoint gradient (ramp function)

Application:

- industrial burner
- thermal power station
- medical technology
- plastic injection moulding
- kitchen technology

Specifications:

Inputs:	
Semiconductor:	**PTC KTY 81-121:** -50 ... +150 °C ±0.5 % of i.v.+1 digit
Resistance thermometer:	**Pt100 / 3-wire:** -200 ... +850 °C ±0.5 % of i.v.+1 digit **Pt1000 / 2-wire:** -200 ... +850 °C ±0.5 % of i.v.+1 digit
Thermocouple:	**Type J:** -50 ... +1000 °C ±0.5 % of i.v. +1 digit **Type K:** -50 ... +1370 °C ±0.5 % of i.v. +1 digit **Type S:** -50 ... +1760 °C ±1 % of i.v. +1 digit **Type R:** -50 ... +1760 °C ±0.5 % of i.v. +1 digit **Type T:** -70 ... +400 °C ±0.5 % of i.v. +1 digit **0 ... 50 mV, 0(12) ... 60 mV:** -1999 ... +9999 ±0.5 % of i.v. +1 digit
Standard signal:	**0(4) ... 20 mA:** -1999 ... +9999 ±0.5 % of i.v. +1 digit **0(1) ... 5 V, 0(2) ... 10 V:** -1999 ... +9999 ±0.5 % of i.v. +1 digit
Outputs:	
Output OUT1:	**Relay:** normally-open contact, 4 A / 2 A / 240 VAC **Semiconductor relay connection:** 12 VDC, 12 mA **Analog output:** (0/4 ... 20 mA, 0/2 ... 10 V) (only KM3)
Output OUT2:	**Relay:** normally-open contact, 4 A / 2 A / 240 VAC **Semiconductor relay connection:** 12 VDC, 12 mA
Output OUT3:	**Relay:** normally-open contact, 4 A / 2 A / 240 VAC **Semiconductor relay connection:** 12 VDC, 12 mA
Output OUT4:	**Semiconductor relay connection:** 12 VDC, 12 mA (programmable)
Control mode:	2-point (on / off), 3-point (neutral zone), PID, double PID
Display:	two-rowed
7-segment LED:	4-digit, red / green / orange, 15.5 mm
Additional display:	set value display, green, 7 mm
Resolution:	
Temperature:	1 °C or 0.1 °C in range -99.9 ... +999.9 °C
Current / voltage:	freely scalable, decimal point setable
Temperature unit:	°C, °F
Supply:	24 VAC / DC ±10 %, 50 / 60 Hz 100 ... 240 VAC ±10 %, 50 / 60 Hz
Configuration interface:	TTL 5-pole
Control input:	1 or 2 potential-free inputs
Transmitter supply:	12 VDC / 20 mA
COM interface:	serial RS 485 (ModBus)
Housing:	
Protection class (Front):	IP65
Connection:	screw terminals (fixed)
Dimensions:	48 x 48 x 63 mm (W x H x D)
Scope of supply:	Device, manual

KM - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10

Greisinger		
1.	Type	
	1	KM1
	3	KM3
2.	Function	
	-	None
	T	Controller + timer
	P	Controller + Timer + Programmer
3.	Power supply	
	L	24V
	H	100...240V
4.	Input combinations	
	C	TC, mV, RTD, mA, V
	E	TC, mV, PTC, NTC, mA, V
5.	OUT1	
	R	Relay
	O	SSR drive
	I	Normsingal mA,V
6.	OUT2	
	R	Relay
	O	SSR drive
	M	Motor valve driving
	-	None
7.	OUT3	
	R	Relay
	O	SSR drive
	M	Motor valve driving
	-	None
8.	OUT4	
	D	SSR drive
9.	Interface	
	S	RS 485
	-	None
10.	Terminals	
	E	Plug-in type
	N	Plug-in type (fix part only)
	-	Fixed screw type

Standard design types (available ex stock):

KM-1 HCRRRD--
Art. no. 605743
KM 1 with 100 ... 240 VAC (power supply), TC, Pt100, Pt1000, mA, mV, V + digital input 1 (input), relay (1 SPST NO, 2 A/250 VAC) and I/O digital (outputs)

KM-1 LCRRRD--
Art. no. 605744
KM 1 with 24 VAC (-25 ... +12 %) or 24 VDC (-15 ... +25 %), TC, Pt100, Pt1000, mA, mV, V + digital input 1 (input), relay (1 SPST NO, 2 A/250 VAC) and I/O digital (outputs)

KM-3 HCIR-D--
Art. no. 605745
KM 3 with 100 ... 240 VAC (power supply), TC, Pt100, Pt1000, mA, mV, V + digital input 1 (input), analog output (0/4 ... 20 mA, 0/2 ... 10 V), relay (1 SPST NO, 2 A/250 VAC) (outputs)

other design types upon request

Self-supplying plug-in display for measuring transducer without auxiliary energy source

GIA 0420 VO

GIA 0420 VOT

HIGHLIGHTS:

- *scale freely adjustable ‚on site' within seconds, no auxiliary devices required*
- *monitoring for probe damage, probe short circuit, values above/below permissible limit*
- *Software filters that can be activated/ deactivated guarantee stable display even with a sensor signal prone to interference.*
- *Without auxiliary energy*
- *Special adapter can be turned to any position*

GIA 0420-VO

Art. no. 601016
Plug-in display without buttons, 4 ... 20 mA

GIA 0420-VO-T

Art. no. 604152
Plug-in display without buttons, 4 ... 20 mA

Specifications:	
Input signal:	4 - 20 mA (2-wire)
Voltage load:	approx. 2 V, (approx. 3.5 V at ...-EX)
Supply current:	from current loop
Accuracy:	±0.2 % FS ±1 digit (at nominal temperature = 25 °C)
Display:	10 mm high LCD
Display range:	-1999 ... +9999
Decimal point:	any position
Scale:	freely adjustable via 3 buttons (for „VO": accessible after cover has been removed)
Measuring rate:	approx. 5 measurements / s
Filter:	adjustable
Limit:	3 limit functions selectable:
LI 0:	Values above/below range permissible
LI 1:	Values above/below range not permissible
LI 2:	When range is exceeded, the refering rail will be displayed
Switching outputs: (only devices with option S1 or S2)	
S1:	1 electrically isolated open collector outputs
S2:	2 electrically isolated open collector outputs, connection via separate M8 jack
Switching point, switching hysteresis:	freely adjustable
max. switching voltage:	28 V
max. switching current:	1 A (option S1: 20 mA)
Reaction time:	≤250 ms
Min./Max. value memory:	memorizing of max. and min. values.
Operation, Configuration:	via 3 keys
Working conditions:	-25 ... +50 °C / 0 ... 80 % RH (non-condensing)
Electric connection:	special-adapter design for cubic plug EN 175301-803/A for simple plug-in wherever required. 2 screws (68 and 75 mm) included in scope of supply.
Protection rating:	IP65 (when mounted appropriately)
Housing:	ABS, keypad, transparent panel made of polycarbonate
Dimensions:	approx. 48.5 x 48.5 x 35.5 mm (W x H x D) without special adapter, approx. 90 x 50.5 x 39.5 mm (W x H x D) with special adapter
Scope of supply:	Device, 2 screws (68 and 75 mm), manual

Variant:

GIA0420-VO-0-00-S2-GE
Art. no. 608220
with 2 electrically isolated switching outputs
Delivery incl. 1 m connecting cable for connection of both switching outputs
(Option S2 **not** in combination with EX-device available)

GIA 0420-VO-T-EX

Art. no. 601040
Plug-in display 4-20 mA with EX-protection for all potentially explosive atmospheres
EA qualification: II 2G Ex ia/ib IIC/IIB T4
(Further information please refer to our homepage www.greisinger.de

Variant:

GIA 0420-VO-T-EX-S1
Art. no. 608758
Device with 1 electrically isolated switching output
(Option S1 just in combination with EX-device available)

GIA 0420-WK-T

Art. no. 601653
Plug-in display with buttons, 4 ... 20 mA

GIA 0420-WK-T-EX

Art. no. 601877
Plug-in display with EX-protection for all potentially explosive atmospheres, 4 ... 20 mA

Specifications:	
as GIA ... VOT but	
Electric connection:	Connection to any standard signal source 4 ... 20 mA or 0 ... 10 V via 2 m connection cable.
Housing:	with mounting holes can be mounted to any surface.

Plug on controller/display needs no auxiliary energy

HIGHLIGHTS:

- *fast controlling and supervision (reacting time <20 ms)*
- *min./max. value memory*
- *3 limit functions, 3 filter stages*
- *alarm delay adjustable*
- *extensive self check and diagnosis system*
- *freely programmable*

GRA 0420-VO

Art. no. 601022
Plug on controller/display without auxiliary energy,
output 4 ... 20 mA, 1 electrically isolated switching output.

GRA 010-VO

Art. no. 601024
Plug on controller/display without auxiliary energy,
output 0 ... 10 V, 1 +Ub-switching output.

Specifications:	GRA 0420 ...	GRA 010 ...
Input signal:	4 ... 20 mA (2-wire)	0 ... 10 Volt (3-wire)
Voltage load:	<5.5 V	--
Input resistance:	--	approx. 30 kOhm
Supply voltage:	--	12 ... 28 V DC
Supply current:	from current loop	<10 mA
Display:	approx. 7 mm high, 4 digit LED	
Display range:	-1999 ... 9999 digit, first and last value freely adjustable	
Recommended range:	≤2000 digit	
Decimal point:	any position	
Accuracy:	≤0.2 % FS ±1 digit (at nominal temperature = 25 °C)	
Measuring rate:	>50 measurements / s	
Filter:	selectable in 3 stages	
Limit:	3 limit functions selectable:	
LI 0:	Values above/below range permissible	
LI 1:	Values above/below range not permissible	
LI 2:	When range is exceeded, the refering rail will be displayed	
Switching outputs:		
GRA0420VO:	1 electrically isolated open collector output, connection via cubic plug	
GRA010VO:	1 +Ub-switching open collector output, connection via cubic plug	
Switching point, switching hysteresis:	freely adjustable	
max. switching voltage:	28 V	
max. switching current:	20 mA (at option ... - S2: 1 A)	
Reaction time:	≤20 ms	
Switching funktions:	2 or 3 point controller, 2 point controller with alarm, min-/max-alarm	
Operation:	via 3 keys	
Working temperature:	-25 ... +50 °C	
Relative humidity:	0 ... 80 % RH (non-condensing)	
Electric connection:	special-adapter design for cubic plug EN 175301-803/A for simple plug-in wherever required. 2 screws (68 and 75 mm) included in scope of supply.	
Protection rating:	IP65 (when mounted appropriately)	
Housing:	ABS, keypad (resp. transparent panel made of polycarbonate)	
Abmessung:	approx. 48,5 x 48,5 x 35,5 mm (W x H x D) without special adapter, approx. 50,5 x 90 x 39,5 mm (W x H x D) with special adapter	
Scope of supply:	Device, 2 screws (68 and 75 mm), manual	

Variants:
GRA 0420-VO-S2 *Art. no. 605920* Design type with 2 electrically isolated switching outputs. Outputs with increased switching current (28 V / 1 A), connection via separate M8 jack (Delivery incl. 1 m connecting cable for connection of both switching outputs)
GRA 0420-VO-OT *Art. no. 605532* design type without pushbuttons in the cover (device`s adjustment is not accessible for users)
GRA 010-VO-S2 *Art. no. 607650* Design type with 2 electrically isolated switching outputs. Outputs with increased switching current (28 V / 1 A), connection via separate M8 jack (Delivery incl. 1 m connecting cable for connection of both switching outputs)
GRA 010-VO-OT *Art. no. 607645* design type without pushbuttons in the cover (device`s adjustment is not accessible for users)

GRA 0420-WK

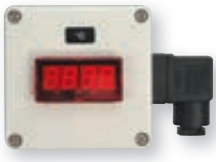
Art. no. 604881
Without auxiliary energy, output 4 ... 20 mA, 1 electrically isolated switching output.

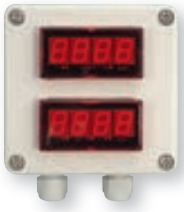
GRA 010-WK

Art. no. 604882
Output 0 ... 10 V, 1 electrically isolated switching output.

Specifications:	
same as GRA ... VO, but	
Electric connection:	connection to any standard signal source and switching output via 2 m connection cable.
Housing:	with mounting holes can be mounted to any surface whatever

Housings for surface mounting for build in of devices





	APG-1*	**APG-2***	**APG-3***
	Art. no. 602826 Housing for surface mounting incl. seal GGD2448	*Art. no. 603178* Housing for surface mounting incl. seal GGD2448	*Art. no. 603462* Housing for surface mounting incl. seal GGD2448
Dimensions:	82 x 80 x 95 mm (W x H x D), without elbow-plug	82 x 80 x 95 mm (W x H x D), without screw connections	82 x 80 x 95 mm (W x H x D), without screw connections
Panel cutout:	for 1 display at the format 48 x 24 mm	for 1 display at the format 48 x 24 mm	for 2 displays at the format 48 x 24 mm
Connection:	elbow-plug in according EN 175301-803/A, 4-pin	2 x screw connections M12 x 1,5	2 x screw connections M12 x 1,5
Protection class:	IP65	IP65	IP65
Suitable for:	GIA 20 EB / GIR 230 ... / GIA 0420 / GIA 0420 SP / GIA 2448 /WE / GTH2448/1,2,3		

	APG-4*	**APG-6***	**APG-7***
	Art. no. 602827 Housing for surface mounting incl. seal GGD4896	*Art. no. 603179* Housing for surface mounting incl. seal GGD4896	*Art. no. 606825* Housing for surface mounting incl. seal GGD4896
Dimensions:	125 x 75 x 126 mm (W x H x D), without screw connections	125 x 175 x 126 mm (W x H x D), without screw connections	122 x 72 x 126 mm (W x H x D), without screw connections
Panel cutout:	for 1 display at the format 96 x 48 mm	for 2 displays at the format 96 x 48 mm	for 1 display at the format 72 x 36 mm
Connection:	screw connections M12 x 1,5 and M16 x 1,5	screw connections 2 x M12 x 1,5 and 2 x M16 x 1,5	screw connections M12 x 1,5
Protection class:	IP65	IP65	IP65
Suitable for:	GIA 2000 / GIR 2000 PT / GIR 2002 ..., / GTH 83 EG, / GTH 1150 EG		GIR 300, GIR 360

* Note: All housings without installation device and without unit sticker! These (see page 109) have to be ordered separately!
The Installation device will be assembled for free in the housing (on common order) if desired.

Solid State Relays

WP66D10
Art. no. 608519
Solid State Relay

WP66D25
Art. no. 608520
Solid State Relay

WP66D50
Art. no. 608521
Solid State Relay

WP66D75
Art. no. 608522
Solid State Relay

General:

The WP SSRs provide an economy option for users requiring devices to switch up to 75A.
- Panel mounting
- High thermal performance
- CE and UL / cUL
- RoSH compliant

Specifications:	
Max. rated current:	10, 25, 50, 75 A
Control voltage:	48 ... 660 VAC
Load voltage:	4 ... 32 VDC
Scope of supply:	Device

Alarm light with buzzer

Application

ALARM 230V
Art. no. 600913
Alarm light with buzzer

General:

Universal alarm device with flashlight and buzzer, which is connected easily to relay outputs and the 230 V grid.

Specifications:	
Color:	red
Sound level:	92 dB
Power supply:	230 V AC / 50 Hz
Working temperature:	-20 ... +50 °C
Protection class:	IP 65
Suitable for:	e. g. GIR 2002, GIR 230, GIR 300

Power supply

GNG 220

GNG 12/300

DPP 15

GNG 220/2
Art. no. 600282

GNG 220/2-12V
Art. no. 600305

GNG 220
Art. no. 603813

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

Specifications:	
Input voltage:	230 V, 50/60 Hz
Output voltage:	**GNG 220/2:** 2 x 18 V DC ±5 %, 25 mA each **GNG 220/2-12V:** 2 x 12 V DC, 30 mA each **GNG 220:** 1 x 12 V DC, 100 mA, unregulated
Dimensions:	48 x 96 x 52 mm (W x H x D)
Mounting:	snap-on to top hat rail

GNG 12 / 300
Art. no. 600274

GNG 24 / 150
Art. no. 600275

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

Specifications:	
Input voltage:	230 V, 50/60 Hz
Output voltage:	**GNG12/300:** 12 V DC ±5 %, 300 mA **GNG24/150:** 24 V DC ±5 %, 150 mA other voltage upon request
Dimensions:	70,4 x 96 x 62 mm (W x H x D)
Mounting:	snap-on to top hat rail

DPP 15
Art. no. 607282

DC power supply unit

Specifications:	
Input voltage:	85 ... 264 V AC, 50 ... 60 Hz or 90 ... 375 V DC
Output voltage:	22.5 ... 28.5 V DC, adjustable by trimmer
max. output current:	0.6 A
Dimensions:	22.8 x 75 x 102 mm (W x H x D)
Mounting:	snap-on to top hat rail

DC/DC-converter

GNG 12 / 24
Art. no. 600276

GNG 24 / 24
Art. no. 600277

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

Specifications:	
Input voltage:	GNG12/24: 10 ... 18 V DC GNG24/24: 19 ... 30 V DC
Output voltage:	24 V DC ±5 %, max. 80 mA, electrically isolated
Insulating voltage:	500 V
Operating temperature:	-20 ... +70 °C
Mounting:	snap on to top hat rail.
Dimensions:	minimum space requirements due to narrow rack housing (module fully encapsulated). Installation width only 22.5 mm.

GNG 12 / 2 x 12
Art. no. 607942

GNG 24 / 2 x 24
Art. no. 605492

DC/DC-converter

Specifications:	
Input voltage:	GNG 12 / 2 x 12: 10 ... 18 V DC GNG 24 / 2 x 24: 19 ... 30 V DC
Output voltage:	2 x 24 V DC ±5 %, max. 80 mA each, electrically isolated

other data identical to GNG12/24 resp. GNG24/24

Power supply and relay module (e.g. for GIA 20 EB)

GNR10
Art. no. 603680

Power supply and relay module for top-hat rail, power supply for one GIA 20 EB and one transducer.

Specifications:	
Input voltage:	230 V, 50/60 Hz (others upon request)
Output voltage:	approx. 11 V DC (unregulated) for the supply of a GIA 20 EB 18 V DC ±5 % (regulated), 25 mA for measuring transducer
Relay outputs:	2 volt-free changeover contacts, switching current: max. 10 A ohmic load.
Connection:	screw-type terminal
Dimensions:	48 x 96 x 60 mm (W x H x D)
Mounting:	snap on to top hat rail

GR10
Art. no. 607943

Relay module for top-hat rail for one GIA 20 EB to mounting to a top-hat rail

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

Data logger T-Logg (not bus-capable)

Data logger for EASYBus

Application:	T-Logg 100 ..	T-Logg 120 ..	T-Logg 160	EASYLog 40k	EASYLog 80CL...	EASYLog 40 NS	EASYLog 40 IMP	EASYLog 40 BIN
Temperature	•		•	•	•			
Humidity			•		•			
Air pressure (abs.)					•			
Standard signal		•				•		
Pulse							•	
State								•
Interface	USB 100			EASYBus	EASYBus	EASYBus	EASYBus	EASYBus
EASYBus-load				2	2	2	2	2
Device information:								
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Sensor moduls for EASYBus

Application:	EBT	EBHT	EBT-2R	EBHT-2R	EBT-IF	EBN	EBG-CO	EBG-CO2
Temperature	•	•	•	•	•			
Humidity		•		•				
Standard signal						•		
CO							•	
CO_2								•
EASYBus-load	1.5	1.5	1.5	1.5	1.5	2	1	1
Device information:								
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LOGGER/ BUS SYSTEMS

DeltaOHM wireless data logger

Application:	HD35ED-I-N/3-TC-E	HD35ED-...-N-TV-E	HD35ED-...-1N-TVI-E	HD35ED-L-1N-TV-E	HD35ED-G-14BN-TVI-E	HD35ED-...-14BNAB-E	HD35-ED-...-1NB-E	HD35ED-G-H-E	HD35ED-W-H-E	HD35ED-W-N-TV-E	HD35ED-W-1N-TVI-E
Temperature	3x NTC Eingang	•	•	•	•	•	•			•	•
Humidity			•	•	•	•	•				•
Air pressure (abs.)					•	•					
CO						•					
CO_2						•	•				
Universal input								3x	4x		
Waterproof									•	•	•
Device information:											
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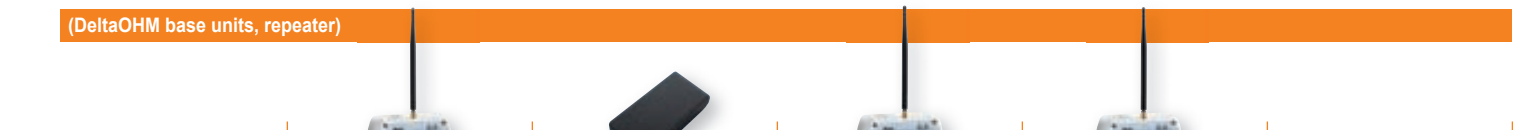
(DeltaOHM base units, repeater)



Application:	HD35-RE-E	HD35-AP-D-E	HD35-AP-W-E	HD35-AP-G-E	HD35-ED-ALM-E
Description	Repeater	USB-Dongle	Access Point	Access Point	Alarm module
Range (868 MHz radio)	300 m (180 m to HD35-AP-D-E)	180 m	300 m	300 m	300 m
USB		•	•	•	
LAN/WiFi			•		
GSM (mobile radio)				•	
Relay outputs					2
Device information:					
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asseccories see page 138, software-information p.r.t. page 95,

T-Logg data logger (for standalone applications)

- Data logger for temperature, humidity, standard signals
- 16,000 measurements

Data logger for standalone applications
(e.g. directly on the goods during refrigerated transport)
The free MINISoft software (download from www.greisinger.de) and a USB 100 connecting cable (not included in the scope of delivery) are required for configuration and readings.
T-Logg is not compatible with EASYBus, is not bus-capable and is not designed for permanent communication with the software.

T-LOGG
The logger series for stand-alone applications

DIN EN 12830

General specifications:	
Display:	LCD-display, 10 mm high
Recording interval:	1 s ... 5 h (T-Logg 160 4 s ... 5 h)
Storage capacity:	16.000 measuring values
Recording time:	166 days (if interval is 15 min.)
Nominal temperature:	25 °C
Working temperature:	-30 ... +60 °C (T-Logg 100... only, otherwise -25 ... +60 °C)
Storage temperature:	-40 ... +85 °C (T-Logg 100... only, otherwise -30 ... +85 °C)
Battery:	CR 2032, exchangeable
Battery service life:	over 3 years (if recording interval is 15 min.)
Approvals:	DIN EN 12830
Interface:	3-pole M8 plug for USB 100
Housing:	Housing made of shock resistant plastic, transparent front made of polycarbonate. splash water-proof: IP 65.
Dimensions:	48.5 x 48.5 x 35.5 mm (W x H x D); Housing without mounting lugs, plug, sensor connection and/or sensor tube

Accessories and spare parts:

USB 100
Art. no. 602051
Interface converter, for direct connection of one T-Logg to the USB-interface of a PC.

GWH 40K
Art. no. 601166
Wall suspension with lock against theft (picture: see page 139)

GWH 10
Art. no. 601169
Simple wall suspension, made of stainless steel (picture: see page 139)

Ersatz-CR 2032
Art. no. 606080
spare battery for T-loggs

ISO-WPF4
Art. no. 602543
Certificate of calibration incl. standard-measuring values (approx. 20 % / 40 % / 60 % / 80 % RH increasing and decreasing; measurement point Temperature: approx. +23 °C)

ISO-WPT3
Art. no. 602596
Certificate of calibration: -20 °C / 0 °C / +70 °C

Note: The T-Logg 100 is neither BUS- nor EASYBus compatible.

Temperature-Logger

T-Logg-100

T-Logg-100-E

T-Logg 100
Art. no. 600563
Temperature data logger (16.000 measurement values) for any application

Specifications:	
Measuring range:	-30.0 ... +60.0 °C (Resolution: 0.1 °C)
Accuracy: (at 25 °C)	±0.5 °C
Sensor:	NTC 10 K
Sensor connection:	integrated in device
Scope of supply:	Device, battery, manual

T-Logg 100-SET
Art. no. 602153
Complete set: T-Logg 100 + USB 100 (incl. software)

T-Logg 100-E
Art. no. 600565
Temperature data logger (16.000 measurement values) for any application

Specifications:	
Measuring range:	-30.0 ... +120.0 °C (Resolution: 0.1 °C)
Accuracy: (at 25 °C)	±0.2 % of measuring value ±0.5 °C
Sensor:	NTC 10 K in VA sensor tube, Ø 5 mm, approx. 50 mm long
Sensor connection:	approx. 1 m silicone cable, with anti-buckling glanding to housing
Scope of supply:	Device, battery, manual

T-LOGG
The logger series for stand-alone applications

DIN EN 12830

Note: For configuration or reading out a interface converter USB 100 is needed!

Humidity- / Temperature-Logger

T-Logg 160

Art. no. 600887

Humidity- / Temperature- Data-Logger (16.000 meas. values) for any application

Specifications:	
Measuring ranges:	0.0 ... 100.0 % r.F. (resolution: 0.1 % RH) -25.0 ... +60.0 °C (resolution: 0.1 °C)
Accuracy (at 25 °C):	±3 % in range 10 ... 90 % ±0.3 °C ±0.017 * (T - 25 °C)
Sensors:	capacitive humidity sensor Silicon temperature sensor in sensor tube with Ø 15 mm and removable plastic protective cap
Sensor connection:	installed directly in the housing
Display:	10 mm high LCD-display
Scope of supply:	Device, battery, manual, free software for download: www.greisinger.de

T-Logg 160 SET

Art. no. 602273

Complete set with T-Logg 160, interface converter USB 100, incl. software

Standard signal data logger

T-Logg 120-W

T-Logg 120-K

T-Logg 120-W-...

Standard signal data logger (16.000 measuring values) for transducers etc.

Specifications:	
Display range:	-1999 ... 9999 digit, freely programmable
Decimal point:	any position
Measuring range:	depending on variant
Accuracy:	±0.5 % FS (at nominal temperature)
Sensor:	16 bit analogue digital converter
Electric connection:	elbow-plug in accordance with EN 175301-803/A for connection to an existing transmitter.
Scope of supply:	Device, battery, manual

T-Logg 120-K-...

Specifications:	
Display range:	depending on variant
Accuracy (at 25 °C):	±0.5 % FS (at nominal temperature)
Sensor:	16 bit analogue digital converter
Electric connection:	Silicone cable, approx. 0.5 m long (with anti-kink protection, not removable)
Scope of supply:	Device, battery, manual

T-LOGG120 - 1 - 2

Greisinger		
1.	Model	
	W	Angle plug
	K	Cable connection
2.	Input signal	
	-E1	4-20 mA
	-E2	0-10 V
	-E3	0-20 mA
	-E4	0-1 V
	-E5	0-2 V

T-LOGG The logger series for stand-alone applications DIN EN 12830

T-LOGG The logger series for stand-alone applications DIN EN 12830

Note: For configuration or reading out a interface converter USB 100 is needed!

asseccories see page 138, software-information p.r.t. page 95,

Temperature Logger for watching production and server-rooms

MIN MAX · ISO · CORR · BAT · LOGG

E.A.S.Y.Bus-Modul

DIN EN 12830

EASYLOG-40K

EASYLOG-40KH

EASYLOG-40KH-GOF

HIGHLIGHTS:

- *as well as cooling chambers according assignation of frozen food 92/1/EWG*

EASYLOG 40K

Art. no. 600542

Temperature data logger, sensor tube are attached on the device

Specifications:	
Measuring ranges:	-30.0 ... +60.0 °C (Resolution: 0.1 °C)
Accuracy (25 °C):	±0.5 °C
Sensor:	Pt1000 (2-wire), DIN cl. AA, in sensor tube made of plastic, Ø 7 mm, approx. 30 mm long, at certificate: stainless steel tube, Ø 5 mm, approx. 60 mm long)
Sensor connection:	Installed directly in the housing

EASYLOG 40KH

Art. no. 600544

Temperature data logger, sensor tube are connected via 1 m cable

Specifications:	
Measuring ranges:	-50.0 ... +150.0 °C (Resolution: 0.1 °C)
Accuracy (25 °C):	±0.5 °C
Sensor:	Pt1000 (2-wire), DIN cl. AA, sensor tube made of stainless steel, Ø 5 mm, approx. 50 mm long
Sensor connection:	Silicone cable, approx. 1 m long (with anti-kink protection, not removable)

EASYLOG 40KH-E300

Art. no. 600547

Temperature data logger, sensor tube are connected via 1 m cable, increased measuring range

Specifications:	
Measuring ranges:	-50.0 ... +300.0 °C (Resolution: 0.1 °C)
Accuracy (25 °C):	±0.5 °C ±0.2 % v. M.W.
Sensor:	Pt1000 (2-wire), DIN cl. AA sensor tube made of stainless steel, Ø 3 mm, approx. 100 mm long, sleeve Ø 5, approx. 50 mm long
Sensor connection:	Glass fibre cable, approx. 1 m long (with anti-kink protection, not removable)

EASYLOG 40KH-E600

Art. no. 600549

Temperature data logger, sensor tube are connected via 1 m cable, increased measuring range

Specifications:	
Measuring ranges:	0 ... 600 °C (Resolution: 1 °C)
Accuracy (25 °C):	±1 °C ±0.2 % v. M.W.
Sensor:	Pt1000 (2-wire), DIN cl. AA sensor tube made of stainless steel, Ø 3 mm, approx. 100 mm long, sleeve Ø 5, approx. 50 mm long
Sensor connection:	Silicone cable, approx. 1 m long (with anti-kink protection, not removable)

EASYLOG 40KH-GOF

Art. no. 600551

Temperature data logger, with surface probe for pipe mounting

Specifications:	
Measuring ranges:	-50.0 ... +150.0 °C (Resolution: 0.1 °C)
Accuracy (25 °C):	±0.5 °C ±0.2 % v. M.W.
Sensor:	Pt1000 (2-wire), DIN cl. AA self-adhesive surface temperature probe (type GOF 115 Pt1000 - p.r.t. p. 198)
Sensor connection:	PFA cable, approx. 2 m long (with anti-kink protection, not removable)

Specifications:	
Display:	10 mm high LCD-display
Recording interval:	2 s ... 5 h, free programmable via software GSOFT 40K
Storage capacity:	48.000 measuring values
Recording time:	500 days, (if recording interval is 15 min.)
Battery service life:	approx. 6 years (if recording interval is 15 min.)
Working temperature (electronic):	-30 ... +60 °C
Storage temperature:	-40 ... +70 °C
Interface:	EASYBus-interface, 3-pin mini-integral plug
Approvals:	DIN EN 12830
Housing:	ABS housing, clear polycarbonate pane. Splash-proof IP65
Dimensions:	48.5 x 48.5 x 35.5 mm (L x W x D) sensor and plug not included
Scope of supply:	Device, manual

Accessories and spare parts:

ISO-WPT3
Art. no. 602596
Certificate of calibration, measuring points -20 °C / 0 °C / +70 °C (at ...40KH)

ISO-WPT3L
Art. no. 603530
Certificate of calibration, measuring points: -20 °C / 0 °C / +60 °C (at ...40K)

EASYLOG - 1 - 2 - 3 - 4 - 5 - 6

Greisinger		
1.	Design type	
	40K	40K
	40KH	40KH
	40KH-E300	40KH-E300
	40KH-E600	40KH-E600
	40KH-GOF	40KH-GOF
2.	Option	
	-DBK	Double battery capacity
3.	Option	
	-ALARM	Additional Alarm output according to PI
4.	Option	
	-AFK	Detachable sensor cable acc. PI
	-AFK-GL	Detachable sensor cable acc. PI, without sensor
5.	Option	
	-SMB	Special measuring range selectable between -200 .. +600 ° C
6.	Option	
	-WD	Water proof sensor
	-TU	Tefl on covered sensor
Various cable types and lengths upon request		

Other probes see page 188-190

Attention: Our software GSOFT40K as well as a level converter (EBW1, EBW3 or EBW64) and connection cable (EBSK 01) are required for all EASYLOG devices for configuration and to read-out logger data. (p.r.t. pages 97 and 138/139).

Humidity-/Temperature-/Air pressure Logger

EASYLOG 80CL-E

EASYLOG 80CL

EASYLOG 80CL

Art. no. 602773

Humidity-/Temperature-/Air pressure data logger (each 250.000 measured values) for climatic applications.

EASYLOG 80CL-E

Art. no. 606630

Humidity-/Temperature-/Air pressure data logger (each 250.000 measured values) for climatic applications., with external sensor

Specifications:

	Measuring / display range:	Accuracy (at 25 °C):
Humidity:	0.0 ... 100.0 % RH	±2 % in range 10 ... 90 %
Temperature:	-25.0 ... +60.0 °C	±0.3 °C ± 0.017 * (T -25 °C)
Air pressure:	300.0 ... 1100.0 hPa	±1.0 hPa
Additional available display ranges:		
Wet bulb temperature:	-27.0 ... +60.0 °C	
Dewpoint temperature:	-40.0 ... +60.0 °C	
Enthalpy:	-25.0 ... +999.9 kJ/kg	
Atmospheric humidity:	-0.0 ... +640.0 g/kg	
Absolute humidity:	0.0 ... 200.0 g/cm³	
Resolution display and memory:	0.1 °C, 0.1 % RH and 0.1 hPa or 1 digit	
Sensors:		
Humidity/Temperature:	sensor mounted in sensor tube (sensor is exchangeable)	
Air pressure:	sensor integrated in housing	
Sensor tube:	approx. Ø 15 mm made of polyamide	
Protection cap:	screw-type plastic protection cap for quick responses	
Display:	two 4½-digit LCD-displays	
Recording interval:	4 s ... 5 h, free programmable via buttons on the device or via the software GSOFT 40K	
Storage capacity:	250.000 data sets (humidity, temperature, air pressure) in max. 64 recording sequences	
Recording time:	7 years (at 15 min. interval)	
Battery service life:	approx. 5 years (at 15 min)	
Working temperature:	-25 ... +60 °C	
Storage temperature:	-30 ... +70 °C	
Interface:	EASYBus-interface 3-pin mini-integral plug	
Housing:	Housing made of shock resistant plastic, transparent front made of polycarbonate, splash water-proof: IP65 (excl. protection cap)	
Dimensions:	48.5 x 48.5 x 35.5 mm (L x W x H) sensor and plug not included.	
Scope of supply:	Device, manual	

Variants:

EASYLOG 80CL-ALARM

Art. no. 603336

Humidity-/Temperature-/Air pressure data logger additional alarm-output, open-collector output via 4-pole miniature mounting connector (IP65) including 1 m cable. Max. switching power: 28 V, 50 mA

Accessories and spare parts:

ISO-80CL

Art. no. 607734

Certificate of calibration humidity (measured points about 20/40/60/80% at 23 ° C) Pressure 5 points increase, 5 points decrease over the entire measuring range

Standard signal logger

EASYLOG 40NS-W

REPLACES FOR EXPENSIVE RECORDERS

EASYLOG 40NS-W-...

Standard Signal Data Logger (48.000 meas. values) for transducers etc. (with elbow type plug)

EASYLOG 40NS-K-...

Standard Signal Data Logger (48.000 meas. values) for transducers etc. (with PG glanding and cable)

Specifications:

Display range:	-1999 ... 9999 digit free programmable
Decimal point:	any position
Eingangssignale:	one signal only! 0 ... 2 V, 0 ... 10 V, 0 ... 20 mA or 4 ... 20 mA, other input signals upon request (input is not isolated for EASYBus)
Accuracy:	±0.5 % (at nominal temperature)
Display:	10 mm high LCD-display
Recording interval:	2 s ... 5 h, free programmable via software GSOFT 40K
Storage capacity:	48.000 measuring values
Recording time:	500 days (if recording interval is 15 min)
Battery service life:	approx. 6 years (if recording interval is 15 min)
Working temperature:	-25 ... +60 °C
Storage temperature:	-30 ... +70 °C
Interface:	EASYBus-interface 3-pin mini-integral plug
Electric connection: (for input signals)	
... 40NS-W:	elbow-plug in accordance with EN 175301-803/A for connection to an existing transmitter.
... 40NS-K:	approx. 0.5 m connection cable
Housing:	Housing made of shock resistant plastic, transparent front made of polycarbonate, splash water-proof: IP65
Dimensions:	48.5 x 48.5 x 35.5 mm (W x L x D), with elbow-plug: 50.5 x 90 x 39.5 mm
Scope of supply:	Device, manual

EASYLOG40NS - [1] - [2] - [3] - [4]

Greisinger		
1.	Design type	
	K	Cable connection
	W	Angle plug
2.	Input signal	
	-E1	4-20 mA
	-E2	0-10 V
	-E3	0-20 mA
	-E4	0-1 V
3.	Option	
	-DBK	Double battery capacity
4.	Option	
	-ALARM	Additional Alarm output

asseccories see page 138, software-information p.r.t. page 95,

Pulse-Logger

BAT
LOGG
MIN MAX
E.A.S.Y.Bus-Modul

FOR CONSUMPTION AND FLOW RATE MEASURING, PIECE COUNTING ETC.

EASYLOG 40IMP-S

Art. no. 600553

Pulse Data Logger (48000 measuring values) for individual use
(type switching contact - with PG-glanding and cable)

EASYLOG 40IMP-T

Art. no. 600555

Pulse Data Logger (48000 measuring values) for individual use
(type TTL-signal - with PG-glanding and cable)

Specifications:	
Measuring range:	0 ... 30000 pulses/cycle
Resolution:	1 pulse
Cycle:	2 s ... 5 h, free programmable via software GSOFT 40K
Display range:	-1999 ... 9999 digit free programmable
Decimal point:	any position
Input signals: (input is not isolated for EASYBus)	
EASYLog 40IMP/S:	passive volt-free switching contact
EASYLog 40IMP/T:	active TTL-signal
Resolution display and memory:	1 digit
Accuracy:	cycle time ±50 ms
Display:	10 mm high LCD-display
Recording interval:	equal to cycle
Storage capacity:	48.000 measuring values
Recording time:	500 days (if recording interval is 15 min.)
Battery service life:	approx. 6 years (without switching current, at 15 min)
Working temperature:	-25 ... +60 °C
Storage temperature:	-30 ... +70 °C
Interface:	EASYBus-interface, 3-pin mini-integral plug
Electric connection:	(for input signals) approx. 0.5 m connection cable, flying leads
Housing:	ABS housing, clear polycarbonate pane. Impermeable to splash water IP65
Dimensions:	48.5 x 48.5 x 35.5 mm (L x W x H) without connecting cable and plug
Scope of supply:	Device, manual

EASYLOG40IMP - [1] - [2] - [3]

Greisinger		
1.	Design type	
	S	Switching contact - with PG screw fitting & cable
	T	TTL signal - with PG screw fitting & cable
2.	Option	
	-DBK	Double battery capacity
3.	Option	
	-ALARM	Additional Alarm output

State-Logger

BAT
LOGG
MIN MAX
E.A.S.Y.Bus-Modul

FOR STATE MONITORING ETC.

EASYLOG 40BIN

Art. no. 602975

State Data-Logger (48000 measuring values) for individual use

Specifications:	
Input signal:	passive volt-free switching contact (input is not isolated for EASYBus)
Measuring values:	1 = contact is closed (R < 50 Ohm) 0 = contact is open (R > 20 kOhm)
Cycle:	2 s ... 5 h, free programmable via software GSOFT 40K
Resolution display and memory:	1 digit
Display:	10 mm high LCD-display
Recording interval:	equal to cycle
Storage capacity:	48.000 measuring values
Recording time:	500 days (if recording interval is 15 min.)
Battery service life:	approx. 6 years (without switching current, if recording interval is 15 min.)
Working temperature:	-25 ... +60 °C
Storage temperature:	-30 ... +70 °C
Interface:	EASYBus-interface 3-pin mini-integral plug
Electric connection:	(for input signals) approx. 0.5 m connection cable, flying leads
Housing:	ABS housing, clear polycarbonate pane. Impermeable to splash water IP65
Dimensions:	48.5 x 48.5 x 35.5 mm (L x W x H) without connecting cable and plug
Scope of supply:	Device, manual

EASYLOG40BIN - [1] - [2]

Greisinger		
1.	**Option**	
	DBK	Double battery capacity
2.	**Option**	
	ALARM	Additional Alarm output

Attention: Our software GSOFT40K as well as a level converter (EBW1, EBW3 or EBW64) and connection cable (EBSK 01) are required for all EASYLOG devices for configuration and to read-out logger data. (p.r.t. pages 97 and 138/139).

E.A.S.Y.Bus® System

PRINCIPLE OVERVIEW

Characteristics of the EASYBus system

- Low-cost wiring by using a twisted 2-pin connection line in either bus or tree design (polarity-free); can be used in any combination
- Bus line for simultaneous power supply and signal transmission
- Bus length up to 1000 m, extensible by using a repeater
- Fully automatic start-up installation via software
- Sensor modules can be changed, removed or added during operation at any time
- Connection of up to 250 sensor modules
- Optimum transmission reliability by means of CRC check
- Bus system is able to process data up to 20 measuring values per second
- Response time inside the EASYBus-system approx. 1 s; but approx. 20 ms by using a local controlling system

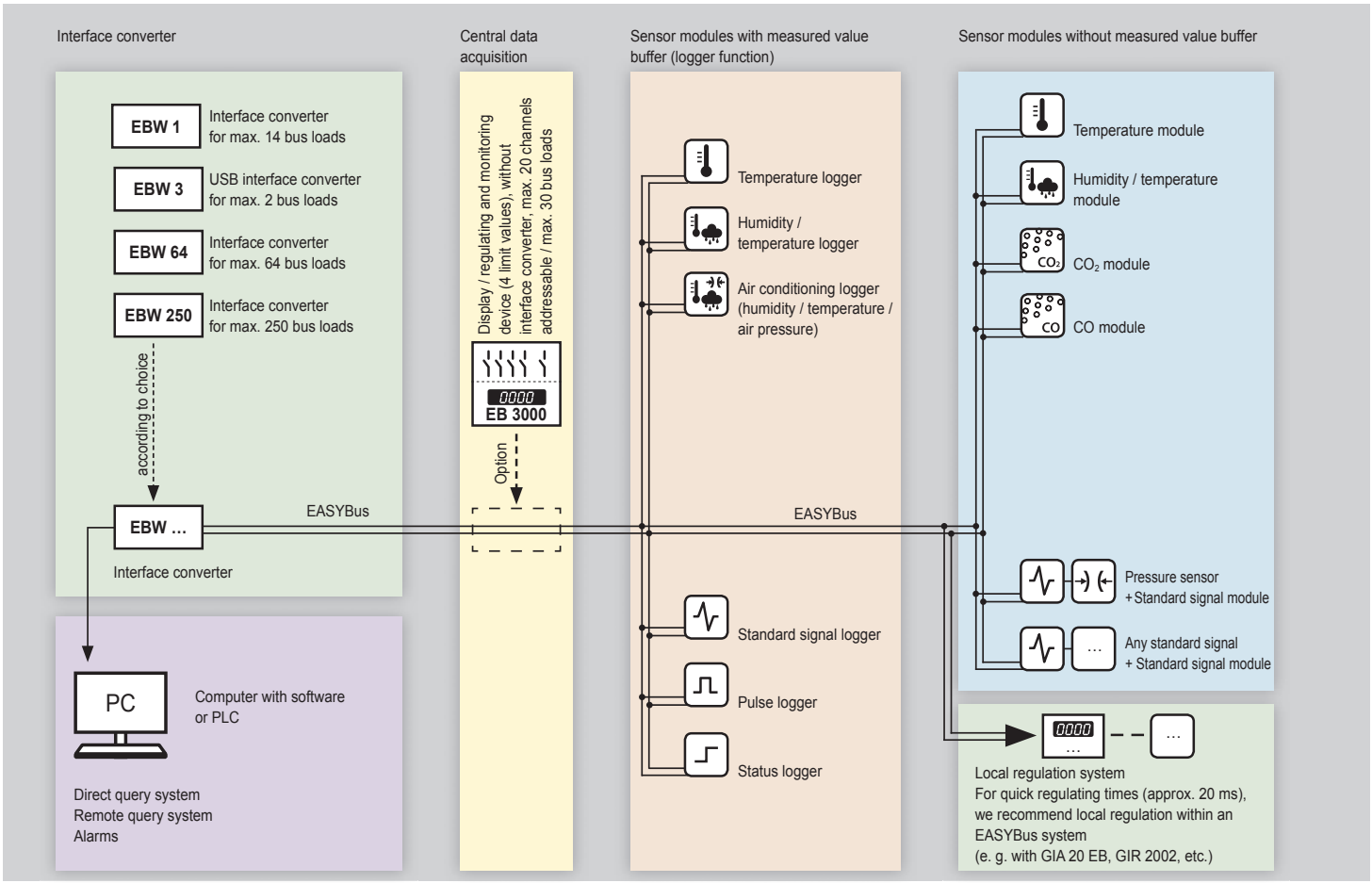
Temperature monitoring and regulation:
Cooling chambers
Laboratory + utility rooms
Storage rooms

Relative humidity / dew point / temperature monitoring:
Storage rooms, Heating systems / air condition, Museums / exhibition rooms / Libraries, Laboratories / utility rooms

Relative humidity / atmospheric pressure, CO_2 monitoring:
Manufacturing rooms / storage rooms, Office rooms (to condition the air of the room), Greenhouses

CO monitoring:
Underground garages / Parking garages, Motorcar garage / car repair
Indoor go-kart tracks

Further information you find in our brochure ‚Measurement data acquisition systems` and on www.greisinger.de.

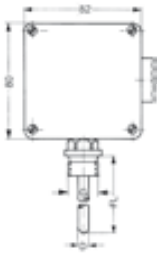


asseccories see page 138, software-information p.r.t. page 95,

EASYBus - sensor modules for temperature

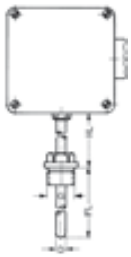
EBT - AP1
water proof
IP 65

EBT - AP1



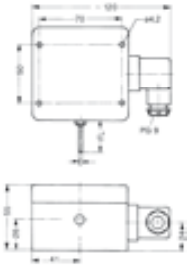
Standard:
G = ½"
FL = 100 mm
D = 6 mm

EBT - AP2



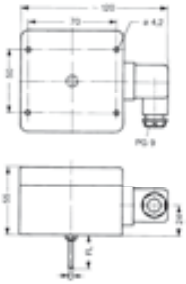
Standard:
G = ½"
HL = 50 mm
FL = 100 mm
D = 6 mm

EBT - AP3



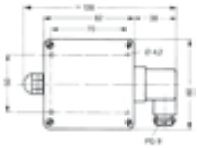
Standard:
FL = 50 mm
D = 3 mm

EBT - AP4



Standard:
FL = 100 mm
D = 6 mm

EBT - AP5



EBT-AP1
EASYBus - sensor modules for temperature (measuring range: -50.0 ... +150.0 °C)

EBT-AP2
EASYBus - sensor modules for temperature (measuring range: -50.0 ... +400.0 °C)

EBT-AP3
EASYBus - sensor modules for temperature (measuring range: -50.0 ... +150.0 °C)

EBT-AP4
EASYBus - sensor modules for temperature (measuring range: -50.0 ... +150.0 °C)

EBT-AP5
EASYBus - sensor modules for temperature (measuring range: -199.9 ... +650.0 °C)

EBT-SHUT
EASYBus - sensor modules for temperature incl. heat absorption hat (measuring range: -25.0 ... +80.0 °C)

Design types:	
EBT-AP1:	With threaded pin „G“ for direct screw connection.
EBT-AP2:	For higher temperatures, threaded pin „G“ at a distance from housing. HL = collar tube length.
EBT-AP3:	Indoor or outdoor probe for direct wall mounting (encapsulation of electronics required for outdoor use).
EBT-AP4:	Duct-type probe with probe tube arranged centrally and pointing downwards.
EBT-AP5:	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).
EBT-SHUT	without illustration; see next page
Other design types upon request - please do not hesitate to contact us!	

Specifications:	
Measuring range:	
AP1, AP3, AP4:	-50.0 ... +150.0 °C or -58.0 ... +302.0 °F
AP2:	-50.0 ... +400.0 °C or -58.0 ... +752.0 °F
AP5:	-199.9 ... +650.0 °C or -199.9 ... +999.9 °F
SHUT:	-25.0 ... +80.0 °C or -13.0 ... +176.0 °F
Sensor element:	Resistance thermometer Pt1000 acc. to DIN IEC 751
Resolution:	0.1 °C / 0.1 °F
Accuracy (electronic):	(at nominal temperature = 25 °C) ±0.2 % of meas. value ±0.2 °C
Sensor accuracy:	(Pt1000)
Standard:	acc. to DIN cl.B (±0.3 °C at 0 °C)
Option:	DIN cl. AA: ±0.1 °C at 0 °C
Electric connection:	elbow-type plug EN 175301-803/A (IP65), output 2-wire connection, max. 1.5 mm² each, no polarity
Sensor connection:	2-wire connection available (e.g. EBT - AP5)
Ambient temperature (electronic):	-25 ... +70 °C
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 70 mm
Fixing screws:	max. shaft Ø: 4mm

Sensor mounting:	sensors are electrically insulated as a standard.
Thread sizes G:	1/2“ (standard) material V4A
Housing:	Material: ABS, protection class: IP65
Dimensions:	82 x 80 x 55 (L x W x H)
Scope of supply:	Device, manual

EBT - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8

Greisinger		
1.	Design type	
	AP1	With thread, without neck tube
	AP2	With thread, with neck tube
	AP3	Indoor and outdoor sensor
	AP4	Duct sensor
	AP5	For external sensor connection
	SHUT	Heat protective hat
	AP	loose board
2.	Fitting length EL	
	-050	50 mm, Standard at AP3
	-100	100 mm, Standard at AP1, AP2, AP4
		Each further 100 mm
3.	Neck tube length	
	-050	50 mm
4.	Probe diameter D	
	-03	Ø 3 mm
	-04	Ø 4 mm
	-05	Ø 5 mm
	-06	Ø 6 mm
	-08	Ø 8 mm
5.	Thread	
	-G1	G 1/2
	-G2	G 1/4
	-G5	G 3/8
	-M5	M5
	-M6	M6
	-M8	M8
	-M0	M10
	-M2	M12
6.	Option	
	-VO	On site display
7.	Option	
	-LACK	Encapsulated PC Board
8.	Option	
	-1/3B	Higher sensor accuracy DIN class AA

EASYBus - Sensormodule für Feuchte / Temperatur

MIN MAX

O-CORR

E.A.S.Y.Bus-Modul

EBHT - 1R
incl. option VO

EBHT-1K

EBHT-2K

EBHT-SHUT

EBHT-KABEL

EBHT-1R

Art. no. 602905
EASYBus-sensor modules for humidity / temperature
(sensor tube at the side, FL = 50 mm)

EBHT-1K

Art. no. 602904
EASYBus-sensor modules for humidity / temperature
(sensor tube at the side, FL = 220 mm)

EBHT-2K

Art. no. 602906
EASYBus-sensor modules for humidity / temperature
(sensor tube pointing downwards, FL = 220 mm)

EBHT-SHUT

Art. no. 605863
EASYBus-sensor modules for humidity / temperature
(incl. heat absorption hat) type incl. option HO and LACK

EBHT-KABEL

Art. no. 605029
EASYBus-sensor modules for humidity / temperature
(separated sensor tube) type incl. option HO

Specifications:	
Measuring range:	
Humidity:	0.0 ... 100.0 % RH
recommended range (standard):	30 ... 80 % RH
recommended range (option -HO):	5 ... 95 % RH
Temperature:	-40.0 ... 120.0 °C or -40.0 ... 248.0 °F
Display options:	with option UNI an alternative display unit can be shown instead of the humidity measuring value. The unit selection will be done via the interface or at the keyboard (by option VO).
Wet bulb temperature:	-27.0 ... +60.0 °C
Dewpoint temperature:	-40.0 ... +60.0 °C
Enthalpy:	-25.0 ... +999.9 kJ/kg
Atmospheric humidity:	0.0 ... 640.0 g/kg
Absolute humidity:	0.0 ... 200.0 g/m³
Resolution:	0.1 % RH or 0.1 °C / 0.1 °F
Accuracy: (at nominal temperature = 25 °C)	
Humidity:	±2.5 % RH (at recommended range)
Temperature:	±0.4 % of measuring value ±0.2 °C
Electric connection:	elbow-type plug EN 175301-803/A (IP65), output 2-wire connection, max. 1.5 mm² each, no polarity
Ambient temperature:	
Electronic, housing:	-25 ... +50 °C
Sensor (sensor tube):	-40 ... +100 °C (for short time up to 120 °C)
Sensor tube:	tube-Ø 14 mm, screwable, protection cap with stainless steel gauze (105 µm). Total length approx 50 or 220 mm (standard)
Version KABEL:	„separated sensor tube“, sensor head (Ø 14 x 68 mm) connected to housing via approx. 1 m teflon cable.
Version SHUT:	Radiation cap / weather protection **Applications:** The radiation cap is designed for especially precise exterior dimensions. Powerful solar radiation and rain do not falsify measurements. **Design:** Plastic radiation cap, Ø 110 mm, height approx. 140 mm. The design also includes a stainless steel wall mount with 3 fastening holes for screws with a maximum shaft diameter of 5 mm. Maximum projection 160 mm.
Optional extended length 300, 400 or 500 mm available. (please specify upon order!)	
Option Display:	10 mm high LCD-display The option VO additionally has 3 pushbuttons for calling min./max. values and adjustment of measuring parameters (offset and scale correction)
For outdoor use:	Option „encapsulated PC board“ required. We also recommend using a heat absorption hat (weather protection shield) to avoid falsification of measuring data due to sun/rain etc.
Housing:	Material: ABS, protection class: IP65
Dimensions:	82 x 80 x 55 (L x W x H)
Scope of supply:	Device, manual

Other types upon request!

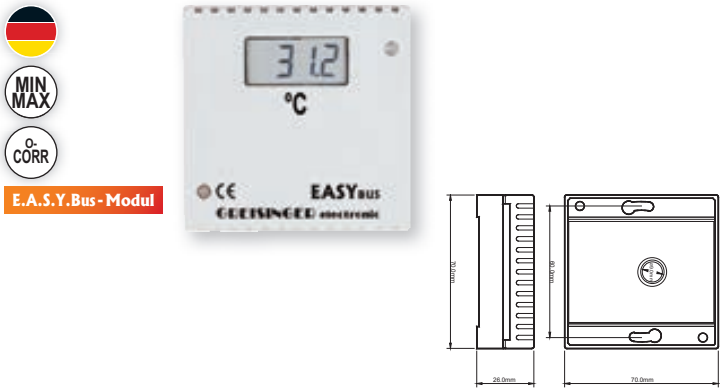
Accessories and spare parts:
Spare protection cap with stainless steel gauze (105 µ mesh size) - for standard and high humidity use
Bronzefilter *Art. no. 605749* not for use in high humidity use)

EBHT - 1 - 2 - 3 - 4 - 5 - 6

Greisinger		
1.	Design type	
	1K	Surface /duct design
	1R	Surface design
	2K	Duct design
	KABEL	Surface design with cable, with High humidity sensor
	SHUT	Heat protective hat
2.	Options sensor	
	-HO	High humidity sensor
3.	Fitting length EL	
	-000	No installation length
	-050	50 mm
	-220	220 mm
	-300	300 mm
	-400	400 mm
	-500	500 mm
4.	Option	
	-VO	On site display
5.	Option	
	-LACK	Encapsulated PC Board
6.	Option	
	-UNI	Selectable humidity display instead of the standard humidity values

asseccories see page 138, software-information p.r.t. page 95,

EASYBus - sensor modules for temperature



EBT-2R

Art. no. 602864

EASYBus-sensor modules for temperature

EBT-2RE

Art. no. 602866

EASYBus - sensor modules for temperature
Type with external sensor for lower or higher temperatures.

Specifications:	
Measuring range:	
EBT-2R:	-25.0 ... 70.0 °C or -13.0 ... 158.0 °F
EBT-2RE:	-50.0 ... 150.0 °C or -58.0 ... 302.0 °F
Resolution:	0.1 °C / 0.1 °F
Accuracy:	±0.4 % of meas. value ±0.3 °C (at nominal temperature=25 °C)
Sensor element:	Pt1000 according to DIN IEC 751
Electric connection:	2 pin screw-type terminal, no polarity, max. 1.5 mm²
Ambient temperature:	-25 ... +50 °C (electronic)
Sensor (EBT-2RE):	V4A-can, 5 mm Ø, 50 mm long, approx. 1 m silicone cable
Option Display:	10 mm high LCD-display
Housing:	Attractive surface-mounted housing for indoor installation (fits directly on flush-mounted boxes)
Dimensions:	70 x 70 x 26 mm (L x W x H)
Scope of supply:	Device, manual

EBT - [1] - [2]

Greisinger		
1.	Design type	
	2R	with internal sensor
	2RE	with external probe
2.	Options	
	-VO	On site display

EASYBus - sensor modules for humidity / temperature

EBHT-2R

Art. no. 603476

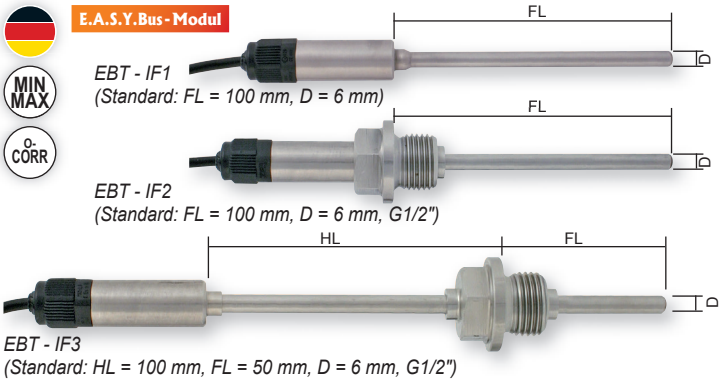
EASYBus-sensor modules for humidity / temperature

Specifications:	
Measuring range:	
Humidity:	0.0 ... 100.0 % RH
recommended range (standard):	30 ... 80 % RH
recommended range (option -HO):	5 ... 95 % RH
Temperature:	-25.0 ... +70.0 °C or -13.0 ... +158.0 °F
Display options:	refer to below
Resolution:	0.1 % RH or 0.1 °C / 0.1 °F
Accuracy: (at nominal temperature = 25 °C)	
Humidity:	±2.5 % RH (at recommended range)
Temperature:	±0.4 % of measuring value ±0.3 °C
Electric connection:	2 pin screw-type terminal, no polarity, max. 1.5 mm²
Ambient temperature:	-25 ... +50 °C
Option Display:	10 mm high LCD-display
Housing:	70 x 70 x 26 mm (L x W x D) (fits directly on flush-mounted boxes)
Scope of supply:	Device, manual

EBHT-2R - [1] - [2]

Greisinger		
1.	Options sensor	
	00	No option
	HO	High humidity sensor
2.	Options general	
	-00	Without option
	-VO	On site display
	-UNI	Selectable humidity display instead of the standard humidity values

EASYBus - sensor modules for temperature



EBT-IF1

Art. no. 602797

EASYBus-sensor modules for temperature (-30.0 ... +100.0 °C)

EBT-IF2

Art. no. 602799

EASYBus-sensor modules for temperature (-30.0 ... +100.0 °C)

EBT-IF3

Art. no. 603862

EASYBus-sensor modules for temperature (-70.0 ... +400.0 °C)

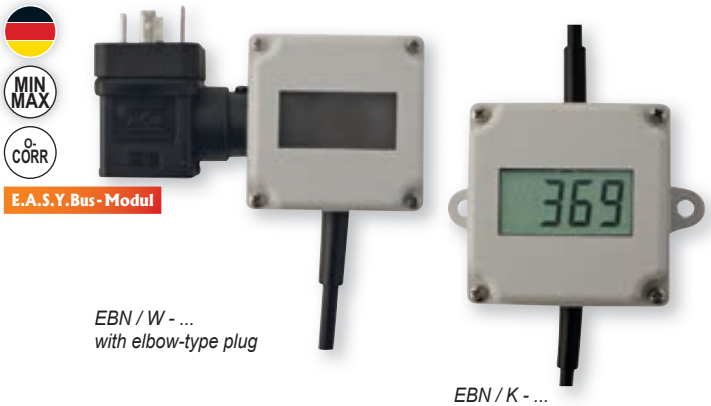
Specifications:

Measuring range: The probe length FL has to be chosen long enough, that the allowable temperature range of the electronics situated in the tube sleeve is not exceeded. Other measuring ranges (max. -200 ... +500 °C) upon request	
Measuring probe:	internal Pt1000-sensor
Accuracy: (at nominal temperature = 25 °C)	
Electronic:	±0.2 % of meas. value ±0.2 °C
Measuring probe:	standard: DIN cl. B, optionally higher sensor accuracy available
Interface:	EASYBus-interface attached 2-pole cable, cable-length approx. 1 m
Operating ambient of electronics (in tube sleeve):	
Working temperature:	-25 ... +70 °C
Relative air humidity:	0 ... 100 % RH
Housing:	stainless steel housing
Dimensions:	depending on sensor construction
tube sleeve:	Ø 15 x 35 mm (without screwing)
thread:	G1/2“ or on customer requirement (available threads M8 x 1, M10 x 1, M14 x 1,5, G1/8“, G1/4“, G3/8“, G3/4“)
Scope of supply:	Device, manual

EBT - 1 - 2 - 3 - 4 - 5 - 6

Greisinger		
1.	Design type	
	IF1	Without thread
	IF2	With thread
	IF3	With thread and neck tube
2.	Measuring range	
	-MB1	-30,0..+100,0°C, Standard IF1, IF2
	-MB2	-70,0..+400,0°C, Standard IF3
3.	Fitting length EL	
	-050	50 mm, Standard IF3
	-100	100 mm, Standard IF1, IF2
	-400	400 mm
	-500	500 mm
4.	Neck tube length	
	...	100 mm
5.	Probe diameter D	
	-D4	Ø 4 mm
	-D5	Ø 5 mm
	-D6	Ø 6 mm
	-D8	Ø 8 mm
	-99	front sold
6.	Thread	
	-G1	G 1/2, Standard IF3

EASYBus - sensor modules for standardized signals



EBN / W - ...
with elbow-type plug

EBN / K - ...
with connection cable
Abb. incl. option VO

EBN / K - ...

Art. no. 602839

EASYBus - sensor modules for standardized signals

EBN / W - ...

Art. no. 609775

EASYBus - sensor modules for standardized signals

General:

All standard signals (0 ... 2 V, 0 ... 10 V, 0 ... 20 mA, 4 ... 20 mA, others on request) can be acquired on the EASYBus with its current module. When using a according interface converter an the **EASY**Control net software different transmitters can be connected resp. watched.

Specifications:

Input signal:	0 ... 2 V, 0 ... 10 V, 0 ... 20 mA or 4 ... 20 mA. (input is not isolated for EASYBus)
Measuring range:	-1999 ... 9999 digit, Measuring range and decimal point can be set via free available software.
Accuracy:	±0.5 % (at nominal temperature = 25 °C)
Working temperature:	-25 ... +60 °C
Storage temperature:	-30 ... +70 °C
Interface:	EASYBus-interface attached 2-pole cable, cable-length approx. 1 m.
Electric connection:	(for input signals)
EBN / K - ...:	for connection to standardized signal source via 0.5 m connection cable.
EBN / W - ...:	elbow-type plug according to EN 175301-803/A for plug-in into an existing transmitter connection.
Housing:	splash-proof IP65
Dimensions:	48.5 x 48.5 x 35.5 mm (L x W x H) with elbow-plug: 50.5 x 90 x 39.5 mm
Scope of supply:	Device, manual

EBN - 1 - 2 - 3

Greisinger		
1.	Design type	
	K	Cable connection
	W	Angle plug
	G	with output signal 0..10V, 3-wire, T03 BU
2.	Input signal	
	-E1	0-2 V
	-E2	0-10 V
	-E3	0-20 mA
	-E4	4-20 mA
3.	Options	
	-00	Without option
	-VO	On site display

asseccories see page 138, software-information p.r.t. page 95,

EASYBus - sensor modul for carbon monoxide (CO)

MIN MAX
0-CORR
E.A.S.Y.Bus-Modul

HIGHLIGHTS:

- *long-lasting electrochemical measuring cell*
- *automatic zero calibration*
- *3 years warranty for the CO sensor element*

EBG-CO-1R

Art. no. 604991
EASYBus - sensor modul for carbon monoxide (CO)

General:

High quality CO transmitter for detection of carbon monoxide in underground garages, parking garages, boiler plants, heating systems, garages as well as in the ambient air. The CO sensor module has a very long-lasting electrochemical measuring cell and could be easily installed.

Applications:

- underground garages, parking garages
- boiler plant and heating systems
- motorcar garage

Specifications:

Measuring range:	0 ... 300 ppm CO (carbon monoxide)
Measuring principle:	electrochemical, permanent measuring
Reproducibility:	<3 ppm according to VDI 2053
Response Time T_{90}:	<60 s
Cross sensitivity:	≤2 % of 300 ppm CO (acc. to VDI 2053)
Linearity error:	≤2 % of 300 ppm CO (acc. to VDI 2053)
Offset adjustment:	automatically
Interface:	EASYBus-interface
Auxiliary energy:	14 ... 30 V DC, max. 50 mA
Working condition:	-10 ... +40 °C, 15 ... 95 % RH (non-condensing)
Option: on site display	3½-digit LCD-display
Electric connection:	elbow-type plug acc. to EN 175301-803/A (IP65), max. wire cross section: 1.5 mm², wire diameter from 4.5 ... 7 mm
Mounting:	with fixing holes for wall mounting
Mounting distance:	70 x 50 mm (W x H)
Fixing screws:	max. shaft-Ø 4 mm
Housing:	ABS
Dimensions:	82 x 80 x 55 mm (without elbow-type plug)
Weight:	approx. 200 g
Scope of supply:	Device, manual

Option:

VO
On site display

Accessories and spare parts:

GZ-01
Art. no. 603122
test gas cap GT (for controlled flow with test gas)

GZ-02
Art. no. 606710
gas bottle with 12l test gas: 30 ppm CO

GZ-03
Art. no. 606711
gas bottle with 12l test gas: 300 ppm CO

GZ-04
Art. no. 603570
gas valve unit MiniFlo for gas bottles with 12l

GSN 24
Art. no. 604386
plug-in power supply (230 V AC => 24 V DC/300 mA)

EASYBus - sensor modul for carbon dioxide (CO_2)

MIN MAX
0-CORR
E.A.S.Y.Bus-Modul

HIGHLIGHTS:

- *excellent long-term stability*
- *auto-calibration procedure*
- *for surveillance of the recommended CO2 concentration in ambient air*

EBG-CO2-1R

Art. no. 604385
EASYBus - Sensormodul für Kohlendioxid (CO_2)

General:

Due to the fact, that CO_2 is an important indicator for the quality of air in rooms, it's super important to measure the CO_2 content. The recommended CO_2 limit value for ambient air is 1000 ppm. An exceeding of this limit causes tiredness and a loss of concentration. The high quality and precise CO_2-module works according to the infrared principle (NDIR). An auto-calibration procedure compensates aging effects and is responsible for an excellent long term stability of this CO_2-module. Additionally, there is a local display which shows beside the actual CO_2 concentration, the minimum and maximum values as well as an optical alarm.

Specifications:

Measuring range:	
Standard:	0 ... 2000 ppm CO_2 (carbon dioxide)
Option 5000:	0 ... 5000 ppm CO_2 (carbon dioxide)
Measuring principle:	infrared principle (NDIR)
Accuracy:	
Standard:	±50 ppm ±2 % of meas. value (at 20 °C, 1023 mbar)
Option 5000:	±50 ppm ±3 % of meas. value (at 20 °C, 1023 mbar)
Interface:	EASYBus-interface
Auxiliary energy:	12 ... 30 V DC, max. 600 mA
Display:	approx. 10 mm high, 4-digit LCD-display
Working condition:	-10 ... +50 °C, 5 ... 95 % RH, 850 ... 1100 hPa
Storage condition:	-25 ... +60 °C, 5 ... 95 % RH, 700 ... 1100 hPa
Electric connection:	elbow-type plug acc. to EN 175301-803/A (IP65), max. wire cross section: 1.5 mm², wire diameter from 4.5 ... 7 mm
Terminal assignment:	2 x EASYBus, no polarity 2 x Auxiliary energy
Mounting:	with fixing holes for wall mounting
Mounting distance:	70 x 50 mm (W x H)
Fixing screws:	max. shaft-Ø 4 mm
Features:	min-/max-value memory, optical alarm, input of offset and scale for adjusting
Housing:	ABS
Dimensions:	82 x 80 x 55 mm (without elbow-type plug)
Weight:	approx. 225 g
Scope of supply:	Device, manual

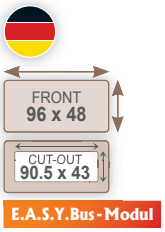
Variant:

EBG-CO2-1R-5000:
Art. no. 605074
Measuring range: 0 ... 5000 ppm CO_2

Accessories and spare parts:

GSN 24-750
Art. no. 604387
plug-in power supply (230 V AC => 24 V DC/750 mA)

EASYBus-display and monitoring device for 20 channels



EB 3000

Art. no. 600269

EASYBus-display and monitoring device for 20 channels

General:

- Up to 20 sensor-modules can be connected
- 2 further functions for calculation
- 5 relay outputs (4 x controlling, 1 x alarm)
- Controller functions can be assigned to any channel
- Alarm monitoring for all connected EASYBus-moduls
- Up to 1000 m cable-length possible

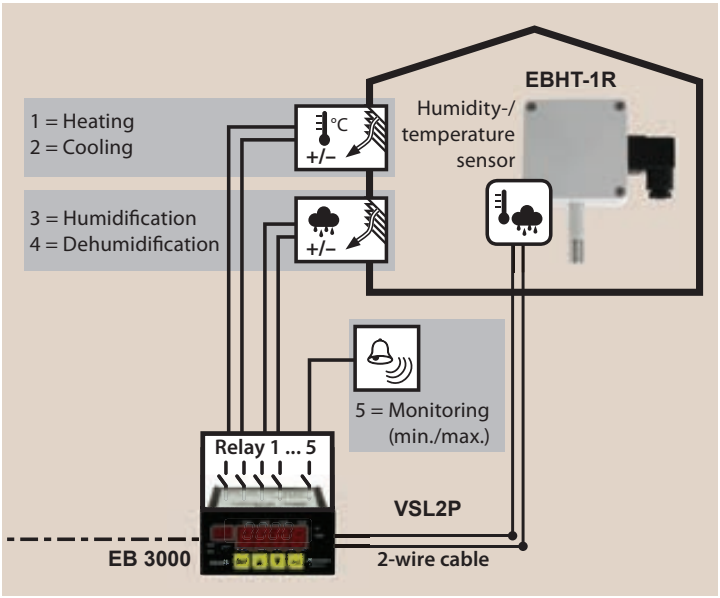
Specifications:

Display range:	-1999 ... +9999 digit
Resolution, Accuracy:	depending on sensor module used
Sensors:	all EASYBus sensor modules
Sensor supply:	via EB 3000
max. bus load:	30 EASYBus standard loads
measuring channels:	20
permitted cable length:	500 m (depending on type of cable and wiring)
Switching outputs:	4 relay outputs (NO), shared input. Outputs can be assigned to any channel
Alarm output:	1 relay output (change-over contacts)
Switching function:	230 VAC, 5 A, ohm resistive load
Configuration:	directly on the device or via additional configuration software (supported converter is needed).
Min./Max. value memory:	from all connected sensor modules the max. and min. value are callable via front-side keypad.
Display:	main display: LED, 4-digit, 13 mm channel display: LED, 2-digit, 7 mm 11 more LEDs for e.g.: switching status and alarm
Interface:	EASYBus-interface
Connection:	2-wire connection in ring-, tree- or star type. No polarity.
Connection terminals:	screw-type/plug-in terminals
Ambient temperature:	-25 ... +50 °C (permissible ambient temperature)
Voltage supply:	230 V AC 50/60 Hz
Power consumption:	approx. 9 VA
Housing:	Transparent membrane keyboard IP65. Sealing for housing for installation according to IP65 will have to be ordered separately (option).
Dimensions:	96 x 48 x 100 mm (H x W x D).
Panel cutout:	90.5 x 43 mm (W x H).
Scope of supply:	Device, CD, manual

Option:

IP

Mounting seal to increase the protection class to IP65



EB 3000 FTR

Art. no. 605923

Cost effective Set for Moisture / Temperature Controlling

General:

Cost effective monitoring and controlling of temperature and humidity. The humidity- / temperature sensor EBHT-1R will be connected with the EB 3000 via a single 2-wire twisted pair cable (e.g. bell wire). The maximum distance between sensor and controlling device is 500 m.
The components are fully configured. The only remaining work is to connect the modules via a 2-pole twisted wire and input the switching points.

Application:

Refrigeration warehouse, green house, storage room, terrarium, etc.

Specifications:

Scope of Supply:	EB 3000: monitoring and controlling device EBHT-1R: temperature / mumidity modul (p.r.t. page 133) VSL2P: 10 m twisted pair cable (p.r.t. page 139)

Accessories and spare parts:

EBW 1

Art. no. 601136

Interface converter, for connection of max. 9 EASYBus data loggers to the RS232 interface of your PC. (power supply: 230 V AC/50 Hz)

EBS 20M

Art. no. 601158

Software for recording and archiving of max. 20 sensor modules (p.r.t. page 96)

Note:

For configuration of the EB 3000 and recording / reading of connected EASYBus modules, a serial converter EBW 1 and software EBS 20M are needed.

asseccories see page 138, software-information p.r.t. page 95,

Assessories

EBW 1

Art. no. 601136
Interface converter

General:

for connection of max. 7 EASYBus-modules to the RS232-interface (9-pin Dsub) of your PC.

Specifications:

Voltage supply:	230 V AC / 50Hz, 12 / 24 V DC on request
Power consumption:	approx. 5 W
Max. permissible sensor modules:	7 (depending on type of the used sensor modules)
Permissible cable length:	200 m (depending on type of cable and wiring)
Baud rate:	4800 Baud
Serial connection:	RS232
Electrical isolated:	yes
Overload display:	no
Short-circuit proof:	yes (limited: 30 s)
Operating temperature:	0 ... 50 °C
Humidity:	20 ... 80 % RH, non-condensing
Storage temperature:	-20 ... +70 °C
Dimensions:	112 x 80 x 45 mm (H x W x D)
Bit-Recovery	no
Scope of supply:	interface converter, 9-pin Dsub extension cable

EBW 3

Art. no. 601137
Interface converter

General:

for connection of one EASYBus-module (e.g. EASYLOG) to the USB-interface of your PC. (Power supply: via USB)

Specifications:

Voltage supply:	not necessary
Power consumption:	max. 0.5 W
Max. permissible sensor modules:	1 (depending on type of the used sensor modules)
Permissible cable length:	10 m (depending on type of cable and wiring)
Baud rate:	4800 Baud
Serial connection:	USB
Electrical isolated:	yes
Overload display:	no
Short-circuit proof:	no
Operating temperature:	-25 ... +50 °C
Humidity:	20 ... 80 % RH, non-condensing
Storage temperature:	-25 ... +70 °C
Dimensions:	56 x 31 x 24 mm (H x W x D)
Bit-Recovery	no
Scope of supply:	interface converter, driver CD, manual

EBW 64

Art. no. 601139
Interface converter

General:

For connection of max. 64 EASYBus-modules to the RS232-interface of your PC.

Specifications:

Voltage supply:	230 V AC / 50Hz
Power consumption:	approx. 15 W
Max. permissible sensor modules:	64 (depending on type of the used sensor modules)
Permissible cable length:	1000 m (depending on type of cable and wiring)
Baud rate:	4800 Baud
Serial connection:	RS232
Electrical isolated:	yes
Overload display:	yes
Short-circuit proof:	yes (passiv)
Operating temperature:	0 ... 50 °C
Humidity:	20 ... 80 % RH, non-condensing
Storage temperature:	-20 ...+70 °C
Dimensions:	100 x 75 x 110 mm (H x W x D)
Bit-Recovery	yes
Scope of supply:	interface converter, 9-pin Dsub extension cable

Assessories:

USB-Adapter
Art. no. 601108
for connection of an interface converter to the USB-interface of yout PC

EBW 250

Art. no. 609308
Interface converter

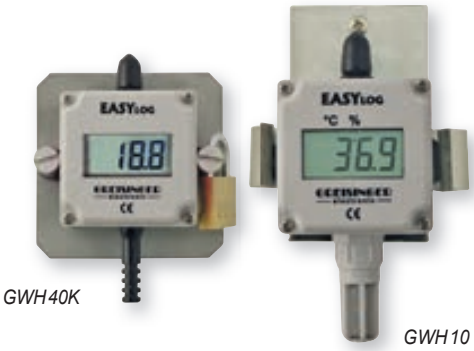
General:

For connection of up to 250 sensor modules via RS232, USB or network. For use as a repeater in an existing EASYBus system.

Specifications:

Voltage supply:	110 ... 250 V AC
Power consumption:	max. 100 V
Max. permissible sensor modules:	250 (depending on type of the used sensor modules)
Permissible cable length:	1000 m (depending on type of cable and wiring)
Baud rate:	300 ... 38400 Baud
Serial connection:	RS 232, USB, network, EASYBus input (repeater function)
Electrical isolated:	yes
Overload display:	yes
Short-circuit proof:	yes (active)
Operating temperature:	0 ... 45 °C
Humidity:	30 ... 80 % RH
Storage temperature:	-20 ... +70 °C
Dimensions:	229 x 204 x 76 (H x W x D)
Bit-Recovery	yes
Scope of supply:	Interface converter, driver CD, manual

Assessories



GWH40K *GWH10*

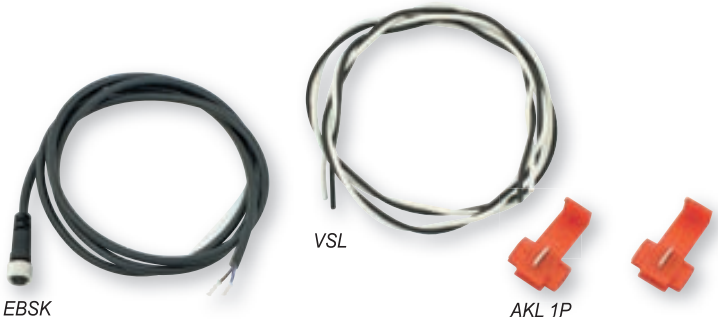
GWH 40K
Art. no. 601166
Wall suspension with lock
as protection against theft suitable for all EASYLog (except EASYLog 40NS W), EBN/K - ..., GIA 0420 WK and GRA 0420 WK

GWH 10
Art. no. 601169
simple wall suspension, made of stainless steel, suitable for all EASYLog (except EASYLog 40NS W).

GSM-3000
Art. no. 607638
Alarm device

General:
Sending SMS when alarms occur. Connectivitye.g. for EB 3000, the GIA 20 EB or otherdevices with relay output or NPN switching output.

Specifications:	
LCD-Display:	with text display
Inputs:	6
Outputs:	4
Miscellaneous:	SMS or call for up to 9 phone numbers Emergency battery SMS at power failure
Scope of supply:	GSM alarm device, antenna for Screw on SMA connector, Fastening material, 9 V battery, Power supply, manual, connection instructions



EBSK *VSL* *AKL 1P*

EBSK 01
Art. no. 601173
Special plug with approx. 1 m of cable for connection of one EASYLog, to the EASYBus

EBSK 03
Art. no. 601174
Special plug with approx.3 m of cable for connection of one EASYLog, to the EASYBus

EBSK 10
Art. no. 601176
Special plug with approx.10 m of cable for connection of one EASYLog, to the EASYBus
(Note: the EASYLOG will be supplied without connection cable. The GSOFT40K includes a connection cable EBSK01. Please order EBSK01, EBSK03 resp. EBSK10 as required in case of permanent bus connection!)

VSL 2P
Art. no. 601178
Twisted special cable for EASYBus-system, cross section 2 x 0,75 mm²

AKL 1P
Art. no. 601182
Special branch terminal for connection to VSL2P, 2 pieces

USB-Adapter
Art. no. 601108
For connection of an interface converter with RS232 connection to the USB interface

Assessories T-Logg

Ersatz-CR 2032

USB 100

Ersatz-CR 2032
Art. no. 606080
Spare battery for all T-Loggs

USB 100
Art. no. 602051
USB interface converter for connection to the PC

asseccories see page 138, software-information p.r.t. page 95,

Accessories

Alarm monitoring

GNR 232 A

GNG 12-LE
Art. no. 604723
plugin power supply 12 V DC / 300 mA

GNR 232 A
Art. no. 604719
Power supply and relay module for EBUW 232 A

Specifications:	
Power supply:	230 V, 50/60 Hz
Output voltage:	12 V DC ±5 % (regulated) 25 mA
Relay output:	volt-free changeover contacts, switching current max. 10 A ohmic load
Connection:	screw-type terminal
Dimensions:	96 x 61 x 60 mm (H x W x D)

EB 3000
Art. no. 600269
EASYBus-display, regulating and monitoring device for 20 channels
p.r.t. page 140

LAN 3200

WLAN3100

LAN 3200
Art. no. 609253
Gigabit Ethernet to USB converter

General:

For inquiring EASYBus modules, GMH handheld devices with interface or GDUSB 1000 via network. 2 USB ports for direct connection of EBW 3, USB 3100N or GDUSB 1000 (up to 15 with USB hub). Connection of EBW 1, EBW 64 or EBW 250 via USB adapter (included to scope of delivery)
Scope of supply: LAN 3100, power supply unit, USB adapter, manual, driver CD

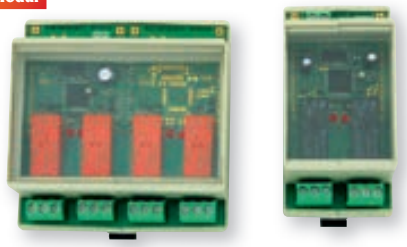
WLAN 3100
Art. no. 606061
Wireless or Gigabit Ethernet to USB converter

General:

To request EASYBus modules, GMH handheld instruments with interface or GDUSB 1000 network or radio network. With 2 USB ports, a right or more EBW 3 USB 3100N or GDUSB 1000 be connected (up to 15 with USB hub). For EBW 1, EBW 64 or EBW 250 is a USB adapter included.
Scope of supply: WLAN 3100, power adapter, USB adapter, manual, CD

Switching modules

E.A.S.Y.Bus-Modul



EBB 2 OUT / BP
Art. no. 603105
EASYBus switching module, 2 relays, bus-powered

EBB 2 OUT / 12V
Art. no. 603348
EASYBus switching module, 2 relays

EBB 4 OUT / BP
Art. no. 603141
EASYBus switching module, 4 relays, bus-powered

EBB 4 OUT / 12V
Art. no. 609776
EASYBus switching module, 4 relays

General:

The EBB ... OUT / ... are switching modules for the EASYBus that can be arbitrarily placed on a location in the bus system. The control of the modules' relays is realized by an alarm monitoring module EBUW 232A or by PC-software (e.g. EASYControlnet).
There are 2 different design types of the switching modules:
... / BP: Bus Power - no external auxiliary supply needed
... / 12V: external 12 V-supply needed - this allows faster switching and a higher operating reliability due to adjustable preferred relay states in case of a system failure. (Power supply unit not in scope of supply)

Specifications:	EBB 2 OUT / BP	EBB 4 OUT / BP
Power supply:	Powered by the EASYBus	
Switching outputs:	2 changers	4 changers
Switching reaction:	<1 s	<2 s
Switching power:	max. 250 V AC / 16 A ohmic load	
Connection:	screw type terminal	
Dimensions:	96 x 48 x 60 mm	96 x 94 x 60 mm

Specifications:	EBB 2 OUT / 12V	EBB 4 OUT / 12V
Power supply:	12 V DC ±10 % / 150 mA	
Switching outputs:	2 changers	4 changers
Switching reaction:	<0.1 s	<0.1 s
Switching power:	max. 250 V AC / 16 A ohmic load	
Connection:	screw type terminal	
Dimensions:	96 x 48 x 60 mm	96 x 94 x 60 mm

EBB 4IN-BP
Art. no. 603477
EASYBus sensor module with 4 digital inputs

General:

The statuses of 4 potential-free switch contacts can be detected with the digital input via the EASYBus.

Specifications:	
Power supply:	The device power is supplied from the EASYBus
Input:	4 digital inputs (for a potential-free switch contact)
Connection:	screw type terminal
Dimensions:	approx. 22.5 x 75 x 98 mm

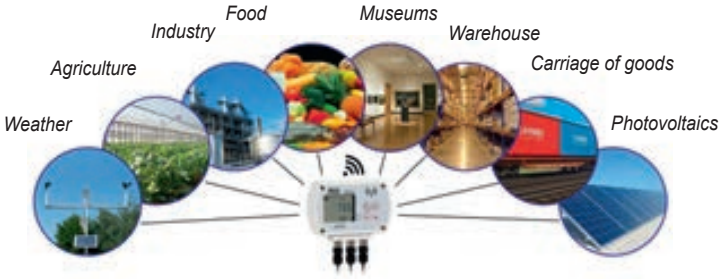
Wireless data logging system

Measurand:

- **Temperature**
- **Relative humidity**
- **Atmospheric pressure and differential pressure**
- **Carbon monoxide (CO)**
- **Carbon dioxide (CO_2)**

Connection via USB, WLAN, Ethernet, RS485, GSM/GPRS, WiFi

Upon request:
- Solar radiation
- Soil moisture
- Illuminance (lux)
- UVA, UVB and UVC Irradiance
- Rainfall
- Wind speed and direction
- Leaf wetness
- Standard signals, Analog, Digital (ModBus), Potentiometer, potential-free contacts, PT100, PT1000, ...



Application:

- Food services (refrigerated containers, cold storage, production and carriage of food)
- Health (storage of medicines, vaccines, blood, monitoring of operating rooms)
- Greenhouses and agriculture crops
- Environmental analyses (Air quality, meteorology and hydrology)
- Monitoring of solar panels
- Museums and document archives
- Transportation of perishable and fragile goods (monitoring of shocks by measuring the acceleration)
- Air conditioning
- Clean rooms
- Laboratories
- Industrial processes
- Buildings, offices, schools
- Building automation
- Meteorology
- Industry
- Pharmaceutical industry
- Warehouse
- Photovoltaics

Description:

The Delta OHM wireless data logging system allows the monitoring of many physical quantities in various application fields.

The models that measure relative humidity and temperature can also calculate derived humidity quantities. The calculated quantities depend on the model and can be: Dew Point, wet bulb temperature, absolute humidity, mixing ratio, partial vapour pressure.

Depending on the model, the external measuring probes are connected to the data logger via M12 connector or screw terminal header. Some of the models are equipped with built-in sensors.

A version of data logger with terminal header inputs is available for the connection of:
- Transmitters with 0 ... 20 or 4 ... 20 mA current output and 0 ... 50 mV, 0 ... 1 V or 0 ... 10 V voltage output
- Pt100 / Pt1000 and K, J, T, N, E type thermocouple temperature sensors
- Sensors with voltage free contact output (counting of switchings) or potentiometric output

This allows to extend the monitoring capability of the system to countless other quantities, in addition to those listed.

Transmission frequency:

All the models (except HD35APD ...) are available in three versions, depending on the transmitting frequency band:
- 868 MHz (in compliance with the european normative EN 300 220),
- 902 ... 928 MHz (in compliance with U.S. FCC part 15 section 247 and I.C. RSS-210 regulations),
- 915.9 ... 929.7 MHz (in compliance with ARIB STD-T108 standard).

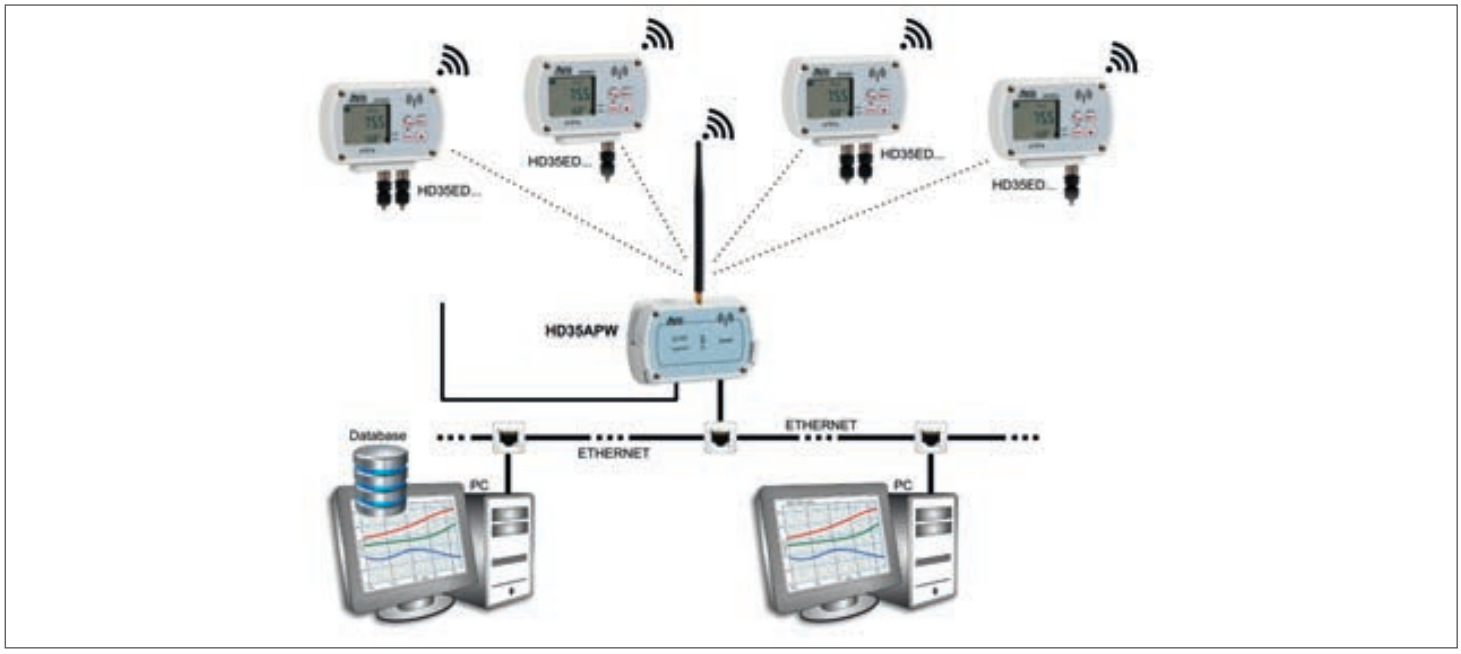
The base unit HD35APD is only available with 868 MHz or 902 ... 928 MHz transmitting frequency band.
The 902 - 928 MHz transmitting frequency band can be reduced to 915 ... 928 MHz (Australia) or 921 ... 928 MHz (New Zealand).
The wireless transmission of the Delta OHM system is extremely robust against radio frequency interference. The system is able to detect any RF interference in the transmission channel, and to transfer the data communication in another channel of the same transmitting band. The correctness of the transmitted data is ensured by the bidirectional communication between the base unit and the remote data loggers.

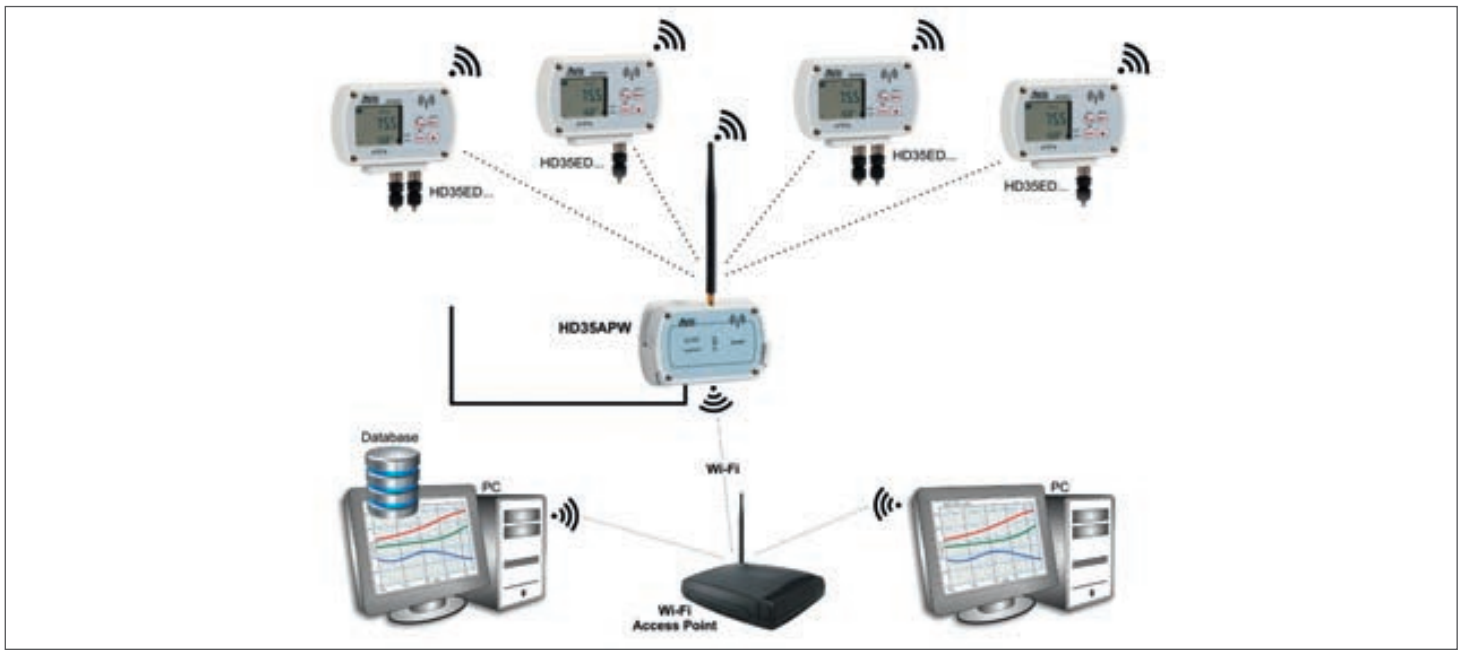
Transmission range and Repeater:

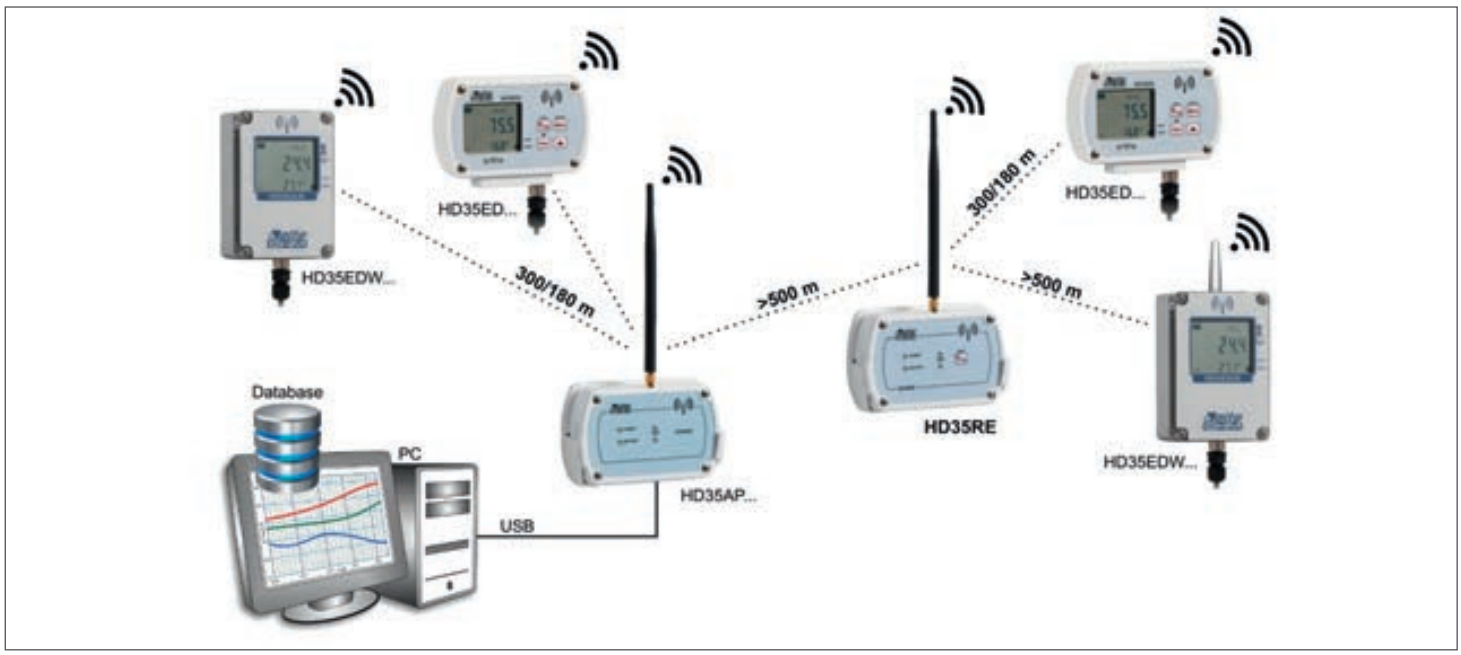
To increase the distance between the base unit and the data loggers, the HD35RE... repeaters are used. More repeaters in cascade can be used (“multi-hop” network).
Depending on HF-frequency band the typical transmitting range between two devices communicating directly is 300 m in open field (the range can be reduced if there are obstacles between the two devices.).

asseccories see page 138, software-information p.r.t. page 95,

Examples


HD35ED...
HD35ED...
HD35ED...
HD35ED...
HD35APW
Database
PC
ETHERNET
ETHERNET
PC


HD35ED...
HD35ED...
HD35ED...
HD35ED...
HD35APW
Database
PC
Wi-Fi
PC
Wi-Fi
Access Point


HD35ED...
HD35EDW...
300/180 m
300/180 m
HD35ED...
>500 m
>500 m
HD35RE
HD35EDW...
Database
PC
USB
HD35AP...

Repeater

HD35-RE-E

Art. no. 608724
Repeater

General:

The device is able to act as a brigde between the base unit HD35-AP... and the remote data loggers HD35-ED..., allowing the communication distance between data loggers and base unit to be increased.
Severals repaters in cascade can be used. External 6 VDC power supply. Internal back-up battery. Configuration via HD35-AP-S software. Wall mount removable (by using the included support) or fixed (with optional flanges) installation.

Specifications:

Power supply:	Internal 3.7 V lithium ion rechargeable battery, capacity 2250 mA/h, JST 3-pole connector Optional 6 V DC external power adapter (SWD06) Powered directly from the PC USB port
Power consumption:	30 mA
Battery autonomy (typical):	3 days
Transmitting frequency:	868 MHz
Antenna:	Whip external
Serial outputs:	USB with Mini USB type connector (cable CP23) Only for configuration and firmware update, not for data download
LED indicators:	Presence of external power supply, battery charge level, RF communication status.
Keyboard:	Push-button for connection / PING (for testing RF)
Working temperature and humidity range:	-10 ... +60 °C / 0 ... 85 % RH not condensing
Housing:	
Material:	LURAN® S 777K
Dimensions:	135 x 86 x 33 mm (excluding antenna) (H x W x D)
Installation:	Wall mount support (supplied) for removable installation or flanges (optional) for fixed installation
Scope of supply:	Device, battery HD35-BAT1, wall mount support HD35-03, without power supply

Accessories:

HD35-SWD06
Art. no. 609458
Power supply, 100 ... 250 V AC/6 V CD/1 A mains voltage

Signal range	HD35-RE-E	HD35-AP...	HD35-AP-D-E
	868 MHz frequency		
HD35-ED... with internal antenna	300 m	300 m	180 m

base unit

HD35-AP-D-E

Art. no. 608727
Base unit

General:

"Dongle" base unit for interfacing among PC and data loggers of the system. USB connection. Powered only by the PC USB port (the unit has no internal battery). Internal antenna.

Specifications:

Versions:	With internal antenna
Power supply:	Powered directly from the PC USB port
Transmitting frequency:	868 MHz
Transmitting range:	See table
Output:	USB with type A connector
Internal memory:	The number of samples that can be stored depends on the type of data loggers connected. The capacity is 226,700 samples if all the data loggers record 7 quantities.
LED indicators:	RF communication status
Working temperature and humidity range:	-10 ... +60 °C / 0 ... 85 % RH not condensing
Dimensions:	62 x 25.5 x 13.2 mm (H x W x D)
Scope of supply:	Device, basic HD35-AP-S software, operating manual

Comparison of the different Access Points

Connection	HD35-AP-D-E	HD35-AP-W-E	HD35-AP-G-E
USB	•	•	•
RS485			
Wi-Fi		•	
Ethernet		•	
GSM/GPRS			•
Protocols			
Proprietary on USB	•	•	•
Proprietary on TCP/IP		•	•
Modbus RTU			
Modbus TCP/IP		•	
SMS commands			•
Data processing			
Automatical data download in the Database	•	•	•
Sending of data via e-mail		•	•
Sending of data to an FTP address		•	•
Integrated web server		•	
Alarms			
Alarm thresholds	•	•	•
Alarm SMSes			•
Alarm e-mails		•	•

asseccories see page 138, software-information p.r.t. page 95,

Base unit

HD35-AP-W-E

Art. no. 608723

Base unit, USB output, Wi-Fi and ethernet interface

HD35-AP-G-E

Art. no. 609450

Base unit, USB output and GSM module

General:

Device acting as an interface between the network data loggers that are positioned in the measurement sites, and the PC. It receives via wireless the data acquired by the remote data loggers and communicate with the PC via the USB output, the GSM connection or the Ethernet or WIFI local network.
Does not require the installation of USB drivers.
Directly powered by the USB port of the PC, if connected, or by the external 6 V DC power supply. Internal backup battery.
If the PC is not connected, the internal memory allows the storage of the measurement data received from the data loggers (the memory is managed in circular mode: when the memory is full, the oldest data are overwritten by the new ones).
Acoustic alarm with internal buzzer. Configuration via HD35-AP-S software. Wall mount removable (by using the included support) or fixed (with optional flanges) installation.

Specifications:

Power supply:	Internal 3.7 V lithium ion rechargeable battery, capacity 2250 mA/h, JST 3-pole connector
Power consumption:	30 mA without Ethernet/Wi-Fi and with typical GSM activity (**), 160 mA with Ethernet, 275 mA with Wi-Fi
Battery autonomy (typical):	3 days if not connected to the local network and with typical GSM activity (**), 11 hours with Ethernet, 8 hours with Wi-Fi
Transmitting frequency:	868 MHz
Antenna:	Whip external
Transmitting range:	See table on page before
Serial outputs:	USB with Mini USB type connector (cable HD35-CP23)
Ethernet connection: (Only HD35-AP-W-E)	Permits (if the Internet connection is available) sending alarm e-mail and the recorded data via e-mail or to an FTP address (***). Allows the MODBUS TCP/IP protocol. With integrated Web server.
Wi Fi connection: (Only HD35-AP-W-E)	Permits (if the Internet connection is available) sending alarm e-mail and the recorded data via e-mail or to an FTP address (***). Allows the MODBUS TCP/IP protocol. With integrated Web server.
GSM connection: (Only HD35-AP-G-E)	For sending alarm e-mail or SMS and data via e-mail or FTP (***). Allows the GPRS TCP/IP protocol.
Internal memory:	The number of samples that can be stored depends on the type of data loggers connected. The capacity is 226,700 samples if all the data loggers record 7 quantities.
LED indicators:	Presence of external power supply, battery charge level, RF communication status
Working temperature and humidity range:	-10 ... +60 °C / 0 ... 85 % RH not condensing
Housing	
Material:	LURAN® S 777K
Dimensions:	135 x 86 x 33 mm (excluding antenna) (H x W x D)
Installation:	Wall mount support (supplied) for removable installation or flanges (optional) for fixed installation
Scope of supply:	Device, battery HD35-BAT1, software HD35-AP-S, wall mount support HD35-03, power supply

(**) The intensive use of the GSM transmission can significantly increase the power consumption and reduce the battery life.
(***) In the basic version, the data are sent via FTP with an interval of not less than 2 minutes and only if in the network there are up to 5 data loggers. For the full FTP functionality, the PLUS option has to be requested.

Accessories p.r.t. page 150

Temperature wireless data logger

HD35ED-L-N/3-TC-E

Art. no. 608642

3-input temperature wireless data logger for NTC sensor temperature probes with cable (probes not included)

General:

HD35ED-L-N/3-TC-E stores the measures in its internal memory (42,000 samples) and transmits the logged data to the base unit automatically at regular intervals or upon request.

Specifications:

Temperature	
Sensor:	NTC 10 kΩ @ 25 °C
Measuring range:	-40 ... +105 °C (the measuring range can be limited by the operating temperature of the used probe)
Resolution:	0.1 °C
Accuracy:	± 0.3 °C in the range 0...+70 °C ± 0.4 °C outside
Instrument	
Transmission frequency:	868 MHz
Transmission range:	300 m (E, J)/ 180 m (U) in open field (can be reduced in presence of obstacles or adverse atmospheric conditions)
Logging interval:	1, 2, 5, 10, 15, 30 s / 1, 2, 5, 10, 15, 30, 60 min
Power supply:	Non rechargeable lithium thyonil chloride (Li-$SOCl_2$) internal battery, 3.6 V, AA format, 2-pole Molex 5264 connector
Battery life:	2 years typical (without repeaters, measurement interval 5 s and log interval 30 s)
Operating conditions:	-20 ... +70 °C / 0 ... 85 % RH non condensing
Dimensions:	135 x 102 x 33 mm (excluding the probes) (H x W x D)
Housing:	LURAN® S 777K
Protection degree:	IP 64
Scope of supply:	Device, battery, wall mount support HD35-03; For configuration a basic unit HD35-AP-... (see page 144) is required. ***NTC probes have to be ordered separately.***

Necessary accessories:

DTP35N-1-3-C
Art. no. 608740
NTC 10 K Ω, temperature range -20 ... +75 °C, Ø 5 x 40 mm, temperature sensor, 3 m cable length, 4-pole M12 connector

Additional accessories p.r.t. page 150

Temperature wireless data logger

HD35ED-O-N-TV-E

Art. no. 608705

Temperature wireless data logger with fixed vertical probe, without display

HD35ED-L-N-TV-E

Art. no. 609448

Temperature wireless data logger with fixed vertical probe, with display

General:

HD35ED-O-N-TV-E stores the measures in its internal memory (68,000 samples) and transmits the logged data to the base unit automatically at regular intervals or upon request.
Temperature fixed vertical probe with NTC 10 KΩ temperature sensor.
Acoustic alarm with internal buzzer. Configuration via HD35-AP-S software. Powered by the internal battery. Wall mount removable (by using the included support) or fixed (with optional flanges) installation.

Specifications:

Temperature	
Sensor:	NTC 10 kΩ @ 25 °C
Measuring range:	-40 ... +105 °C
Resolution:	0.1 °C
Accuracy:	± 0.3 °C in the range 0 ... +70 °C ± 0.4 °C outside
Instrument	
Transmission frequency:	868 MHz
Transmission range:	300 m (E, J) / 180 m (U) in open field (can be reduced in presence of obstacles or adverse atmospheric conditions)
Logging interval:	1, 2, 5, 10, 15, 30 s / 1, 2, 5, 10, 15, 30, 60 min
Power supply:	Non rechargeable lithium thyonil chloride (Li-$SOCl_2$) internal battery, 3.6 V, AA format, 2-pole Molex 5264 connector
Battery life:	2 years typical (without repeaters, measurement interval 5 s and log interval 30 s)
Operating conditions:	-20 ... +70 °C / 0 ... 85 % rF non condensing
Dimensions:	135 x 144 x 33 mm (H x W x D)
Housing:	LURAN® S 777 K
Protection degree:	IP 64
Scope of supply:	Device, battery HD35-BAT1, wall mount support HD35-03; For configuration a basic unit HD35-AP-... (see page 144) is required.

Accessories p.r.t. page 150

Temperature and humidity wireless data logger

Picture shows HD35ED-L-1N-TVI-E with display

HD35ED-0-1N-TVI-E

Art. no. 608703

Temperature and humidity wireless data logger with T / RH fixed vertical probe, without display

HD35ED-L-1N-TVI-E

Art. no. 608640

Temperature and humidity wireless data logger with T / RH fixed vertical probe, with display

General:

HD35ED-...-1N-TVI-E stores the measures in its internal memory (24,000 samples) and transmits the logged data to the base unit automatically at regular intervals or upon request.
Temperature and relative humidity fixed vertical probe with temperature sensor integrated in the R.H. module.
Calculated quantities: dew point, wet bulb temperature, absolute humidity, mixing ratio, partial vapour pressure.
Acoustic alarm with internal buzzer. Configuration via HD35-AP-S software or front keyboard (only version with LCD). Powered by the internal battery. Wall mount removable (by using the included support) or fixed (with optional flanges) installation.

Specifications:

Humidity	
Sensor:	Capacitive
Measuring range:	0 ... 100 % RH
Resolution:	0.1 % RH
Accuracy (@ 23 °C):	±1.8 % RH (0 ... 80 % RH) ±[1.8 + 0.11 * (RH -80)] % RH (remaining range)
Sensor	
Operating temperature:	-40 ... +105 °C (R.H. max=[100^{-2}*(T-80)] @ T=80 ... 105 °C)
Temperature	
Sensor:	Sensor integrated in humidity module
Measuring range:	-40 ... +105 °C
Resolution:	0.1 °C
Accuracy:	±0.2 °C in the range 0 ... +60 °C ±(0.2 - 0.05 * T) °C in the range T=-40 ... 0 °C ±[0.2 + 0.032 * (T-60)] °C in the range T=+60 ... +105 °C
Instrument	
Transmission frequency:	868 MHz
Transmission range:	300 m (E, J) / 180 m (U) in open field (can be reduced in presence of obstacles or adverse atmospheric conditions)
Logging interval:	1, 2, 5, 10, 15, 30 s / 1, 2, 5, 10, 15, 30, 60 min
Power supply:	Non rechargeable lithium thyonil chloride (Li-$SOCl_2$) internal battery, 3.6 V, AA format, 2-pole Molex 5264 connector
Battery life:	2 years typical (without repeaters, measurement interval 5 s and log interval 30 s)
Operating conditions:	-20 ... +70 °C / 0 ... 85 % rF non condensing
Dimensions:	135 x 144 x 33 mm (H x W x D)
Housing:	LURAN® S 777K
Protection degree:	IP 64
Scope of supply:	Device, battery HD35-BAT1, wall mount support HD35-03; For configuration a basic unit HD35-AP-... (see page 144) is required.

Accessories p.r.t. page 150

asseccories see page 138, software-information p.r.t. page 95,

Temperature and humidity wireless data logger

HD35ED-L-1N-TV-E

Art. no. 608646

Temperature and humidity wireless data logger with T/RH fixed vertical probe

General:

HD35ED-L-1N-TV-E stores the measures in its internal memory (24,000 samples) and transmits the logged data to the base unit automatically at regular intervals or upon request.
Temperature and relative humidity fixed vertical probe with NTC 10 KΩ temperature sensor and high accuracy R.H. sensor.
Calculated quantities: dew point, wet bulb temperature, absolute humidity, mixing ratio, partial vapour pressure.
Acoustic alarm with internal buzzer. Configuration via HD35-AP-S software or front keyboard. Powered by the internal battery. Wall mount removable (by using the included support) or fixed (with optional flanges) installation.

Specifications:

Humidity	
Sensor:	Capacitive
Measuring range:	0 ... 100 % RH
Resolution:	0.1 % RH
Accuracy (@ 23 °C):	±1.5 % RH (0 ... 90 % RH) ±2 % RH (remaining range)
Sensor operating temperature:	-20 ... +80 °C
Temperature	
Sensor:	NTC 10 kΩ @ 25 °C
Measuring range:	-40 ... +105 °C
Resolution:	0.1 °C
Accuracy:	±0.3 °C in the range 0…+70 °C ±0.4 °C outside
Instrument	
Transmission frequency:	868 MHz
Transmission range:	300 m (E, J)/180 m (U) in open field (can be reduced in presence of obstacles or adverse atmospheric conditions)
Logging interval:	1, 2, 5, 10, 15, 30 s / 1, 2, 5, 10, 15, 30, 60 min
Power supply:	Non rechargeable lithium thyonil chloride (Li-$SOCl_2$) internal battery, 3.6 V, AA format, 2-pole Molex 5264 connector
Battery life:	2 years typical (without repeaters, measurement interval 5 s and log interval 30 s)
Operating conditions:	-20 ... +70 °C / 0 ... 85 % RH non condensing
Dimensions:	135 x 144 x 33 mm (H x W x D)
Housing:	LURAN® S 777K
Protection degree:	IP 64
Scope of supply:	Device, battery HD35-BAT1, wall mount support HD35-03; For configuration a basic unit HD35-AP-... (see page 144) is required.

Temperature, humidity and atmospheric pressure wireless data logger

HD35ED-G-14BN-TVI-E

Art. no. 608699

Temperature, humidity and atmospheric pressure wireless data logger with T/RH fixed vertical probe

General:

HD35ED-G-14BN-TVI-E stores the measures in its internal memory (22,000 samples) and transmits the logged data to the base unit automatically at regular intervals or upon request.
Temperature and relative humidity fixed vertical probe with temperature sensor integrated in the R.H. module. Integrated pressure sensor.
Calculated quantities: dew point, wet bulb temperature, absolute humidity, mixing ratio, partial vapour pressure.
Acoustic alarm with internal buzzer. Configuration via HD35-AP-S software or front keyboard. Powered by the internal battery. Wall mount removable (by using the included support) or fixed (with optional flanges) installation.

Specifications:

Humidity	
Sensor:	Capacitive
Measuring range:	0 ... 100 % RH
Resolution:	0.1 % RH
Accuracy (@ 23 °C):	±1.8 % RH (0 ... 80 % RH) ±[1.8 + 0.11 * (RH -80)] % RH (remaining range)
Sensor	
Operating temperature:	-40 ... +105 °C (RH max=[100-2*(T-80)] @ T=80 ... 105 °C)
Temperature	
Sensor:	Sensor integrated in humidity module
Measuring range:	-40 ... +105 °C
Resolution:	0.1 °C
Accuracy:	±0.2 °C in the range 0 ... +60 °C ±(0.2 – 0.05 * T) °C in the range T=-40 ... 0 °C ±[0.2 + 0.032 * (T-60)] °C in the range T=60 ... 105 °C
Atmospheric pressure	
Sensor:	Piezo-resistive
Measuring range:	300 ... 1100 hPa
Resolution:	0.1 hPa
Accuracy:	±0.5 hPa (800 ... 1100 hPa) @ T=25 °C ±1 hPa (300 ... 1100 hPa) @ T=0 ... 50 °C
Instrument	
Transmission frequency:	868 MHz
Transmission range:	300 m (E, J)/180 m (U) in open field (can be reduced in presence of obstacles or adverse atmospheric conditions)
Logging interval:	2, 5, 10, 15, 30 s / 1, 2, 5, 10, 15, 30, 60 min
Power supply:	Non rechargeable lithium thyonil chloride (Li-$SOCl_2$) internal battery, 3.6 V, AA format, 2-pole Molex 5264 connector
Battery life:	2 years typ. (without repeaters, measurement interval 10 s and log interval 30 s)
Operating conditions:	-20 ... +70 °C / 0 ... 85 % RH non condensing
Dimensions:	135 x 144 x 33 mm (H x W x D)
Housing:	LURAN® S 777K
Protection degree:	IP 64
Scope of supply:	Device, battery HD35-BAT1, wall mount support HD35-03; For configuration a basic unit HD35-AP-... (see page 144) is required.

Temperature, humidity, atmospheric pressure, carbon monoxide (CO) and carbon dioxide (CO_2) wireless data logger

NEW!

HD35ED-G-14BNAB-E

Art. no. 608702

Temperature, humidity, atmospheric pressure, carbon monoxide (CO) and carbon dioxide (CO_2) wireless data logger, with display

HD35ED-O-14BNAB-E

Art. no. 609834

Temperature, humidity, atmospheric pressure, carbon monoxide (CO) and carbon dioxide (CO_2) wireless data logger, without display

General:

HD35ED-G-14BNAB-E stores the measures in its internal memory (32,000 samples) and transmits the logged data to the base unit automatically at regular intervals or upon request. The sensors are all inside the housing.
Calculated quantities: dew point, wet bulb temperature, absolute humidity, mixing ratio, partial vapour pressure.
Acoustic alarm with internal buzzer. Configuration via HD35-AP-S software or front keyboard. Powered by the internal battery. Wall mount removable (by using the included support) or fixed (with optional flanges) installation.

Specifications:

Humidity	
Sensor:	Capacitive
Measuring range:	0 ... 100 % RH
Resolution:	0.1 % RH
Accuracy (@ 23 °C):	±1.8 % RH (0 ... 80 % RH) ±[1.8 + 0.11 * (RH -80)] % RH (remaining range)
Sensor	
Operating temperature:	-40 ... +105 °C (RH max=[100^{-2}*(T-80)] @ T=80 ... 105 °C)
Temperature	
Sensor:	Sensor integrated in humidity module
Measuring range:	-40 ... +105 °C
Resolution:	0.1 °C
Accuracy:	±0.2 °C in the range 0 ... +60 °C ±(0.2 – 0.05 * T) °C in the range T=-40 ... 0 °C ±[0.2 + 0.032 * (T-60)] °C in the range T=+60 ... +105 °C
Atm. pressure	
Sensor:	Piezo-resistive
Measuring range:	300 ... 1100 hPa
Resolution:	0.1 hPa
Accuracy:	±0.5 hPa (800 ... 1100 hPa) @ T=25 °C ±1 hPa (300 ... 1100 hPa) @ T=0 ... 50 °C
Carbon monoxide (CO)	
Sensor:	Electrochemical cell
Measuring range:	0 ... 500 ppm
Resolution:	1 ppm
Accuracy:	±3 ppm +3 % of measurement
Operating temperature:	-5 ... +50 °C
Response time:	T_{90} <50 s
Carbon dioxide (CO_2)	
Sensor:	Non-dispersive infrared rays (NDIR)
Measuring range:	0 ... 5000 ppm
Resolution:	1 ppm
Accuracy:	±(50 ppm +3 % of measurement) @ 20 °C and 1013 hPa
Operating temperature:	-5 ... +50 °C
Response time:	T_{90} <120 s (air speed= 2 m/s)
Instrument	
Transmission frequency:	868 MHz
Transmission range:	300 m (E, J)/180 m (U) in open field (can be reduced in presence of obstacles or adverse atmospheric conditions)
Logging interval:	10, 15, 30 s / 1, 2, 5, 10, 15, 30, 60 min
Power supply:	Non rechargeable lithium thyonil chloride (Li-$SOCl_2$) internal battery, 3.6 V, AA format, 2-pole Molex 5264 connector
Battery life:	1.5 years typical (without repeaters, measurement and log interval 2 min)
Operating conditions:	-10 ... +70 °C / 0 ... 85 % RH non condensing
Dimensions:	135 x 126 x 33 mm (H x W x D)
Housing:	LURAN® S 777K
Scope of supply:	Device, battery HD35-BAT1, wall mount support HD35-03; For configuration a basic unit HD35-AP-... (see page 144) is required.

Accessories p.r.t. page 150

asseccories see page 138, software-information p.r.t. page 95,

Temperature, humidity and carbon dioxide (CO_2) wireless data logger

HD35ED-O-1NB-E

Art. no. 609836

Temperature, humidity and carbon dioxide (CO_2) wireless data logger, without display

HD35ED-G-1NB-E

Art. no. 608701

Temperature, humidity and carbon dioxide (CO_2) wireless data logger, with display

General:

HD35ED-G-1NB-E stores the measures in its internal memory (44,000 samples) and transmits the logged data to the base unit automatically at regular intervals or upon request.
The sensors are all inside the housing.
Calculated quantities: dew point, wet bulb temperature, absolute humidity, mixing ratio, partial vapour pressure.
Acoustic alarm with internal buzzer. Configuration via HD35-AP-S software or front keyboard. Powered by the internal battery. Wall mount removable (by using the included support) or fixed (with optional flanges) installation.

Specifications:

Humidity	
Sensor:	Capacitive
Measuring range:	0 ... 100 % RH
Resolution:	0.1 % RH
Accuracy (@ 23 °C):	±1.8 % RH (0 ... 80 % RH) ±[1.8 + 0.11 * (RH -80)] % rF (remaining range)
Sensor	
Operating temperature:	-40 ... +105 °C (RH max=[100^{-2}*(T-80)] @ T=80 ... 105 °C)
Temperature	
Sensor:	Sensor integrated in humidity module
Measuring range:	-40 ... +105 °C
Resolution:	0.1 °C
Accuracy:	±0.2 °C in the range 0 ... +60 °C ±(0.2 - 0.05 * T) °C in the range T=-40 ... 0 °C ±[0.2 + 0.032 * (T-60)] °C in the range T=60 ... 105 °C
Carbon dioxide (CO_2)	
Sensor:	Non-dispersive infrared rays (NDIR)
Measuring range:	0 ... 5000 ppm
Resolution:	1 ppm
Accuracy:	±(50 ppm +3 % of measurement) @ 20 °C and 1013 hPa
Operating temperature:	-5 ... +50 °C
Response time:	T_{90} <120 s (air speed= 2 m/s)
Instrument	
Transmission frequency:	868 MHz
Transmission range:	300 m (E, J)/180 m (U) in open field (can be reduced in presence of obstacles or adverse atmospheric conditions)
Logging interval:	10, 15, 30 s / 1, 2, 5, 10, 15, 30, 60 min
Power supply:	Non rechargeable lithium thyonil chloride (Li-$SOCl_2$) internal battery, 3.6 V, AA format, 2-pole Molex 5264 connector
Battery life:	1.5 years typical (without repeaters, measurement and log interval 2 min)
Operating conditions:	-10 ... +70 °C / 0 ... 85 % RH non condensing
Dimensions:	135 x 126 x 33 mm (H x W x D)
Housing:	LURAN® S 777K
Scope of supply:	Device, battery HD35-BAT1, wall mount support HD35-03; For configuration a basic unit HD35-AP-... (see page 144) is required.

Wireless data logger with 3 terminal header inputs

HD35ED-G-H-E

Art. no. 609837

Wireless data logger with three terminal header inputs for standard sensors, with display

General:

Wireless data logger with three terminal header inputs for the connection of transmitters with 4 ... 20 mA, 0 ... 1 V or 0 ... 50 mV output, Pt100/Pt1000 sensors, K, J, T, N, E thermocouples, sensors with voltage free contact output (max. one sensor) and potentiometric sensors. It stores the measures in its internal memory (from 36,000 to 68,000 samples depending on the number and type of connected sensors) and transmits the logged data to the base unit automatically at regular intervals or upon request. Acoustic alarm with internal buzzer. Configuration via HD35-AP-S software. Powered by the internal battery. Wall mount removable (by using the included support) or fixed (with optional flanges) installation.

Connection:

The model HD35ED-G-H-E is equipped with three terminal header inputs. Each input can be configured as input for: Pt100/Pt1000, thermocouple, 4 ... 20 mA (the shunt resistance is internal), 0 ... 1 V, 0 ... 50 mV or potentiometer. Only input 3 can also be configured as pulse counter (counting of switchings of a voltage-free contact).

Specifications:

Pt100/Pt1000	
Measuring range:	-200 ... +650 °C
Resolution:	0.1 °C
Accuracy:	±0.1 °C (excluding probe error)
Connection:	2, 3 or 4 wires
Thermocouple	
Measuring range:	K: -200 … +1370 °C J: -100 … +750 °C E: -200 … +750 °C T: -200 … +400 °C N: -200 … +1300 °C
Resolution:	0.1 °C
Accuracy:	±0.1 ~0.2 °C (excluding probe error)
Input 0/4 ... 20 mA	
Shunt resistance:	Internal (50 Ω)
Resolution:	16 bit
Accuracy:	±2 µA
Input 0 ... 50 mV / 1 V	
Input resistance:	100 MΩ
Resolution:	16 bit
Accuracy:	±0.01 % f.s.
Voltage-free contact	
Switching frequency:	50 Hz max.
Potentiometer	
Value, Resolution:	Typical 10 kΩ, 16 bit
Accuracy:	±0.01 % f.s.
Instrument	
Transmission frequency:	868 MHz
Transmission range:	300 m (E, J)/180 m (U) in open field (can be reduced in presence of obstacles or adverse atmospheric conditions)
Logging interval:	5, 10, 15, 30 s / 1, 2, 5, 10, 15, 30, 60 min
Power supply:	Non rechargeable lithium thyonil chloride (Li-$SOCl_2$) internal battery, 3.6 V, AA format, 2-pole Molex 5264 connector
Battery life:	2 years typ. (without repeaters, measurement interval 10 s and log interval 30 s)
Operating conditions:	-10 ... +70 °C / 0 ... 85 % RH non condensing
Dimensions:	135 x 110 x 33 mm (H x W x D)
Housing:	LURAN® S 777K
Scope of supply:	Device, battery HD35-BAT1, wall mount support HD35-03; For configuration a basic unit HD35-AP-... (see page 144) is required.

Waterproof wireless data logger with four terminal header inputs

HD35ED-W-H-E

Art. no. 608638

Waterproof wireless data logger with four terminal header inputs for standard sensors

General:

Wireless data logger with four terminal header inputs for the connection of transmitters with 4 ... 20 mA, 0 ... 1/0 ... 10 V or 0 ... 50 mV output, Pt100/Pt1000 sensors, K, J, T, N, E thermocouples, sensors with voltage free contact output (max. one sensor) and potentiometric sensors.
IP 67 waterproof housing. It stores the measures in its internal memory (from 28,000 to 58,000 samples depending on the number and type of connected sensors) and transmits the logged data to the base unit automatically at regular intervals or upon request.
Acoustic alarm with internal buzzer. Configuration via HD35-AP-S software. Powered by the internal battery or external 7... 28 V dc power supply (option E). Installation: wall mounting with HD35-24W flange (optional)

Specifications:

Pt100/Pt1000		
Measuring range:	-200 ... +650 °C	
Resolution:	0.1 °C	
Accuracy:	±0.1 °C (excluding probe error)	
Connection:	2, 3 or 4 wires	
Thermocouple		
Measuring range:	K: -200…+1370 °C E: -200…+750 °C N: -200…+1300 °C	J: -100…+750 °C T: -200…+400 °C
Resolution:	0.1 °C	
Accuracy (excluding probe error):	K: ±0.1°C (<600°C) ±0.2°C (>600°C) N: ±0.1°C (<600°C) ±0.2°C (>600°C)	E: ±0.1°C (<300°C) ±0.2°C (>300°C) J: ±0.1°C T: ±0.1°C
Input 0/4 ... 20 mA		
Shunt resistance:	Internal (50 Ω)	
Resolution:	16 bit	
Accuracy:	±2 µA	
Voltage Input		
Input resistance:	100 MΩ	
Resolution:	16 bit	
Accuracy:	±0.01 % f.s.	
Voltage-free contact		
Switching frequency:	50 Hz max.	
Potentiometer		
Value:	Typical 10 kΩ	
Resolution:	16 bit	
Accuracy:	±0.01 % f.s.	
Instrument		
Transmission frequency:	868 MHz	
Transmission range:	In open field: 300 m (E, J)/ 180 m (U) with internal antenna	
Logging interval:	5, 10, 15, 30 s / 1, 2, 5, 10, 15, 30, 60 min	
Power supply:	Non rechargeable lithium thyonil chloride (Li-$SOCl_2$) internal battery, 3.6 V, C format, 2-pole Molex 5264 connector	
Battery life:	4 years typ. (without repeaters, measurement interval 10 s and log interval 30 s)	
Operating conditions:	-20 ... +70 °C / 0 ... 100 % rF non condensing	
Dimensions:	140 x 80 x 55 mm (excluding ext. antenna) (H x W x D)	
Housing:	Polycarbonate	
Protection degree:	IP 67	
Scope of supply:	Device, battery; For configuration a basic unit HD35-AP-... (see page 144) is required.	

Waterproof temperature wireless data logger with fixed vertical probe

HD35ED-W-N-TV-E

Art. no. 608645

Waterproof temperature wireless data logger with fixed vertical probe, without display

General:

IP 67 waterproof housing. It stores the measures in its internal memory (68,000 samples) and transmits the logged data to the base unit automatically at regular intervals or upon request.
Temperature fixed vertical probe with NTC 10 KΩ temperature sensor.
Acoustic alarm with internal buzzer. Configuration via HD35-AP-S software. Powered by the internal battery. Installation: wall mounting with HD35-24W flange (optional)

Specifications:

Temperature	
Sensor:	NTC 10 kΩ @ 25 °C
Measuring range:	-40 ... +105 °C
Resolution:	0.1 °C
Accuracy:	±0.3 °C in the range 0 ... +70 °C ±0.4 °C outside
Instrument	
Transmission frequency:	868 MHz
Transmission range:	In open field: 300 m (E, J)/ 180 m (U) with internal antenna.
Logging interval:	1, 2, 5, 10, 15, 30 s / 1, 2, 5, 10, 15, 30, 60 min
Power supply:	Non rechargeable lithium thyonil chloride (Li-$SOCl_2$) internal battery, 3.6 V, AA format, 2-pole Molex 5264 connector
Battery life:	2 years typical (without repeaters, measurement interval 5 s and log interval 30 s)
Operating conditions:	-20 ... +70 °C / 0…100 % RH non condensing
Dimensions:	170 x 80 x 55 mm (excluding external antenna) (H x W x D)
Housing:	Polycarbonate
Protection degree:	IP 67
Scope of supply:	Device, battery; For configuration a basic unit HD35-AP-... (see page 144) is required.

Accessories p.r.t. page 150

asseccories see page 138, software-information p.r.t. page 95,

Waterproof temperature and humidity wireless data logger with T/RH fixed vertical probe

NEW!

HD35ED-W-1N-TVI-E

Art. no. 608644

Waterproof temperature and humidity wireless data logger with T/RH fixed vertical probe

General:

IP 67 waterproof housing. It stores the measures in its internal memory (24,000 samples) and transmits the logged data to the base unit automatically at regular intervals or upon request.
Temperature and relative humidity fixed vertical probe with temperature sensor integrated in the R.H. module.
Calculated quantities: dew point, wet bulb temperature, absolute humidity, mixing ratio, partial vapour pressure.
Acoustic alarm with internal buzzer. Configuration via HD35-AP-S software. Powered by the internal battery. Installation: wall mounting with HD35-24W flange (optional)

Specifications:

Humidity	
Sensor:	Capacitive
Measuring range:	0 ... 100 % RH
Resolution:	0.1 % RH
Accuracy (@ 23 °C):	±1.8 % RH (0 ... 80 % RH) ±[1.8 + 0.11 * (RH -80)] % RH (remaining range)
Sensor	
Operating temperature:	-40 ... +105 °C (R.H. max=[100^{-2}*(T-80)] @ T=80 ... 105 °C)
Temperature	
Sensor:	Sensor integrated in humidity module
Measuring range:	-40 ... +105 °C
Resolution:	0.1 °C
Accuracy:	±0.2 °C in the range 0 ... 60 °C ±(0.2 – 0.05 * T) °C in the range T=-40 ... 0 °C ±[0.2 + 0.032 * (T-60)] °C in the range T=60 ... 105 °C
Instrument	
Transmission frequency:	868 MHz
Transmission range:	In open field: 300 m (E, J)/180 m (U) with internal antenna. > 500 m (E, J, U) with external antenna. (can be reduced in presence of obstacles or adverse atmospheric conditions)
Logging interval:	1, 2, 5, 10, 15, 30 s / 1, 2, 5, 10, 15, 30, 60 min
Power supply:	Non rechargeable lithium thyonil chloride (Li-$SOCl_2$) internal battery, 3.6 V, AA format, 2-pole Molex 5264 connector
Battery life:	2 years typical (without repeaters, measurement interval 5 s and log interval 30 s)
Operating conditions:	-20 ... +70 °C / 0 ... 100 % RH non condensing
Dimensions:	170 x 80 x 55 mm (excluding external antenna) (H x W x D)
Housing:	Polycarbonate
Protection degree:	IP 67
Scope of supply:	Device, battery; For configuration a basic unit HD35-AP-... (see page 144) is required.

Accessories for wireless data loggers system

Accessories:

HD35-CP23
Art. no. 609449
Configuration cable

HD35-SWD06
Art. no. 609458
Power supply, 100 ... 250 V AC/6 V CD/1 A mains voltage

HD35-24W
Art. no. 608715
Flange for fixing to the wall the waterproof models HD35-ED-W...
Specify when ordering on which instruments should be assembled.

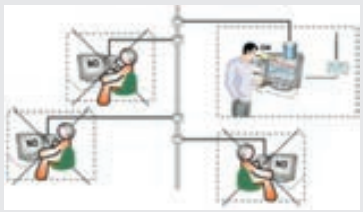
HD35-BAT1
Art. no. 608712
3.7 V lithium-ion rechargeable battery. For the base units HD35-AP…
(except HD35-AP-D and HD35-AP-R) and the repeater HD35-RE

HD35-BAT2
Art. no. 608713
3.6 V lithium-thionyl chloride (Li-$SOCl_2$) non-rechargeable battery. For the data loggers HD35-ED... and the alarm module HD35-ED-ALM.

HD35-ED-ALM-E
Art. no. 608726
Wireless module with two relay outputs for signalling alarm events. Controlled by the base unit, it allows to activate more signalling devices (sirens, blinking lights, etc.) or actuators. Transmitting range: 300 m in open field. Instrument operating temperature / humidity: -10 ... +70 °C / 0 ... 85 % RH. Powered by the internal battery. Supplied with 3.6 V non-rechargeable Li-$SOCl_2$ battery and HD35-03 wall mount support.

HD35-AP-PLUS
Art. no. 608714
Advanced version of the HD35-AP-S software. For Windows® operating systems.
Advanced (PLUS) functionalities:
The system basic functionality allows managing only the data in the local database of the PC in which the HD35-AP-S software is installed. Furthermore, limited FTP functionalities are allowed: the data are sent via FTP by the HD35-AP-G or HD35-AP-W base unit with an interval of not less than 2 minutes and only if in the network there are up to 5 data loggers.
For advanced applications, the HD35-AP-PLUS option with the following additional features is available for a fee:
- Multi-client connection to the database: it is possible to store the data in either a local database or in a remote database on the local network to which the PC is connected; the display of the data can be done from any PC on the local nerwork running the software HD35-AP-S.
- Full FTP functionality: no limit on the data sending interval and on the number of data loggers.

Basic functionality
Storing and viewing of data only in the local database.

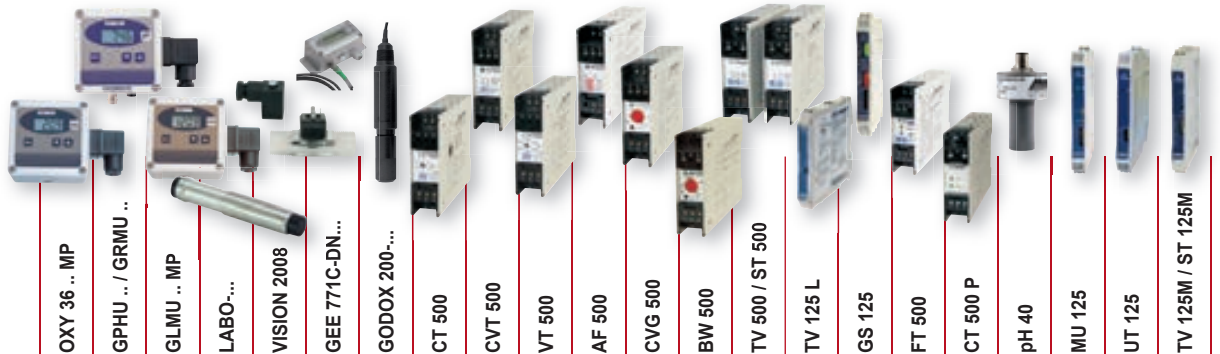


Plus functionality (Unlimited Access Points)
Storing of data in a local or remote database. Viewing of data from any PC of the local network in which the HD35-AP-S software has been installed.

others upon request

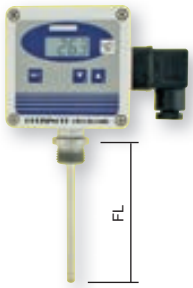
Transmitter

Application:	GTMU ..	GTP-SG / TC 500	GTMU - IF ..	T03 BU ..	RT420 ..	GITT01 ..	MU 500 ..	ST 500 ..	IR-CT 20	GRHU .. MP	GHTU .. MP	GSMU ..	GMUD-MP-..	A-10 / S-10 .. / S-11 .. / S-20 ..	WM 500	GT1-CO / GT10-CO2-1R	GBS ..	LC...	TS 125 / 225	CVC-02/0201	TSA PWR	HD29-0-3-T...
Temperature	●	●	●	●	●	●	●		●		●											
Air humidity										●	●											
Flow												●										
Pressure													●	●								
Carbon monoxide / -dioxide																●						
Level																	●	●				
Power															●							
Switching contact / Namur																			●			
Electricity / Voltage																				●	●	
Ex - Protection						●	●	●									●		●			
Device information:																						
Catalogue page	153	154	155	155	156	157	158	158	159	160	161	166	162	163	174	166	164	171	178	181	181	165



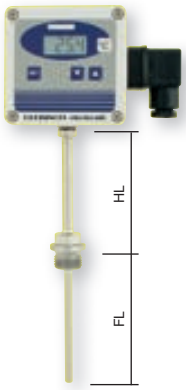
Application:	OXY 36 .. MP	GPHU .. / GRMU ..	GLMU .. MP	LABO-...	VISION 2008	GEE 771C-DN...	GODOX 200-...	CT 500	CVT 500	VT 500	AF 500	CVG 500	BW 500	TV 500 / ST 500	TV 125 L	GS 125	FT 500	CT 500 P	pH 40	MU 125	UT 125	TV 125M / ST 125M
Temperature																				●	●	
Oxygen	●						●															
pH / Redox		●																	●			
Conductivity			●																			
Rotational speed				●																		
Flow					●	●																
Electricity								●	●			●		●	●	●		●			●	●
Voltage									●	●		●	●	●	●	●					●	●
Potentiometer																●				●	●	
Frequency											●						●					
Device information:																						
Catalogue page	168	169	172	171	169	164	170	174	175	175	179	176	176	177	177	178	180	179	180	182	183	184

Freely scaleable temperature transducer Pt1000



GTMU-MP-AP1
for direct screw connection

Standard type:
G = ½“, FL = 100 mm, D = 6 mm



GTMU-MP-AP2
for high temperatures

Standard type:
G = ½“, HL = 100 mm,
FL = 100 mm, D = 6 mm

GTMU-MP-AP3
indoor / outdoor probe
for direct wall mounting

Standard type:
FL = 50 mm, D = 3 mm

GTMU-MP-AP4
duct probe

Standard type:
FL = 100 mm, D = 6 mm

GTMU-MP-SHUT
with heat-
protective shield

GTMU-MP-AP1
Art. no. 607145

GTMU-MP-AP2
Art. no. 602820

GTMU-MP-AP3
Art. no. 602214

GTMU-MP-AP4
Art. no. 606675

GTMU-MP-SHUT
Art. no. 605012

General:

Temperature transducer (measuring range of -50 ... +400 °C) for:
- nearly all kinds of applications
- on site temperature display
- output signal freely scalable
- user-adjustment possible

Specifications:

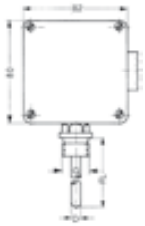
Measuring range:	-50.0 ... +400.0 °C, free scaleable (*The probe length FL has to be chosen long enough, that the allowable temperature of the case and the electronics of 70 °C is not exceeded!)*
Accuracy: (at 25 °C)	
Temperature display:	±0.4 % of measuring value ±0.2 °C
Output signal:	±0.2 % FS (compared to display)
Probe:	Pt1000, 2-wire, DIN class B
Output signal:	4 ... 20 mA (2-wire), freely scaleable
Auxiliary energy:	12 ... 30 VDC or 18 ... 30 VDC (for output: 0- ... V)
Reverse voltage protection:	50 V, permanently
Permissible impedance (at 4-20 mA):	R_A [Ω] ≤ (Uv [V] - 12V) / 0.02 A
Permissible load (at 0-1(10)V):	R_L [Ω] > 3000 Ω
Display:	approx. 10 mm high, 4-digit LCD-display
Working temperature:	-25 ... +70 °C (electronic)
Storage temperature:	-25 ... +70 °C
Relative humidity (electronic):	0 ... 95 % RH (non-condensing); If there is a risk of condensation due to temperature changes, please use our encapsulated or lacquered types (option).
Type SHUT:	Heat protective shield / weather protective shield **Application:** for highly precise outdoor measurements, strong solar radiation and rain **Design:** Weather protective shield made of plastic, Ø 110 mm, heights approx. 140 mm. Wall mounting panel made of stainless steel with 3 mounting holes for screws with maximal shaft diameter 5 mm. Largest overhang 160 mm.
Housing:	ABS (IP65)
Probe tube:	stainless steel
Electric connection:	elbow-type plug acc. to EN 175301-803/A (IP65)
Mounting:	4 housing holes for wall mounting or by means of plastic tube clamps for duct mounting
Functions:	min-/max-value memory, offset and slope digital adjustable, output signal freely scalable (without tools)
Scope of supply:	Device, manual

GTMU-MP - 1 - 2 - 3 - 4 - 5 - 6 - 7

Greisinger		
1.	Design type	
	AP1	With process connection for direct screw
	AP2	For higher temperatures, with process connection and neck tube
	AP3	Indoor/outdoor temperature sensor for direct wall mounting
	AP4	Duct sensor with sensor tube outlet centrally and perpendicularly down
	SHUT	Heat protective hat
2.	Output signal	
	-AA1	Analog output 4 ... 20 mA
	-AV1	Analog output 0-10 V
	-AV01	Analog output 0-1 V
3.	Fitting length EL	
	-050	50 mm,
	-100	100 mm,
	-100	100 mm,
	-200	200 mm
	-200	200 mm
	-300	300 mm
	-400	400 mm
	-600	600 mm
4.	Probe diameter D	
	-D03	Ø 3 mm,
	-D04	Ø 4 mm
	-D05	Ø 5 mm
	-D06	Ø 6 mm,
	-D08	Ø 8 mm
5.	Thread	
	-G1	G 1/2,
	-G2	G 1/4
	-G3	G 3/4
	-G5	G 3/8
	-M5	M5
	-M6	M6
	-M8	M8
	-M0	M10
	-M2	M12
6.	Length of neck tube	
	-070	70 mm
	-100	100 mm,
7.	Options	
	-000	Without option
	-LACK	Encapsulated PC Board

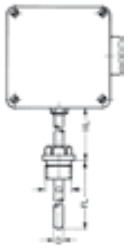
others on request

Temperature transducer GTMU complete with Pt100 or NiCr-Ni (type K) sensor



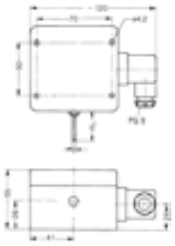
Design type 1
for direct screw connection

Standard type:
G = ½“, FL = 100 mm,
D = 6 mm



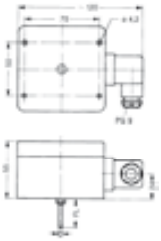
Design type 2
for high temperatures

Standard type:
G = ½“, HL = 50 mm,
FL = 100 mm, D = 6 mm



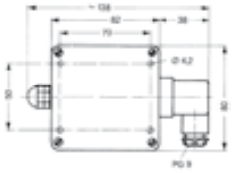
Design type 3
indoor / outdoor probe
for direct wall mounting

Standard type:
FL = 50 mm, D = 3 mm



Design type 4
duct probe

Standard type:
FL = 100 mm, D = 6 mm



Design type 5
for external probes

upon request

GTMU-AP1
GTMU-AP2
GTMU-AP3
GTMU-AP4
GTMU-AP5

General:

The types 1 - 4 are supplied complete with sensor, measuring transducer etc., calibrated and thus ready for use. Type 5 does not include sensor which is either already existing at your works or will have to be ordered separately according to your specifications.

Specifications:

Practical sensor elements:	
Resistance thermometer:	Pt100 class B, potential-free
Thermocouple:	NiCr-Ni class 1, not potential-free
Max. measuring ranges: (not available for every design type)	
Pt100:	-200 ... +800 °C
NiCr-Ni:	-200 ... +1150 °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 ... 1150 °C
Accuracy electronics:	±0.2 % FS (Pt100) or ±0.2 % ±0.5 °C (NiCr-Ni)
Output signal:	
Standard:	4 ... 20 mA (2-wire)
Auxiliary energy::	Uv = 12 ... 30 V DC (at 0-10 V: Uv = 18 ... 30 V DC); (for special types GTMU/GITT and GTMU/RT420: 8 ... 30 V)
Reverse voltage protection:	50 V permanently
Allowable burden (for 4 ... 20 mA):	R_A [Ω] ≤ (Uv [V] - 12V) / 0.02 A (for special types GITT and RT420 refer to this pages)
Allowable load (for 0-__Volt):	RL >3000 Ω
Ambient temperature electronics:	0 ... +70 °C (-40 ... +85 °C at .../RT420 and .../GITT)
Temperature coefficient:	
Pt100:	0.01 % / °C
NiCr-Ni:	0.05 % / °C
Storage temperature:	-20 ... +70 °C
Housing:	ABS (IP65)
Probe tube:	stainless steel
Mounting:	with holes for wall mounting
Electric connection:	elbow plug acc. to EN 175301-803/A (IP65)
Scope of supply:	Device, manual

GTMU - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - 11 - 12

Greisinger		
1.	Design type	
	AP1	Channel /duct design with thread
	AP2	For higher temperatures, with process connection and neck tube
	AP3	Indoor / outdoor temperature sensor
	AP4	Duct sensor
	AP5	For external sensor connection
	SHUT	Heat protective hat
2.	Sensor element	
	-P	Resistance thermometer Pt100
	-K	NiCr-Ni Type K
3.	Measuring range (MB)	
	-MB1	0..100°C
	-MB2	-50..+150°C
	-MB3	0..+200°C
	-MB4	-50..+50°C
		others on request
4.	Signal output	
	-A1	4-20 mA
	-V1	0-1 V
	-V3	0-2 V
	-V4	0-5 V
	-V2	0-10 V
5.	Fitting length EL	
	-100	100 mm
		others on request
6.	Probe diameter D	
	-3	3 mm
	-4	4 mm
	-5	5 mm
	-6	6 mm
	-8	8 mm
7.	Process connection	
	-G1	G 1/2
	-G2	G 1/4
	-G3	G 3/4
	-G5	G 3/8
8.	Length of neck tube	
	-050	50 mm, Standard A2
		each further 100 mm
9.	Option	
	-00	Without option
	-VO	On site display
10.	Option	
	-LACK	Encapsulated PC Board
11.	Option	
	-GITT	Electrically isolated transducer
	-RT420	Transmitter designed for outdoor phrases
12.	Option	
	-POT	Electrically insulated NiCr-Ni-probe

Temperature-measuring transmitter in snap-on housing

GTP-SG

Temperature-measuring transmitter in snap-on housing

General:

Design-type: PC board completely ready for operation (sensor not included) with any measuring range and any output. 3-pin connection terminal for Pt100 in 2 or 3-wire technology. Connection terminal for output in 2-, 3-, or 4-wire technology - depending on type desired.

Specifications:

Sensor element:	for Pt 100 resistance thermometer acc. to DIN IEC 751. suitable sensor can be supplied custom-designed according to your specifications or in standard design from stock (p.r.t. pages 185-200).
Sensor connection:	2- or 3-wire connection. Automatic line resistance compensation for 3-wire connection.
Auxiliary energy:	Uv = 12 ... 30 V DC (at 0-10 V: Uv = 18 ... 30 V DC)
Reverse voltage protection:	50 V permanent
Permissible impedance (at 4 ... 20 mA):	R_A [Ω] ≤ (Uv [V] - 12 V) / 0.02 A
Operating temperature electronics:	0 ... +70 °C
Accuracy electronics:	±0.2 % FS
Temperature coefficient:	0.01 % / °C
Storage temperature:	-20 ... +70 °C
Relative humidity:	0 ... 80 % RH, non-condensing (standard)
Type option:	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

GTP - [1] - [2] - [3] - [4] - [5]

Greisinger		
1.	Model	
	SG	Temperature transmitte in snap-on housing
2.	Sensor element	
	P	Pt100
	-T	Pt1000
3.	sensor connection	
	...	2- or 3-wire
4.	Measuring range	
	-0100	0...100°C
	-0200	0...200°C
	-5050	-50...+50°C
	-5015	-50...+150°C
5.	Output signal	
	-AA1	Analog output 4 ... 20 mA

Thermocouple Transmitter

TC 500

Thermocouple Transmitter

General:

Thermocouple Transmitter TC500 converts thermovoltages into standard industry signals. The measuring range is programmable via rotary switches at the side.

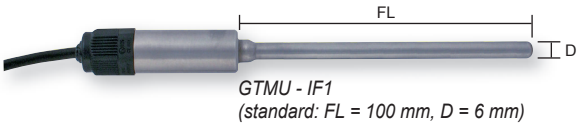
Specifications:

Power supply	
Supply voltage:	230 V AC ±10 % or 24 V DC ±15 %
Frequency AC:	47 ... 63 Hz
Power consumption:	<3.5 VA
Operating temperature:	-10 ... +60 °C
CE-conformity:	EN55022, EN60555-2, IEC61000-4-4/5/11/13
Input	
Thermocouple	
Type J:	Fe-CuNi in range -100 ... +800 °C
Type K:	NiCr-Ni in range -150 ... +1200 °C
Type S:	Pt10Rh-Pt in range 0 ... +1600 °C
Output	
Current:	0 ... 20 mA, 4 ... 20 mA switch selectable, burden ≤500 Ω
Voltage:	0 ... 10 V, 2 ... 10 V switch selectable, load max. 10 mA , short-circuit-proof
Start value:	adjustable approx. ±5 %
End value:	adjustable approx. ±5 %
Broken line:	outputs takes the end value +1 %, overflow indication
Short-circuit:	no indication (output takes terminal temperature)
Accuracy:	≤0.15 %, 1 °C
Temperature coefficient:	≤0.01 %/K
Case:	Polycarbonate, UL94 V-0 TS35 acc. to DIN EN 60715:2001-09
Weight:	approx. 200 g
Protection class:	case IP30, terminals IP20 acc. to BGV A3
Connection:	screw terminals with pressure plate max. 2.5 mm²

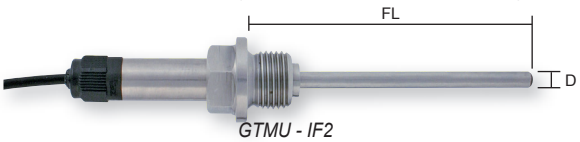
TC 500 - [1] - [2] - [3]

Greisinger		
1.	Input	
	60	Thermocouple J, K, S programmable, output 0/4 ... 20 mA or 0/2 ... 10 V DC
2.	Supply voltage	
	0	230 V AC ±10 %
	5	24 V DC ±15 %
3.	Options	
	00	without option

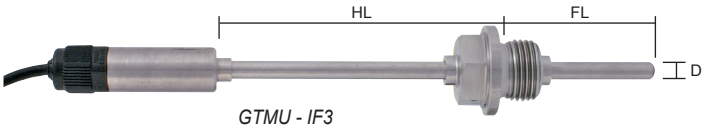
Temperature transmitter PT 1000



GTMU - IF1
(standard: FL = 100 mm, D = 6 mm)



GTMU - IF2
(standard: FL = 100 mm, D = 6 mm, G1/2")



GTMU - IF3
(standard: HL = 100 mm, FL = 50 mm, D = 6 mm, G1/2")

GTMU-IF1
Art. no. 602688
Temperature transmitter

GTMU-IF2
Art. no. 604409
Temperature transmitter

GTMU-IF3
Art. no. 603774
Temperature transmitter

General:

High precision transmitter with compact design.

Specifications:

Measuring range:	The probe length FL has to be chosen long enough, that the allowable temperature range of the electronics situated in the tube sleeve is not exceeded.
GTMU-IF1 (standard):	-30.0 ... +100.0 °C
GTMU-IF2 (standard):	-30.0 ... +100.0 °C
GTMU-IF3 (standard):	-70.0 ... +400.0 °C
	other measuring ranges (max. -200 ... +500 °C) upon request
Measuring probe:	internal Pt1000-sensor, DIN class B
Accuracy: (at nominal temperature = 25 °C)	
Electronic:	±0.2 % of measuring value ±0.2 °C
Measuring probe:	standard: DIN class B optionally higher sensor accuracy available
Output signal:	4 … 20 mA (2-wire)
Auxiliary energy:	Uv = 10 … 30 V DC
Permissible burden:	$R_A \leq (U_V - 10\ V) / 0.022\ A$ [R_A in Ohm, U_V in V]
Working temperature of electronic (in tube sleeve):	-25 ... +60 °C
Housing:	stainless steel housing
Dimensions:	depending on sensor construction
tube sleeve:	Ø 15 x 35 mm (without screwing)
Electric connection:	approx. 1 m long 4-pin cable (2 x current loop, 2 x interface)

Option:

FL=...:
longer tube

HL=...:
longer collar tube

D=...:
other tube diameter

G=...:
other thread

MB=...:
other measuring ranges, set by factory

M12:
electric connection: M12 plug

Analog Pt100-transmitter

T03BU/WE
Analog Pt100-transmitter (transmitter 0 ... 10 V, set by our works)

General:

These transmitter are designed for industrial applications and are used to measure the temperature through Pt100 resistance thermometers in 2-/3-wire circuits connections. The 0 ... 10 V output signal is linear with temperature. The advantages of a continuous analog signal path and those of digital adjustment have been combined in the realization of this transmitter series.

Specifications:

Measurement input:	Pt100 (DIN EN60751)
Measuring range:	-200 ... +850 °C
Measuring span:	40 ... 1050 K
Zero shift:	at span <75 K: -40, -20, 0, 20 or 40 °C at span =75 K: ±50 °C at span >75 K: ±(span * 0.2 + 35 °C)
Sensor connection:	2- or 3-wire connection
Measuring current:	<0.5 mA
Max. perm. line resistance (3-wire):	11 Ohm per conductor
Sampling time:	continuous because of analog signal path
Output signal:	0 … 10 Volt, 3-wire technology
Setting time on a temperature change:	≤10 ms
Transfer characteristic:	linear with temperature
Transfer accuracy:	±0.2 % FS
Calibration accuracy:	≤ ±0.2 °C or ±0.2 % of measuring span
Supply voltage: UB	15 … 30 V DC
Supply voltage error:	±0.01 % FS / V
Permissible load R_L:	R_L ≥10 kOhm
Load error:	≤ ±0.1 % FS
Operating temperature:	-40 … +85 °C
Relative humidity:	0 ... 95 % RH (non condensing)
Storage temperature:	-40 … +100 °C
Electric connection:	via terminals, cross section of connection terminals max. 1.75 mm²
Housing:	PC-housing, suitable for installation in connection head acc. to DIN 43729 form B.
Operating position:	unrestricted
Dimensions:	Ø 44 mm x 21 mm
IP-rating:	housing: IP54, connection terminals: IP00
Weight:	approx. 45 g

Accessories and spare parts:

Hutschienenadapter
Art. no. 603659
zum Aufschnappen des T03 BU auf Hutschiene

T03BU/WE - [1] - [2]

Greisinger		
1.	Sensor Sensor connection anschluss	
	P2	Pt100 (2-wire)
	P3	Pt100 (3-wire)
2.	Measuring range	
	...	-200...+850°C
	MB	Any measuring range desired

Temperature-measuring transducer 4 ... 20 mA, Pt100, 2- / 3- or 4-wire

RT420 with rail adapter

FOR HEAD AND RAIL CASE MOUNTING

HIGHLIGHTS:

- *low-price and robust (complete sealed - no pots, therefore vibration resistant and long time stable)*
- *selectable probe connection as 2- / 3- or 4-wire*
- *high accuracy (0.1 %)*
- *large ambient temperature range (-40 ... +85 °C)*
- *error message in case of sensor damage or sensor short-circuit*
- *functional warranty 5 years*

RT420-00/WE

Head transmitter, set by our works

RT420-SG/WE

Set by our works and mounted in snap-on rail housing

Specifications:	
Measuring range:	-200 ... +850 °C
Measuring span:	25 ... 1050 K
Zero shift:	-200 ... +825 °C
Resolution:	14 bit
Sensor connection:	2-, 3- or 4-wire connection
Measuring current:	<0.3 mA
Permitted resistance of connection cable:	max. 20 Ohm / wire
Compensation for cable error:	±0.02 K / Ohm (at 3-wire)
Sensor monitoring:	monitoring for sensor damage and short-circuit
Measuring cycle:	<700 ms
Linearisation:	linear to temperature acc. to IEC/DIN/EN 60 751-2
Accuracy:	±0.25 °C or ±0.1 % of measuring span
Temperature effect:	< ±0.01 % / 1 K
Analog output:	4 … 20 mA, 2-wire technology
Accuracy output:	<0.1 % of signal span
Auxiliary energy: U_B	8 … 35 V DC (max. ripple factor: 3 Vss @ 50/60 Hz)
Permitted burden R_A:	$R_A \leq (U_B - 8\ V) / 0.023\ A$ [R_A in Ohm, U_B in V]
Effect of auxiliary energy:	±0.01 % / V
Power-on time:	10 s
Damping:	adjustable from 0 ... 30 s
Output limits:	3.5 mA, 23 mA
Signal for sensor damage:	3.5 mA or 23 mA
Operating temperature:	-40 … +85 °C
Relative humidity:	0 ... 98 % RH (non condensing)
Storage temperature:	-55 … +90 °C
Housing:	housing suitable for head mounting
Dimensions:	Ø 44 mm x 19 mm
IP rating:	Housing: IP40, connection terminals: IP10
Electric connection:	via screw-type terminals
Weight:	approx. 35 g

Accessories and spare parts:

Rail adapter
Art. no. 603659
for snap-on the RT420 to top-hat rail

RT420 - 1 - 2 - 3 - 4

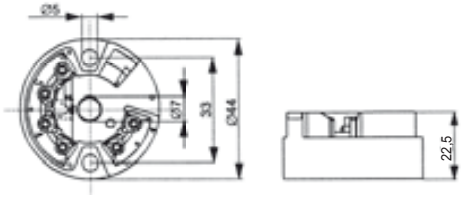
Greisinger		
1.	Design type	
	00/WE	Head transmitter
	SG/WE	Head transmitter in snap-on housing
2.	Sensor connection	
	-P2	Pt100 (2-wire)
	-P3	Pt100 (3-wire)
	-P4	Pt100 (4-wire)
3.	Measuring range	
	-MB1	-200..+850°C
	-MBS	0..+20°C
	-MBS	0..+25°C
	-MBS	0..+40°C
	-MBS	0..+50°C
	-MBS	-50..+50°C
	-MBS	-200..+50°C
	-MBS	0..+100°C
	-MBS	-30..+100°C
	-MBS	-50..+100°C
	-MBS	-50..+150°C
	-MBS	0..+160°C
	-MBS	0..+170°C
	-MBS	0..+180°C
	-MBS	0..+200°C
	-MBS	-50..+200°C
	-MBS	0..+300°C
4.	Sensor break signal	
	-FBU	3.5 mA
	-FBO	> 23 mA

Programmable, electrically isolated, 4 ... 20 mA universal transmitter GITT01

HIGHLIGHTS:

- *electrically isolated*
- *output linear to temperatur*
- *high accuracy for the entire ambient temperature range (-40 ... 85 °C)*
- *available with Ex - protection*

RESISTANCE THERMOMETERS / THERMOCOUPLES
RESISTANCE SENSOR / VOLTAGE SENSOR



GITT01
Electrically isolated, 4 ... 20 mA universal transmitter

GITT01-EX
Electrically isolated, 4 ... 20 mA universal transmitter
(Ex-protection: ATEX II 1G Ex ia IIC T6/T5/T4)

Specifications:

Input signal: can be universally programmed to

Resistance thermometer:		max. meas. range	min. meas. span
Pt100	acc. to IEC 751	-200 ... +850 °C	10 K
Pt500	acc. to IEC 751	-200 ... +250 °C	10 K
Pt1000	acc. to IEC 751	-200 ... +250 °C	10 K
Ni100	acc. to DIN 43760	-60 ... +250 °C	10 K
Ni500	acc. to DIN 43760	-60 ... +150 °C	10 K
Ni1000	acc. to DIN 43760	-60 ... +150 °C	10 K
Thermocouples:		max. meas. range	min. meas. span
Typee B	PtRh30-PtRh6	0 ... +1820 °C	500 K
Type C	W5Re-W26Re (ASTME 988)	0 ... +2320 °C	500 K
Type D	W3Re-W25Re (ASTME 988)	0 ... +2495 °C	500 K
Type E	NiCr-CuNi	-270 ... +1000 °C	50 K
Type J	Fe-CuNi (acc. to IEC 584)	-210 ... +1200 °C	50 K
Type K	NiCr-Ni	-270 ... +1372 °C	50 K
Type L	Fe-CuNi (acc. to DIN 43710)	-200 ... + 900 °C	50 K
Type N	NiCrSi-NiSi	-270 ... +1300 °C	50 K
Type R	Pt13Rh-Pt	-50 ... +1768 °C	500 K
Type S	Pt10Rh-Pt	-50 ... +1768 °C	500 K
Type T	Cu-CuNi (acc. to IEC 584)	-270 ... + 400 °C	50 K
Type U	Cu-CuNi (acc. to DIN 43710)	-200 ... + 600 °C	50 K
	MoRe5-MoRe41	0 ... +2000 °C	500 K
Resistance-type sensor:		max. meas. range	min. meas. span
Resistance		10 ... 400 Ohm	10 Ohm
Resistance		10 ... 2000 Ohm	10 Ohm
Voltage sensor:		max. meas. range	min. meas. span
Voltage		-10 ... 100 mV	5 mV

Resistance thermometer:

Sensor connection:	2-, 3- or 4-wire connection
Meas. current:	<0.6 mA
Max. perm. line resistance:	11 Ohm / line
Accuracy:	
Pt100, Ni100:	±0.2 °C or ±0.08 % of measuring span
Pt500, Ni500:	±0.4 °C or ±0.16 % of measuring span
Pt1000, Ni1000:	±0.2 °C or ±0.08 % of measuring span
Temperature effect:	Td = ± (15ppm/K * max. meas. range + 50ppm/K * meas. span)

Thermocouples:

Sensor connection:	2-wire connection
Sensor current:	<350 nA
Accuracy (typ.):	±0.5 K (Type: K, J, E, L, U), ±1.0 K (Type: N, C, D), ±2.0 K (Type: S, B, R, MoRe5-MoRe41)
CJC:	Pt100 internal or external (0 ... 80 °C)
CJC accuracy:	±1 °C
Temperature effect:	Td = ± (50 ppm/K * max. meas. range + 50 ppm/K * meas. span)
Output signal:	4 … 20 mA or 20 ... 4 mA, 2-wire technology
Linearisation:	temperature linear, resistance linear or voltage linear
Auxiliary energy: U_B	8 … 30 V DC (max. ripple factor: 5 Vss for Ub>13 V)
Electr. isolation (E/O):	Ueff = 2 KV AC
Permitted load R_A:	$R_A \leq (U_B - 8\ V) / 0.022\ A$ [R_A in Ohm, U_B in V]
Supply effects:	≤ ±0.01 % / V deviation from 24 V
Load effect:	≤ ±0.02 % / 100 Ohm
Digital filter:	0 ... 60 s, configurable
Switch-on delay:	approx. 4 s
Response time:	1 s
Output limits:	3.8 ... 20.5 mA
Signal in case of sensor damage:	3.6 mA or ≥21.0 mA, configurable
Operating temperature:	-40 ... +85 °C
Climate class:	acc. to EN 60654-1, class C; condensation permissible
Vibration strength:	4 g / 2 ... 150 Hz acc. to IEC 60 068-2-6
Electric connection:	via terminals, cross section of connection terminals max. 1.75 mm²
Housing:	PC-housing, suitable for installation in connection head acc. to DIN 43729 form B.
Dimensions:	Ø 44 mm x 22.5 mm
IP-rating:	housing: IP54, connection terminals: IP00
Weight:	approx. 40 g
Ex-approved:	ATEX II 1G Ex ia IIC T6/T5/T4
Power suplly set:	Ui ≤30 V DC, Ii ≤100 mA, Pi ≤750 mW Ci, Li = negligibly small
Measuring circuit:	Uo ≤ 8.2 V DC, Io ≤ 4.6 mA, Po ≤ 9.35 mW
Max. connection values:	Lo = 4.5 mH (ia IIC), 8,5 mA (ia IIB) Co = 974 nF (ia IIC), 1900 nF (ia IIB)

Accessories and spare parts:

Rail adapter
Art. no. 603659
(rail adapter for snap-on to top-hat rail)

Temperature transmitter (electrically isolated)

MU500-51-...
Art. no. 602611 (MU500-51-0-00-GN)
Art. no. 604331 (MU500-51-5-00-GN)
Temperature transmitter (Pt100)

MU500-53-...
Art. no. 602613 (MU500-53-0-00-GN)
Temperature transmitter (Pt1000)

MU500-EX-51-...
Art. no. 603257 (MU500-EX-51-0-00-GN)
Art. no. 604830 (MU500-EX-51-5-00-GN)
Temperature transmitter (Pt100)

MU500-EX-53-...
Temperature transmitter (Pt1000)

General:

- Electrically isolated: between input / output / supply voltage
- 2 power-supply-designs with wide range of allowed supply voltage: 10 ... 30 V DC / 10 ... 42 V AC or 85 ... 265 V AC / 110 ... 125 V DC
- 22.5 mm standard case for rail mounting TS35
- Several measuring ranges, selectable via rotary switch at front panel (13 for Pt100, 16 for Pt1000)
- Offset and span adjustable

For Ex-designs:

- Input intrinsically safe ATEX II (1) G [Ex ia] IIC, II (1) D [Ex iaD]
- Burden max. 1000 Ω

Specifications:

Measuring ranges:	selectable via rotary switch
Pt100:	-50 ... 0, -50 ... +50, -30 ... +20, -30 ... +70, -20 ... +30, -20 ... +80, 0 ... 50, 0 ... 100, 0 ... 150, 0 ... 200, 0 ... 300, 0 ... 450, 0 ... 600 °C
Pt1000:	-50 ... 0, -50 ... +50, -30 ... -20, -30 ... -10, -20 ... -10, -20 ... 0, -10 ... 0, -10 ... +10, 0 ... 10, 0 ... 20, 0 ... 30, 0 ... 40, 0 ... 50, 0 ... 100, 0 ... 150, 0 ... 200 °C
Offset adjust:	offset: approx. ±8 Ω (≙ 20 °C for Pt100, ≙ 2 °C for Pt1000) span: approx. ±20 %
Sensor connection:	2- or 3-wire connection
Sensor current:	approx. 1 mA (Pt100), approx. 0.25 mA (Pt1000)
Output signal:	0 ... 20 mA, 4 ... 20 mA, 0 ... 10 V or 2 ... 10 V (selectable via DIP switch)
max. load:	burden ≤1 kΩ (at mA), load: max. 15 mA (at V)
Basic accuracy:	≤0.2 % of measuring range
Temperature coefficient:	≤0.01 %/K
Output accuracy:	≤0.1 % of measuring range
Power supply:	**... - 0 - 00:** 85 ... 265 V AC / 110 ... 125 V DC **... - 5 - 00:** 10 ... 42 V DC / 10 ... 30 V AC
Power consumption:	max. 2.2 W / 3.3 VA
Isolation voltage:	500 V AC, according to VDE 0110 Gr. 2 between input/output/supply voltage
Test voltage:	4 kV DC between input/output/supply voltage
Working temperature:	-10 ... +60 °C
Electrical connection:	screw-terminals with pressure plates, max. 2.5 mm²
Dimensions:	22.5 x 75 x 110 mm (W x D x H)
Protection:	IP 30 (case), IP 20 (terminals)
Ex-certification:	TÜV 03 ATEX 2283, II (1) G [Ex ia] IIC, II (1) D [Ex iaD]
Connection data:	
MU 500-ex-ia-51-..:	U0 = 1,3 V, I0 = <3 mA, P0 = <3 mW, C0 = 29 µF, L0 = 100 mH, Ci = 5 nF, Li = 0 mH
MU 500-ex-ia-53-..:	U0 = 4,9 V, I0 = <3 mA, P0 = <3 mW, C0 = 2,2 µF, L0 = 100 mH, Ci = 5 nF, Li = 0 mH

Isolating signal converter

ST500-10-0-00
Art. no. 603442
Isolating signal converter (230 V AC)

ST500-10-5-00
Art. no. 603483
Isolating signal converter (10 ... 30 V DC/AC)

ST500-EX-10-0-00
Art. no. 603440
Isolating signal converter (230 V AC)

ST500-EX-10-5-00
Art. no. 603627
Isolating signal converter (10 ... 30 V DC/AC)

General:

Isolating signal converter with integrated transmitter supply. It allows the direct connection of active 2-wire sensors (4 ... 20 mA) and 3-wire sensors in the Ex-area.

- 2 power-supply-designs with wide range of allowed supply voltage: 10 ... 30 V DC / AC or 85 ... 253 V AC
- Electrically isolated: between input / output / supply voltage
- 22.5 mm standard case for rail mounting TS35
- Universal inputs/outputs for (0)4 ... 20 mA and 0(2) ... 10 V

For Ex-designs:

- Input intrinsically safe ATEX II (1) G [Ex ia] IIC, II (1) D [Ex iaD]

Specifications:

Measuring ranges:	selectable
Current input:	0 ... 20 mA or 4 ... 20 mA (R_i = 25 Ω, max. 100 mA overload)
Voltage input:	0 ... 10 V or 2 ... 10 V (R_i = ~ 40 kΩ, max. 100 V overload)
Offset adjust:	approx. ±20 %, adjustable
Transmitter supply:	approx. 20 V DC, R_i = approx. 300 Ω
Output signal:	0 ... 20 mA, 4 ... 20 mA, 0 ... 10 V or 2 ... 10 V (selectable via DIP switch)
max. load:	burden ≤1 kΩ (at mA), load: max. 15 mA (at V)
Basic accuracy:	≤0.3 % of measuring range
Temperature coefficient:	≤0.01 %/K
Repeat accuracy:	≤0.1 % of measuring range
Rise time:	T_{90} = <100 ms
Power supply:	**... - 0 - 00:** 85 ... 253 V AC **... - 5 - 00:** 10 ... 30 V DC / AC
Power consumption:	max. 3.5 VA
Isolation voltage:	500 V AC, according to VDE 0110 Gr. 2 between input/output/supply voltage
Test voltage:	4 kV DC between input/output/supply voltage
Working temperature:	-10 ... +55 °C
Electrical connection:	screw-terminals with pressure plates, max. 2.5 mm²
Dimensions:	22.5 x 75 x 110 mm (W x H x D)
Protection:	IP 30 (case), IP 20 (terminals)
Ex-certification:	TÜV 97 ATEX 1150, II (1) G [Ex ia] IIC, II (1) D [Ex iaD]
Connection data:	U0 = 25.2 V, I0 = 95 mA, P0 = 600 mW, C0 / L0 (ia/IIC) = 47 nF / 2 mH or 107 nF / 0.2 mH, C0 / L0 (ia/IIB) = 370 nF / 15 mH or 430 nF / 1 mH, Ci, Li = negligible **The intrinsically safe circuit is electrically isolated from the non-intrinsically safe circuits up to a sum of the peak values of the nominal voltage of 375 V.**

Infrared-measuring transducer

HIGHLIGHTS:

- *small infrared sensor heads with 22:1 optical resolution*
- *rugged and applicable without cooling up to 180 °C ambient*
- *adjustable emission factor*
- *freely scaleable analogue output*
- *illuminated liquid crystal display*

NON-CONTACT TEMPERATURE MEASURING FROM -50 ... +975 °C

IRCT20

Art. no. 602832

Precision infrared transducer, -50 ... +975 °C, optic 22:1

Application:

Glass, paper, plastic industries, automotive industry, metal industry,quality assurance / maintenance

Specifications:

Measuring range:	-50 ... +975 °C freely scaleable via programming keys
Spectral sensitivity:	8 ... 14 µm
Optic resolution:	22:1 (precision glass optics)
System accuracy:	±1% or ±1 °C (higher value applicable)
Reproducibility:	±0.5 % or ±0.5 °C (higher value applicable)
Nominal temperature:	23 ±5 °C
Temperature coefficient:	0.05 % or 0.05 °C/K (higher value applicable)
Temperature resolution:	0.1 °C
Response time:	150 ms (95 %)
Emission-, transmission factor:	adjustable from 0.100 ... 1.100
Output signals:	0 ... 20 mA, 4 ... 20 mA, 0 ... 5 V, 0 ... 10 V, thermocouple type J or K
Output impedance:	
mA	max. 500 Ohm (at 8 ... 36 VDC)
V	min. 100 kOhm load resistance
Thermo couple:	20 Ohm
Supply voltage:	8 ... 36 VDC
Power consumption:	max. 100 mA
Cable length:	1 m (Standard), 3 m, 15 m
IP rating:	IP65 (NEMA-4)
Ambient temperature:	
Measuring head:	-20 ... +180 °C
Electronic box:	0 ... +65 °C
Storage temperature:	
Measuring head:	-40 ... +180 °C
Electronic box:	-40 ... +85 °C
Relative humidity:	10 ... 95 % RH, non condensing
Vibration (meas. head):	
IEC 68-2-6:	3G, 11-200 Hz, each axis
Shock (meas. head):	
IEC 68-2-27:	50G, 11 ms, each axis
Weight (meas. head / elec. box):	40 g / 420 g
Dimensions electronic box:	120 x 70 x 30 mm
Scope of supply:	electronics-box with LCD, stainless steel sensor head (M12) incl. screw nut, 1 m high temperature sensor head cable, manual

Options:

CB3
3 m sensor head cable

CB15
15 m sensor head cable

CF
Auxiliary lens for measuring of smallest objects
measuring zone dia 0.6 mm @10 mm, in long distance 1.5:1

Accessories and spare parts:

MW
Art. no. 604567
mounting bracket, fixed

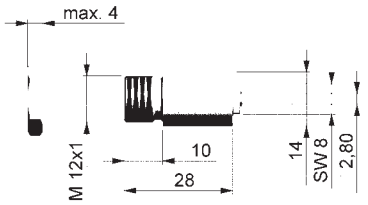
MB
Art. no. 604568
mounting bolts with M12x1 thread

MG
Art. no. 603711
mounting fork, adjustable in 2 axis with M 12x1 mount

FVS
Art. no. 603138
standard blow clear header

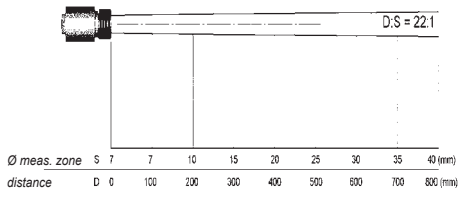
FVL
Art. no. 603712
laminar blow clear header

ISO-WPS-IRCT
Art. no. 604967
calibration certificate 23 °C, 110 °C, 510 °C

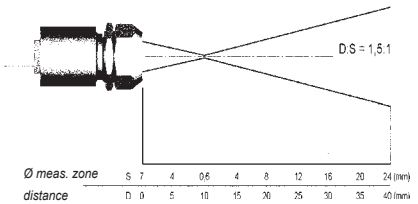


Further special design types (e.g. for metal processing, or with other optics) up on request

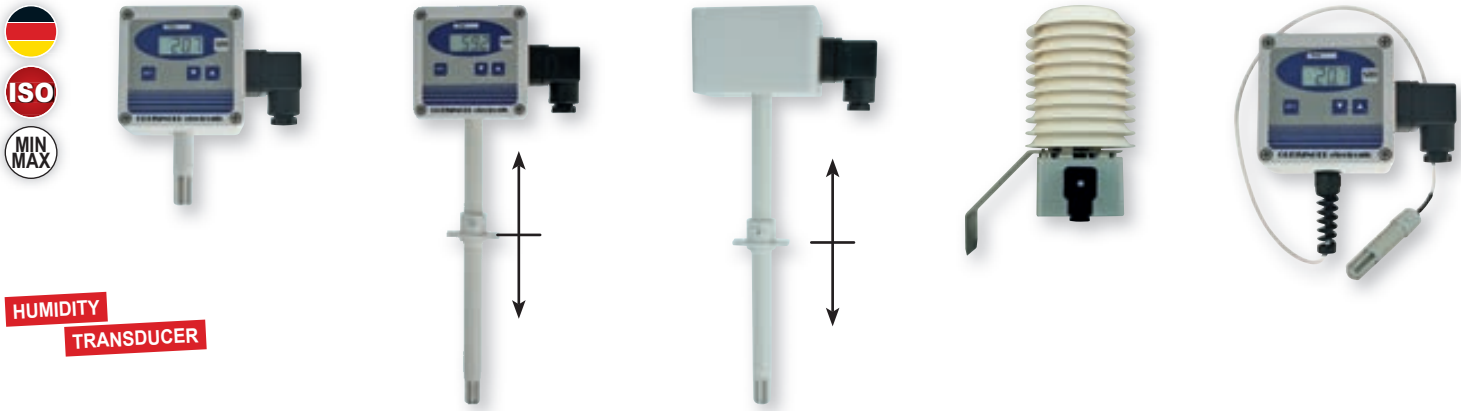
Optic resolution (standard)



Optic resolution (with option CF)



Humidity transducer



GRHU-1R-MP
Wall version

Standard version:
Probe length: 50 mm

GRHU-1K-MP
Wall / channel version

Standard version:
Probe length: 220 mm

GRHU-2K-MP
Channel version

Standard version:
Probe length: 220 mm

GRHU-SHUT-MP
absorption hat / weather protection

GRHU-KABEL-MP
wall version with cable and high humidity sensor

GRHU-1R-MP
Art. no. 602938

GRHU-1K-MP
Art. no. 602941

GRHU-2K-MP
Art. no. 602943

GRHU-SHUT-MP
Art. no. 603953

GRHU-KABEL-MP
Art. no. 608043

General:

The humidity transducer offers even greater possibilities to compensate the special sensor characteristics due to the newest microprocessor technology. Regarding precision, temperature stability and functionality a new dimension is entered. The transducer can be used for almost all applications due to the different types (e.g. wall or channel mount, with separated probe or with heat absorption hat) and the wide temperature range (electronic: -25 °C ... +50 °C; sensor: -40 ... +120 °C).

Specifications:

Measuring ranges:	
Humidity:	0.0 ... 100.0 % RH (temperature compensated)
Temperature:	-40.0 ... 120.0 °C or -40,0 ... 248 °F
Recommended humidity range:	20.0 ... 80.0 % RH (standard) 5.0 ... 95.0 % RH (with option high humidtiy)
Display options:	with option UNI an alternative display unit can be shown instead of the humidity measuring value. The unit selection will be done via keyboard.
Wet bulb temperature	-27.0 ... +60.0 °C
Dewpoint temperature	-40.0 ... +60.0 °C
Enthalpy	-25.0 ... +999.9 kJ/kg
Atmospheric humidity	0.0 ... 640.0 g/kg
Absolute humidity	0.0 ... 200.0 g/m³
Accuracy: (at 25 °C and in recommended range)	
Display:	humidity: ±2.5 % RH temperature: ±0.4 % of measuring value ±0.2 °C
Output signal:	±0.2 % FS
Temperature compensation:	automatically
Auxiliary energy:	12 ... 30 VDC or 18 ... 30 VDC (for output: 0 ... 10 V)
Reverse voltage protection:	50 V, permanently
Perm. impedance (at 4 ... 20 mA):	R_A [Ω] ≤ (U_V [V] - 12V) / 0.02 A
Permissible load (at 0 ... 1(10)V):	R_L [Ω] > 3000 Ω
Display:	approx. 10 mm high, 4-digit LCD-display, alternating humidity and temperature display
Working temperature:	-25 ... +50 °C (electronics)
Sensor head and tube:	-40 ... +100 °C - for short time up to +120 °C
Storage temperature:	-25 ... +70 °C
Relative humidity (electronic):	0 ... 95 % RH (non-condensing); If there is a risk of condensation due to temperature changes, please use our encapsulated or lacquered types (optionally available).
Housing:	ABS (IP65)
Sensor tube:	tube 14 mm Ø, with screw-type protection cap
Design type KABEL:	with separated sensor tube, sensor head (Ø14x 68 mm) connected to device via 1 m teflon cable. Inclusive option high-humidty sensor
Design type SHUT:	Heat protective shield / weather protective shield **Application:** for highly precise outdoor measurements, strong solar radiation and rain **Design:** Weather protective shield made of plastic, Ø 110 mm, heights approx. 140 mm. Wall mounting panel made of stainless steel with 3 mounting holes for screws with maximal shaft diameter 5 mm. Largest overhang 160 mm.
Electric connection:	elbow-type plug acc. to EN 175301-803/A (IP65)
Mounting:	4 housing holes for wall mounting or by means of plastic tube clamps for duct mounting
Functions:	min-/max-value memory, offset and slope adjustable, output signal scaleable

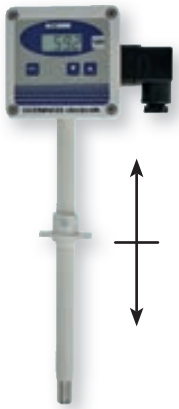
GRHU - [1] - [2] - [3] - [4] - [5]

Greisinger		Grundpreis
1.	Design type	
	1R-MP	Surface design
	1K-MP	Surface / duct design
	2K-MP	Duct design
	KABEL-MP	Surface design with cable and high humidity sensor
	SHUT-MP	Weather protective shield / heat-protective hat
2.	Options Sensor	
	...	Standard sensor
	-HO	High humidity sensor
3.	Fitting length EL	
	...	No installation lenght
	-050	50 mm
	-220	220 mm
	-300	300 mm
	-400	400 mm
	-500	500 mm
4.	Output signal	
	...	4...20 mA
	-AV1	Analog output 0-10 V
	-AV01	Analog output 0-1 V
	-AV10G	0-10V (3 or. 4 pins)
5.	Option	
	-LACK	Encapsulated PC Board
	-UNI	Selectable humidity display instead of the standard humidity values

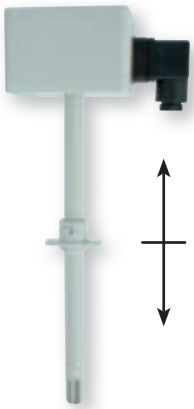
Humidity- and temperature transducer

2-CHANNEL HUMIDITY/-TEMPERATURE TRANSDUCER

GHTU-1R-MP
Wall version
Standard version:
Probe length: 50 mm



GHTU-1K-MP
Wall / channel version
Standard version:
Probe length: 220 mm



GHTU-2K-MP
Channel version
Standard version:
Probe length: 220 mm

GHTU-SHUT-MP
absorption hat / weather protection

GHTU-KABEL-MP
wall version with cable and high humidity sensor

GHTU-1R-MP
Art. no. 602585

GHTU-1K-MP
Art. no. 602587

GHTU-2K-MP
Art. no. 602592

GHTU-SHUT-MP
Art. no. 603896

GHTU-KABEL-MP
Art. no. 604436

General:

The humidity & temperature transducer offers even greater possibilities to compensate the special sensor characteristics due to the newest microprocessor technology. Regarding precision, temperature stability and functionality a new dimension is entered. The transducer can be used for almost all applications due to the different types (e.g. wall or channel mount, with separated probe or with heat absorption hat) and the wide temperature range (electronic: -25 °C ... +50 °C; sensor: -40 ... +120 °C), 2 standard signal outputs.

Specifications:

Measuring ranges:	
Humidity:	0.0 ... 100.0 % RH (temperature compensated)
Temperature:	-40.0 ... +120.0 °C or -40,0 ... +248 °F
Recommended humidity range:	20.0 ... 80.0 % RH (standard) 5.0 ... 95.0 % RH (with option high humidtiy)
Display options:	with option UNI an alternative display unit can be shown instead of the humidity measuring value. The unit selection will be done via keyboard.
Wet bulb temperature:	-27.0 ... +60.0 °C
Dewpoint temperature:	-40.0 ... +60.0 °C
Enthalpy:	-25.0 ... +999.9 kJ/kg
Atmospheric humidity:	0.0 ... 640.0 g/kg
Absolute humidity:	0.0 ... 200.0 g/m³
Accuracy: (at 25 °C and in recommended range)	
Display:	humidity: ±2.5 % RH temperature: ±0.4 % of measuring value ±0.2 °C
Output signal:	humidity ±0.2 % FS, temperature ±0.2 % FS
Temperature compensation:	automatically
Auxiliary energy:	12 ... 30 VDC or 18 ... 30 VDC (for output: 0-10 V)
Reverse voltage protection:	50 V, permanently
Perm. impedance (at 4 ... 20 mA):	R_A [Ω] ≤ (Uv [V] - 12V) / 0.02 A
Permissible load (at 0 ... 1(10)V):	R_L [Ω] > 3000 Ω
Display:	approx. 10 mm high, 4-digit LCD-display, alternating humidity and temperature display
Working temperature:	-25 ... +50 °C (electronics)
Sensor head and tube:	-40 ... +100 °C - for short time up to 120 °C
Storage temperature:	-25 ... +70 °C
Relative humidity (electronic):	0 ... 95 % RH (non-condensing); If there is a risk of condensation due to temperature changes, please use our encapsulated or lacquered types (optionally available).

Housing:	ABS (IP65)
Sensor tube:	tube 14 mm Ø, with screw-type protection cap
Design type KABEL:	with separated sensor tube, sensor head (Ø14x 68 mm) connected to device via 1 m teflon cable. Inclusive option high-humidty sensor
Design type SHUT:	Heat protective shield / weather protective shield **Application:** for highly precise outdoor measurements, strong solar radiation and rain **Design:** Weather protective shield made of plastic, Ø 110 mm, heights approx. 140 mm. Wall mounting panel made of stainless steel with 3 mounting holes for screws with maximal shaft diameter 5 mm. Largest overhang 160 mm.
Electric connection:	elbow-type plug acc. to EN 175301-803/A (IP65)
Mounting:	4 housing holes for wall mounting or by means of plastic tube clamps for duct mounting
Functions:	min-/max-value memory, offset and slope adjustable, output signal scaleable

GHTU - [1] - [2] - [3] - [4] - [5] - [6]

Greisinger		
1.	Design type	
	1R-MP	Surface design
	1K-MP	Surface / duct design
	2K-MP	Duct design
	KABEL-MP	Surface design with cable and high humidity sensor
	SHUT-MP	Weather protective shield / heat-protective hat
2.	Fitting length EL	
	...	No installation length
	-050	50 mm
	-220	220 mm
	-300	300 mm
	-400	400 mm
	-500	500 mm
3.	Output signal	
	...	4...20 mA
	-AV01	0-1 V
	-AV01G	0-1V (galvanically isolated)
	-AV10	0-10 V
	-AV10G	0-10 V (galvanically isolated)
4.	Options Sensor	
	...	Standard sensor
	-HO	High humidity sensor
5.	Option	
	-LACK	Encapsulated PC Board
6.	Option	
	-UNI	Selectable humidity display instead of the standard humidity values

Pressure measuring transducer for absolute pressure or over/under pressure and pressure difference

FREELY SCALABLE

HIGHLIGHTS:

- *Change between 4 ... 20 mA / 0 ... 10 V*
- *With display*
- *Switching output*
- *Configuration protected by code lock*

absolute pressure connection

GMUD-MP-S

Pressure measuring transducer for pressure difference or absolute pressure (pressure range >25 mbar)

GMUD-MP-F

Pressure measuring transducer for pressure difference (fine pressure range ≤25 mbar)

General:

Microprocessor controlled, digital pressure transducer with display and operation via 3 buttons. With freely scalable analog output that can be switched between 4 ... 20 mA and 0 ... 10 V. Code lock for input, after code input parameters can be changed (code permanently stored).

Application:

For air and non-aggressive gases
Area of application:
controlling, measuring and monitoring, climate and ventilation, environmental and medical technology

Measuring ranges:

Difference fine pressure range:

GMUD MP-F-MR0: *Art. no. 602483*	**Measuring ranges:** 0.000 … 1.000 mbar **Overload:** 250 mbar, **Burst pressure:** 500 mbar
GMUD MP-F-MR1: *Art. no. 602485*	**Measuring ranges:** 0.00 … 10.00 mbar **Overload:** 150 mbar, **Burst pressure:** 200 mbar
GMUD MP-F-MR2: *Art. no. 602487*	**Measuring ranges:** 0.00 … 20.00 mbar **Overload:** 150 mbar, **Burst pressure:** 200 mbar
GMUD-MP-F-MR3: *Art. no. 605958*	**Measuring ranges:** -1.999 ... +2.500 mbar **Overload:** 250 mbar, **Burst pressure:** 500 mbar
GMUD-MP-F-MR4: *Art. no. 604355*	**Measuring ranges:** -19.99 ... +20.00 mbar **Overload:** 150 mbar, **Burst pressure:** 200 mbar

Difference pressure range:

GMUD MP-S-MR0: *Art. no. 602482*	**Measuring ranges:** 0.0 … 100.0 mbar **Overload:** 1000 mbar, **Burst pressure:** 1500 mbar
GMUD MP-S-MR1: *Art. no. 602491*	**Measuring ranges:** 0.0 … 500.0 mbar **Overload:** 1000 mbar, **Burst pressure:** 1500 mbar
GMUD MP-S-MR2: *Art. no. 602493*	**Measuring ranges:** 0 … 1000 mbar **Overload:** 2000 mbar, **Burst pressure:** 3000 mbar
GMUD MP-S-MR3: *Art. no. 602495*	**Measuring ranges:** 0 … 2000 mbar **Overload:** 4000 mbar, **Burst pressure:** 6000 mbar
GMUD MP-S-MR4: *Art. no. 602497*	**Measuring ranges:** 0 … 5000 mbar **Overload:** 7000 mbar, **Burst pressure:** 7000 mbar
GMUD-MP-S-MR5 *Art. no. 607278*	**Measuring ranges:** -100.0 ... +100.0 mbar **Overload:** 1000 mbar, **Burst pressure:** 1500 mbar
GMUD-MP-S-MR6 *Art. no. 607925*	**Measuring ranges:** -500 ... +500 mbar **Overload:** 1000 mbar, **Burst pressure:** 1500 mbar
GMUD-MP-S-MR7 *Art. no. 607252*	**Measuring ranges:** -1000 ... +1000 mbar **Overload:** 2000 mbar, **Burst pressure:** 3000 mbar

Absolute pressure range:

GMUD MP-S-MA0: *Art. no. 602499*	**Measuring ranges:** 0 … 1100 mbar abs. **Overload:** 2000 mbar, **Burst pressure:** 3000 mbar
GMUD MP-S-MA1: *Art. no. 602501*	**Measuring ranges:** 0 … 2000 mbar abs. **Overload:** 4000 mbar, **Burst pressure:** 6000 mbar

Types of pressure:

Absolute pressure is the pressure related to vacuum (zero pressure). When no pressure is applied (pressure port open), the ambient pressure is displayed.
Examples: meteorological measurements (eg 1013 hPa abs), vacuum processes
Differential pressure is the pressure difference between 2 press. Mostly both pressures are connected to a respective side of the measuring membrane, the sensor must have two pressure connections.
Examples: ventilation technology / filters, dynamic pressure measurements
The relative pressure is the pressure difference between a pressure / vacuum and the ambient pressure. For relative pressure measurement with a differential pressure sensor (2 pressure ports) one of the terminals is left open.
Examples: pneumatic, tire pressure, hydraulic

Specifications:

Sensor element:	piezoresistive pressure sensor with integrated temperature
Typ. accuracy:	depends on type (see manual) ±0.15 % (linearity) ±0.6 % FS (hysteresis and temperature 0 ... 70 °C)
Output signal:	4 ... 20 mA / 0 ... 10 V (selectable in menu)
Auxiliary energy:	only needed if 0 ... 10 V output signal is selected (18 ... 30 V DC / 24 V AC)
Permissible burden:	(4 ... 20 mA): $R_A[\Omega] \leq (Uv\ [V] - 12\ [V]) / 0.02\ A$
Permissible load:	(0 ... 10 V): ≥3000 Ω
Operating temperature:	-20 ... +70 °C
Storage temperature:	-40 ... +70 °C
Display / operation:	4-digit 7-segment display and 3 buttons
Display range:	-1999 ... 9999 digit
Pressure connection:	universal pressure connecting pieces for 6 x 1 mm or 8 x 1 mm plastic tubes (4 or 6 mm inner pipe diameter)
Mounting position:	any position (small influence of mounting position for low ranges)
Housing:	ABS (IP65): with fixing holes for wall mounting (accessible after cover has been removed)
Dimensions:	Housing 80 x 82 x 55 mm (without elbow-plug and pressure connecting pieces)
Electric connection:	elbow-type plug acc. to EN 175301-803/A (IP65) max. wire cross section: 1.5 mm², wire/cable Ø: 4.5 ... 7 mm

Option:

LACK
card coated on both sides (for outdoor application)

OUT
Switching output (max 28 V, 40 mA), switches if meas. value falls below or exceeds limit value connection via 2nd elbow-type plug

WE
Default settings according to customer's specifications, includes: output signal, measuring range, default state in case of error (without upcharge if together with MBF / MBS)

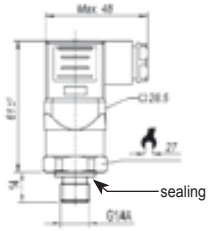
MBF
Option any fine pressure range ≤25 mbar,
please state desired measuring range

MBS
Option any pressure range >25 mbar ... 5000 mbar
please state desired measuring range

Accessories and spare parts:

Tube and accessories: see page 75.

Pressure transmitter



A 10

Pressure transmitter (relative pressure, zero output at atmospheric pressure)

Application:

Suitable for all applications in machine and systems engineering, automotive technology as well as cooling and air conditioning technology.

Specifications:

Measuring range (MR), Overload limit (OL), Burst pressure (BP):	
MB:	1, 1.6, 2.5, 4, 6, 10, 16, 25, 40, 60, 100, 160, 250, 400, 600
ÜL:	2 3.2 5 8 12 20 32 50 80 120 200 320 500 800 1200
BD:	5 10 10 17 34 34 100 100 400 550 800 1000 1200 1700 2400
Output signal:	4 ... 20 mA, 2-wire, R_A [Ω] < (Uv [V] - 8V) / 0.02 A 0-10 V, 3-wire, R_L > 10 kΩ (other output signals upon request)
Auxiliary energy Uv:	8 ... 30 VDC (for output 4 ... 20 mA) 14 ... 30 VDC (for output 0 ... 10 V)
Accuracy: *	≤1.0 % FS (optional: ≤0.5 % FS), * = including non-linearity, hysteresis, zero point and scale error. Corresponds to error of measurement per IEC 61298-2. Sensor adjusted in vertical mounting position with lower pressure connection
Non-Linearity:	≤0.5 % FS (optional: ≤0.25 % FS)
Zero Offset:	≤0.5 % FS (typ.), ≤0.8 % FS (max.), (Optional: ≤0.15 % FS (typ.), ≤0.4 % FS (max.))
Hysteresis:	≤0.16 % FS
Repeatability:	≤0.1 % FS
Long-term drift:	≤0.1 % FS (according to IEC 61298-3)
Response time: T_{90}	≤4 ms
Permitted temperature of measurement media:	0 ... +80 °C (optional: -30 ... +100 °C)
Ambient temperature:	0 ... +80 °C (optional: -20 ... +100 °C)
Storage temperature:	-20 ... +80 °C
Temperature compensated area:	0 ... +80 °C
Temperature error in compensated area:	≤1.0 % FS (typ.), ≤2.5 % FS (max.)
Material:	Parts coming into contact with pres. media
Pressure connection:	316 L
Pressure sensor:	316 L (as of 10 bar rel. 13 ... 8 PH)
Housing:	316 L
Pressure connection:	G ¼ A, DIN 3852-E with NBR sealing
Protection rating:	IP65 or IP67 with cable
Electric connection:	elbow-type plug acc. to EN 175301-803/A or connection cable, cable length 2 m
Electric protections:	reverse voltage and short-circuit protection
Weight:	approx. 80 g

Options:

Absolute pressure
(0 ... 1 bar abs. to 0 ... 25 bar abs.)

Under pressure
(-1.0 ... +1.5 bar, -1.0 ... +3.0 bar, -1.0 ... +9.0 bar)

G2
Higher sensor accuracy (class 0.5)

T2
Extended temperature range: -30 ... +100 °C

V2
Output signal 0 ... 10 V

Fixed connecting cable
2 m with bend protection (instead of elbow-type plug, IP67)

Pressure measuring transducer for over/under and absolute pressure


S 10


S 11


S 20

S 10 REL

Pressure measuring transducer (Standard, zero output at ambient pressure)

S 11 REL

Pressure measuring transducer (Flush, zero output at ambient pressure)

S 20 REL

Pressure measuring transducer (Standard, zero output at ambient pressure)

S 10 ABS

Pressure measuring transducer (Standard, absolute, zero output at vacuum)

S 11 ABS

Pressure measuring transducer (Flush, absolute, zero output at vacuum)

S 20 ABS

Pressure measuring transducer (Standard, absolute, zero output at vacuum)

General:

Piezoresistive pressure sensor with temperature compensation. Completely welded and stainless steel design, filled food safe (up to 16 bar), thin film strain (above 25 bar).

Specifications:

Measuring ranges:	in bar (other values upon request)
S-10 / S-11 REL: **S-11 / S-20 REL:**	0.1, 0.16, 0.25, 0.4, 0.6, 1, 1.6, 2.5, 4, 6, 10, 16, 25, 40, 60, 100, 160, 250, 400, 600, **only S-20 REL:** 1000, 1600
S-10 / S-11 ABS: **S-11 / S-20 ABS:** **S-10 ABS:**	0.25, 0.4, 0.6, 1, 1.6, 2.5, 4, 6, 10, 16, **only S-20 ABS:** 20, 40 0.8 ... 1.2,
Available overload pressure limits:	3-fold at measuring range <10 bar (150 psi) 2-fold at measuring range ≥10 bar (150 psi)
Output signal:	4 ... 20 mA (0 ... 10 V - refer to options; others upon request)
Permissible impedance:	R_A [Ω] ≤ (Uv [V] - 10 V) / 0.02 A (for output 4 ... 20 mA)
Permissible load:	R_L > 10 kOhm (for output 0 ... 10 V)
Auxiliary energy:	10 ... 30 V DC (14 ... 30 V DC for output 0 ... 10 V)
Accuracy:	
deviation from parameter (% of Span):	≤0.5 (setting of cut-off point) ≤0.25 (setting of tolerance band, BFSL)
Repeatability (% of Span):	≤0.1 %
Stability/year (% of Span):	≤0.2 (at reference conditions)
Hysteresis (% of Span):	≤0.1
Permissible temperature of media:	-30 ... +100 °C (refer to options)
Operating temperature ambient:	-20 ... +80 °C
Compensated temperature range:	0 ... +80 °C
Temperature coefficient:	≤0.02 % FS / K (or ≤0.04 % FS for MB ≤0.25 bar)
Housing:	stainless steel 1.4435 (IP65)
Pressure connection:	(other upon request)
Type S 10 / 20... :	G ½ B, other upon request
Type S 11... :	G 1 B (up to 1.6 bar), G ½ B (from 2.5 ... 600 bar)
Mounting position:	any
Electric connection:	standard via elbow-type plug EN 175301-803/A
Electric protections:	reverse voltage protection, over voltage and short-circuit protection.

Options:

Special measuring range

Media temperature: -40 ... +125 °C (S-10/-20 only)

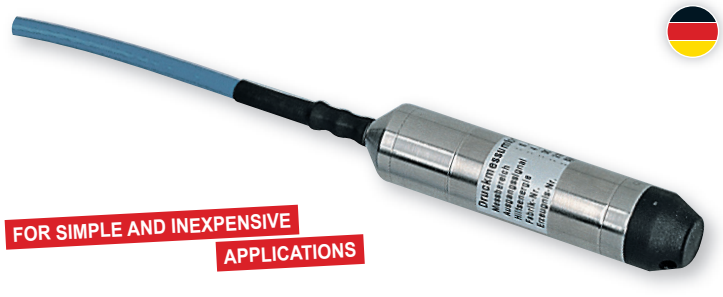
Media temperature: -30 ... +125 °C (S-11 only)

Media temperature: -20 ... +150°C
(S-11 only with cooling section)

Output signal 0-10 V
(other upon request)

Ex-protection

Water level / well probe Tank contents measuring probe



GBS 01

Art. no. 603059
Water level / well probe

Application:

Suitable for permanent level measuring in tanks, rivers, lakes, drinking-water wells, drilling holes, waste water plants...

GBS 02

Art. no. 603146
Tank contents measuring probe for difficult measuring conditions

General:

Piezoresistive pressure sensor with temperature compensation. Welded, non-corrosive design with integral and additionally sealed water-proof connecting cable. The pressure compensation is done via a cable-integrated air path to the atmosphere. A special feature of GBS 02 is the lateral flow resistance, which prevents media ingress.

Application:

For measuring the level of fuel and other aggressive media. The sensor is highly precise, insensitive to lateral flow and offers optionally lightning protection and other output signals (e.g. 0 ... 10 V). For measuring of gasoline please order ex-design.

Specifications:

Measuring ranges:	0.1 bar (100 mbar) ... 10 bar = 1 ... 100 m water column
Available ranges:	0.1, 0.25, 0.4, 0.6, 1, 1.6, 2.5, 4, 6, 10
Overload (bar):	1 2 2 3 5 8 8 10 10 10
Output signal:	4 ... 20 mA (option: 0 ... 10 V only for GBS02)
Permissible impedance:	4 ... 20 mA: R_A [Ω] < (Uv [V] - 10 V) / 0.02 A
Permissible load:	0 ... 10 V: R_L [Ω] >100 kOhm
Auxiliary energy:	10 ... 30 V DC (14 ... 30 V DC at 0 ... 10 V)
Accuracy:	accuracy (% of span):
GBS01:	≤0.5 setting of cut-off point) resp. ≤0.25 (BFSL)
GBS02:	accuracy (% of span): ≤0.25 (setting of cut-off point) resp. ≤0.125 (BFSL); (at 0.1 bar: ≤0.5 setting of cut-off point) resp. ≤0.25 (BFSL))
Hysteresis (% of span):	≤0.1
Repeatabilty (% of span):	≤0.05
Stability per year (% of span):	≤0.2 (at reference conditions)
Operating temperature:	-10 ... +50 °C (GBS01) or -10 ... +85 °C (GBS02)
Temperature coefficient (% of span):	≤0.02 / K (for meas. range >0.4 bar)
Filling:	KN77, food safe
Housing:	chromium-nickel alloy 1.4571. Male thread G 1/2“ accessible after removal of plastic protection cap.
Probe dimensions:	Ø 27 mm, length of metal body: approx. 100 mm (GBS 01), approx. 147 mm (GBS 02), cable Ø approx. 7.5 mm
Connection:	10 m stationary casted PUR cable (GBS 01) resp. FEP-cable (GBS 02), loose ends. Glass-fibre screen protects cable against tearing. (Extra long cable against upcharge - please specify when ordering)

Option GBS 01:

extra long connection cable (PUR)
till max. 300 m

Options GBS 02:

extra long connection cable (FEP, teflon)
till max. 100 m

output signal 0 ... 10 V

lightning protection, Ex-protection, meas. range 16 and 25 bar

Inline compressed air flowmeter for compressed air consumption measurements

GEE 771C-DN15

Art. no. 602917
Flowmeter with DN15 sensor and assembly ball valve DN15

GEE 771C-DN20

Art. no. 602918
Flowmeter with DN20 sensor and assembly ball valve DN20

GEE 771C-DN25

Art. no. 602919
Flowmeter with DN25 sensor and assembly ball valve DN25

General:

The inline flowmeter is based on the thermal mass flow measuring principle and is well suited for flow measurements in pipes DN15 till DN25. It allows measuring the consumption of compressed air (optionally also nitrogen, CO2, oxygen, helium or other non-corrosive, incombustible gases).
The device sets standards in terms of accuracy and repeatability, its unique mounting concept as well as its close-to-application adjustment at a pressure of 7 bar.
The mounting in a measurement assembly ensures easy installation and removal of the sensor for regular calibration and assures at the same time an exact and reproducible positioning of the flow sensor in the pipe. There are two signal outputs to read-out the measured values. Depending on the application the outputs can be configured as analog output (current or voltage), switching output or pulse output for consumption measurement.
Configuration software
The flow meter can be configured to its desired use by means of its integrated USB interface and a software included in shipping.
Functions of the software:
• configuration of outputs (range / switching points)
• 2 point adjustment for flow and temperature
• read-out of consumption meter
• reset of min-/max- values and consumption meter

Application:

Leakage detection: Consumption of compressed air despite of shut-down installations is a serious hint for a leak in one of the pipes (even a 1.5 mm sized hole can already yet energy costs of € 1.500!)
Improvement in efficiency: Compressed air is one of the most expensive form of energy in many plants! Therefore the knowledge about the consumption is essential for the application of an energy management system (e.g. acc. to DIN50001)

Specifications:

Measuring unit:	Volume flow acc. to DIN1343
Measuring range:	DN15: 0,32 ... 63 Nm³/h DN20: 0,57 ... 113 Nm³/h DN25: 0,90 ... 176 Nm³/h
Meas. range temperature:	-20 … +80 °C
Output 1:	Analog output 0(4) … 20 mA or 0 … 10 V
Output 2:	Pulse output or switching output
Power supply:	18 - 30 V AC/DC, max. 200 mA
Working temperature:	-20 … +60 °C
Media temperature:	-20 … +80 °C
Working pressure:	max. 16 bar

Accessories and spare parts:

GEE-KH-DN15
Art. no. 604559
Assembly ball valve DN15

GEE-KH-DN20
Art. no. 604560
Assembly ball valve DN20

GEE-KH-DN25
Art. no. 607966
Assembly ball valve DN25

GEE-AK-2m
Art. no. 607967
Connection cable transmitter ↔ sensor, 2 m

Air speed transmitters

HD29-0-3T-01

HD29-0-3-TC1-2

HIGHLIGHTS:

- *For air conditioning HVAC*
- *For calculation of outdoor air exchange*
- *For evaluating the frequency of renewal of air*
- *For airflow duct control*
- *For actuators (ventilation rate)*

other design types upon request

HD29-0-3-T01

Art. no. 609883
Air speed transmitter, sensor length 150 mm
Combined with temperature and humidity, other cable lengths, probe lengths or output 0 ... 10 V upon request

HD29-0-3-TC1-2

Art. no. 609884
Air speed transmitter, sensor length 250 mm, cable length 2 m
Combined with temperature and humidity, other cable lengths, probe lengths or output 0 ... 10 V upon request

General:

The HD29-0-3-T... is employed in the control of air speed in the air conditioning and ventilation (HVAC / BEMS) in the pharmaceutical, museum, clean rooms, ventilation ducts, industrial sectors and households, crowded places, cafeterias, auditoriums, gymnasiums or on farms with large numbers of animals. The sensors in combination with an accurate electronics guarantee precise and reliable measurements in the time.

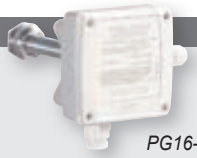
Common technical specifications:		Notes:
Air speed Measuring range:	0.05 ... 1 m/s 0.1 ... 2 m/s 0.20 ... 10 m/s 0.20 ... 20 m/s	*The measuring range can be selected by dips-witch.*
Air speed Accuracy **range 0 ... 1 m/s** **range 0 ... 2 m/s** **range 0 ... 10 m/s** **range 0 ... 20 m/s**	 ±(0.1 m/s +3 % of measurement) ±(0.15 m/s +3 % of measurement) ±(0.5 m/s +3 % of measurement) ±(0.7 m/s +3 % of measurement)	 *at 50 % RH and 1.013 hPa*
Output:	4 ... 20 mA	R_L *<500 Ω*
Power supply:	16 ... 40 V DC or 12 ... 24 V AC ±10 %	
Response time (selected by jumper)	0.2 s 2.0 s	*Fast* *Slow*
Operating temperature **electronics** **probe**	 0 ... +60 °C -10 ... +80 °C	
Storage temperature:	-10 ... +70 °C	
Protection class:	IP67	
Sensor working conditions:	Clean air, RH <80 %	
Case dimensions:	80 x 84 x 44	*Without probe*

Installation notes:

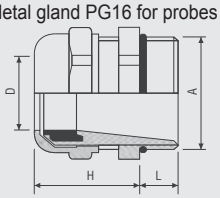
- To fix the probe inside a ventilation duct, a pipe, etc. you can use a PG16-12 metal cable gland (Ø 10 ... 14 mm) or a 3/8" universal biconical connection.
- The transmitters are factory calibrated and no further adjustments are required.
- To select the air speed output range use the dual dip-switch on the board

Accessories:

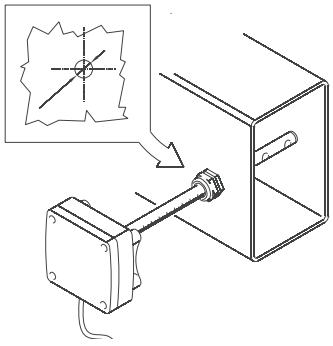
PG16-12
Art. no. 700081
Metal gland PG16 for probes Ø 12 mm



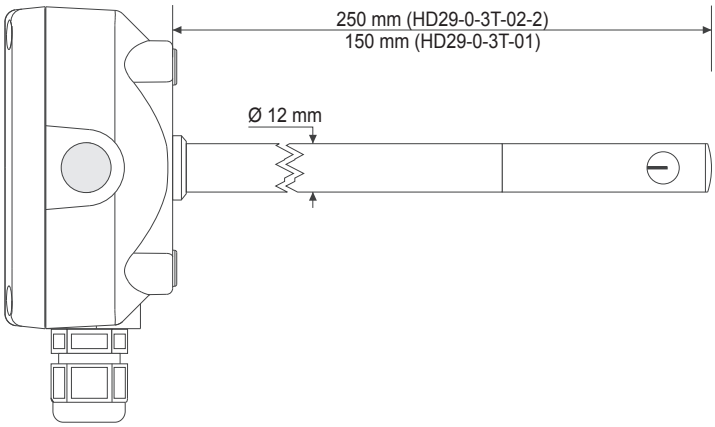
PG16-12



PG16-12 metal cable gland
D = 10 ... 14 mm
L = 6,5 mm
H = 23 mm
A = PG 16



Probe dimensions:



Miniature Air Velocity Transmitter

GSMU 671

Art. no. 608997
Miniature Air Velocity Transmitter

General:

The GSMU 671 measuring transducer is a compact rod-type flow probe for HVAC applications. The integrated flow sensor is a high-quality thin film sensor element of the latest generation - based on the hot film anemometer principle in combination with state-of-the-art transfer moulding technology.

Application:

- heating, ventilating
- air conditioning technology
- supply air control of ovens

Specifications:

Working range:	0 … 20 m/s, others (0 … 5 m/s, 0 … 10 m/s, 0 … 15 m/s) upon request
Output signal:	0 ... 10 V
Accuracy:	+-0,4 m/s +6 % of measured value (at 20 °C, 45 % RH, 1013 hPa and 1 … 20 m/s)
Response time (T_{90}):	typ. 4 s
Power supply:	10 … 29 V DC
Power consumption:	max. 70 mA (at 20 m/s)
Working conditions:	-20 … +60 °C, 5 … 95 % RH (non condensing)
Storage temperature:	-30 … +60 °C
Connection:	0.5 m cable, PVC, 5 x 0.25 mm², wire end ferrule
Housing:	Polycarbonate, length:130 mm, Ø 12 mm
Protection class:	IP50 (measuring head), IP54 (housing)

Accessories and spare parts:

GNG 24/150
Art. no. 600275
Power supply: 24 VDC, 150 mA

CO-Transducer

GT1-CO

Art. no. 602858
CO-Transducer

General:

High quality, TÜV certified CO transmitter for detection of carbon monoxide in underground garages, parking garages, boiler plants, heating systems, garages as well as in the ambient air. The CO transducer has a very long-lasting electrochemical measuring cell and could be easily integrated in existing CO surveillance systems (without loss of validity of existing TÜV certificates). Via two-wire system, displays, controller and alarm devices with 4 ... 20 mA input could be connected without any problem.

Highlights:

- TÜV certification according to VDI 2053
- also suitable as replacement sensor for existing CO surveillance systems
- long-lasting electrochemical measuring cell
- automatic zero calibration
- 3 years warranty for the co sensor element

Application:

- underground garages, parking garages
- boiler plant and heating systems
- motorcar garage

Specifications:

Measuring range:	0 ... 300 ppm CO (carbon monoxide)
Measuring principle:	electrochemical, permanent measuring
Reproducibility:	<3 ppm according to VDI 2053
Response Time T_{90}:	<60 s
Cross sensitivity:	≤2 % of 300 ppm CO (acc. to VDI 2053)
Linearity error:	≤2 % of 300 ppm CO (acc. to VDI 2053)
Offset adjustment:	automatically
Output signal:	4 ... 20 mA, 2 wire, max. burdon = 500 Ohm
Power supply:	12 ... 28 V DC (at option VO: 16 ... 28 V DC)
Permissible burdon:	R_A [Ω] ≤ (Uv [V] - 12 V or 16 V) / 0.02 A
Working condition:	-10 ... +40 °C, 15 ... 95 % RH (non-condensing)
Option: on site display	approx. 13 mm high, 3½-digit LC-display
Electric connection:	elbow-type plug acc. to EN 175301-803/A (IP65), max. wire cross section: 1.5 mm², wire diameter from 4.5 ... 7 mm
Housing:	ABS, 82 x 80 x 55 mm (without elbow-type plug)
Mounting:	with fixing holes for wall mounting
Mounting distance:	70 x 50 mm (W x H)
Fixing screws:	max. shaft-Ø 4 mm
Weight:	approx. 190 g

Variant:

GT1 - CO VO
Art. no. 607965
CO Transducer with on site display

Accessories and spare parts:

GZ-01
Art. no. 603122
test gas cap GT (for controlled flow with test gas)

GZ-02
Art. no. 603569
gas bottle with 12l test gas: 30 ppm CO

GZ-03
Art. no. 603123
gas bottle with 12l test gas: 300 ppm CO

GZ-04
Art. no. 603570
gas valve unit MiniFlo for gas bottles with 12l

GSN-24
Art. no. 604386
plug-in power supply (230 V AC => 24 V DC/300 mA)

CO_2-Transducer

GT10-CO2-1R

Art. no. 602599

CO_2-Transducer

General:

Due to the fact, that CO_2 is an important indicator for the quality of air in rooms, it's super important to measure the CO_2 content. The recommended CO_2 limit value for ambient air is 1000 ppm. An exceeding of this limit causes tiredness and a loss of concentration. The high quality and precise CO_2-transducer works according to the infrared principle (NDIR). An auto-calibration procedure compensates aging effects and is responsible for an excellent long term stability of this CO_2 transducer.
Due to the freely adjustable output signal the transmitter could be used for nearly each existing controller input etc. Additionally, there is a local display which shows beside the actual CO_2 concentration, the minimum and maximum values as well as an optical alarm.

Highlights:

- excellent long term stability
- auto-calibration procedure
- for surveillance of the recommended CO_2 concentration in ambient air
- output signal free scaleable

Specifications:

Measuring range:	standard: 0 ... 2000 ppm CO_2 (carbon dioxide) optional: 0 ... 5000 ppm CO_2 (carbon dioxide)
Measuring principle:	infrared principle (NDIR)
Accuracy:	standard: ±50 ppm ±2 % of meas. value (at 20 °C, 1023 mbar) opt. /5000: ±50 ppm ±3 % of meas. value (at 20 °C, 1023 mbar)
Output signal:	4 ... 20 mA (3-wire), standard 0 ... 1 V or 0 ... 10 V (3-wire), upon upcharge
Output scaling:	free scaleable, by entering display range
Auxiliary energy:	12 ... 30 V DC, max. 600 mA (at option 0 ... 10 V: 18 ... 30 V DC, max. 600 mA)
Permissible burdon (at 4 ... 20 mA):	R_A <200 Ω
Perm. load (at 0-...Volt):	R_L >3000 Ω
Display:	approx. 10 mm high, 4-digit LC-display
Working condition:	-10 ... +50 °C, 5 ... 95 % RH, 850 ... 1100 hPa
Storage condition:	-25 ... +60 °C, 5 ... 95 % RH, 700 ... 1100 hPa
Electric connection:	elbow-type plug acc. to EN 175301-803/A (IP65), max. wire cross section: 1.5 mm², wire diameter from 4.5 ... 7 mm
Housing:	ABS, 82 x 80 x 55 mm (without elbow-type plug)
Mounting:	with fixing holes for wall mounting
Mounting distance:	70 x 50 mm (W x H)
Fixing screws:	max. shaft-Ø 4 mm
Weight:	approx. 225 g
Features:	min-/max-value memory, optical alarm, input of offset and scale for adjusting

Option:

MB2:
measuring range: 0 ... 5000 ppm CO_2

AV01:
output signal 0 ... 1 V

AV010:
output signal 0 ... 10 V

Accessories and spare parts:

GSN 24-750
Art. no. 604387
plug-in power supply (230 V AC => 24 V DC / 750 mA)

Air oxygen measuring transducer

OXY 3690 MP

Art. no. 602027

Air oxygen measuring transducer incl. sensor

Specifications:

Measuring ranges:	
Oxygen concentration:	0.0 ... 100.0 % O_2 (gaseous)
Temperature:	-20.0 ... +50.0 °C
Accuracy device (at nominal temperature 25 °C):	
Oxygen:	±0.1 % ±1 digit
Temperature:	±0.1 °C ±1 digit
Output signal (only O_2):	4 - 20 mA (2-wire - standard), 0 - 10 V (3-wire - option)
Electric isolation:	input electrically isolated
Auxiliary energy:	12 ... 30 V DC (at output 4 ... 20 mA) 18 ... 30 V DC (at output 0 ... 10 V - option)
Perm. impedance (at 4 ... 20 mA):	R_A [Ω] ≤ (Uv [V] - 12 V) / 0.02 A
Permissible load (at 0 ... 10 Volt):	R_L > 3000 Ω
Working condition:	0 ... +50 °C, 0 ... +95 % RH (non-condensing)
Storage temperature:	-20 ... +70 °C
Reverse voltage protection:	50 V permanently
Display:	approx. 10 mm high, 4-digit LCD-display
Housing:	ABS (IP65 - with the exception of sensor plug)
Dimensions:	82 x 80 x 55 mm (without elbow-type plug and sensor plug)
Electric connection:	elbow-type plug acc. to EN 175301-803/A (IP65), max. wire cross section: 1.5 mm², wire diameter from 4.5 ... 7 mm
Sensor connection:	5-pin jack connector, screwable
Calibration:	1-point calibration in atmospheric air.
Air pressure compensation:	500 ... 2000 hPa abs., manually input

Oxygen sensor:

Sensor type:	GGO 370-L01-MU
Measuring range:	0.0 ... 100.0 % O_2
Response time T_{90}:	<10 s, depending on temperature
Warranty:	12 months (assuming appropriate usage according to the manual)
Application area:	suitable for air and pure oxygen, suitable for high CO_2-concentrations
Temperature compensation:	integrated in sensor housing
Connection cable:	approx. 1.3 m, with 5-pin plug, screwable
Operating pressure:	500 ... 2000 hPa (static).
For air and gas-stream use the option GOO.../MU.	
Working condition:	0 ... +45 °C, 0 ... +95 % RH (non-condensing)
Storage temperature:	-15 ... +60 °C
Dimensions of housing:	approx. Ø 40 x 103 mm (153 mm incl. anti-buckling glanding), housing with M16x1-screw thread (sensor can be connected to line tubes by means of an included adapter piece)
Weight:	approx. 135 g

Option:

AV010:
Output signal 0 ... 10 V

GOO:
Oxygen sensor GOO 370-L01-MU, open sensor type, suitable for air and gas-stream. (further information p.r.t. page 66)

KL10:
Sensor connection cable 10 m

LO:
Design type for fast measurements of low oxygen contents (0 ... 25 %) with sensor element GOEL 380

Accessories and spare parts:

GOEL 370
Art. no. 601490
spare sensor element for GGO 370 / MU

Oxygen measuring transducer for dissolved oxygen in liquids

OXY 3610 MP

Art. no. 602029

Oxygen measuring transducer incl. sensor

Specifications:	
Messbereiche:	
Oxygen concentration:	0.00 ... 25.00 mg/l (dissolved)
Temperature:	0.0 ... 50.0 °C
Accuracy device (at nominal temperature 25 °C):	
Oxygen:	±1.5 % of m.v ±0.2 mg/l
Temperature:	±0.1 °C ±1 digit
Output signal (only O_2):	4 ... 20 mA (2-wire - standard), 0 ... 10 V (3-wire - option)
Electric isolation:	input electrically isolated
Auxiliary energy:	12 ... 30 V DC (at output 4 ... 20 mA) 18 ... 30 V DC (at output 0 ... 10 V - Option)
Perm. impedance (at 4 ... 20 mA):	R_A [Ω] ≤ (Uv [V] - 12 V) / 0.02 A
Permissible load (at 0 ... 10 Volt):	R_L > 3000 Ω
Working condition:	0 ... +50 °C, 0 ... +95 % RH (non-condensing)
Storage temperature:	-20 ... +70 °C
Reverse voltage protection:	50 V permanently
Display:	approx. 10 mm high, 4-digit LCD-display
Housing:	ABS (IP65 - with the exception of sensor plug)
Dimensions:	82 x 80 x 55 mm (without elbow-type plug and sensor plug)
Electric connection:	elbow-type plug acc. to EN 175301-803/A (IP65), max. wire cross section: 1.5 mm², wire diameter from 4.5 ... 7 mm
Sensor connection:	5-pin jack connector, screwable
Calibration:	1-point calibration: simple quick calibration in atmospheric air.

Oxygen sensor:	
Type:	active membrane type, with integrated NTC-resistor
Response time:	95 % in 10 s, depending on temperature
Operation life:	3 years or more, depending on maintenance
Operating pressure:	max. 3 bar.
Flow rate:	min. 30 cm/s
Build in diameter:	Ø 12.0 ±0.2 mm (suitable for ½" screw connection)
Overall length:	approx. 220 mm (with anti-buckling glanding)
Build in length:	approx. 110 mm
Connection cable:	approx. 4 m, with 5-pin plug, screwable
Warranty:	12 months
Working temperature:	0 ... +40 °C
Scope of supply:	device incl. electrode, GWOK01 and KOH100

Variant:

OXY3610MP-V2
Art. no. 602720
Output signal 0 ... 10 V

Accessories and spare parts:

GWO 3600-L04-MU
Art. no. 607198
Spare electrode with 4 m cable

GWO 3600-L10-MU
Art. no. 610382
Spare electrode with 10 m cable

GWO 3600-L30-MU
Art. no. 610171
Spare electrode with 30 m cable

GSKA 3600
Art. no. 601414
protection cap for depth measuring

GAS 3600
Art. no. 603497
working set (consisting of 3 spare diaphragm heads and 100 ml KOH-electrolyte)

GWOK 01
Art. no. 601411
spare diaphragm head

KOH 100
Art. no. 603356
spare electrolyte KOH, 100 ml-bottle

M12-connection cable

KM4P-G02
Art. no. 606224
straight connector, 4-pole, 2 m cable

KM4P-G10
Art. no. 604518
straight connector, 4-pole, 10 m cable

KM4P-W02
Art. no. 604104
90° connector, 4-pole, 2 m cable

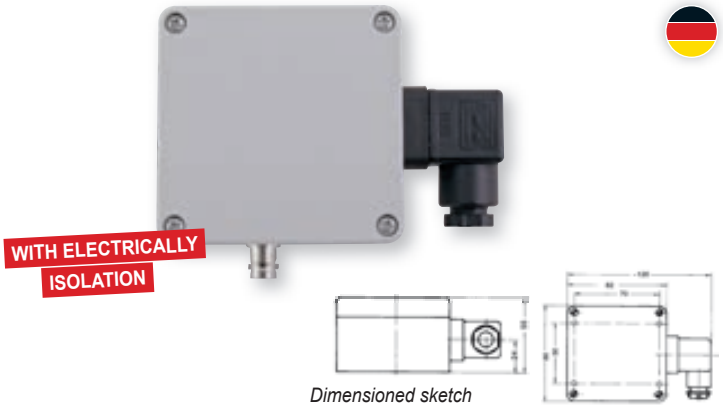
KM4P-W10
Art. no. 607963
90° connector, 4-pole, 10 m cable

KM4P-GL
Art. no. 607964
connector for self-tailoring, 4-pole

General:

Screened PUR-connection cable with moulded M12x1-connector (and loose ends). Available in straight and angular design.

Redox-measuring transducer



Dimensioned sketch GPHU / GRMU:

GRMU 2000 MP-BNC

Art. no. 602019

Redox-measuring transducer without electrode, BNC-connection

GRMU 2000 MP-Cinch

Art. no. 602021

Redox-measuring transducer without electrode, Cinch-connection

Specifications:	
Measuring range:	±2000 mV or special limited measuring ranges acc. to customer specification!
Accuracy:	0.2 % FS (at nominal temperature = 25 °C)
Output signal:	4 ... 20 mA (2-wire), standard 0 ... 10 V (3-wire), upon upcharge
Electric isolation:	input electrically isolated
Auxiliary energy:	12 ... 30 V DC (for option 0 ... 10 V: 18 ... 30 V DC)
Perm. impedance (at 4 ... 20 mA):	R_A [Ω] ≤ (Uv [V] - 12 V) / 0.02 A
Permissible load (at 0 ... 10 Volt):	R_L >3000 Ω
Input resistance:	10^{12} Ohm
Electrode socket:	BNC-socket or Cinch-socket
Option: on site display	approx. 10 mm high, 4-digit LCD-display
Working temperature:	0 ... +50 °C (electronic)
Storage temperature:	-20 ... +70 °C
Electric connection:	elbow-type plug acc. to EN 175301-803/A (IP65)
Housing:	ABS (IP65) with the exception of electrode 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. shaft-Ø 4 mm

Option:

VO:
On site display

V2:
Output signal 0 ... 10 V

MB...:
Limited measuring range (please state the desired range)

Ordering example:

GRMU 2000 MP-BNC-VO:
GRMU2000MP with BNC electrode socket and on site display

Accessories and spare parts:

GR 105-Cinch
Art. no. 607797
Redox electrode with cinch-plug

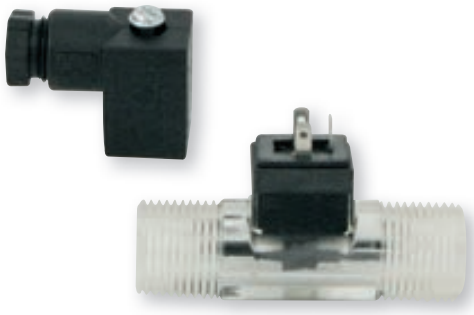
GR 105-BNC
Art. no. 607798
Redox electrode with BNC-plug

GR 175-BNC
Art. no. 607801
Redox electrode with BNC-plug

PG 13,5
Art. no. 603205
Plug on thread adapter for pressureless use, with external thread PG 13.5 (suitable for any electrode with shank diameter 12 mm)

For additional electrodes and accessories p.r.t. page 55/56

Flow measuring transducer with hall-effect sensor



VISION 2008

Art. no. 603492

Flow measuring transducer with hall-Sensor incl. elbow-type plug

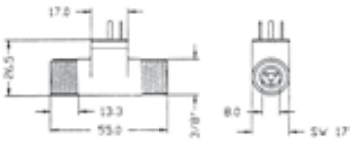
General:

- minimum size, maximum accuracy
- easy installation
- installation in any position possible
- optimum-quality due to high-quality materials used
- no maintenance

Application:

- manufacturing of oil and gas burners, flow heaters or cooling systems
- for dish washers and washing machines
- automotive technology (measuring of petro consumption, etc.)
- laboratories, chemical works, pharmaceutical industry
- agriculture and horticulture

Specifications:	
Rotor-position scanning:	hall sensor
Measuring range:	1.5 ... 25 l/min
Resolution:	approx. 1000 pulses/l
Measuring agent:	clean liquids, we recommend filtering with approx. 20 ... 40 micron
Viscosity:	up to approx. 15 cSt.
Accuracy:	±3 % ranging from 10 - 10 %
Repeatability:	<0.5 %
Working temperature:	-20 ... +100 °C
Operating pressure:	25 bar
Electric connection:	elbow-type plug acc. to EN 175301-803/A, type C industrial
Auxiliary energy:	5 ... 24 V DC, approx. 8 mA
Multiplier (R):	1 ... 2.2 kOhm
Output signal:	frequency 5 ... 416 Hz, open collector NPN
Output current:	max. 20 mA
Material:	
Housing:	Grilamid TR55 (PA12)
Rotor:	Grilamid (PA12 Ferrit)
Bearings:	PTFE 15 % graphite
Delivery connection:	G 3/8“ thread
DN:	8 mm
Dimensions:	approx. 55 x 17 x 30 mm
Weight:	approx. 15 g
Scope of supply:	Device, manual



Optical oxygen converter

HIGHLIGHTS:

- *Two 4 ... 20 mA (or 0 ... 5 V) outputs: concentration and saturation*
- *Fully pressure and temperature compensated*
- *Calibration in many applications once per year!*
- *No flow required*

GODOX-200-ST

Art. no. 608019

Optical oxygen transmitter for universal applications, stainless steel

GODOX-200-PS

Art. no. 608020

Optical oxygen transmitter for continuous measurements in salt water

General:

The oxygen transmitter GODOX-200 is a robust measuring system for the low-maintenance continuous use. Compared to electrochemical sensors, it comes without electrolyte, measured with a fluorescence-maturity method. Together with the complete data preparation including automatic ambient pressure and temperature compensation it provides a free package for continuous measurements. Measurement in depth up to 30 m is possible.
The life of the replaceable measuring membrane is generally 2 years.

Specifications:

Measuring ranges (both can be used simultaneously)	
Oxygen concentration:	0 ... 20 mg/l (=ppm)
Oxygen saturation:	0 ... 200 % O_2
Output signal:	4 ... 20 mA or 0 ... 5 V respectively (changeable)
Accuracy:	±0.1 mg/l less than 1 mg/l, ±0.2 mg/l more than 1 mg/l
Response time T_{90}:	<30 s
Operating temperature:	0 ... 65 °C
Supply:	5 ... 15 V DC, approx. 160 mA
Material	
Housing:	PVC / stainless steel, option „marine“: PVC
Diaphragm:	PET
Dimensions sensor	
Length:	225 mm length
Mounting length:	70.5 mm
Diameter:	42.1 mm
Mounting diameter:	28.0 mm
Process connection:	1” NPT front / rear (others on request)
Connection	
Loose cable ends:	No color description 1 red supply + 2 black supply - 3 green output O_2 concentration 4 white output O_2 saturation
Cable length:	5 m
Scope of supply:	Transmitter (consisting of sensor body and evaluation, connected via cable), storage cap

Option:

Cable length 10 m
Cable length 15 m
Cable length 30 m

Accessories and spare parts:

GSKA 200
Art. no. 607992
Metal cap steel (Mechanical protection / browsing protection)

EMS 200
Art. no. 607990
Spare membrane head-Set

GNG 12/300
Art. no. 600274
Power Supply

pH-measuring transducer with on site display

HIGHLIGHTS:

- *automatically and manually temperatur compensation*
- *external Pt1000-temperature probe connectable*

WITH ELECTRICALLY ISOLATION

GPHU 014 MP-BNC

Art. no. 601985

pH-measuring transducer with on site display without electrode, BNC-connection

GPHU 014 MP-Cinch

Art. no. 601989

pH-measuring transducer with on site display without electrode, Cinch-connection

Specifications:

Measuring range:	0.00 ... 14.00 pH
Accuracy:	0.02 pH ±1 digit (at nominal temperature = 25 °C)
Output signal:	4 ... 20 mA (2-wire), standard; 0 ... 10 V (3-wire), upon upcharge
Electric isolation:	input electrically isolated
Hilfsenergie:	12 ... 30 V DC (bei Option 0-10 V: 18 ... 30 V DC)
Perm. impedance (at 4 ... 20 mA):	R_A [Ω] ≤ (Uv [V] - 12 V) / 0.02 A
Permissible load (at 0 ... 10 Volt):	R_L >3000 Ω
Electrode:	any standard pH electrode is suitable (not in scope of supply)
Input resistance:	10^{12} Ohm
Electrode socket:	BNC-socket or Cinch-socket
Temperature compensation:	-30 ... +150 °C, manually via 3 keys or automatically via external Pt1000 sensor, banana plug
Adjustment:	via 3 keys and integrated LCD
Temp. sensor socket:	2 x banana socket Ø 4 mm, for Pt1000 probe
Display:	approx. 10 mm high, 4-digit LCD-display
Working temperature:	0 ... +50 °C (electronic)
Storage temperature:	-20 ... +70 °C
Electric connection:	elbow-type plug acc. to EN 175301-803/A (IP65)
Housing:	ABS (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. shaft-Ø 4 mm

Options:

V2:
Output signal 0 ... 10 V

MB...:
limited measuring range (please state the desired range) (i.e.: 2.00 ... 10.00 pH)

Accessories and spare parts:

GTF 2000-B-WD
Art. no. 601884
Water proof Pt1000-temperature probe, with 2 banana plugs Ø 4 mm

GE 100-BNC
Art. no. 600704
Standard electrode, BNC-plug (thread adapter PG 13.5 optional available)

GE 100-Cinch
Art. no. 600702
Standard electrode, Cinch-plug (thread adapter PG 13.5 optional available)

GE 117-BNC
Art. no. 600730
pH electrode with integrated Pt1000-sensor, 1 x BNC-plug and 1 x banana plug Ø 4 mm, thread PG13.5, pressure resistant up to 6 bar

GE 173-BNC
Art. no. 600735
Process electrode for continuous operation, with thread PG 13.5, pressure resistant up to 6 bar, BNC-plug

GE 173-Cinch
Art. no. 600734
Process electrode for continuous operation, with thread PG 13.5, pressure resistant up to 6 bar, Cinch-plug

GAK 1400
Art. no. 603523
working and calibration set (p.r.t. page 53)

for add. electrodes and accessories p.r.t. p. 55/56, Pt1000 probes p.r.t. page 14/15 and from 188.

Screw-in transmitter

HIGHLIGHTS:

- *Complete sensor with transmitter in the housing of a proximity switch*
- *Conversion of frequencies into current, voltage, frequency or pulse signals*
- *16-bit microcontroller*
- *Linearisable*
- *A parameter can be set locally*

SUCCESSOR OF EFF...

LABO-D...I / U / F / C

Screw-in transmitter

Specifications:	
Sensor:	Magnetic field sensor (magneto-resistive) Pre-tensioned hall sensor Inductive sensor
Detection distance:	**Magnetic field sensor:** Depending on magnets used, signal threshold typ. 8 Gauss (= 0.8 milliTesla), switching distances over 25 mm possible **Pre-tensioned hall sensor:** Typ. 0.5 ... 2.5 mm **Inductive sensor:** Typ. max. 4 mm based on 1 cm³ ST37
Metering range:	0 ... 10 kHz
Measurement uncertainty:	±0.1 % measured value
Pressure resistance:	Pressureless application
Operating temperature:	-0 ... +70 °C
Storage temperature:	-20 ... +80 °C
Materials:	Housing: CW614N nickelled Sensor flap: PA Plug insert: PC Contacts: CuZn, gold-plated
Supply voltage:	-10 ... +30 V DC, with voltage output 10 V: 15 ... 30 V DC
Power requirement:	<1 W (for no-load output)
Output data:	all outputs are resistant to short circuits and reversal polarity protected
Current output:	4 ... 20 mA (0 ... 20 mA available on request)
Voltage output:	-0 ... +10 V (2 ... 10 V available on request)
Frequency output:	Transistor output „Push-Pull“, I_{out} = 100 mA max.
Pulsausgang:	Transistor output „Push-Pull“, I_{out} = 100 mA max. Pulse width 50 ms Pulse/quantity is to be stated
Display:	Yellow LCD shows Operating voltage (LABO-D...I / U) or Output status (LABO-D...F / C) (rapid flashing = Programming)
Electrical connection:	for round plug connector M12x1, 4pole
Protection rating:	IP67

Accessories and spare parts:	
Round plug connector/cable	**see page 168**

LABO-D- [1] - [2] - [3] - [4]

Greisinger		
1.	Sensor	
	H	Magnetic field sensor
	V	Pre-tensioned hall sensor
	I	Inductive sensor
2.	Signal output	
	I	Current output 4 ... 20 mA
	U	Voltage output 0 ... 10 V
	F	Frequency output
	C	Pulse output
3.	Programming	
	P	Programmable (teaching possible)
	N	Cannot be programmed (no teaching)
4.	Electrical connection	
	S	For round plug connector M12x1, 4-pole

Level transmitter

LC-S45HM...

Level transmitter (brass)

LC-S44HM...

Level transmitter (brass)

LC-K52HK...

Level transmitter (stainless steel)

General:

A magnet equipped float activates a reed chain inside a tube which is connected to resistors comparable to a potentiometer. The gapless positioning of the sensors provides a continuous signal with good resolution (up to 10 ... 20 mm) and repeatability.
- top assembly
- selectable material combinations
- optional: with user-specific characteristic (for adjustment to tank design)

Application:

Sensor suitable for: Water, oil, aggressive substances (only LC-K52K...)

Specifications:

Tube length:	250 mm, 500 mm, 750 mm, 1000 mm, 1500 mm und 2000 mm					
Float travel:	**...0250**	**...0500**	**...0750**	**...1000**	**...1500**	**...2000**
LC-S45M... :	190 mm	440 mm	690 mm	940 mm		
LC-S44M... :				930 mm	1430 mm	1930 mm
LC-K52K... :	160 mm	410 mm	660 mm	910 mm	1410 mm	1910 mm
Division (resolution):	10 mm (LC-S45..., LC-K52K0250) or 20 mm					
Output signal:	4 ... 20 mA (2-wire) (see option)					
Optional:	0 ... 10 V (3-wire) (see option)					
Auxiliary energy:	10 ... 30 V DC (at option Flex: 18 ... 30 V DC)					
Electrical connection:	elbow-type plug acc. to DIN 43650-A/ISO 4400 (at option Flex: 4-pole locked plug M12 x 1)					
Working temperature:	0 ... 85 °C					
Working pressure:	max. 20 bar (LC-S..), max. 40 bar (LC-K..)					
Density medium:	>0,34 g/cm³ (LC-S45...), >0,44 g/cm³ (LC-S44...), >0,66 g/cm³ (LC-K52...)					
Mounting position:	vertical, float pointing downwards					
Protection class:	IP 65					
Dimensions:	**LC-S45...**		**LC-S44...**		**LC-K52...**	
Sensor head:	~50 x 50 x 78 mm		~60 x 58 x 78 mm		Ø 69 x 78 mm	
Tube length:	according to design type					
Mounting SW:	SW 40		SW 46		SW 46	
Screw-in threat:	G1 A		G1 1/2 A		G2 A	
Float:	Ø 30 x 45 mm		Ø 44 x 50 mm		Ø 52 x 70 mm	
Materials:						
Gehäuse:	Ms58		Ms58		stainl. steel 1.4571	
Schaltrohr:	Ms58		Ms58		stainl. steel 1.4571	
Schwimmer:	Spansil		Spansil		stainl. steel 1.4571	

Option:

Output signals 4 ... 20 mA (2- or 3-wire), 0 ... 10 V

Flex:
Transmitter with Flex-head (M12-connection) user-specific characteristic possible.

Conductivity measuring transducer

HIGHLIGHTS:

- *Compact measuring cells*
- *Freely scalable*
- *Adjustable cell constant*
- *Local display*
- *Integrated temperature compensation*
- *Measuring cell included, pre-adjusted*

Laboratory measuring cells best value Standard cable length: 1 m	Optional PG (with PG 13.5 thread) up to 6 bar (@ 22 °C) Standard cable length: 1 m	Professional, field installation M12, G 1/2 A fitting, max. 16 bar (@ 22 °C) Standard cable length: 5 m

GLMU 200 MP-TR

Conductivity measuring transducer, incl. 2-pole measuring cell

General:

2-pole measuring cells,
suitable for use in clean / potable / fresh water
Recommended usage range:
up to 2000 µS/cm
4 Measuring ranges:
0.1 µS/cm ... 200.0 mS/cm

GLMU 200 MP-TR
Art. no. 607814

Ø 12 mm 2-pole measuring cell LFE 202
Graphite, C=1.0; -5 ... +80 °C

GLMU 200 MP-TR-PG
Art. no. 607815

Ø 12 mm 2-pole measuring cell LFE 202-PG; Graphite, C=1.0; -5 ... +80 °C

GLMU 200 MP-TRP*)
Art. no. 607816

Ø 16 mm 2-pole measuring cell LFE 230
Graphite, C=0.9; 0 ... +60 °C (higher available on request)

GLMU 400 MP-SW

Conductivity measuring transducer, incl. 4-pole measuring cell

General:

4-pole measuring cells,
especially well-suited for use above 2000 µS/cm, applications susceptible to contamination, sea water, etc.
5 Measuring ranges:
0.1 µS/cm ... 500 mS/cm

GLMU 400 MP-SW
Art. no. 607819

Ø 12 mm 4-pole measuring cell LFE 400
Graphite, C=0.55; -5 ... +80 °C

GLMU 400 MP-SW-PG
Art. no. 607820

Ø 12 mm 4-pole measuring cell LFE 400-PG
Graphite, C=0.55; -5 ... +80 °C

GLMU 400 MP-SWP*)
Art. no. 607821

Ø 16 mm 4-pole measuring cell LFE 430
Graphite, C=0.4; 0 ... +60 °C (higher available on request)

GLMU 200 MP-RW

Clean/cleanest water measuring system

General:

2-pole measuring cells,
recommended usage range up to 200 µS/cm
Usage range up to 200 µS/cm
3 Measuring ranges: 0.01 ... 200.0 µS/cm

GLMU 200 MP-RW
Art. no. 607817

Ø 12 mm 2-pole measuring cell LFE 240
stainless steel/ PEEK; C=0.1, -5 ... +80 °C

GLMU 200 MP-RWP*)
Art. no. 607818

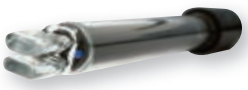
Ø 12 mm 2-pole measuring cell LFE 220
stainless steel/ PEEK; C=0.1; -10 ... +100 °C

GLMU 200 MP-LTG

Measuring transducer with 2-pin electrode

General:

2-pole measuring cells,
suitable for use in organic substances (alcohol, benzine, diesel)
Usage range up to 1000 µS/cm
2 Measuring ranges:
0.1 µS/cm ... 2000 µS/cm



GLMU 200 MP-LTG
Art. no. 607641

Ø 12 mm 2-pole measuring cell LFE 210
Platinum glass; C=1.0

**) Attention:*
A special cable is supplied with the professional version.
The measuring cell can be unscrewed locally without having to change the wiring!

Conductivity measuring transducer

General:

Cheap conductivity measurement in drinking water, sea water, process water and waste-water, operational.

Specifications:	GLMU 400 MP	GLMU 200 MP	GLMU 200 MP-RW
Measuring ranges: (customer-selectable)			
Conductivity:	0.0 ... 200.0 µS/cm 0 ... 2000 µS/cm 0.00 ... 20.00 mS/cm 0.0 ... 200.0 mS/cm 0 ... 500 mS/cm	0.0 ... 200.0 µS/cm 0 ... 2000 µS/cm 0.00 ... 20.00 mS/cm 0.0 ... 200.0 mS/cm	0.0 ... 200.0 µS/cm 0.00 ...20.00 µS/cm
Specific resistance:	0.0 ... 200.0 kOhm*cm 0.00 ... 20.00 kOhm*cm 1 ... 5000 Ohm*cm 1.0 ... 500.0 Ohm*cm 1.00 ... 50.00 Ohm*cm	5.0 ... 100.0 kOhm*cm 0.50 ... 10.00 kOhm*cm 50 ... 1000 Ohm*cm 5.0 ... 100.0 Ohm*cm	0 ... 200 kOhm*cm 0 ... 2000 kOhm*cm
TDS:	0.0 ... 200.0 mg/l 0 ... 500.0 mg/l 0 ... 2000 mg/l 0.0 ... 20.0 g/l 0 ... 200 g/l	0.0 ... 200.0 mg/l 0 ... 2000 mg/l	0.0 ... 200.0 mg/l 0.00 ... 20.00 mg/l
Salinity:	0.0 ... 70.0 (PSU)	0.0 ... 70.0 (PSU)	
Temperature measurement:	5.0 ... +140.0 ° C (device) permissible temperature of the measuring cell note!		
Measuring cell:	4-pole measuring cell	2-pole measuring cell	2-pole measuring cell
Standard measuring cell:	conductivity measuring cell with integrated temperature sensor. Cell constant determined from the factory and preset.		
Accuracy: (at nominal temperature = 25 °C)			
Conductivity:	0.5% of reading ± 0.3% FS (-RW: ±1 % v. MW ±0.3 % FS)		
Temperature measurement:	±0.2 °C ±1 digit		
Cells connection:	7-pin DIN socket		
Cell constant:	K = 0.30 ... 1.20, adjustable (-RW: 0.03 ... 0.12)		
Temperature compensation: (customer-selectable)	off: no compensation Lin: linear compensation (of 0.3 ... 3.0 % / K) nLF: non-linear function of natural water according toEN27888 (ISO 7888) in salinity: automatically after IOT		
Display:	approx. 10 mm high, 4-digit LCD display		
Output signal:	4 ... 20 mA (2-wire), standard 0 ... 1 V or 0 ... 10 V (3-wire), surcharge		
Galvanic isolation:	input electrically isolated		
Power supply:	12 ... 30 V DC (for option 0 ... 10 V: 18 ... 30 V DC)		
Reverse polarity:	50 V continuous		
perm. burden (4-20 mA):	R_A [Ω] ≤ (Uv [V] - 12 V) / 0.02 A		
perm. load (0-10 volts):	R_L > 3000 Ω		
Working temperature:	-25 ... +50 °C (transmitter), 0 ... +80 °C (measuring cell)		
Storage temperature:	-25 ... +70 °C		
Electrical connection:	Angle connector according to EN 175301-803 / A (IP65)		
Housing:	ABS (IP65) except electrode connection sockets		
Dimensions:	82 x 80 x 55 mm, without angle plug and socket		
Warranty:	12 months		
Mounting:	with fixing holes for wall mounting Mounting distance: 70 x 50 mm (W x H)		
Scope of supply:	Device, measuring cell, manual		

Options:

AV010:
Output signal 0 ... 10 V

AV01:
Output signal 0 ... 1 V

KL=..:
longer measuring cell cable (recommended max. 5 m)

Accessories and spare parts:

GLMU 400 MP-UNI-AV010
Art. no. 608006
GLMU 400 MP-UNI-AV01
Art. no. 608053
GLMU 400 MP-UNI-AV420
Art. no. 608052
Transmitter without measuring cell, suitable for 2- and 4-pole measuring cells to create your own conductivity measuring system with special measuring cells. Different standard systems:
- Area selection of cell constant 0.01; 0.1; 1.0; 10, for example, 1.0 corresponds to 0.300 ... 1.200, 0.1 corresponds to 0.0300 ... 0.1200
- Depending on this measuring range selection without limitations (5 regions)
- selection of temperature input Pt1000 or NTC10 k

Note: The measuring accuracy of the overall system strongly from the measuring cell used and the dependent on the area of application

LFE 202
Art. no. 604344
2-pole spare measuring cell (for GLMU 200 MP-TR)

LFE 202-PG
Art. no. 603594
2-pole spare measuring cell (for GLMU 200 MP-TR-PG)

LFE 230
Art. no. 607825
2-pole spare measuring cell (for GLMU 200 MP-RWP)

LFE 400
Art. no. 604635
4-pole spare measuring cell (for GLMU 400 MP)

LFE 400-PG
Art. no. 603565
4-pole spare measuring cell (for GLMU 400 MP-PG)

LFE 430
Art. no. 607827
4-pole spare measuring cell (for GLMU 400 MP-SWP)

LFE 240
Art. no. 607828
2-pole replacement measuring cell (for GLMU 200 MP-RW)

LFE 220
Art. no. 607829
2-pole replacement measuring cell (for GLMU 200 MP-RW-RWP)

LFE 210
Art. no. 606991
2-pole replacement measuring cell (for GLMU 200 MP-LTG)

PG 13.5
Art. no. 603205
Plug on thread adapter for pressureless use, for electrodes with 12 mm shank diameter

GWA1Z
Art. no. 602914
Thread adapter PG13.5 to G1“, plastics

GKL 100
Art. no. 601396
Conductivity control solution
100 ml bottle with 1413 µs / cm, according to DIN EN 27888

GKL 101
Art. no. 601398
Conductivity control solution (250 ml bottle with 84 µs / cm)

GKL 102
Art. no. 601400
Conductivity control solution (100 ml bottle containing 50 mS / cm)

VKMU-M12
Art. no. 609306
Connection cable, 5 m long

Active Power Transmitter

HIGHLIGHTS:

- *For 1- and 3-phase power systems with symmetric load*
- *Current measuring range 1 A or 5 A*
- *Power-factor (cos φ) selectable 0.72 or 1*
- *Frequency range 45 ... 400 Hz*

WM 500

Wirkleistungs-Messumformer

General:

Active-power transmitter WM 500 converts active-power of symmetric 1-3 phase power supply systems into proportional industry standard signals. Devices without compensating circuits can be used to measure active-power of phase-angle controlled equipments or electric motor drives controlled by frequency inverters.

Specifications:

Power supply	
Supply voltage:	230 V AC ±10 % or 24 V DC ±15 %
Frequency AC:	47 ... 63 Hz
Power consumption:	<3 VA
Workting temperature:	-10 ... +50 °C
CE-conformity:	EN 55022, EN 60555, IEC 61000-4-4/5
Inputs:	
Current:	0 ... 1 A: R_i = 82 mΩ, over load 2-times, 4-times for max. 5 s 0 ... 5 A: R_i = 10 mΩ, over load 2-times, 4-times for max. 5 s
Frequency range:	45 ... 400 Hz, Crest-factor: 3
Curve shape:	insignificant
Voltage:	0 ... 440 V, R_i = 3.4 kΩ/V, over load max. 700 V
Frequency range:	45 ... 400 Hz
Curve shape:	insignificant, without compensating circuit
Curve shape:	sinusoidal, with compensating circuit
End value:	adjustable -30 ... +5 % for factory adjustment
Outputs: Voltage/current	
Current:	0/4 ... 20 mA selectable, burden ≤500 Ω
Burden error:	<0.1 % (R_L = 0 ... 200 Ω), <0.2 % (R_L = 0 ... 500 Ω)
Voltage:	0/2 ... 10 V selectable, load max. 10 mA
Adjustment:	P = U x I x √ 3 x cosφ = 20 mA (10 V)* (* cosφ=1)
Rise time (T_{90}):	<500 ms
Housing:	
Connection:	screw terminals, max. 2.5 mm²
Protection class:	Housing IP30, terminals IP20 acc. to BGV A3

WM500 - [1] - [2] - [3] - [4] - [5]

Greisinger		
1.	Power supply system	
	1	1-phase
	3	3-phase
2.	Measuring voltage	
	100	100 V AC
	110	110 V AC
	230	230V AC
	400	400 V AC
	440	440 V AC
3.	Measuring current	
	1	1 A AC
	5	5 A AC
4.	Model	
	1	without compensating circuit
	2	with compensating circuit
5.	Supply voltage	
	0	230 V AC ±10 %
	5	24 V DC ±15 %

Important:
For the factory provided settings please specify the measurement range of the effective power and the primary current range of the upstream current transformer in the purchasing order.

AC Current Transmitter

HIGHLIGHTS:

- *12 measuring ranges selectable 0 ... 6 A / 0 ... 60 A AC*
- *Average function selectable*
- *Frequency range 40 ... 2000 Hz*

CT 500

AC current transmitter

General:

AC current transmitter CT 500 converts true r.m.s. current measuring values of all types of waveform into industry standard signals for process control systems. For example, the load current of an frequency converter can be detected and converted. The universal limit interpretation of the inputs and outputs and the wide auxiliary voltage ranges the variety of types in 2 versions.

Specifications:

Power supply	
Supply voltage:	85 ... 265 V AC or 10 ... 30 V AC/DC
Frequency AC:	40 ... 400 Hz
Power consumption:	<3 VA
Working temperature:	-10 ... +60 °C
CE-conformity:	EN 55022, EN 60555, IEC 61000-4-3/4/5/11/13
Input	
Current:	
Terminals:	0 ... 1 / 2 / 3 / 4 / 5 / 6 A AC, over load max. 9 A
Bushing connection:	0 ... 10 / 20 / 30 / 40 / 50 / 60 A, over load max. 90 A, cable diameter max. 8 mm
R_i:	<20 mΩ
Frequency:	40 ... 2000 Hz fundamental wave, $16_{2/3}$ Hz on request
Start value:	adjustable ±5 %
End value:	adjustable ±35 %
Output:	
Current:	0/4 ... 20 mA, selectable, burden ≤ 1 kΩ
Voltage:	0/2 ... 10 V DC, selectable, load max. 15 mA, short circuit proof (parallel with the voltage output max. 5 mA)
Rise time (T_{90}):	≤150 ms
Accuracy:	≤0,5 %; single adjustment ≤ 0.2 %
Housing:	Polycarbonat, UL 94 V-0, TS35 acc. to DIN EN 60715:2001-09
Weight:	approx. 200 g
Connection:	terminals, max. 2.5 mm²
Protection class:	housing IP30, terminals IP20, acc. to BGV A3

Accessories and spare parts:

KA-VT
terminal cover for measuring voltages >400 V AC

CT500 - [1] - [2]

Greisinger		
1.	Measuring ranges	
	30	0 ... 1 / 2 / 3 / 4 / 5 / 6 and 0 ... 10 / 20 / 30 / 40 / 50 / 60 A AC
		custom range on request
2.	Supply voltage	
	0	85 ... 265 V AC
	5	10 ... 30 V DC

Current and Voltage Transmitter

HIGHLIGHTS:

- *Measuring input for DC- and sinusoidal AC-signals*
- *Arithmetic average value measurement RMS calibrated*
- *Frequency range 40 ... 200 Hz*

CVT 500

Current and Voltage Transmitter

General:

Transmitter CVT 500 convert current or voltage signals to proportional industry standard signals. Currents up to 5 A AC / DC and voltages up to 400 V AC / DC can go directly to the transmitters. For larger AC currents is a current transformer or for larger AC voltages ahead one voltage transformer.

Specifications:

Power supply	
Supply voltage:	230 V AC ±10 % (47 ... 63 Hz) or 24 V DC ±15 %
Power consumption:	<3 VA
Working temperature:	-10 ... +50 °C
CE-conformity:	EN 55022, EN 60555, IEC 61000-4-3/4/5/11/13
Inputs	
Accuracy:	≤ 0.5 % (≤ 0.2 % single adjustment)
Standard measuring ranges	
Current:	0 ... 1 A and 0 ... 5 A sinusoidal or DC
R_i:	20 mΩ (5 A-) or 100 mΩ (1 A-input)
Overload:	2-times, 4-times max. 5 s
Voltage	
Measuring ranges:	0 ... 125 V and 0 ... 250 V AC or DC
R_i:	600 kΩ (125 V-) or 1.2 MΩ (250 V-input)
Overload:	max. 500 V AC/DC
Custom measuring ranges	
Voltage:	end value in range 0.1 ... 400 V AC/DC, R_i 4.8 kΩ/V
Overload:	5-times UN, max. 500 V AC/DC
Current:	end value in range 0.001 ... 5 A AC/DC, R_i 100 mΩ
Overload:	2-times, 4-times max. 5 s
Output	
Output changing	
Voltage/current:	link between terminal 8 and 9
Current output:	0/4 ... 20 mA selectable, burden ≤ 500 Ω
Rise time (T_{90}):	<650 ms
Burden error:	<0.1 % (R_L = <200 Ω), <0.2 % (R_L = <500 Ω)
Voltage:	0/2 ... 10 V selectable, load max. 10 mA
Housing	
Connection:	screw terminals, max. 2.5 mm²
Protection class:	Housing IP30, terminals IP20 acc. to BGV A3

CVT500 - 1 - 2 - 3

Greisinger		
1.	**Current ranges**	
	0	not installed (custom measuring range voltage)
	1 / 5	standard device 0 ... 1 A and 0 ... 5 A AC / DC
	X	please specify custom measuring range
2.	**Voltage ranges**	
	0	not installed (custom measuring range current)
	125 / 250	standard device 0 ... 125 V and 0 ... 250 V AC/DC
	X	please specify custom measuring range
3.	**Supply voltage**	
	0	230 V AC ± 10 %
	5	24 V DC ± 15 %

AC Voltage Transmitter

HIGHLIGHTS:

- *6 measuring ranges*
- *Average function selectable*
- *Frequency range 40 ... 2000 Hz fundamental wave*

VT 500

AC Voltage Transmitter

General:

Wechselspannungs-Messumformer VT 500 wandeln den Echt-Effektivwert einer Wechselspannung beliebiger Kurvenform in proportionale Einheitssignale um. Damit kann z. B. die Lastspannung eines Frequenzumrichters erfasst und umgewandelt werden. Die universelle Auslegung der Ein- und Ausgänge und die weiten Hilfsspannungsbereiche begrenzen die Typenvielfalt auf 2 Ausführungen. Die geringe Gehäusebreite ermöglicht eine platzsparende Montage.

Specifications:

Power supply	
Supply voltage:	85 ... 265 V AC or 10 ... 30 V AC/DC
Frequency AC:	40 ... 400 Hz
Power consumption:	<3 VA
Working temperature:	-10 ... +60 °C
CE-conformity:	EN 55022, EN 60555, IEC 61000-4-3/4/5/11/13
Input	
Voltage AC:	0 ... 100 / 200 / 300 / 400 / 500 / 600 V AC, overload max. 1200 V max. 5 s
R_i:	720 kΩ
Frequency:	40 ... 2000 Hz fundamental wave, $16_{2/3}$ Hz on request
Start value:	adjustable ±5 %
End value:	adjustable ±35 %
Output	
Current:	0/4 ... 20 mA, selectable, burden ≤1 kΩ
Voltage:	0/2 ... 10 V DC, selectable, load max. 15 mA, short-circuit-proof (parallel with the voltage output max. 5 mA)
Rise time (T_{90}):	≤150 ms
Accuracy:	≤0.5 %; single adjustment ≤0.2 %
Housing:	Polycarbonat, UL 94 V-0, TS35 acc. to DIN EN 60715:2001-09
Weight:	approx. 200 g
Connection:	screw terminals, max. 2.5 mm²
Protection class:	Housing IP30, terminals IP20 acc. to BGV A3

Accessories and spare parts:

KA-VT
Terminal cover for measuring voltages >400 V AC

VT500- 1 - 2

Greisinger		
1.	**Measuring ranges**	
	30	0 ... 100 / 200 / 300 / 400 / 500 / 600 V AC
		custom range on request
2.	**Supply voltage**	
	0	85 ... 265 V AC
	5	10 ... 30 V DC

Current and Voltage Monitoring Relay

HIGHLIGHTS:

- *Arithmetic average value measuring RMS calibrated (AC) or DC*
- *Contact function min/max selectable*
- *Hysteresis and time delay adjustable*

CVG 500

Current and Voltage Monitoring Relay

General:

CVG 500 monitoring relays can be used for monitoring current or voltage levels. The standard model is designed for input 0 ... 1/5 A and 0 ... 125/250 V AC/DC. Models with inputs in range of 0 ... 1 mA/ 5 A AC/DC or 0 ... 50 mV/400 V AC/DC are available.

Specifications:

Power supply	
Supply voltage:	230 V AC ±10 % (47 ... 63 Hz) or 24 V DC -30/+40 %
Working temperature:	-10 ... +50 °C (-25 °C ... +70 °C on request)
CE-conformity:	EN 55022, EN 60555, IEC 61000-4-3/4/5/11/13
Inputs	
Scale error:	≤2 %
Standard ranges	
Current:	0 ... 1 A and 0 ... 5 A AC (sinusoidal) or DC
R_i:	20 mΩ (5 A input) or 100 mΩ (1 A input)
Overload:	2-times, 4-times for max. 5 s
Voltage:	0 ... 125 V and 0 ... 250 V sinusoidal or DC
R_i:	600 KΩ (125 V input) or 1.2 MΩ (250 V input)
Overload:	max. 300 V AC/DC
Custom ranges	
Voltage:	end value in the range 0.05 ... 400 VAC/DC
R_i:	4.8 kΩ/V
Overload:	5-times nominal voltage, max. 500 V AC / DC
Current:	end value in the range 0.001 ... 5 A AC/DC
R_i:	= 100 mΩ ÷ (measuring range [A])
Overload:	2-times, 4-times for max. 5 s
Output	
Relay SPDT:	250 V AC <250 VA <2 A; 100 V= <50 W <1 A
Switching function:	min. / max. selectable
Hysteresis:	1 ... 25 %
Time delay:	0.1 ... 8 s
Housing	
Protection class:	Housing IP30, terminals IP20, (BGV A3)
Connection:	screw terminals, max. 2.5 mm²

CVG500- [1] - [2] - [3]

Greisinger		
1.	**Current measuring ranges**	
	0	not installed (at custom range voltage)
	1/5	standard range 0 ... 1 A and 0 ... 5 A AC/DC
	X	custom range state in clear text
2.	**Voltage measuring ranges**	
	0	not installed (at custom range current)
	125/250	standard range 0 ... 125 V and 0 ... 250 V AC/DC
	X	custom range state in clear text
3.	**Supply voltage**	
	0	230 V AC ±10 %
	5	24 V DC -30 ... +40 %

Battery Voltage Guard

HIGHLIGHTS:

- *Monitoring of battery voltages 12 V, 24 V, 48 V or 60 V*
- *Alarm function under-voltage / over-voltage selectable*
- *Time delay adjustable*
- *Measuring voltage and supply voltage are identical*

BW 500

Battery Voltage Guard

General:

The BW500 is designed for monitoring of battery voltages. Undervoltage or over-voltage can be selected.
Under-voltage:
The relay switches off, if the voltage falls under the limit value and if the delay time ran off. If the voltage exceeds the limit value + hysteresis, the relay will be activated.
Over-voltage:
The relay switches on, if the voltage exceeds the limit value and if the delay time ran off. If the voltage falls under the limit value - hysteresis, the relay will be deactivated.

Specifications:

Power supply	
Battery voltage:	12 V, 24 V, 48 V or 60 V DC, -30 ... +40 %
Current consumption:	14 mA (24 mA at 12 V type) with activated relay
Working temperature:	-10 ... +60 °C
CE-conformity:	EN 50022, EN 60555, IEC 61000-4-4/5/11/13 vibration,- shock- and jolt-inspection acc. to IEC 68-2-6/27/29
Measuring input/measuring range	
12 V:	11 ... 14 V
24 V:	22 ... 28 V
48 V:	44 ... 56 V
60 V:	55 ... 70 V
Scale error:	≤2 %
Output	
Relay SPDT:	250 V AC <250 VA <2 A; 300 V= <50 W <2 A
Alarm function:	under-voltage/over-voltage selectable
Hysteresis:	2 ... 16 % adjustable (related to the nominal battery voltage)
Time delay:	in 2-steps switch selectable 1 ... 60 s or 5 ... 300 s adjustable
Housing:	standard case polycarbonate 8020 UL 94 V-1 acc. to DIN EN 60715:2001-09
Weight:	approx. 100 g
Protection class:	Housing IP30, terminal IP20, (BGV A3)
Connection:	screw terminals, max. 2.5 mm²

BW500- [1] - [2] - [3]

Greisinger		
1.	**Measuring input**	
	1	1 input
2.	**Battery voltage / measuring scale**	
	12V	11 ... 14 V
	24V	22 ... 28 V
	48V	44 ... 56 V
	60V	55 ... 70 V
3.	**Option**	
	00	without option

Isolating Signal Converter

TV 500/ST 500

Isolating signal converter

General:

Isolating signal converter of the series TV 500/ST 500 are suitable for potential isolation or for conversion of unit signals. The universal design of the in- and outputs and the wide range of supply voltage limits the devices into 2 models. The ST 500 provides an isolated transmitter supply for direct connection of active 2-wire sensors (4 ... 20 mA) and 3-wire sensors.

Specifications:

Power supply	
Supply voltage:	100 ... 265 V AC or 10.8 ... 30 V AC/DC
Frequency AC:	47 ... 63 Hz
Power consumption:	<3.5 VA
Working temperature:	-10 ... +60 °C
CE-conformity:	EN 55022, EN 60555-2, IEC 61000-4-4/5/11/13
Inputs	
Current:	0/4 ... 20 mA selectable, R_i = 25 Ω, overload max. 100 mA
Voltage:	0/2 ... 10 V DC selectable, R_i approx. 40 kΩ, overload max. 100 V
Span and start value 4 mA/2 V:	adjustable approx. ±5 %
Transmitter supply: (only ST500)	approx. 24 V DC, R_i approx. 150 Ω, short-circuit current approx. 35 mA
Outputs	
Current:	0/4 ... 20 mA selectable, burden max. 1 kΩ
Voltage:	0/2 ... 10 V selectable, load max. 15 mA, short-circuit-proof (parallel with the current output max. 5 mA)
Rise time (T_{90}):	model 10: <20 ms, max. frequency 18 Hz model 11: <100 µs, max. frequency 1 kHz
Accuracy:	≤0.2 % (single range adjustment ≤0.1 %)
Housing:	standard case polycarbonate 8020 UL94V-1 acc. to DIN EN 60715:2001-09
Weight:	approx. 200 g
Connection:	screw terminals, max. 2.5 mm²
Protection class:	Housing IP30, terminals IP20 acc. to BGV A3

1 - 2 - 3

Greisinger		
1.	**Model**	
	TV500	signal converter
	ST500	power feed signal converter
2.	**Measuring range**	
	10	inputs 0/4 ... 20 mA and 0/2 ... 10 V outputs 0/4 ... 20 mA and 0/2 ... 10 V
	11	as 10, but rise time T_{90} <100 µS
3.	**Supply voltage**	
	0	100 ... 265 V AC
	5	10.8 ... 30 V AC/DC

Universal Isolating Amplifier

HIGHLIGHTS:

- *Safe galvanic isolation*
- *Step response T_{90} 40 ms*
- *Output deviation <0.2 % of the limit value*
- *Operating display and status messages via two-colour LED*
- *Configuration via front DIP switches*
- *Narrow installation width of 12.5 mm for carrier rail*

TV 125 L

Universal Isolating Amplifier

General:

Isolating amplifiers of the series TV 125 L are suitable for potential isolation or for conversion of unit signals. The universal layout of the inputs and the output enables a broad range of applications with only one type of device. The plug-in terminal strips enable simple and time-saving wiring. The configuration is also quick and easy with the front DIP switches.

Specifications:

Auxiliary power	
Auxiliary voltage:	18 ... 30 V DC
Power consumption:	<0.5 VA
Conformity:	CE, Directive 2004/108/EG
EMC:	DIN EN 61326-1: 2013-07, Class A
Standards:	DIN EN 61010-1: 2011-07, DIN EN 61010-2: 2011-07
Rated voltage:	300 V AC/DC in accordance with DIN EN 61010-1
Test voltage:	3 kV AC, 50 Hz, 1 min
Input / Output / Auxiliary power	
Environmental conditions	
Working temperature:	-10 ... +60 °C
Storage temperature:	-20 ... +60 °C
Air humidity:	<95 % (no condensation)
Inputs	
Voltage input:	Switchable, 0 ... 10 V or 2 ... 10 V., R_i = 47 kΩ. Max. overload 32 V AC
Current input:	Switchable, 0 ... 20 mA or 4 ... 20 mA. R_i = 48 Ω + 15 Ω (RiPTC). Max. overload 32 V AC/DC in accordance with DIN EN 61010-2-30
Output	
Current output:	Switchable, 0 ... 20 mA or 4 ... 20 mA. Load <150 Ω
Step response:	40 ms
Standard error:	<0.2 % of final value
Temperature coefficient:	<0.01 % / K
Housing	
Material:	Polyamide (PA) 6.6, UL94V-0
Weight:	91 g
Protection rating:	Housing IP30, terminals IP20 BGV A3
Colour:	light grey
Installation width:	12.5 mm
Dimensions (HxD):	108 x 114 mm
Installation:	Carrier rail mounting TS35 DIN EN 60715

Ordering code:
TV125L - 10 - 5 - 00

Switch amplifier

HIGHLIGHTS:

- *1 or 2 channel version*
- *Safe galvanic isolation between input / output / auxiliary voltage*
- *Functional safety up to SIL2 EN61508*
- *Inputs for switching contacts, Namur initiators, or optocouplers*

TS 125 und TS 225

Switch amplifier

General:

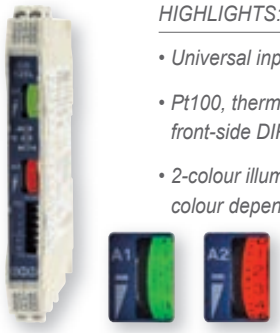
Switch amplifiers of the series TS 125 and TW 255 are used in switch cabinets for the conversion and isolation of digital switching signals, as well as in explosion-prone areas. The devices are available in one- or two-channel versions.
Passive sensors, such as switching contacts, Namur initiators, or passive electronic outputs of third-party devices, can be connected to the intrinsically safe inputs. The TS125 series in 12.5 mm wide carrier rail housing offers relay outputs with output make circuit. The TW225 series in 22.5 mm wide carrier rail housing offers relay outputs with changeover function. The plug-in terminal strips enable simple and time-saving wiring. The configuration is also quick and easy with the front DIP switches.

Specifications:	
Wide-range mains	20 ... 125 V DC and 20 ... 250 V AC, (47 ... 63 Hz), max.1.5 W
Auxiliary voltage:	24 V DC +/-15 % max. 1.5 W
Test voltage:	3kV AC between input / output / auxiliary voltage
Working temperature:	-10 ... +60 °C
Storage temperature:	-20 ... +80 °C
Air humidity:	10 ... 90 % (non-condensing)
Measuring inputs (in accordance with EN60947-5-6 Namur)	
Open circuit voltage:	approx. 8 V
Short circuit voltage:	approx. 8 mA
Switching points:	inactive <= 1.2 mA, active >= 2.1 mA, hyst. < > 0.5 mA
Error recognition:	Wire break: <0.2 mA, ahort circuit: >7 mA
Relay outputs:	
Switching voltage:	<250 V AC <2 A <500 VA, <125 V DC <0.2 A <25 W, < 30 V DC <2 A <60 W
Switching frequency:	max. 5 Hz
Delay:	max. 30 ms
Housing	
Dimensions (W x D x H):	TS125: 12.5 x 114 x 108 mm, TS225: 22.5 x 114 x 108 mm
Protection rating:	IP20
Terminals:	0.2 ... 2.5 mm², AWG 24 ... 14, removable coded terminals
Explosion protection:	specific data on request
Functional safety:	SIL2 in accordance with EN61508

TS - 1 - 2 - 3

Greisinger		
1.	**Device version**	
	125L	Housing width 12.5 mm, Relay NO contacts, Auxiliary voltage 24 V DC +/- 15 %
	125M	Housing width 12.5 mm, Relay NO contacts, Wide-range mains adapter
	225M	Housing width 22.5 mm, Relay changeover contacts, Wide-range mains adapter
2.	**Explosion protection**	
	00	Installation of the device TV125L in Zone 2 permitted, in accordance with ATEX ignition protection rating ‚n'
	Ex	With installation of the devices outside the Ex area: Inputs intrinsically safe in accordance with ATEX ignition protection rating ‚ia' for Zones 0 and 20. The device TS125L may be installed in Zone 2 in accordance with ATEX ignition protection rating ‚ic'.
3.	**Number of channels**	
	1	Single channel
	2	Dual channel
	F	Single channel with additional error relay or parallel relay

Limit value switch



HIGHLIGHTS:

- *Universal input for unit signals,*
- *Pt100, thermocouple, potentiometer, switchable via front-side DIP switch*
- *2-colour illuminated scales for limit value adjustment, colour depends on switch status*

colour depends on switch status

GS 125

Limit value switch

General:

Limit value switches of the series GS125 are used in switch cabinets for process monitoring or for simple process regulation. Both temperatures and derived variables such as voltage, current and resistance are used as control signals. In the process, 1 or 2 limit values can be monitored. For assignment of the measuring unit to the scale labelling, 24 transparent adhesive labels are supplied. They can be glued between the adjusting wheels on the front panel.

Specifications:	
Measurement inputs	Switchable via DIP switch
Unit signals:	0/2 ... 10 V, 0/4 ... 20 mA
Potentiometer:	500 Ω ... 20 kΩ
Pt100:	-50 ... +50 °C, 0 ... 50 °C, 0 ... 100 °C, 0 ... 150 °C, 0 ... 200 °C, 0 ... 300 °C, 0 ... 500 °C
Thermocouple:	FeCuNI, Type J: 0 ... 250 °C, 0 ... 500 °C NiCrNi, Type K : 0 ... 500 °C, 0 ... 750 °C, 0 ... 1000 °C PtRhPt, Type S: 0 ... 1500 °C
Wide-range power supply	
24 V power supply	
Rated voltage:	253 V AC
Test voltage:	3kV AC between input/relay output/auxiliary voltage
Working temperature:	-10 ... +60 °C
Storage temperature:	-20 ... +80 °C
Air humidity:	10 ... 90 % (non-condensing)
Relay outputs	
Switching voltage:	<250 V AC <2 A <500 VA, <125 V DC <0,2 A <25 W, < 30 V DC <2 A <60 W
Switching frequency:	max. 5 Hz
Switching hysteresis:	ca. 1 %
Functional safety:	SIL2 gem. EN61508 (spezifische Daten auf Anforderung)
Setpoint setting:	Skalengenauigkeit: 2 %
Actual value output:	4 ... 20 mA, Bürde max. 120 Ω, keine galvanische Trennung zum Eingangssignal

GS - 1 - 2 - 3 - 4

Greisinger		
1.	**Device version**	
	125L	Power supply 24 V DC +/- 15 %
	125LP	Power supply 24V DC +/-15% with carrier rail bus connection *)
	125M	Wide-range power supply 20 ... 125 VDC / 20 ... 253 V AC
2.	**Limit value contacts**	
	1	1 relay (changeover contact)
	2	2 relays (universal connection)
	3	2 relays (potential-free n.o. contacts)
3.	**Actual value output**	
	0	not provided
	1	Output 4 ... 20 mA
4.	**Options**	
	01	No options
	01	Push-in terminals (plug-in)

*) see also separate information sheet Power-Rail

AC Current Transmitter

HIGHLIGHTS:

- *1- and 2-channel device*
- *Measuring ranges 0 ... 1 A / 0 ... 5 A AC*
- *Arithmetic average value measurement RMS calibrated*
- *Frequency range 45 ... 400 Hz*
- *Loop voltage 14 ... 30 V DC*

CT 500 P

AC Current Transmitter

General:

The transmitter converts AC current from 0 ... 1 A or 0 ... 5 A to the proportional standard signal 4 ... 20 mA. The measurement method is calibrated an arithmetic averaging on RMS. The CT 500 P operates like an 2-wire transmitter, which is supplied from the measuring device (e.g. SPS input circuit board). Small housing width allows a space-saving installation.

Specifications:

Power supply	
Loop voltage:	14 ... 30 V DC
Working temperature:	-10 ... +60 °C
CE-conformity:	EN55022, EN60555, IEC61000-4-4/5
Input:	1- or 2-channels
Current:	0 ... 1 A or 0 ... 5 A AC, overload max 10 A
R_i:	<20 mΩ
Frequency:	45 ... 400 Hz fundamental wave, $16_{2/3}$ Hz on request
End value:	adjustable ±5 %
Output	
Current:	4 ... 20 mA, burden $R_{max.}$ = (UB - 14 V) ÷ 20 mA
Rise time (T_{90}):	≤1 s
Accuracy:	≤0.2 %
Housing	Polycarbonate, UL94V-0 TS 35 acc. to DIN EN 60715:2001-09
Weight:	approx. 200 g
Connection:	screw terminals, max. 2.5 mm²
Protection class:	Housing IP30, terminals IP20 acc. to BGV A3

Accessories and spare parts:

KA-500
Terminal cover for measuring voltages >400V AC

CT500P- 1 - 2 - 3

Greisinger		
1.	**Number of channels**	
	1	
	2	
2.	**Input direct connection / via transformer**	
	0	1 A
	5	5 A
3.	**Options**	
	00	without option

Analog Frequency Transmitter

HIGHLIGHTS:

- *Output frequency from 0 ... 0.01 Hz/20 kHz programmable*
- *Inputs for 0/4 ... 20 mA, 0/2 ... 10 V DC*
- *Teach-in programming for analog start- and end value*
- *Outputs transistor and relay SPDT*
- *Power- and programming indicator via 2-color LED*

AF 500

Analog Frequency Transmitter

General:

Analog frequency transmitter AF 500 converts standard industry signals 0/4 ... 20 mA or 0/2 ... 10 V DC into a proportional frequency. The output frequency is programmable with rotary switches at the case side.

Specifications:

Power supply	
Supply voltage:	230 V AC ±10 % or 24 V DC ±15 %
Frequency AC:	47 ... 63 Hz
Power consumption:	<3 VA
Working temperature:	-10 ... +60 °C
CE-conformity:	EN 55022, EN 60555, IEC 61000-4-4/5/11/13
Input	
Current:	0/4 ... 20 mA, switch selectable
- Internal resistance:	R_i = 51 Ω
Voltage:	0/2 ... 10 V DC, switch selectable
- internal resistance:	R_i = 20 kΩ
Start value:	via software programmable 0 ... +25 %
End value:	via software programmable -15 ... +10 %
Output	
Transistor:	max. 30 V DC, load max. 30 mA
- Frequency range:	0 ... 0.01 Hz, 0 ... 20 kHz duty cycle 0.5
Relay SPDT:	250 V AC <250 VA <2 A, 100 V = < 50 W <1 A
Frequency range:	0 ... 0.01 Hz, 0 ... 9.9 Hz, duty cycle 0.5
Accuracy:	0.1 % of the end value
Housing:	Polycarbonate, UL94V-0 TS 35 acc. to DIN EN 60715:2001-09
Weight:	approx. 140 g
Connection:	screw terminal, max. 2.5 mm²
Protection class:	Housing IP30, terminals IP20 acc. to BGV A3

AF500- 1 - 2 - 3

Greisinger		
1.	**Measuring range**	
	10	0/4 ... 20 mA, 0/2 ... 10 V DC output frequency from 0 ... 0.01 up to 20 kHz
2.	**Supply voltage**	
	0	230 V AC ±10 %
	5	24 V DC ±15 %
3.	**Options**	
	00	without option

Frequency Analog Transmitter

HIGHLIGHTS:

- *Frequency ranges from 0 ... 0.01Hz/ 20 kHz programmable*
- *start- and end value of the measuring range programmable*
- *Multipurpose inputs for 24 V sensors, switching contacts and Namur actors*
- *Integrated transmitter supply*

FT 500

Frequency analog transmitter

General:

Frequency transmitter FT 500 are used to convert an impulse frequency range into industry standard signals. The transmitter accepts impulses from proximity switch, contact switch, light barriers and Namur proximity switches. Start- and end value will be programmed with 5 rotary switches. The setting of intermediate values occurs at the front trim. Increasing or decreasing output characteristic is therefore programmable.

Specifications:

Power supply	
Supply voltage:	85 ... 265 V AC or 10 ... 30 V AC / DC
Frequency AC:	47 ... 63 Hz
Power consumption:	<4 VA
Working temperature:	-10 ... +60 °C
CE-conformity:	EN 55022, EN 60555, IEC 61000-4-4/5/11/13
Input	
Frequency range:	0 ... 0.01 Hz / 20 kHz
Pulse cycle	
pulse/stop:	min. 20 µs (electronic) and min. 5 ms (contacts)
Start value:	programmable 0 ... +25 %
End value:	programmable -15 ... +5 %
Impulse input	
(Terminals 2, 3):	Low-Signal -30 V ... +3 V, High-Signal +10 V ... +35 V
Input resistance:	R_i >10 kΩ
Transmitter supply	
(Terminal 1):	approx. 20 V DC, 25 mA short circuit current
Namur input	
(Terminals 4, 5):	acc. to DIN 19234, Namur
input resistance:	approx. 1 kΩ
Output	
Current:	0/4 ... 20 mA selectable, burden ≤1 kΩ
Voltage:	0/2 ... 10 V DC, load max. 10 mA, short-circuit-proof (parallel with current output, 5 mA)
Accuracy:	0.1 % Measuring end value
Rise time (T_{90}):	<130 ms
Housing:	Polycarbonate, UL94V-0 TS 35 acc. to DIN EN 60715:2001-09
Weight:	approx. 140 g
Connection:	screw terminals, max. 2.5 mm²
Protection class:	case IP30, terminals IP20, acc. to BGV A3

FT500- 1 - 2 - 3

Greisinger		
1.	**Measuring range**	
	70	0 ... 0.01 Hz up to 20 kHz, output 0/4 ... 20 mA and 0/2 ... 10 V DC
2.	**Supply voltage**	
	0	85 ... 265 V AC
	5	10 ... 30 V AC / DC
3.	**Options**	
	00	without option

pH Head-Transmitter

HIGHLIGHTS:

- *Measuring range -1 ... +15 pH*
- *2-wire transmitter 4 ... 20 mA*
- *Error free measurement up to 100 m*

pH 40

pH Head-Transmitter

General:

The head transmitter PH 40 provides a cost-effective way of pH measurement. It is simply plugged on the pH sensor with „Überwurfmutter". The electrical connection is via the 8-pole. Circular Connectors. Depending on the execution is the signal from the pH sensor issued with either a low output impedance or available as galvanically isolated 4 ... 20 mA signal is available.

Specifications:

Power supply	
Supply voltage:	5 ... 30 V DC output 0 10 ... 30 V DC output 2
Working temperature:	-10 ... +60 °C
Input pH/ORP	
Measuring range:	-1 ... +15 pH / ± 1500 mV
Input resistance:	>10^{12} Ω
Output	
Type 1:	1:1 transfer of the pH-signal with low output impedance, error free measurement up to 100 m
Type 2:	4 ... 20 mA, 2-wire technology in the range -1 ... +15 pH depending at 25 °C, zero-point pH 7.0, slope 59.2 mV/pH, not compensated
Accuracy:	type 0 = 0.01 %, type 2 = 0.2 %
Housing	
Material:	PVC-U
Weight:	approx. 100 g
Process connection:	S7
Electrical connection:	8 pole round socket
Protection class:	IP65

Accessories and spare parts:

SKM8E-02
2 m IP67, connection cable terminated with 8-pin. Cable socket and open on one side with ferrules, PU cable

SKM8E-05
5 m IP67, connection cable terminated with 8-pin. Cable socket and open on one side with ferrules, PU cable

SKM8E-10
10 m IP67, connection cable terminated with 8-pin. Cable socket and open on one side with ferrules, PU cable

SKM8E-25
25 m IP67, connection cable terminated with 8-pin. Cable socket and open on one side with ferrules, PU cable

Ordering code:
pH40 - 0 - 2 - 00
Output: -1 ... +15 pH, 1:1 signal transfer
pH40 - 2 - 2 - 00
Output: 4 ... 20 mA = -1 ... +15 pH

CVC-Amplifier

CVC-02/0201

CVC-Amplifier

General:

The CVC-amplifier is used for potential-free signal processing and filtering of currents. For this, two channels per board are available. About pluggable filter modules, the signal can be filtered in any specified frequency range. For an input current range of ±2 A, the output voltage is ±1 V. The functionally reliable supply voltage range is 6 ... 18 V DC.

Specifications:

Supply voltage **Specified range**	12 V DC 6 ... 18 V DC
Power consumption at nominal voltage (without sensor / without load)	45 mA
Electrical isolation (3-way isolation)	1000 V DC
Accuracy (typ.):	0.1 %
Cut-off frequency (standard / maximum)	5 kHz / 10 kHz
Linearity (typical):	0.02 %
Input – Current **Input range**	± 2 A
Output – Voltage **Output range** **max. Current output** **short circuit proof**	 ±1 V ±10 mA yes
Residual ripple @ **f_g = 1 kHz** **f_g = 10 kHz**	 typ. 10 mV_{pp} typ. 15 mV_{pp}
Environmental temperature:	0 ... 50 °C
Plug-in filter **Standard frequencies in Hz:**	10, 30, 50, 100, 300, 500, 1 k, 3 k, 5 k, 10 k
Connectivity **Rated Current IN** **Wire Gauge flexible** **Wire Gauge solid**	Spring-loaded terminals 9 A 0.2 ... 1 mm² 0.2 ... 1.5 mm²
Housing:	100 x 33 x 21 mm (W x H x D)
Scope of supply:	Device, manual

CVC- [1] - [2] - [3] - [4] - [5]

Greisinger		
1.	**Model**	
	02	2 Channels
2.	**Input**	
	02	±2 A
3.	**Output**	
	01	±1 V
4.	**Output filter frequencies (Hz)**	
	XXX	Enter standard values: 10, 30, 50, 100, 300, 500, 1 k, 3 k, 5 k, 10 k
	YY	Enter non-standard value: 1 ... 30 k
5.	**Filter characteristics**	
	BW	Butterworth 4th order
	BS	Bessel 4th order

TSA-PWR module

TSA-PWR

TSA-PWR module

General:

The TSA-PWR module is used for control of loads up to a power of 2 W at a current of up to 200 mA. Depending on the application, the required configuration must be specified.

Specifications:

Supply voltage:	24 V DC (10 ... 30 V DC)
Power consumption at nominal voltage (without sensor / without load)	100 mA
Electrical isolation (3-way isolation)	1000 V DC
Accuracy	0.1 %
Cut-off frequency (standard / maximum)	5 kHz / 10 kHz
Linearity (typical)	0.02 %
Input – Voltage **Input range (V1 / V2)** **Input resistance** **Input – Current** **Input range (A1 / A2 / A3)** **Input resistance**	 ±10 V / 0 ... 10 V 10 MΩ ±20 mA / 0 ... 20 mA / 4 ... 20 mA 50 Ω
Output – Voltage **Output range (V10)** **Output – Current** **Output range (A5 / A6)** **Max. load current (U output)**	 ±10 V / 0 ... 10 V ±200 mA / 0 ... 200 mA ±200 mA
Residual ripple @ **f_g = 1 kHz** **f_g = 10 kHz**	 typ. 10 mV_{pp} typ. 15 mV_{pp}
Environmental temperature	0 ... 50 °C
Plug-in filter **Standard frequencies in Hz**	10, 30, 50, 100, 300, 500, 1 k, 3 k, 5 k, 10 k
Housing:	ME 22.5: 22.5 x 99 x 114.5 mm (W x H x T)
Scope of supply:	Device, manual

TSA-PWR- [1] - [2] - [3] - [4] - [5]

Greisinger		
1.	**Model**	
	1	1 Output
2.	**Input (not all combinations with output feasible)**	
	V1	±10 V
	V2	0 ... 10 V
	A1	±20 mA
	A2	0 ... 20 mA
	A3	4 ... 20 mA
3.	**Output filter frequencies (Hz)**	
	XXX	Enter standard values: 10, 30, 50, 100, 300, 500,1 k, 3 k, 5 k, 10 k
	YY	Enter non-standard value: 1 ... 30 k
4.	**Filter characteristics**	
	BW	Butterworth 4th order
	BS	Bessel 4th order
5.	**Output (not all combinations with input feasible)**	
	V10	±10 V (I = max. ±200 mA)
	A5	±100 mA
	A6	±200 mA

Temperature Measuring Transducer

NEW!

HIGHLIGHTS:

- *Universal input for Pt100, Pt1000, thermocouple, NTC and resistance measurement value*
- *Configuration via front DIP switches*
- *Analog actual value output 4 ... 20 mA*
- *Zero point and limit value can be adjusted via trim potentiometers on the front*
- *With Pt100 and Pt1000 sensors, monitoring of sensor break and short-circuit*
- *Wide-range power supply or 24 V DC*
- *Optional supply via carrier rail bus*
- *Removable coded screw terminals or optional push-in terminals*
- *Housing width 12.5 mm*
- *Carrier rail mounting TS35 EN60715*

MU 125

Temperature Measuring Transducer

General:

Devices of the MU125 series convert a temperature measurement value or resistance measurement value from various sensors to a current signal of 4 ... 20 mA.
The universal configurability of the measuring inputs reduces the stock requirement for various applications. The housing width of only 12.5 mm enables space-saving installation in the switch cabinet.

Specifications:

Wide-range power supply	
Supply voltage:	20 ... 125 V DC and 20 ... 250 V AC (47 ... 63 Hz), max.1.5 W
24V power supply	
Supply voltage:	24 V DC +/-15 %, max. 1.5 W
Combined data	
Rated voltage:	253 V AC
Test voltage:	3 kV AC between supply // input = output
Working temperature:	-10 ... +60 °C
Storage temperature:	-20 ... +80 °C
Humidity:	10 ... 90 % (no condensation)
Measurement inputs	
Pt100:	linearised, measuring current approx. 1.6 mA
Pt1000:	linearised, measuring current approx. 130 µA In the event of a sensor break or short circuit, the analog output drops to 0mA. The operation LED blinks red
Thermocouple:	linearised with comparison position compensation (optionally without internal compensation)
NTC:	linearised for $B_{25/85}$=3977 K or 3528 K Max. load 200 µW (averaged)
Linear resistance:	Mb. 0 ... 2 kΩ: approx. 1.4 mA Mbs. 0 ... 5 kΩ, 0 ... 10 kΩ: approx. 300 µA
Zero point setting:	+/-40 % of the factory measuring range (= end value – start value) via 12-turn trim potentiometer
End value reduction:	-50 % based on the factory end value via 12-turn trim potentiometer Note: The measuring accuracy drops proportionally with the narrowing of the measuring range
Potentiometer setting limits:	Limitation of the aforementioned adjustment ranges Pt100: -50 ... +500 °C (... +600°C) Pt1000: -50 ... +250 °C (... +300 °C) FeCuNi: -100 ... +500 °C (... +800 °C) NiCrNi: -150 ... +1250 °C PtRhPt: 0 ... 1500 °C (... +1600 °C) NTC (10 kΩ): -20 ... +100 °C (... +150 °C) NTC (2 kΩ): -40 ... +100 °C (-50 °C ... +150 °C) R linear: 0 ... 10 kΩ (values in parentheses apply for optional, customer-specific special measuring ranges that are configured at the factory)
Analog output:	4 ... 20 mA, max. burden 400 Ω, no galvanic isolation from the input signal (max. burden error of 0.2 % at 400 Ohm)
Dimensions (W x D x H):	12.5 x 114 x 108 mm
Material:	PA6.6, light grey, Flammability class V0 (UL94)
Weight :	120 g
Protection rating:	IP20
Screw terminals:	0.2 ... 2.5 mm², AWG 24 ... 14, removable, coded
Push-in terminals: (spring-type terminals)	0,5 ... 1,5 mm², AWG 25 ... 16, Double connection (12A between the connections), removable, coded
Power Rail:	8 A over the entire bus system (power supply via removable terminals 0.2 ... 2.5 mm², AWG 24 ... 14)

A service mode for the trim potentiometers on the front offers the following possibilities:
1) A check of whether potentiometers are positioned at the calibrated factory settings
2) The pre-adjustment of a new output characteristic curve only with connection of a current measuring device only. (a temperature calibrator is not necessary)
3) Specification of a constant value at the current output, e.g. in order to test the reaction of connected devices. (Limited range from 5.6 ... 20 mA)

MU - 1 - 2

Greisinger		
1.	**Device version**	
	125L	Supply voltage 24 V DC +/- 15 %
	125LP	Supply voltage 24 V DC +/-15 % with carrier rail bus connection
	125M	Wide-range power supply 20 ... 125 V DC / 20 ... 253 V AC
2.	**Options**	
	00	No options
	01	Push-In-Klemmen (steckbar)

Universal Transmitter

NEW!

HIGHLIGHTS:

- *Transmitter for electrical signals*
- *Universal input for standard signals, Pt100, thermocouple, potentiometer, configuration via front-side DIP switch*
- *Analog output 4 ... 20 mA*
- *With Pt100 sensors, monitoring of sensor break and short-circuit*
- *Wide-range power supply or 24 V DC*
- *Housing width 12.5 mm*
- *Removal coded screw terminals*
- *Carrier rail mounting TS35 EN60715*

UT 125

Universal Transmitter

General:

The UT 125 series of universal transmitters are designed for the affordable transformation of standard signals, temperatures and potentiometer statuses into a current signal of 4 ... 20 mA. The universal configurability of the measuring inputs reduces the stock requirement for various applications. The measuring inputs and actual value output are not galvanically isolated. The housing width of only 12.5 mm enables space-saving installation in the switch cabinet.

Specifications:

Wide-range power supply		
Supply voltage:	20 ... 125 V DC and 20 ... 250 V AC (47 ... 63 Hz), max.1.5 W	
24V power supply		
Supply voltage:	24 V DC +/-15 %, max. 1.5 W	
Combined data		
Rated voltage:	253 V AC	
Test voltage:	3 kV AC between power supply // input = output	
Working temperature:	-10 ... +60 °C	
Storage temperature:	-20 ... +80 °C	
Air humidity:	10 ... 90 % (no condensation)	
Measurement inputs		
Voltage:	0/2 ... 10 V, R_i approx. 20 kΩ	
Current:	0/4 ... 20 mA, R_i approx. 60 Ω	
Pt100:	linearised, measurement current 1.6 mA Recognition of sensor break or short circuit: Actual value drops to approx. 0 mA	
Thermocouple:	linearised with comparison point compensation	
Resistance:	Potentiometer (3-wire), rated value 500 Ω ... 20 kΩ Intern. reference voltage approx. 1.5 V	
Analog output:	4 ... 20 mA, max. burden 400 Ω, no galvanic isolation from the input signal	

Input signal	Basic precisionactual value output	Temperature deviation *)
0/2 ... 10 V	0.2 %	0.004 %/K
0/4 ... 20 mA	0.2 %	0.004 %/K
Potentiometer	1 %	0.007 %/K
Pt100 -50 ... +50 °C	0.5 %	0.03 %/K
Pt100 0 ... 50 °C	0.9 %	0.04 %/K
Pt100 0 ... 100 °C	0.5 %	0.03 %/K
Pt100 0 ... 150 °C	0.2 %	0.02 %/K
Pt100 0 ... 200 °C	0.4 %	0.02 %/K
Pt100 0 ... 300 °C	0.3 %	0.01 %/K
Pt100 0 ... 500 °C	0.2 %	0.007 %/K
FeCuNi 0 ... 250 °C	1.0 %	0.04 %/K
FeCuNi 0 ... 500 °C	0.5 %	0.03 %/K
NiCrNi 0 ... 500 °C	0.5 %	0.04 %/K
NiCrNi 0 ... 750 °C	0.4 %	0.03 %/K
NiCrNi 0 ... 1000 °C	0.3 %	0.02 %/K
PtRhPt 0 ... 1500 °C	1.0 %	0.04 %/K

*) Measurement deviation depending on the environmental temperature in the switch cabinet (-10 ... +60 °C)

Housing	
Dimensions (W x D x H)	12.5 x 115 x 108 mm
Material:	PA6.6, light grey, Flammability class V0 (UL94)
Weight:	120 g
Protection rating:	IP20
Screw terminals:	0.2 ... 2.5 mm², AWG 24 ... 14, removable, coded
Push-in terminals: (spring-type terminal)	0.5 ... 1.5 mm², AWG 25 ... 16, double connection (12 A between the connections), removable, coded
Power Rail:	8 A over the entire bus system (Supply via removable terminals 0.2 ... 2.5 mm², AWG 24 ... 14)

UT - 1 - 2

Greisinger		
1.	Device version	
	125L	Supply voltage 24 V DC +/- 15 %
	125LP	Supply voltage 24 V DC +/-15 % with carrier rail bus connection *)
	125M	Wide-range power supply 20 ... 125 V DC / 20 ... 253 V AC
2.	Options	
	00	No options
	01	Push-in terminals (plug-in)

*) Supply including

Universal Isolating Amplifier

NEW!

HIGHLIGHTS:

- *Standard inputs and outputs with adjustment function*
- *Safe galvanic isolation between input / output / auxiliary voltage with reinforced isolation in accordance with DIN EN 61010-1*
- *Wide-range power supply*
- *Power supply via power rail*
- *Output deviation <0.2 %*
- *Operating display and status messages via two-colour LED*
- *Configuration via front DIP switches*
- *Removable coded screw terminals or optional push-in terminals*
- *Narrow installation width of 12.5 mm*
- *Carrier rail mounting TS 35*

TV 125M / ST 125M

Universal Isolating Amplifier

General:

Isolating amplifiers of the series TV/ST125M are suitable for potential isolation or for conversion of unit signals. The universal configuration of the inputs and output and the internal power supply by means of wide-range power supply enable a broad spectrum of use with only one device type. The power supply can optionally take place via a carrier rail bus connector. The push-in terminal enable simple and time-saving wiring. The configuration is also quick and easy with the front DIP switches.

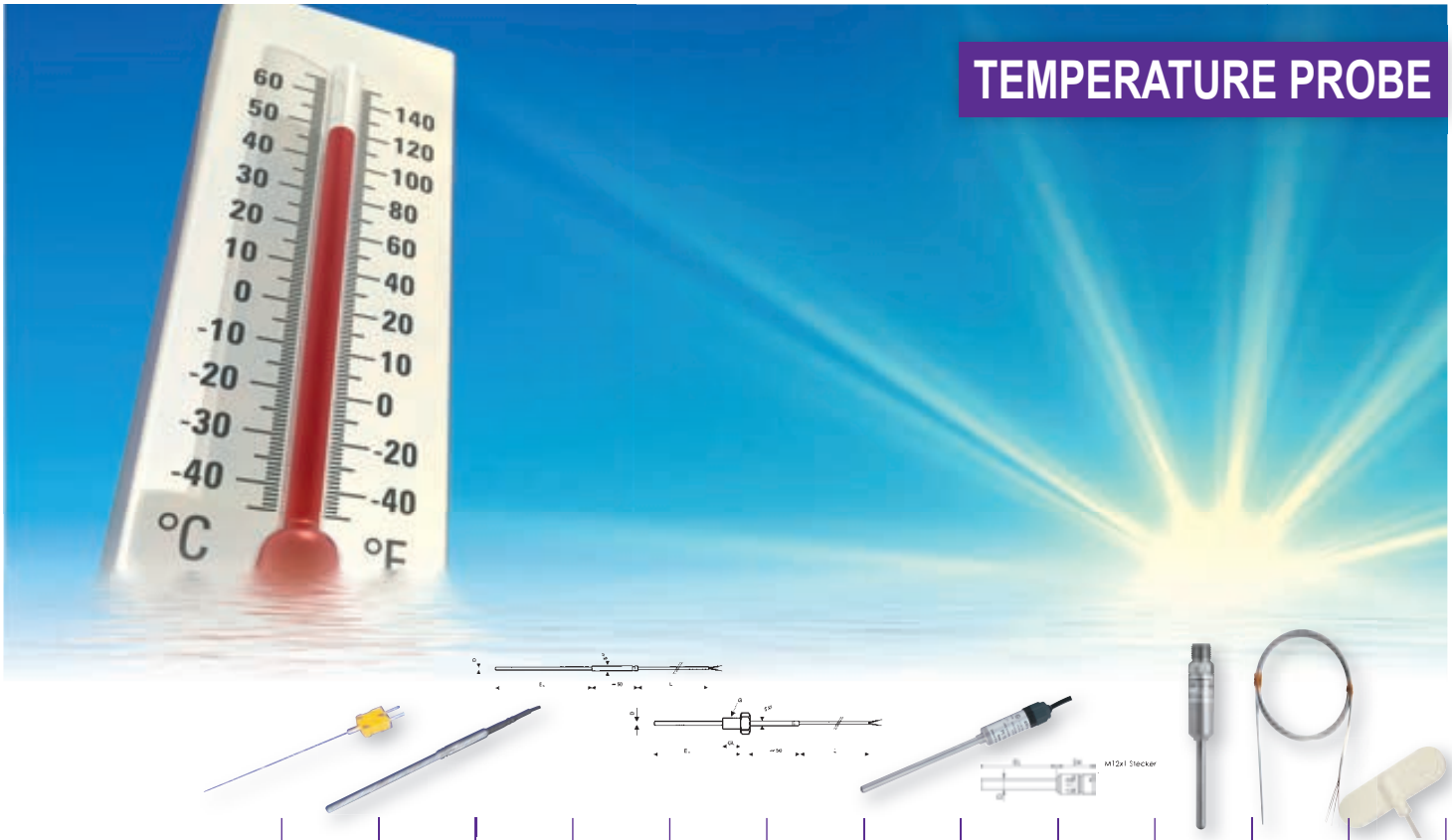
Specifications:

Power supply	
Auxiliary voltage	
Wide-range power supply:	20 ... 125 V DC / 85 ... 253 V AC (47 ... 63Hz)
Supply via power rail:	24 V DC +/-15 %
Power consumption	
Wide-range power supply:	<4 VA
Supply via power rail:	<2 W
Conformity:	Directive 2014/35/EU2014/30/EU
EMC:	Directive 2014/30/EU
Standards:	EN 61010-1: 2010, EN 61326-1: 2013 EN 61326-3-1: 2008, Amendment 2009
Rated voltage:	253 V AC, 125 V DC in accordance with EN 60079-11 300 V AC/DC in accordance with DIN EN 61010-1 with Overvoltage Category 2 and Degree of Contamination 2 between all circuits. Safe separation with amplified isolation
Test voltage:	3 kV AC input / output / auxiliary energy
Environmental conditions	
Working temperature:	-10 ... +60 °C
Storage temperature:	-20 ... +80 °C
Air humidity:	10 ... 90 % (no condensation)
Inputs	
Voltage input:	switchable, 0 ... 10 V or 2 ... 10 V. R_i = 30 kΩ. Max. overload 26 V AC/DC
Current input:	switchable, 0 ... 20 mA or 4 ... 20 mA. R_i = 51 Ω max. overload. 94 mA
Measuring range:	adjustable ±2 %
Zero point:	adjustable ±2 %
Output	
Voltage output:	0 ... 10 V or 2 ... 10 V switchable, resistance >500 Ω.
Current output:	0 ... 20 mA or 4 ... 20 mA switchable, burden < 600 Ω.
Step response:	40 ms
Standard error:	<0.2 % of final value
Temperature coefficient:	<0.01 % / K
Transmitter supply	
Transmitter power supply (only ST125M):	>15 V DC with 20 mA output current, R_i = 300 Ω

Housing	
Material:	Polyamide (PA) 6.6, UL94V-0
Weight:	91 g
Protection rating:	Housing IP30, terminals IP20 BGV A3
Colour:	light grey
Installation width:	12.5 mm
Dimensions (H x D):	108 x 114 mm
Installation:	Carrier rail mounting TS35 DIN EN 60715

1 - 2 - 3 - 4

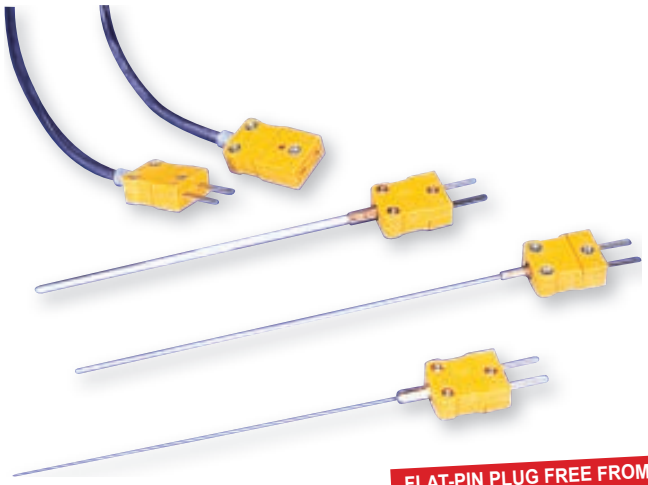
Greisinger		
1.	Device version	
	TV125M	Wide-range power supply
	TV125MP	Carrier rail bus connection, supply voltage 24 V DC +/-15 %
	ST125M	Transmitter power supply, wide-range power supply
	ST125MP	Transmitter power supply carrier rail bus connection , supply voltage 24 V DC +/-15 %
2.	Explosion protection	
	00	No protection
3.	Input	
	10	0/2 ... 10 V / 0/4 ... 20 mA
4.	Options	
	00	No options
	01	Push-in terminals (plug-in)



Application:	GTT ..	GTF 101-5...	GTF 101-N...	GTF 101 ...	GTF 102 ...	GTF 103 ...	GTF 10x-EX	GTF 111	GTF 112	GTF 11x-EX	TF 101 ...	GOF 1xx ...
NiCr-Ni (Type K)	●	●		●	●	●					●	●
NiCrSi-NiSi (Type N)			●									
Freely customized probes (Pt100 / Pt1000)				●	●	●		●	●		●	●
Miniature flat-pin plug	●	●	●	●	●						●	●
Loose ends	●	●	●	●	●		●				●	●
M12-plug, 4-pol.								●	●	●		
Sensor head						●	●					
Ex - Protection							●			●		
Thermo elements	●	●										
permanent high temperatures			●									
Industrial probes, process connection without thread	●	●	●	●		●	●	●		●		
Industrial probes, process connection with thread					●	●	●		●	●		
Hermetically sealed probe											●	
Self-adhesive probes												●
Device information:												
Catalogue page	Page 186	Page 187	Page 193	Page 188	Page 190	Page 191	Page 194	Page 192	Page 192	Page 196	Page 197	Page 198

Note: Handheld instrument probes can be found in chapter handheld instruments and the appropriate devices

Standard - jacket thermo elements Type K (NiCr-Ni)



HIGHLIGHTS:

- *Same material for contacts and thermo elements*
- *No incorrect temperature values due to different materials*
- *Polarity cannot be mixed up*
- *One plug size for Ø from 0.5 ... 6.0 mm*
- *Any extension possible (extension cable VKA-1m or length per customers' requests)*
- *Sensor elements can be exchanged easily*

ALSO IN TYPE N AVAILABLE

GTT-xx-xxxx

Jacket thermo elements type K (NiCr-Ni) complete with miniature flat-pin plug NST1200 (free from thermal e.m.f.)

Specifications:	
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 measuring 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)

Recommended upper temperature limit for continuous use:			
Ø	0.5	1.0	1.5
°C	700	700	920

Accessories and spare parts:

NKU1200
Art. no. 602737
coupling free from thermal e.m.f.

NKU1200O
Art. no. 602738
U-coupling free from thermal e.m.f.

VKA-1m
Art. no. 602909
plug-in extension cable

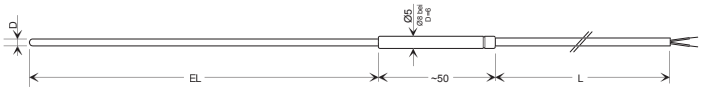
Special sizes upon request.

All thermo elements accuracy class 1 (Almost double accuracy than class 2!)

Type:	Ø mm	EL mm
GTT-05-0150 *Art. no. 607542*	0.5	150
GTT-05-0250 *Art. no. 607543*		250
GTT-05-0500 *Art. no. 607544*		500
GTT-05-1000 *Art. no. 607545*		1000
GTT-05-1500 *Art. no. 607546*		1500
GTT-10-0150 *Art. no. 607547*	1.0	150
GTT-10-0250 *Art. no. 607548*		250
GTT-10-0500 *Art. no. 607549*		500
GTT-10-1000 *Art. no. 607550*		1000
GTT-10-1500 *Art. no. 607551*		1500
GTT-15-0150 *Art. no. 607552*	1.5	150
GTT-15-0250 *Art. no. 607553*		250
GTT-15-0500 *Art. no. 607554*		500
GTT-15-1000 *Art. no. 607555*		1000
GTT-15-1500 *Art. no. 607556*		1500
GTT-30-0150 *Art. no. 607557*	3.0	150
GTT-30-0250 *Art. no. 607558*		250
GTT-30-0500 *Art. no. 607559*		500
GTT-30-1000 *Art. no. 607560*		1000
GTT-30-1500 *Art. no. 607561*		1500
GTT-60-0150 *Art. no. 607562*	6.0	150
GTT-60-0250 *Art. no. 607563*		250
GTT-60-0500 *Art. no. 607564*		500
GTT-60-1000 *Art. no. 607565*		1000
GTT-60-1500 *Art. no. 607566*		1500

Standard - jacket thermo elements Type K (NiCr-Ni)

MECHANICALLY ROBUST



L = 1 m, for other cable length or other accessories p.r.t. accessories

HIGHLIGHTS:

- *Can be subjected to high temperatures and pressures*
- *Resistant to aggressive atmospheres*
- *Minimum dimensions, therefore short response times*
- *Flexible (the smaller the diameter the smaller the bending radii)*
- *Potential-free (thermoelement wires have no connection to the outer jacket)*
- *Optimum accuracy acc. to DIN IEC584 class 1*

GTF101-5-xx-xxxx

Jacket thermo elements type K (NiCr-Ni) complete with cable sleeve and 1 m silicone cable (compensation line), loose wire ends

Specifications:	
Jacket material:	Inconel 600, flexible (standard)
Insulation:	highly compressed pure MgO
Thermo wires:	NiCr-Ni, DIN IEC 584, welding insulated (volt-free)
Accuracy:	optimum accuracy (cl. 1) = ±1.5 °C or ±0.4 % of measuring value (Almost double accuracy as compared to class 2. As a comparison with class 2: ±2.5 °C or ±0.75 % of meas. value)
Connecting cable:	silicone compensation line, 1 m 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

Recommended upper temperature limit for continuous use:			
Ø	0.5	1.0	1.5
°C	700	700	920

Accessories and spare parts:

Clamping screw connection
Ø 1.5, 3.0 or 6.0 mm, see accessories

NST1200 „K“
Prefabricated flat connector
Please specify when ordering

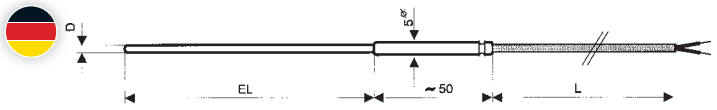
Special sizes and other connection cables see industry temperature probe type GTF 101 K

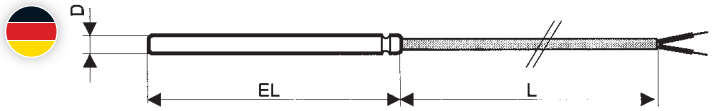
All thermo elements accuracy class 1 (Almost double accuracy than class 2!)

Type:	Ø mm	EL mm
GTF101-5-05-0150 *Art. no. 607596*	0.5	150
GTF101-5-05-0250 *Art. no. 607597*		250
GTF101-5-05-0500 *Art. no. 607598*		500
GTF101-5-05-1000 *Art. no. 607599*		1000
GTF101-5-05-1500 *Art. no. 607600*		1500
GTF101-5-10-0150 *Art. no. 607601*	1.0	150
GTF101-5-10-0250 *Art. no. 607602*		250
GTF101-5-10-0500 *Art. no. 607603*		500
GTF101-5-10-1000 *Art. no. 607604*		1000
GTF101-5-10-1500 *Art. no. 607605*		1500
GTF101-5-15-0150 *Art. no. 607606*	1.5	150
GTF101-5-15-0250 *Art. no. 607607*		250
GTF101-5-15-0500 *Art. no. 607608*		500
GTF101-5-15-1000 *Art. no. 607609*		1000
GTF101-5-15-1500 *Art. no. 607610*		1500
GTF101-5-30-0150 *Art. no. 607611*	3.0	150
GTF101-5-30-0250 *Art. no. 607612*		250
GTF101-5-30-0500 *Art. no. 607613*		500
GTF101-5-30-1000 *Art. no. 607614*		1000
GTF101-5-30-1500 *Art. no. 607615*		1500
GTF101-5-60-0150 *Art. no. 607616*	6.0	150
GTF101-5-60-0250 *Art. no. 607617*		250
GTF101-5-60-0500 *Art. no. 607618*		500
GTF101-5-60-1000 *Art. no. 607619*		1000
GTF101-5-60-1500 *Art. no. 607620*		1500

Note: Handheld instrument probes can be found in chapter handheld instruments and the appropriate devices

Industry-temperature probe





GTF 101 P

Temperature probe

General:

The GTF 101 is a temperature probe that can be fully tailored according to customers' requirements. The robust GTF 101 is especially suited for applications at high permanent temperatures and pressures in air, gases or liquids. The temperature is measured with resistance temperature sensors (Pt100 or Pt1000)

Specifications:

Probe diameter D:	3 mm, 4 mm, 5 mm, 6 mm, 8 mm, other diameters upon request
Cable sleeve:	for probe diameters D 3 mm, 4 mm, 5 mm, 6 mm, 8 mm: there is a cable sleeve Ø 5 mm x 50 mm in addition to the fitting length for probe diameters D 6 mm and MB3 or MB4: there is a cable sleeve Ø 8 mm x 35 mm with taper to Ø 5 mm x 17 mm in addition to the fitting length **Note:** The temperature of the cable sleeve must not exceed the permitted temperature of the cable.
Accuracy:	DIN class B, DIN class A, 1/3 DIN class B, 1/10 DIN class B
Tube material:	V4A stainless steel (1.4404)

GTF 101 P - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8

Greisinger		
1.	Sensor element	
	P	Pt100
	T	Pt1000
2.	Sensor element connection	
	2L	2-wire
	3L	3-wire
	4L	4-wire
3.	Accuracy	
	A	DIN class A
	B	DIN class B (standard)
	D	1/3 DIN class B
	Z	1/10 DIN class B (validity area: -50 ... +100 °C)
4.	Measuring range MB	
	MB1	-50 ... +400 °C
	MB2	-200 ... +400 °C
	MB3	-70 ... +600 °C (jacket thermo element)
	MB4	-50 ... +850 °C (jacket thermo element)
5.	Probe diameter D	
	D30	3.0 mm
	D40	4.0 mm
	D50	5.0 mm
	D60	6.0 mm
	D80	8.0 mm
	Dxx	other diameter in mm
6.	Fitting length EL	
	0050	50 mm
	0100	100 mm
	0150	150 mm
	0250	250 mm
	0500	500 mm
	1000	1000 mm
	xxxx	any length in mm
7.	Cable length L	
	L01	1 m silicone cable (standard)
	Lxx	any length in m
8.	Type of cable	
	P	PVC cable up to max. 105 °C (surcharge per 1 m cable length L)
	S	silicone cable up to max. 200 °C (surcharge per 1 m cable length L)
	T	Teflon cable up to max. 250 °C (surcharge per 1 m cable length L)
	G	glass silk cable up to max. 400 °C (surcharge per 1 m cable length L)

GTF 101 P-OKH

Temperature probe

General:

The GTF 101 is a temperature probe that can be fully tailored according to customers' requirements. The robust GTF 101 is especially suited for applications at high permanent temperatures and pressures in air, gases or liquids. The temperature is measured with resistance temperature sensors (Pt100 or Pt1000)

Specifications:

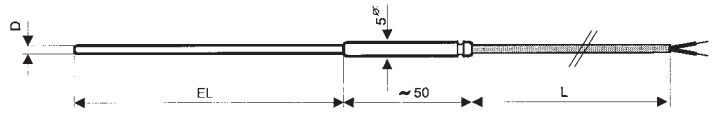
Probe diameter D:	3 mm, 4 mm, 5 mm, 6 mm, 8 mm, other diameters upon request
Accuracy:	DIN class B, DIN class A, DIN class AA, 1/10 DIN class B
Tube material:	V4A stainless steel (1.4404 or 1.4571)

GTF 101 P-OKH - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8

Greisinger		
1.	Sensor element	
	P	Pt100
	T	Pt1000
2.	Sensor element connection	
	2L	2-wire
	3L	3-wire
	4L	4-wire
3.	Accuracy	
	A	DIN class A
	B	DIN class B (standard)
	D	1/3 DIN class B
	Z	1/10 DIN class B (validity area: -50 ... +100 °C)
4.	Measuring range MB	
	MB1	-50 ... +200 °C
	MB2	-50 ... +250 °C (only with Teflon or glass silk cable)
	MB3	-50 ... +400 °C (only with glass silk cable)
	MB4	-200 ... +250 °C (only with Teflon cable)
	MB5	-20 ... +105 °C (only with PVC-cable)
5.	Probe diameter D	
	D30	3.0 mm (only with Teflon cable)
	D40	4.0 mm (only with Teflon cable)
	D50	5.0 mm
	D60	6.0 mm
	D80	8.0 mm
	Dxx	other diameter in mm
6.	Fitting length EL	
	0050	50 mm
	0100	100 mm
	0150	150 mm
	0250	250 mm
	0500	500 mm
	1000	1000 mm
	xxxx	any length in mm
7.	Cable length L	
	L01	1 m silicone cable (standard)
	Lxx	any length in m
8.	Type of cable	
	P	PVC cable up to max. 105 °C (surcharge per 1 m cable length L)
	S	silicone cable up to max. 200 °C (surcharge per 1 m cable length L)
	T	Teflon cable up to max. 250 °C (surcharge per 1 m cable length L)
	G	glass silk cable up to max. 400 °C (surcharge per 1 m cable length L)

Special lengths, special sheath materials, etc. upon request.

Industry-temperature probe



GTF 101 K

Temperature probe

General:

The GTF 101 is a temperature probe that can be fully tailored according to customers' requirements. The robust GTF 101 is especially suited for applications at high permanent temperatures and pressures in air, gases or liquids. The temperature is measured with thermocouple wires (NiCr-Ni).

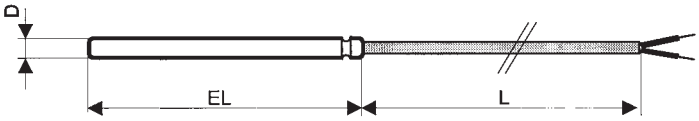
Specifications:

Sensor element:	type K (NiCr-Ni)
Measuring range:	-200 ... +1150 °C
Probe diameter D:	1.5 mm, 3 mm, 6 mm other diameters upon request
Cable sleeve:	for probe diameters D 0.5 mm, 1 mm, 1.5 mm, 3 mm: there is a cable sleeve Ø 5 mm x 50 mm in addition to the fitting length for probe diameters D 6 mm: there is a cable sleeve Ø 8 mm x 35 mm with taper to Ø 5 mm x 17 mm in addition to the fitting length **Note:** The temperature of the cable sleeve must not exceed the permitted temperature of the cable.
Accuracy:	class 1
Tube material:	Inconel 600

GTF 101 K - 1 - 2 - 3 - 4

Greisinger		
1.	Probe diameter D	
	D15	1.5 mm
	D30	3.0 mm
	D60	6.0 mm
	Dxx	other diameter in mm
2.	Fitting length EL	
	0100	100 mm
	0150	150 mm
	0250	250 mm
	0500	500 mm
	1000	1000 mm
	xxxx	any EL in mm (e.g.: 0100 = 100 mm)
3.	Cable length L	
	L01	1 m silicone cable (standard)
	Lxx	any length in m (e.g.: L03 = 3 m)
4.	Type of cable	
	P	PVC cable up to max. 105 °C (surcharge per 1 m cable length L)
	S	silicone cable up to max. -50 ... +200 °C (standard) (surcharge per 1 m cable length L)
	T	Teflon cable up to max. -200 ... +250 °C (surcharge per 1 m cable length L)
	G	glass silk cable up to max. -50 ... +400 °C (surcharge per 1 m cable length L)

Standard types see standard jacket thermo element GTF 101-5-xx-xxxx.



GTF 101 K-OKH

Temperature probe

General:

The GTF 101 is a temperature probe that can be fully tailored according to customers' requirements. The robust GTF 101 is especially suited for applications at high permanent temperatures and pressures in air, gases or liquids. The temperature is measured with thermocouple wires (NiCr-Ni).

Specifications:

Sensor element:	type K (NiCr-Ni)
Probe diameter D:	3 mm, 5 mm, 6 mm, other diameters upon request
Accuracy:	class 1
Tube material:	V4A stainless steel (1.4404 bzw. 1.4571)

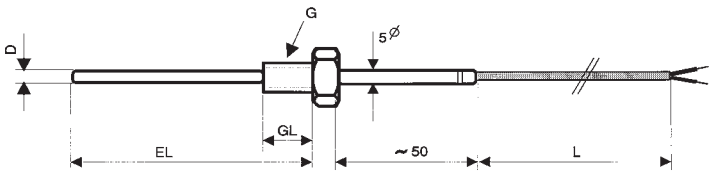
GTF 101 K-OKH - 1 - 2 - 3 - 4 - 5

Greisinger		
1.	Probe diameter D	
	D30	3.0 mm only with Teflon cable
	D50	5.0 mm
	D60	6.0 mm
	Dxx	other diameter in mm
2.	Fitting length EL	
	0050	50 mm
	0100	100 mm
	0150	150 mm
	0250	250 mm
	0500	500 mm
	1000	1000 mm
	xxxx	any EL in mm (e.g.: 0100 = 100 mm)
3.	Measuring range	
	MB1	-50 ... +200 °C
	MB2	-50 ... +250 °C only with Teflon or glass silk cable
	MB3	-50 ... +400 °C only with glass silk cable
4.	Cable length L	
	L01	1 m silicone cable (standard)
	Lxx	any length in m (e.g.: L03 = 3 m)
5.	Type of cable	
	P	PVC cable up to max. 105 °C (surcharge per 1 m cable length L)
	S	silicone cable up to max. -50 ... +200 °C (standard) (surcharge per 1 m cable length L)
	T	Teflon cable up to max. -200 ... +250 °C (surcharge per 1 m cable length L)
	G	glass silk cable up to max. -50 ... +400 °C (surcharge per 1 m cable length L)

Special lengths, special sheath materials, etc. upon request.

Note: Handheld instrument probes can be found in chapter handheld instruments and the appropriate devices

Industry-temperature probe



HIGHLIGHTS:

- *Pt100, Pt1000, NiCr-Ni (type K)*
- *complete with thread and cable (loose ends)*
- *very robust*

GTF 102

Temperature probe

General:

The GTF 102 is a temperature probe that can be fully tailored according to customers' requirements. The robust GTF 102 is especially suited for applications at high permanent temperatures and pressures in air, gases or liquids.
The temperature is measured with either thermocouple (NiCr-Ni) or resistance temperature sensors (Pt100 / Pt1000). The probe is provided by default with tread, cable sleeve and 1 m silicone cable (compensation line with loose ends).

Specifications:

Sensor element:	Pt100 (2- / 3- or 4- wire), Pt1000 (2- / 3- or 4- wire) NiCr-Ni
Accuracy (standard):	Pt100 / Pt1000: DIN class B, NiCr-Ni: class 1
Tube material:	V4A (1.4404)
Thread material:	stainless steel
Connection cable:	standard: silicone compensation line, loose ends, length: 1 m (up to max. 200)

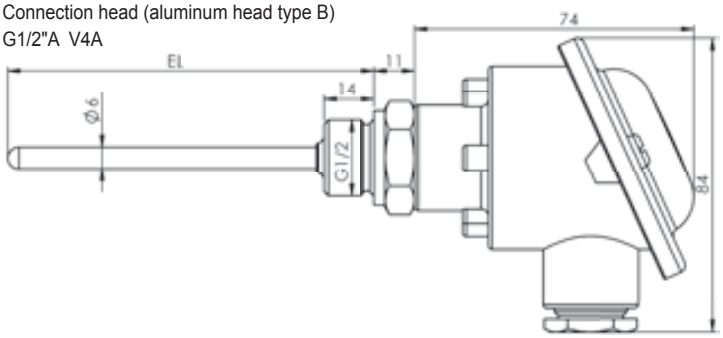
GTF 102 - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8

Greisinger		
1.	Sensor element	
	P2	Pt100 (2-wire)
	P3	Pt100 (3-wire)
	P4	Pt100 (4-wire)
	T2	Pt1000 (2-wire)
	T4	Pt1000 (4-wire)
	K	NiCr-Ni
2.	Accuracy	
	1	class 1 only for NiCr-Ni
	A	DIN class A only for Pt100 / Pt1000
	B	DIN class B (standard) only for Pt100 / Pt1000
	D	1/3 DIN class B only for Pt100 / Pt1000
	Z	1/10 DIN class B only for Pt100 (validity area: -50 ... +100 °C)
3.	Measuring range	
	MB1	-50 ... +200 °C
	MB2	-50 ... +400 °C
	MB3	-50 ... +600 °C
	MBS	other measuring range
4.	Probe diameter D	
	15	1.5 mm only with sensor element NiCr-Ni (K)
	22	2.2 mm rigid
	30	3.0 mm (standard)
	40	4.0 mm
	50	5.0 mm
	60	6.0 mm
	80	8.0 mm
5.	Fitting length EL	
	0100	100 mm (standard)
	0150	150 mm
	0250	250 mm
	0500	500 mm
	1000	1000 mm
	xxxx	any length in mm (e.g. 0700 = 700 mm)
6.	Thread	
	G1	G ½ (standard)
	G2	G ¼
	G5	G ⅜
	M5	M5 max. D = 3.0 mm
	M6	M6 max. D = 3.0 mm
	M8	M8 max. D = 5.0 mm
	M0	M10 max. D = 6.0 mm
	xxx	other thread
7.	Cable length L	
	L01	1 m silicone cable (standard)
	Lxx	any length in m (e.g.: L03 = 3 m)
8.	Type of cable	
	P	PVC cable up to max. -20 ... +105 °C (surcharge per 1 m cable length L)
	S	silicone cable up to max. -50 ... +200 °C (standard) (surcharge per 1 m cable length L)
	T	Teflon cable up to max. -200 ... +250 °C (surcharge per 1 m cable length L)
	G	glass silk cable up to max. -50 ... +400 °C (surcharge per 1 m cable length L)

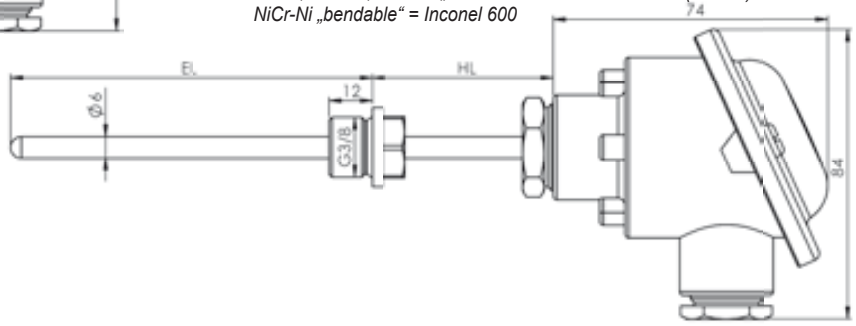
Special lengths, special sheath materials, etc. upon request.

Industry-temperature probe

Connection head (aluminum head type B)
G1/2"A V4A



Sensor tube material:
Pt100, Pt1000, NiCr-Ni „non bendable“ = materialV4A (1.4404)
NiCr-Ni „bendable“ = Inconel 600



GTF 103

Temperature probe

GTF 103 - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 -
10 - 11 - 12 - 13

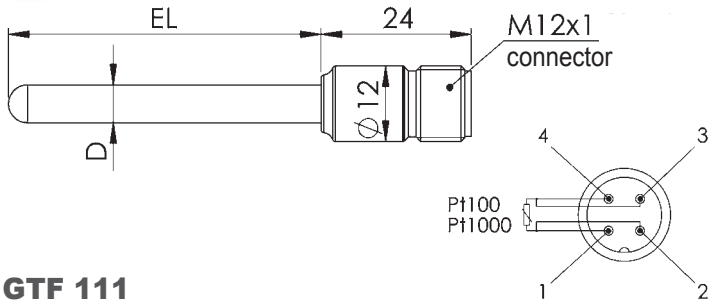
Greisinger		
1.	Normsignal	
	O	without output signal
	G	with ouput signal 4-20 mA, 2-wire, RT420 (Pt100 only)
	G	with ouput signal 4-20 mA, 2-wire, GITT 01 (Pt1000 or NiCr-Ni)
	GV	with ouput signal 0 ... 10 V, 3-wire, T03 BU (Pt100 only)
		Technical specifications Transmitter T03 BU, RT 420,GIT01, see chapter Transmitters
2.	Sensor element	
	P	Pt100
	T	Pt1000
	K	NiCr-Ni Type K
3.	Accuracy class	
	B	DIN class B (Pt100 or Pt1000)
	A	DIN class A (Pt100 or Pt1000)
	D	1/3 DIN class B (Pt100 or Pt1000)
	Z	1/10 DIN class B (only Pt100) (validity area: -50 ... +100 °C)
	1	class 1 NiCr-Ni type K
4.	Sensor element connection	
	2L	2-wire
	3L	3-wire
	4L	4-wire
5.	Connection head	
	A	sensor head made of aluminum (DIN B head)
	E	sensor head made of stainless steel
	K	sensor head made of plastic
	S	small sensor head (design type DE)
6.	Measuring insert	
	0	without process connection
	MA	with process connection (standard for transmitter)
7.	Process connection	
	N	without process connection
	J	with process connection
8.	Neck tube	
	K	no neck tube
	M	with neck tube

9.	Size of process connection	
	G1	G 1/2
	G2	G 1/4
	G5	G 3/8
	M14	M14x1.5
	xxx	other thread
10.	Length of neck tube	
	000	no neck tube
	050	50 mm
	100	100 mm
	xxx	other neck tube length
11.	Probe diameter	
	30	3 mm
	40	4 mm
	60	6 mm
	80	8 mm
	xxx	other diameter
12.	Fitting length	
	0050	50 mm
	0100	100 mm
	0150	150 mm
	0250	250 mm
	0500	500 mm
	xxxx	any length in mm (e.g. 0600 = 600 mm)
13.	Measuring range	
	MB1	-50 … +200 °C
	MB2	-50 … +400 °C
	MB3	-50 … +600 °C
	MBS	other measuring range (Specification required with standard signal)

Special designs can be ordered only in written form (fax/letter/email) and are excluded from exchange!

Note: Handheld instrument probes can be found in chapter handheld instruments and the appropriate devices

Industry-temperature probe



GTF 111

Temperature probe

General:

The GTF 111 is a temperature sensor without thread with a practical M12 connector. The measurement is carried out by means of resistance temperature sensors Pt100 or Pt1000.

Specifications:

Sensor element:	Pt100 or Pt1000 (4-wire)
Temperature range:	-50 … +250 °C (probe tip)
Accuracy:	Class B, Class A, Class AA, Class 1/10 DIN B
Response time:	FS Ø 3 mm: T_{90} ≤1.5 s FS Ø 6 mm: T_{90} ≤7.4 s
Process pressure:	max. 50 bar
Electrical connection:	M12 connector, 4-pole
Thermowell and tip:	1.4404 (V4A)
Protection:	IP67 / IP69K
Ambient temperature:	-20 ... +85 °C

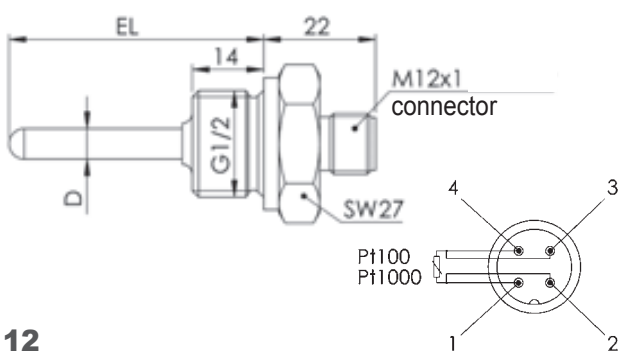
GTF 111 - [1] - [2] - [3] - [4] - [5] - [6]

Greisinger		
1.	Sensor element	
	P	Pt100
	T	Pt1000
2.	Accuracy	
	B	class B (Standard)
	A	class A
	D	class AA (1/3 class B)
	Z	1/10 DIN cl. B only for Pt100
3.	Measuring range	
	MB1	-50 … +250 °C (M12 does not exceed 85 °C)
	MBS	other measuring ranges
4.	Installation length EL	
	0050	50 mm
	0100	100 mm
	0150	150 mm
	0250	250 mm
	xxxx	any installation length in mm
5.	Probe diameter D	
	D60	Ø 6 mm, without taper
	D30	Ø 6 mm, with tapered probe tip Ø 3 mm L = 30 mm
	Dxx	other diameters in mm
6.	**Option**	
	00	without option

M12 connecting cable see page 168

tapered probe tip

Special lengths, special sheath materials, etc. upon request.



GTF 112

Temperature probe

General:

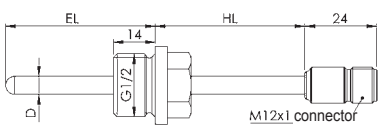
The GTF 112 is a temperature sensor with threaded process with a practical M12 connector. The measurement is performed by means of resistance temperature sensors Pt100 or Pt1000.

Specifications:

Sensor element:	Pt100 or Pt1000 (4-wire)
Temperature range:	-50 … +250 °C (probe tip)
Accuracy:	Class B, Class A, Class AA, Class 1/10 DIN B
Response time:	FS Ø 3 mm: T_{90} ≤1.5 s FS Ø 6 mm: T_{90} ≤7.4 s
Process pressure:	max. 50 bar
Electrical connection:	M12 connector, 4-pole
Thermowell and tip:	1.4404 (V4A)
Protection:	IP67 / IP69K
Ambient temperature:	-20 ... +85 °C

GTF 112 - [1] - [2] - [3] - [4] - [5] - [6] - [7] - [8]

Greisinger		
1.	Sensor element	
	P	Pt100
	T	Pt1000
2.	Accuracy	
	B	class B
	A	class A
	D	class AA (1/3 class B)
	Z	1/10 DIN cl. B only for Pt100
3.	Measuring range	
	MB0	-50 … +100 °C
	MB1	-50 … +250 °C (with neck tube HL = 50 mm)
	MBS	other measuring ranges
4.	Installation length EL	
	0050	50 mm
	0100	100 mm
	0150	150 mm
	0250	250 mm
	xxxx	any installation length in mm
5.	Probe diameter D	
	D60	Ø 6 mm, without taper
	D30	Ø 6 mm, with tapered probe tip Ø 3 mm L = 30 mm
	Dxx	other diameters in mm
6.	Thread	
	G1	G ½ (standard)
	G2	G ¼
	xxx	other threads
7.	Neck tube	
	000	No neck tube (only up to 100 °C, only with MB0)
	050	50 mm
8.	Option	
	00	without option



with neck tube

Industrial probes for food-, beverage- and pharma industry

GTL ...

Probes according to customer specification

Specifications:	
Measuring range:	-40 ... +200 °C (depending on probe construction)
Sensor:	Pt 100
Process connection:	M12 / G1/2“ / without thread
Probe head:	probe head Ø 59 mm probe head Ø 18 mm Long (with transmitter) probe head Ø 18 mm Short (without transmitter)
Material:	sensor head: V2A, protection tube and peak: V4A
Probe length:	50, 100, 150, 250 or according to customer specification (in mm)
Diameter:	Ø 6 mm without contraction Ø 4 mm without contraction Ø 6 mm with offset probe peak Ø 3 mm
Response Time:	Ø 6 mm: T_{90} ≤8.0 s Ø 4 mm: T_{90} ≤6.5 s Ø 3 mm: T_{90} ≤1.5 s
Protection class:	IP69K / IP67

Option:

- **Neck tube**
- **Electr. connection:**
  fixed cable (PG) or M12-plug
- **Transmitter**
- **Higher accuracy (DIN cl. AA or 1/10 DIN cl. B)**
- **Display of temperature**

In case of interest, please ask for the GHM industrial probes brochure

Type N (NiCrSi-NiSi) - measuring probe (class 1)

HIGH TEMPERATURES
COST-EFFICIENT MEASUREMENTS

GTF101-N03250

Art. no. 602770
-50 ... +1300 °C, (short-term up to 1330 °C), FL = 250 mm

GTF101-N03500

Art. no. 602771
as above, but FL = 500 mm

GTF101-N031000

Art. no. 602772
as above, but FL = 1000 mm

General:

Measuring probe Ø 3 mm
Mantle material: nickel-chromium-based stainless steel with extraordinary resistivity against oxidation at high temperatures and excellent corrosion resistance in chlorine and ammoniacal environments. A protective layer emerges at temperatures of approx. 980 °C and provides improved accuracy compared to other mantle materials.
The temperature can be applied to high temperatures for a longer period without noteworthy drift. The K-effect (near-order effect) is much smaller for type N thermocouples than for type K thermocouples.

Application:

Temperature measurement of exhaust fumes

Specifications:	
Response time T_{90}:	approx. 5 s
Probe tube:	nickel-chromium-based stainless steel Ø 3 mm
Cable:	1 m silicone cable, loose ends

HIGH TEMPERATURES (PERMANENTLY UP TO 1300 °C)
COST-EFFICIENT MEASUREMENTS

GTF101-N06250

Art. no. 602769
-50 … +1300 °C, (short-term up to 1330°C), FL = 250 mm;
more robust design with thicker protective cover

GTF101-N06500

Art. no. 607634
as above, but FL = 500 mm

GTF101-N061000

Art. no. 607635
as above, but FL = 1000 mm

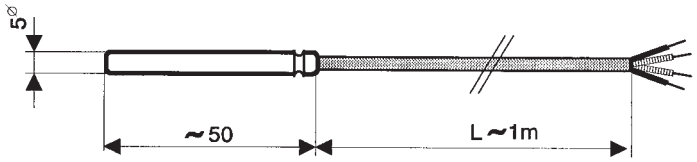
General:

Measuring probe Ø 6 mm
Probe for permanently high temperatures, other data as probe Ø 3 mm

Specifications:	
Response time T_{90}:	approx. 10 s
Probe tube:	nickel-chromium-based stainless steel Ø 6 mm
Cable:	1 m silicone cable, loose ends

Note: Handheld instrument probes can be found in chapter handheld instruments and the appropriate devices

Industrial temperature probes



GTF 200 Pt100

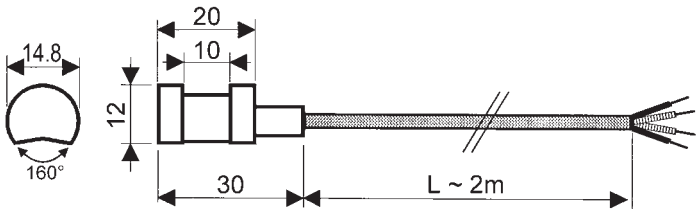
Art. no. 600017
-50 ... +200 °C, Pt100, 4-wire

Specifications:	
Sensor:	Pt100, DIN cl. B (±0.3 °C at 0 °C)
Sensor sleeve:	made of stainless steel (1.4571)
Cable:	silicone (4 x 0.14²), approx. 1 m suitable for 2-/ 3- or 4-wire probe

GTF 200 Pt100 WD

Art. no. 600020
-20 ... +105 °C, Pt100, 4-wire, tube enclosed water proof

Specifications:	
Sensor:	Pt100, DIN cl. B (±0.3 °C at 0 °C)
Sensor sleeve:	made of stainless steel
Cable:	PVC (4 x 0.14²), approx. 1 m suitable for 2-/ 3- or 4-wire probe



GRO 200 Pt100

Art. no. 600012
Temperature probes

GRO 200 Pt1000

Art. no. 600013
Temperature probes, -50 ... +200 °C, DIN class B, 4-wire

GRO 200 K

Art. no. 600011
Temperature probes, -50 ... +200 °C, NiCr-Ni (Type K)

Specifications:	
Sensor body:	made of aluminium
Probe:	can be mounted with cable clamp or similar constructions to pipes (any diameter)
Cable:	silicone, approx. 2 m
	For faster heat exchange we suggest our **heat-conductive paste GWL10G** *Art. no. 603267*

Industrial temperature probes (ATEX 100)

without neck tube, for temperatures ≤100 °C

with neck tube, for temperatures >100 °C

FOR ALL POTENTIALLY EXPLOSIVE ATMOSPHERES OF THE EQUIPMENT-GROUP II WITH THE PROTECTION (I) OR (E)

GTF 101-EX

-200 °C ... +100 °C (without neck tube)
-200 °C ... +900 °C (with neck tube)

General:

Readily assembled voltage free temperature probe of stainless steel with connection cable. The sensor inset is not exchangeable. Mounting is done via separate clamping ring fittings GKV.

Upcharges:

Sensors:
Pt100 / Pt1000; mineral insulated element, 4-wire:
meas. range: -200 °C ... +100 °C (600 °C - with neck tube), DIN class B
Type K, mineral insulated thermocouple:
meas. range: -200 °C ... +100 °C (900 °C - with neck tube), class 1

Probe length:
up to 100mm (without upcharge)
upcharge per further starting 100 mm

Neck tube length:
without (without upcharge)
upcharge per starting 100 mm

Probe diameter:
3 mm, 4 mm, 5 mm, 6 mm or 8 mm (without upcharge)

Cable:
silicone cable, standard length 1 m
upcharge per further starting m cable
PVC, teflon (Pt100 / Pt1000 only) upon request

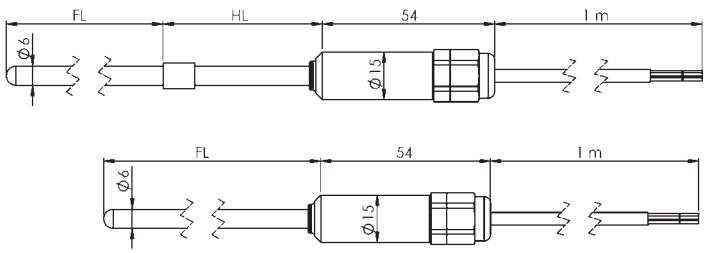
Ambient temperature:
-20 ... +60 °C (protection type „e“ and protection type „i“ zone 0, 20) or -20 ... +80 °C (protection type „i“ zone 1, 2, 21, 22)

Type of protection:
„i“ : intrinsic safety (without upcharge)
„e“: increased safety

Potentially explosive atmospheres:
suitable for zone 0, zone 1, zone 2, zone 20, zone 21, zone 22

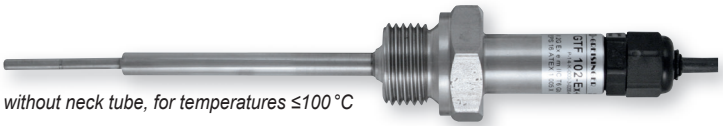
Clamping ring screw connection:
available at M8x1, M10x1, G1/4“ and G1/2“ for diameter 3 mm, 6 mm or 8 mm.
Please refer to page 199

To determine exact order name ask for our type list. Download via homepage possible (Products -->Ex-Protection-->Temperature probes).

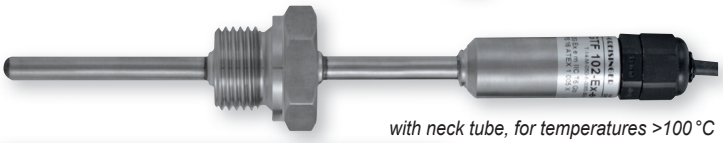


Note: Not all execution options are possible in all zones!

Industrial temperature probes (ATEX 100)



without neck tube, for temperatures ≤100 °C



with neck tube, for temperatures >100 °C

FOR ALL POTENTIALLY EXPLOSIVE ATMOSPHERES OF THE EQUIPMENT-GROUP II WITH THE PROTECTION (I) OR (E)

GTF 102-EX

-200 °C ... +100 °C (without neck tube)
-200 °C ... +900 °C (with neck tube)

General:

Readily assembled voltage free temperature probe of stainless steel with connection cable. The sensor inset is not exchangeable. Thread is welded or brazed to the probe.

Upcharges:

Sensors:
Pt100 / Pt1000, mineral insulated element, 4-wire:
meas. range: -200 °C ... +100 °C (600 °C - with neck tube), DIN cl. B
type K or N, mineral insulated thermocouple:
meas. range: -200 °C ... +100 °C (900 °C - with neck tube), class 1

Probe length:
up to 100 mm (without upcharge)
upcharge per further starting 100 mm

Neck tube length:
without (without upcharge)
upcharge per starting 100 mm

Probe diameter:
3 mm, 4 mm, 5 mm, 6 mm or 8 mm (without upcharge)

Thread:
G1/2“, G3/8“ (standard) (without upcharge)
G1/8“, G1/4“, G3/4“, M8x1, M10x1

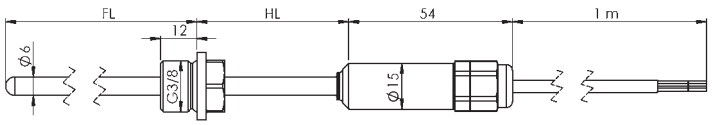
Cable:
silicone cable, standard length 1 m
upcharge per further starting m cable
PVC, teflon (Pt100 / Pt1000 only) upon request

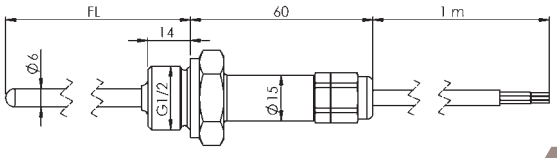
Ambient temperature:
-20 ... +60 °C (protection type „e“ and protection type „i“ zone 0, 20) or -20 ... +80 °C (protection type „i“ zone 0/1, 1, 2, 20/21,21, 22)

Type of protection:
„i“: intrinsic safety (without upcharge)
„e“: increased safety

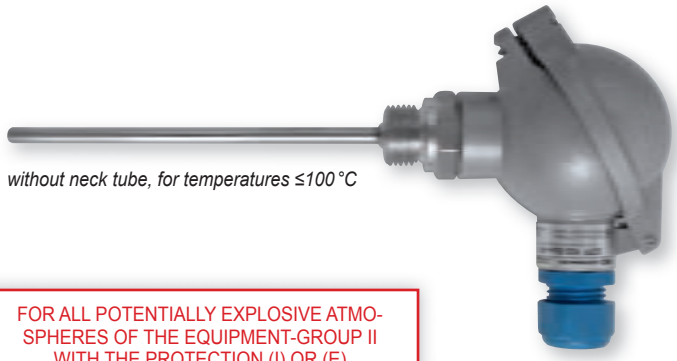
Potentially explosive atmospheres:
suitable for zone 0, zone 0/1, zone 1, zone 2, zone 20, zone 20/21, 21, zone 22

To determine exact order name ask for our type list. Download via homepage possible (Products -->Ex-Protection-->Temperature probes).





Note: Not all execution options are possible in all zones!



without neck tube, for temperatures ≤100 °C

FOR ALL POTENTIALLY EXPLOSIVE ATMOSPHERES OF THE EQUIPMENT-GROUP II WITH THE PROTECTION (I) OR (E)

GTF 103-EX

-200 °C ... +100 °C (without neck tube)
-200 °C ... +900 °C (with neck tube)

General:

Readily assembled voltage free temperature probe of stainless steel connection head and clamping block. The sensor inset is exchangeable. Thread is welded or brazed to the probe. Mounting is done via clamping ring fitting or thread welded / brazed to the probe tube. The connection head is also suitable to carry a head transmitter.

Upcharges:

Sensors:
Pt100 / Pt1000; mineral insulated element, 4-wire:
meas. range: -200 °C ... +100 °C (600 °C - with neck tube), DIN cl. B
type K, mineral insulated thermocouple:
meas. range: -200 °C ... +100 °C (900 °C - with neck tube), class 1

Probe length:
up to 100 mm (without upcharge)
upcharge per further starting 100 mm

Neck tube length:
without (without upcharge)
upcharge per starting 100 mm

Probe diameter:
3 mm (the sensor inset is not exchangeable) (without upcharge)
4 mm, 5 mm, 6 mm or 8 mm (the sensor inset exchangeable)

Thread:
G1/2“, G3/8“ (standard) or without thread or without thread (without upcharge)
G1/8“, G1/4“, G3/4“, M8x1, M10x1

Ambient temperature:
Intrinsically safe version without output signal
Zone 0, 20: -20 °C ... +60 °C; Zone 0/1, 1, 2, 20/21, 21, 22: -20 °C ... +80 °C
Intrinsically safe version with output signal 4 ... 20 mA
Zone 0, 20: -20 °C ... +40 °C; Zone 0/1, 1, 2, 20/21, 21, 22: -20 °C ... +50 °C
Version with elevated safety: Zone 1, 2, 21, 22: -20 °C ... +60 °C

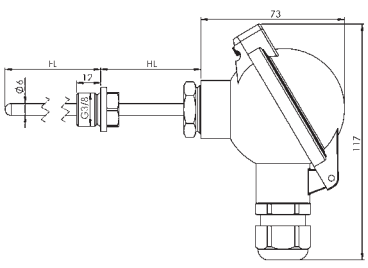
Type of protection:
„i“: intrinsic safety (without upcharge)
„e“: increased safety

Potentially explosive atmospheres:
suitable for zone 0, zone 0/1, zone 1, zone 2, zone 20, zone 20/21, zone 21, zone 22

Messumformer GITT 01-Ex
(please refer to page 157), output signal 4 ... 20 mA, measuring range on customers demands, protection type „i“ intrinsic safety.

Clamping ring screw connection:
available at M8x1, M10x1, G1/4“ and G1/2“ for diameter 3 mm, 6 mm or 8 mm.
Please refer to page 199

To determine exact order name ask for our type list. Download via homepage possible (Products -->Ex-Protection-->Temperature probes).



Note: Not all execution options are possible in all zones!

Note: Handheld instrument probes can be found in chapter handheld instruments and the appropriate devices

Industrie-Temperaturfühler (ATEX 100)

GTF 111-EX

-200 °C ... +100 °C (without neck tube)
-200 °C ... +900 °C (with neck tube)

General:

The GTF 111-Ex temperature probe is designed for use in explosion-prone areas. The probe is very small, which makes it suitable for use in places that are difficult to access. The probe is equipped with an M12 connection.
The probe inserts of the GTF 111-Ex are potted and cannot be replaced. They are available in the following sensor element group: Resistance thermometer: Pt 100 or Pt 1000. Only jacket resistance thermometers are used as sensor elements. The materials used for the probe parts that come into contact with the medium consist of stainless steel (e.g. 1.4404, 1.4435 or 1.4571). This guarantees high resistance to a wide variety of chemical compounds.

Upcharges:

Sensors:
Pt100 / Pt1000, mineral insulated element, 4-wire:
meas. range: -200 °C ... +100 °C (600 °C - with neck tube), DIN cl. B

Probe length:
up to 100 mm (without upcharge)
upcharge per further starting 100 mm

Neck tube length:
without (without upcharge)
upcharge per starting 100 mm

Probe diameter:
3 mm, 4 mm, 5 mm, 6 mm or 8 mm (without upcharge)

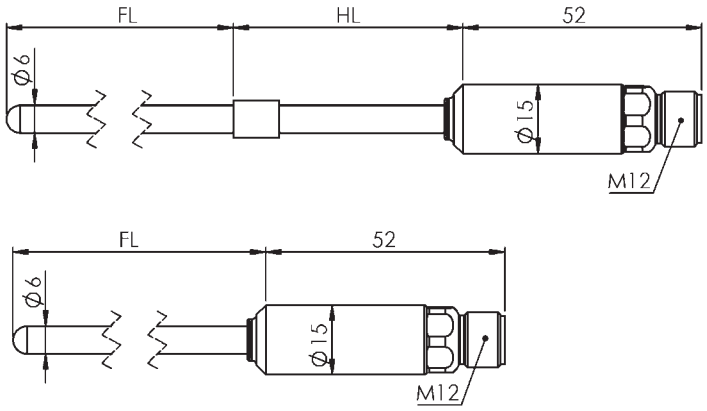
Connection:
M12 plug connector

Ambient temperature:
-20 ... +60 °C (protection type „e“ and protection type „i“ zone 0, 20) or -20 ... +80 °C (protection type „i“ zone 1, 2, 21, 22)

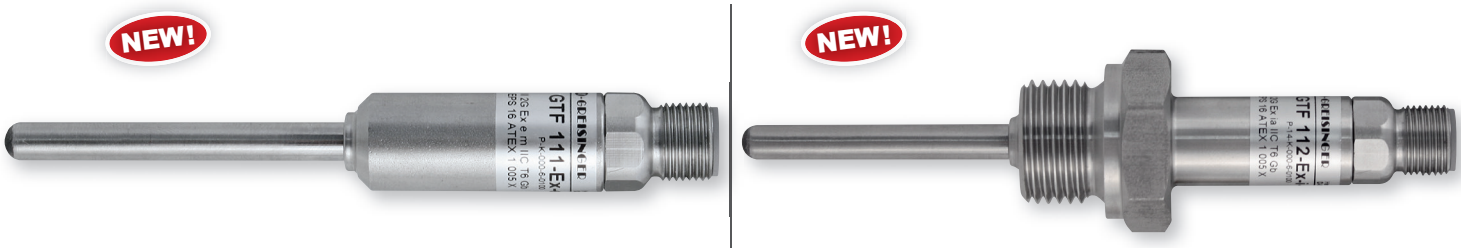
Type of protection:
„i“: intrinsic safety (without upcharge)
„e“: increased safety

Potentially explosive atmospheres:
suitable for zone 0, zone 1, zone 2, zone 20, 21, zone 22

To determine exact order name ask for our type list. Download via homepage possible (Products -->Ex-Protection-->Temperature probes).



Note: Not all execution options are possible in all zones!



GTF 112-EX

-200 °C ... +100 °C (without neck tube)
-200 °C ... +900 °C (with neck tube)

General:

The GTF 112-Ex temperature probe is designed for use in explosion-prone areas. The probe is very small, which makes it suitable for use in places that are difficult to access. The probe is equipped with an M12 connection.
The probe inserts of the GTF 112-Ex are potted and cannot be replaced. They are available in the following sensor element group: Resistance thermometer: Pt 100 or Pt 1000. Only jacket resistance thermometers are used as sensor elements. The materials used for the probe parts that come into contact with the medium consist of stainless steel (e.g. 1.4404, 1.4435 or 1.4571). This guarantees high resistance to a wide variety of chemical compounds.

Upcharges:

Sensors:
Pt100 / Pt1000, mineral insulated element, 4-wire:
meas. range: -200 °C ... +100 °C (600 °C - with neck tube), DIN cl. B

Probe length:
up to 100 mm (without upcharge)
upcharge per further starting 100 mm

Neck tube length:
without (without upcharge)
upcharge per starting 100 mm

Probe diameter:
3 mm, 4 mm, 5 mm, 6 mm or 8 mm (without upcharge)

Thread:
G1/2“, G3/8“ (standard) (without upcharge)
G1/8“, G1/4“, G3/4“, M8x1, M10x1

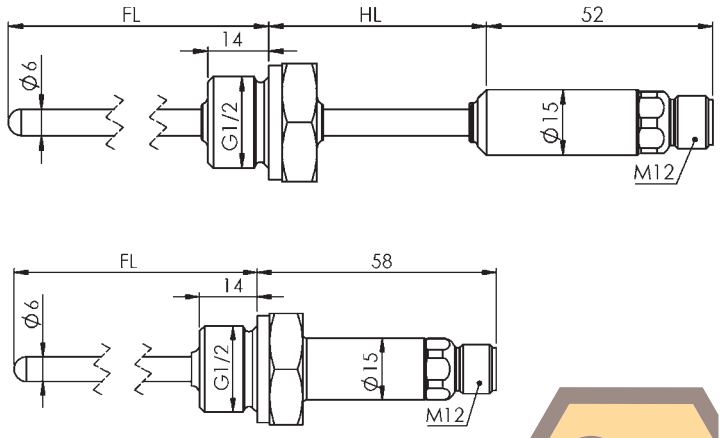
Connection:
M12 plug connector

Ambient temperature:
-20 ... +60 °C (protection type „e“ and protection type „i“ zone 0, 20) or -20 ... +80 °C (protection type „i“ zone 0/1, 1, 2, 20/21,21, 22)

Type of protection:
„i“: intrinsic safety (without upcharge)
„e“: increased safety

Potentially explosive atmospheres:
suitable for zone 0, zone 0/1, zone 1, zone 2, zone 20, zone 20/21, 21, zone 22

To determine exact order name ask for our type list. Download via homepage possible (Products -->Ex-Protection-->Temperature probes).



Note: Not all execution options are possible in all zones!

Sterilizable, hermetically sealed water proof temperature probes

HIGHLIGHTS:

- *sealed against moisture and corrosion*
- *easily cleaned and sterilised*
- *small size provides a fast response*
- *also available in custom lengths*
- *optionally with mechanical protection (V4A-sleeve) and with thread or clamping ring screw connection available.*

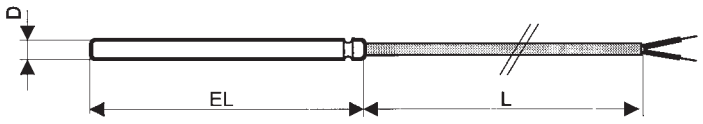
TF 101 P-L01
Art. no. 601686
Design type Pt100, cable length 1 m

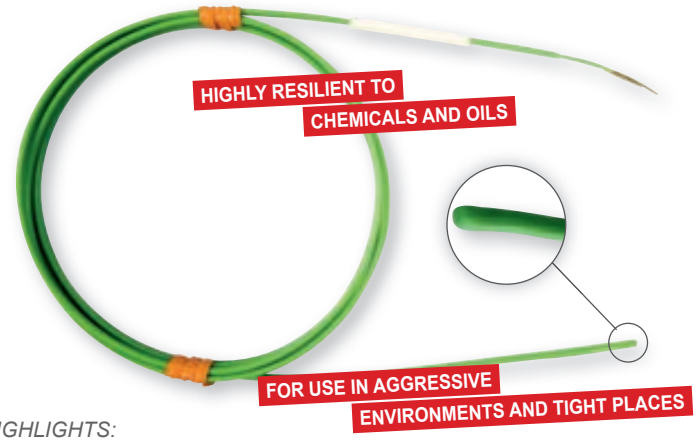
TF 101 P-L02
Art. no. 601688
Design type Pt100, cable length 2 m

TF 101 P-L03
Art. no. 601690
Design type Pt100, cable length 3 m

Specifications:	
Probe:	flexible sealed PFA Pt100 sensor
Connection:	4-wire-connection (4 x 0.14 mm², nickel-plated copper)
nominal diameter:	2.1 mm
accuracy:	according to DIN class A
measuring range:	-60 ... +250 °C
	IP68 seal-welded tip
	also available with Pt1000

Variants:	
TF 101 P-L01-V4A *Art. no. 605092* robust design type with robust V4A protective tube Ø 3 mm, FL = 50 mm *not possible at type K!*	
TF 101 P-L02-V4A *Art. no. 602761* robust design type with robust V4A protective tube Ø 3 mm, FL = 50 mm *not possible at type K!*	
TF 101 P-L03-V4A *Art. no. 604563* robust design type with robust V4A protective tube Ø 3 mm, FL = 50 mm *not possible at type K!*	





HIGHLIGHTS:

- *sealed against moisture and corrosion*
- *easily cleaned and sterilised*
- *small size provides a fast response*
- *also available in custom lengths*
- *optionally with mechanical protection (V4A-sleeve) and with thread or clamping ring screw connection available.*

TF 101 K-L01
Art. no. 601820
Design type K (NiCr-Ni), cable length 1 m

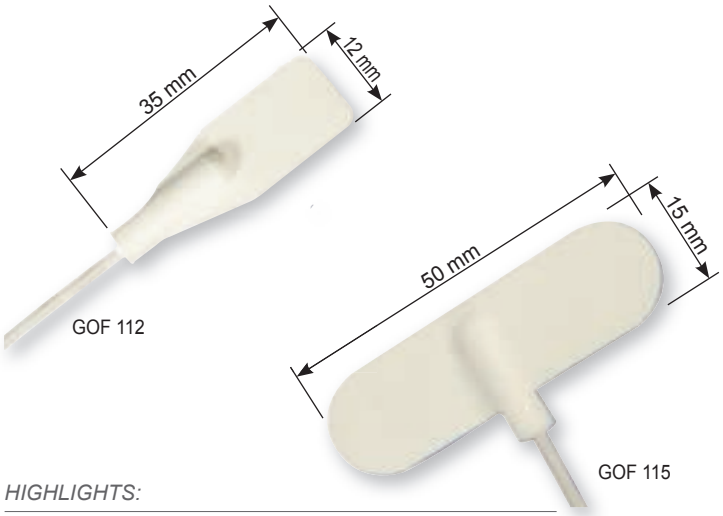
TF 101 K-L02
Art. no. 601798
Design type K (NiCr-Ni), cable length 2 m

TF 101 K-L03
Art. no. 601797
Design type K (NiCr-Ni), cable length 3 m

Specifications:	
Probe:	These PFA insulated thermocouple wire sensors are hermetically seal-welded at the sensor tip to provide continuous PFA protection over the measurement junction.
	stranded NiCr-Ni-thermocouple wire (0.14 mm²)
Nominal cross section:	1.6 mm x 2.5 mm
Measuring range:	-270 ... +250 °C
	IP68 seal-welded tip
	electrically-insulated junction
	also available with thermocouples type J, T and E

Note: Handheld instrument probes can be found in chapter handheld instruments and the appropriate devices

Self-adhesive temperature probes



HIGHLIGHTS:

- *sensor have adhesive back for easy mounting*
- *ultra-slim silicone rubber for maximum flexibility*
- *resistant to a variety of chemicals and oils*
- *PFA-insulated connection cable, 2 m long (other length up on request)*
- *2 designs for flat (GOF 112) or curved (GOF 115) surfaces available*

WITH MOULDED SILICONE DESIGN FOR SURFACE MEASUREMENT ON CURVED AND FLAT SURFACES

GOF 112-PT
Art. no. 603028
Design type Pt100, adhesive back 35 x 12 mm, cable length 2 m, white

GOF 115-PT
Art. no. 603203
Design type Pt100, adhesive back 15 x 50 mm, cable length 2 m, white

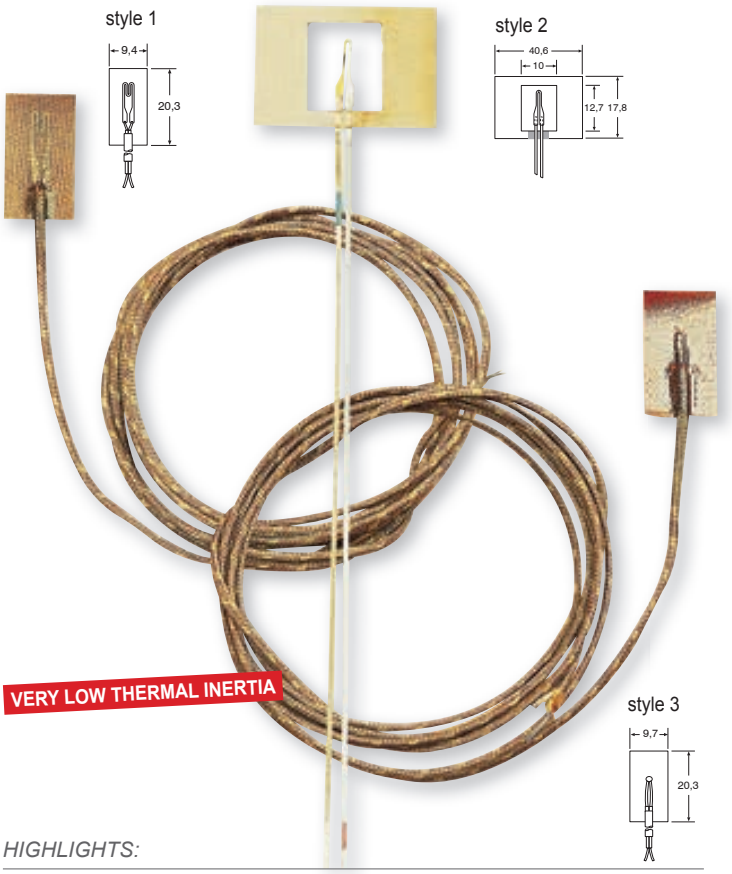
General:
- precision Pt100-probe, DIN class A, 4-wire connection
- temperature range: -50 ... +200 °C
- also available with Pt1000

GOF 112-K
Art. no. 604696
Design type NiCr-Ni, adhesive back 35 x 12 mm, cable length 2 m, green

GOF 115-K
Art. no. 603458
Design type NiCr-Ni, adhesive back 15 x 50 mm, cable length 2 m, green

General:
The integral thermocouple sensor is bonded onto the inner surface of the self adhesive aluminum foil strip, which is provided for fast response time
- stranded NiCr-Ni-thermocouple wire (0.14 mm²)
- temperature range: -50 ... +200 °C
- also available with thermocouples type J, T and E

„Cement-On“ thermocouples



HIGHLIGHTS:

- *ultra fast response time: (style 1:t_{63} = approx. 20 ms, style 2: approx. 5 ms, style 3: approx. 300 ms)*
- *also available with thermocouples type J (only design 3), T and E*
- *style 1 and 3 optionally available with other lengths*

GOF 120-K1
Art. no. 604184
Design type K (NiCr-Ni), cable length 90 cm, max. 260 °C (short-time: 370 °C)

GOF 120-K2
Art. no. 604334
Design type K (NiCr-Ni), cable length 15 cm, max. 540 °C (short-time: 650 °C)

GOF 120-K3
Art. no. 603249
Design type K (NiCr-Ni), cable length 90 cm, max. 260 °C (short-time: 370 °C)

General:
The series GOF 120 are a model line of Cement-On, fast response thermocouples for fast surface temperature measurement. The model line have 3 different styles.
(Please order the high temperature cement separately)

The **design styles 1 and 2** are made from 0.01 mm thermocouple alloy foil by a special process where the butt welded thermocouple junction is 0.25 mm in thickness. The thermocouples are fabricated from class 1!
These styles are flat, extremely low inertia construction and are ideal means of measuring the temperature of both flat and courved metals, plastic and ceramic surfaces where very fast response is desired.

The **design style 3** is an economy version constructed from 0.25 mm diameter bead welded standard limit of error thermocouple wire. It should be used where extremely fast response time is not essential.

Accessories and spare parts:

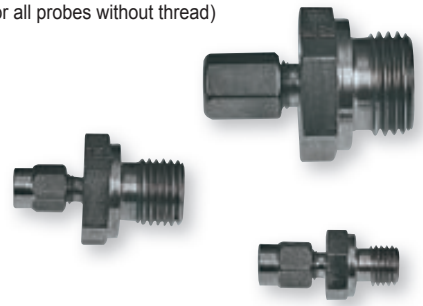
OB-700
Art. no. 602883
High temperature chemical set cement, 236 ml (max. 871 °C)

Note:
cannot be used with high temperature cement (will break down insulation)

Accessories

Clamping ring screw connection GKV... stainless steel

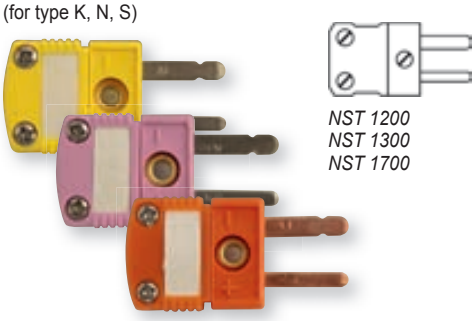
(for all probes without thread)



Type:	Outside thread	Clamp. ring-Ø (sensor tube-Ø)	Clamping ring
GKV1 *602888*	M8 x 1	1.5 mm	Teflon
GKV2 *602889*			Stainless steel
GKV3 *602890*		3.0 mm	Teflon
GKV4 *602891*			Stainless steel
GKV5 *602892*	G1/4"	1.5 mm	Teflon
GKV6 *602893*			Stainless steel
GKV7 *602894*		3.0 mm	Teflon
GKV8 *602895*			Stainless steel
GKV11 *602898*		6.0 mm	Teflon
GKV12 *602899*			Stainless steel
GKV9 *602896*	G1/2"	6.0 mm	Teflon
GKV10 *602897*			Stainless steel
GKV13 *602900*		8.0 mm	Teflon
GKV14 *602901*			Stainless steel
GKV15 *602902*		14.0 mm	Teflon
GKV16 *602903*	M10x1	6.0 mm	Stainless steel

Flat-pin connections, free from thermal e.m.f.

(for type K, N, S)



NST 1200
NST 1300
NST 1700

NST 1200-K

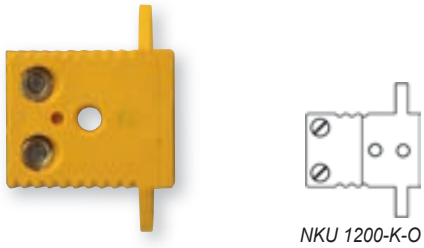
Art. no. 602566
Flat-pin connections, free from thermal e.m.f., type K

NST 1300-N

Art. no. 605762
Flat-pin connections, free from thermal e.m.f., type N

NST 1700-S

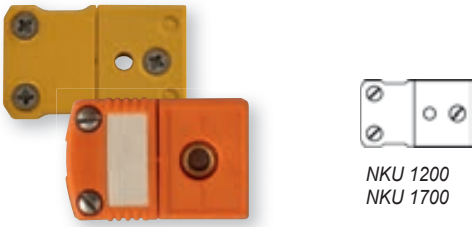
Art. no. 603890
Flat-pin connections, free from thermal e.m.f., type S



NKU 1200-K-O

NKU 1200-K-O

Art. no. 602738
U-coupling for installation in front panels (max. 120 °C)



NKU 1200
NKU 1700

NKU 1200-K

Art. no. 602737
Flat-pin connections, free from thermal e.m.f., type K

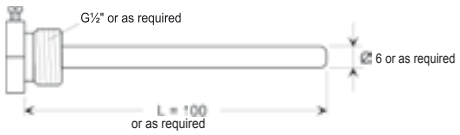
NKU 1700-S

Art. no. 603535
Flat-pin connections, free from thermal e.m.f., type S

For higher temperatures use ceramic plug and coupling.

Immersion sleeve of stainless steel

Immersion sleeve for probes without thread



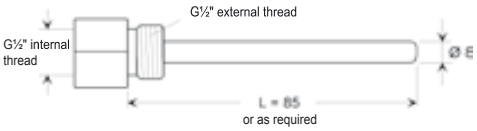
EST01

Art. no. 602868
Basic price for 100 mm

General:

Thread: G1/2 (external thread)
Outer diameter immersion sleeve: Ø 6 mm
(for probes with outer diameter Ø 5 mm)
length: L = 100 mm (suitable for e.g. GTF101 with FL = 105 mm, Ø 5 mm)
Special lengths, diameters or threads upon request

Immersion sleeve for all probes with a G1/2“-thread



EST02

Art. no. 603362
für 85 mm

General:

Thread: G1/2 (internal/external)
Outer diameter immersion sleeve: Ø 8 mm
(for probes with outer diameter Ø 6 mm)
L = 85 mm (suitable for e.g. GTF 103 with FL = 100 mm, Ø 6 mm)
L = 100 mm (suitable for e.g. GTF 103 with FL = 115 mm, Ø 6 mm)
Special lengths, diameters or threads upon request

GWL10G

Art. no. 603267
heat-conductive paste 10 g, in plastic gun, for faster heat exchange

Note: Handheld instrument probes can be found in chapter handheld instruments and the appropriate devices

Accessories

Cables and lines

Silicone cable (-50 ... +200 °C) with teflon screened wires

S2P
silicone cable, 2-pole (2 x 0.25 mm²), highly flexible,
external diameter approx. 3.8 mm, price per meter

S4P
silicone cable, 4-pole, 4 x 0.14 mm² cross section (insulation 2 x blue, 2 x white)
(can also used as 3-wire), external diameter approx. 4 mm,
price per meter

Glass silk insulated cable (-50 ... +400 °C) with stainless steel braiding

G4P
glass silk insulated cable, 4-pole (4 x 0.22 mm²),
external diameter approx. 4 mm, price per meter

Teflon insulated cable (-200 ... +250 °C) with individual teflon insulated wires

T2P
teflon insulated cable, 2-pole (2 x 0.14 mm²), with additional cable screen,
external diameter approx. 2.3 mm, price per meter

T4P
teflon insulated cable, 4-pole (4 x 0.14 mm²), with additional cable screen
external diameter approx. 4 mm, price per meter

PVC-lines (-20 ... +70 °C)

P2P
PVC cable, 2-pole (2 x 0.14 mm²), external diameter approx. 3.5 mm,
price per meter

P4P
PVC cable, 4-pole (4 x 0.14 mm²), external diameter approx. 3.9 mm,
price per meter

Extension cable for NiCr-Ni (Type K)

VKA 1m
Art. no. 602909
1 m Silicon-Compensation lines with DIN plug and DIN coupler
Upcharge per meter

Compensation lines for NiCr-Ni (type K), 2-wire

AGL1
Silicone cable (2 x 0.22 mm²) (max. 200 °C), external diameter approx. 3.8 mm, price per

AGL3
Thermo wire (can also be used as thermo couple) glass silk (2 x 0.5 mm²) (max. 400 °C),
external diameter approx. 4 mm, price per meter

AGL4
Teflon screened twisted thermo wire without joint outer sheath, wire Ø 0.2 mm
(max. 250 °C), external diameter approx. 1.4 mm, price per meter

AGL5
Thermo wire, with glass silk braiding, wire-Ø 0.2 mm (max. 400 °C),
external diameter 0.8 x 1.2 mm, price per meter

AGL6
Teflon cable, screened - can also be used as thermo couple (2 x 0.22 mm²) (max. 250
°C), with additional cable screen, external diameter approx. 4 mm, price per meter

Compensation lines for Pt10RH-Pt (Type S), 2-wire

AGL S2
Silicone cable (max. 200 °C), external diameter approx. 3.9 mm
price per meter

Compensation lines for NiCrSi-NiSi (Type N), 2-wire

AGL N2
Silicone cable (max. 200 °C), external diameter approx. 3.9 mm
price per meter

Sensor elements (Pt100/1000, NTC, PTC)

Pt100/1
Art. no. 602989
Ceramic lamina, 2 x 2.3 x 0.6 mm, -70 ... +500 °C, tolerance: B

Pt100/2
Art. no. 602990
Ceramic lamina, 2.5 x 2.0 x 1.3 mm, -50 ... +500 °C, tolerance: 1/3 DIN

Pt100/3
Art. no. 602991
Ceramic lamina, 2 x 5 x 0.9 mm, -196 ... +500 °C, tolerance: B

Pt100/4
Art. no. 602993
Wound design, Ø 2 x 20 mm, -200 ... +600 °C, tolerance: B

Pt100/5
Art. no. 602994
TO92-housing, -50 ... +150 °C, tolerance: B

Pt100/6
Art. no. 602995
Ceramic lamina, 1 x 3 x 0.6 mm, -50 ... +500 °C, tolerance: B

Pt1000/1
Art. no. 606368
Ceramic lamina, 2.1 x 4 x 0.9 mm, -70 ... +500 °C, tolerance: 1/3 DIN

Pt1000/2
Art. no. 602997
TO92-housing, -50 ... +150 °C, tolerance: B

Pt1000/3
Art. no. 602998
Ceramic lamina, 1 x 3 x 0.6 mm, -50 ... +500 °C, tolerance: B

KTY 81-210
Art. no. 607894
Replacement for KTY 11-6, -20 ... +110 °C

KTY 81-121
Art. no. 607895
1 kOhm (25 °C), TO92-housing, -50 ... +150 °C

For larger quantities special prizes - upon request

SIMULATORS

Application:	GHM SensorSimulator SIM-1	HD-9609
DMS simulation	●	
Voltage simulation	●	
Current simulation	●	
TC simulation	●	
Pt100 simulation	●	
Current measurement	●	
Voltage measurement	●	
pH simulation		●
Redox simulation		●
Equipment:		
Connections	7-pin Binder	BNC
Battery	Li-Ion	9 V DC alkaline battery
Display	Graphic LCD	LCD, 2 lines, 3 ½ digits
Device information:		
Catalogue page	**Page 202**	**Page 202**

The GHM sensor simulator is used for fast verification of metrological devices such as DMS and temperature measuring amplifiers.
Even sensors with a voltage or current interface can be simulated. Instead of Sensor, a GHM sensor simulator is connected and thus the complete measurement chain from the sensor cable over the amplifier to digital detection tested.
The simple and intuitive operation and the graphical display allow easy useage without training periods.
Due to battery operation and compact dimensions the GHM sensor simulator is suitable particularly for the mobile use on the test bench.
The additional complete measurement of the voltage and current signals the GHM sensor simulator into a unique instrument for using the test bench as well as in the laboratory.

Simulator

HIGHLIGHTS:

- *Simulation of various sensors, such as strain gauge, Pt100, TC*
- *Transmitter and measuring function for voltages and currents*
- *Simple, self-explanatory use in German and English*
- *Robust protective silicone case*
- *Graphic LCD*
- *Compact dimensions*
- *Battery-operated*

GHM SensorSimulator SIM-1

Art. no. 201164
Simulator

General:

The GHM SensorSimulator issues various current and voltage signals. With additional return measurement of feed voltages and currents from connected measuring amplifiers, the GHM SensorSimulator can also provide optimal, true-to-the-original simulation of sensors like Pt100 and strain gauge sensors.

Application:

It can be used to compare and check displays and measuring transducers or transformers or complete measuring distances. Voltages and currents can also be measured with the device.

Specifications:

General:	
Accuracy:	see under Sensors
Connections:	7-pin Binder socket for signal input and output Mini USB for voltage supply / charge function
Display:	Graphic LCD, monochrome, adjustable background light (180 x 128 pixels)
Operation:	Keypad
Supported languages:	German / English
Dimensions:	86 x 160 x 37 mm (W x H x D)
Weight:	250 g (including battery)
Supply voltage:	5 V DC (Mini-USB)
Akku:	Li-Ion battery
Ambient temperature:	0 ... +50 °C
Simulation function:	
Voltage source:	
Simulation range:	±10 V
Accuracy:	±1 %
Signal current:	
Measurement ranges:	±20 mA
Accuracy:	±1 %
Strain gauge bridges:	
Simulation ranges:	0.5, 1, 2, 4, 5, 10, 25, 50 mV/V
Accuracy:	±1 %
Feed:	2.5 V, 5 V, 10 V
Thermocouples, type K (others optional)	
Measurement ranges:	-100 ... +1000 °C (in 50 °C increments)
Accuracy:	±1 %
Pt100	
Measurement ranges:	-100 ... +850 °C (in 50 °C increments)
Accuracy:	±1 %
Measurement function:	
Voltage source:	
Measurement range:	±30 V
Accuracy:	±0.5 %
Current	
Measurement range:	±30 mA
Accuracy:	±0.1 %
Scope of supply:	GHM SensorSimulator, battery, charger, manual

pH and mV simulator

HIGHLIGHTS:

- *Checking and calibrating pH and redox ORP instrument*
- *Simple to use*

HD-9609

Art. no. 700046
pH and mV simulator

General:

The simulator HD-9609 is a portable instrument for checking and calibrating pH and mV measuring instruments. The characteristics of this instrument satisfy any checking and calibrating requirements for both portable and panel-mounted instruments; it can be used in laboratories, in industry or for check out on field. Despite its many functions, the instrument is simple to be used: a large display, with dual indication, and a series of symbols allow it to be used even by unskilled personnel.

Specifications:

pH simulation:	0 ... 14 pH
pH resolution:	0.1 pH
pH accuracy (20 ... 25 °C):	0.002 pH
mV simulation:	±1999 mV
mV resolution:	1 mV
mV accuracy:	±100 µV
Noise (0 ... 10 Hz):	1 µV peak/peak
Simulation of temperature compensation:	-20 ... +150 °C (-4 ... +302 °F)
Output impedance:	100 kΩ 1 %, 1 GΩ 5 %
Display:	LCD 2 lines, 3 ½ digits. Figure height approx. 12.5 mm.
Symbols:	pH, mV, °C, °F, HI imp., LO imp., 0.1 pH, 1 pH, 1 mV, 10 mV
Working temperature:	-5 ... +50 °C (-23 ... +122 °F)
Power supply:	9 V DC alkaline battery. Low battery indication.
Consumption (instrument only):	5 mA lit up, 20 µA turned off
Autonomy:	about 200 h
Dimensions:	187 x 72 x 38 mm (H x W x D)
Scope of supply:	instrument HD-9609, adapter cables CP-9509BNC, CP-9509-T, carrying case

Accessories:

CP-9509-BNC
Art. no. 700047
Adapter cable, L = 1 m, male BNC connector on both ends

CP-9509-T
Art. no. 700048
Adapter cable, L = 1 m, male BNC connector on one side

ALARM/PROTECTION, LEVEL

Application:	ALSCHU 300 FG ALSCHU 300 SP	ALSCHU 485	ALSCHU 485 OE ALSCHU 485 OE / 3P	GEWAS 181 A GEWAS 183 A GEWAS 181 A - ½“, - ¾“, - 1“	ALSCHU 480 ALSCHU 480 P	GEWAS 200	GEWAS 191 N	GEWAS 191 AN
Universal application	●				●	●		
Level controler	●	●	●					
Water leak detector				●	●	●	●	●
Electrodes incl.		●		●			●	●
Alarm buzzer		●	●	●	●		●	●
Switching output	●	●	●	●	●	●		●
Water supply is switched off				●			●	●
Device information:								
Catalogue page	Page 204	Page 204	Page 204	Page 208	Page 209	Page 206	Page 207	Page 207

Application:	GEWAS 300 FG GEWAS 300 SP	GNS-SCV-W GNS-SCV-Z	GNS-KIT	GNS-C1 GNS-C2	RWI-016 PPK RWI-016 PVK RW-015 HKL	GSS-F25
Universal application	●					
Level controler			●			
Water leak detector	●					
Electrodes incl.	●	●		●	●	●
Alarm buzzer			●			
Switching output	● / -					
Control output	●	●	●	●	●	●
Device information:						
Catalogue page	Page 206	Page 210	Page 210	Page 211	Page 211	Page 211

Electrode controller / level controller

ALSCHU 300 FG

ALSCHU 300 SP

ALSCHU 300 FG

Art. no. 600476

Electrode controller in field frame for wall mounting, device without sensor

ALSCHU 300 SP

Art. no. 600479

Electrode controller in snap-on housing for DIN rail mounting, device without sensor

Application:

Automatic control of drainage pumps and wastewater lifting plants, overflow and low liquid level control, automatic filling and draining of tanks, level control of liquid reservoirs, aquariums, storage tanks, etc.
The ALSCHU 300 .. is especially suitable for detection of conducting media (water, etc.). It is less applicable for badly or non conducting media (oils or fatty liquids), conducting foaming liquids or media causing electrically isolating deposits on the electrodes.

Measuring method:

The measuring method for level detection is based on the conductive principle, i.e. the electrical conductivity of the media is monitored. If the switching amplifier detects a value below the set conductivity the state “media detected” is output, otherwise “no media”. Depending on number and design of the connected level sensors the device can be used for level detection (min-/max-detection) or as 2-point controller.

Specifications:

Power supply:	18 V … 250 V AC/DC wide-range power supply
Power consumption:	<2 VA
2 signal inputs:	
Triggering level:	<80 kΩ
Response time:	2 s
1 Relay output:	
Contact:	change-over contact, potential-free
Switching voltage:	≤250 V AC
Switching current:	≤5 A (ohmic load)
Protection class:	IP20 (ALSCHU 300 SP) and IP65 (ALSCHU 300 FG)
Working temperature:	-20 … +60 °C, <75 % RH (non condensing)
Storage temperature:	-40 … +80 °C
Condensation:	not allowed
Functions / displays:	
Red / green LED:	display for switching state of relay, switching state of sensors, status (supply) of device
Housing:	
ALSCHU 300 SP:	22,5 x 75 x 110 mm (W x H x D)
ALSCHU 300 FG:	100 x 100 x 60 mm (W x H x D without PG cable glands
Scope of supply:	device, manual

Accessories and spare parts:

Sensors see page 205

Electrode controller / level controller

ALSCHU 485

Art. no. 603479

Electrode control device for filling or emptying, incl. two 2-pin. electrodes

ALSCHU 485 OE

Art. no. 603807

(as above, but without electrodes - connection for two 2-pin. electrodes)

ALSCHU 485 OE/3P

Art. no. 603808

(as above, but without electrodes - connection for 3-pin electrodes)

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.

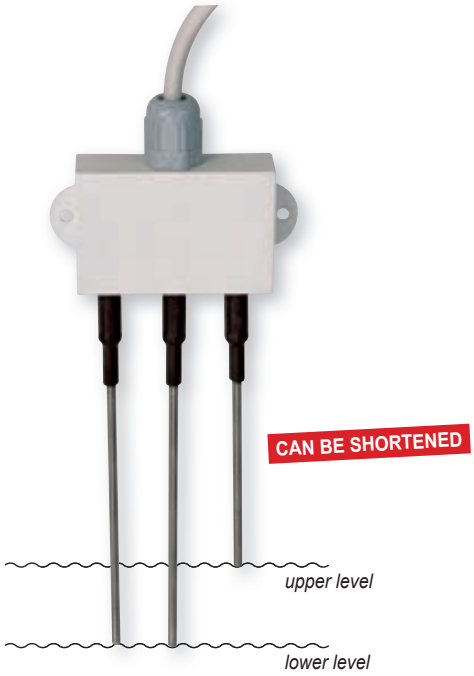
Specifications:

Control device:	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:	
ALSCHU 485:	2 x 2.5 mm jack sockets, 2 electrodes with stainless steel pins, plastic body with PVC cable (2 m long) included (any length available upon surcharge)
ALSCHU 485 OE:	2 x 2.5 mm jack sockets
ALSCHU 485 OE/3P:	3-pole screw terminal
Dimensions:	112 x 71 x 48 mm (L x W x D)
Scope of supply:	Device, manual, only ALSCHU 485: 2 electrodes

Accessories and spare parts:

Sensors see page 205

3-pin. probe for level control (conductive)



GNS-3P

Art. no. 603170

3-pin. level probe

General:

- For all industrial applications
- Alarm-, Level- and Doseregulation
- Optional teflon covered staffs
- Combined with control electronics (ALSCHU 300, ALSCHU 485 OE / 3P or MINAL) an accurate liquids level control system

Specifications:

Number of electrodes:	3 pieces
Length of electrodes:	150 mm, other lengths upon request, probes can be cutted to needed length, in order to be adapted to local conditions.
Electrical connection:	2 m cable
Switching distance:	10 mm
Dimensions:	
Electrode length:	150 mm
Electrode diameter:	3 mm
Electronics box:	55 x 35 mm (W x H)
Scope of supply:	Device, manual

Option:

other length available

Teflon covered staffs
only tip is uncovered (for electrodes used in salt water, ...)

suitable for:

Alschu 300 FG, Alschu 300 SP, ALSCHU 485 OE / 3P

3-pin. probe for level control (conductive)

GNS-3P-SLV

Art. no. 604786

3 electrodes with Poliolefin coating

- cooling water
- all conductive liquids

GNS-3P-SLK

Art. no. 604016

3 electrodes with Kynar coating

- food and beverage industry
- chemical industry

GNS-3P-SLE

Art. no. 603172

3 electrodes with PTFE coating

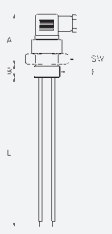
- aggressive conductive liquids

General:

- Coated electrodes
- Rugged construction, sealed
- Alarm or level regulation or dosage of liquids
- Combined with control electronics (ALSCHU 300, ALSCHU 485 OE / 3P) an accurate liquids level control system

Specifications:

Number of electrodes:	3 pieces
Length of electrodes:	500 mm, other lengths upon request, probes can be cutted to needed length, in order to be adapted to local conditions.
Electrical connection:	EN 175301-803/A plug
Process connection:	G 1“, Polypropylen
Pressure max.:	6 bar
Temperature max.:	+100 °C
Protection class:	IP65
Dimensions:	SW: 40 mm A: 68 mm B: 20 mm L: 500 mm
Scope of supply:	Device, manual



suitable for:

Alschu 300 FG, Alschu 300 SP, ALSCHU 485 OE / 3P

Water monitor with one signal input and one relay output

GEWAS 300 FG

GEWAS 300 SP

GEWAS 300 FG

Art. no. 600472

Water monitor in field frame for wall mounting, device without sensor

GEWAS 300 SP

Art. no. 600474

Water monitor in snap-on housing for DIN rail mounting, device without sensor

Application:

Versatile alarm and protection device for DIN rail or surface mounting with universal input (screw-type terminals) for several external sensors. Sensors with switching threshold <100 kOhm can be connected (e.g. water probes, floating switches, level probes, magnetic contacts, etc.). In case of an alarm the connected device (e.g. pump, machine) is switched of by a change-over contact. The GEWAS 300 FG additionally provides an alarm. The internal or an external push-button resets the alarm state.
The GEWAS 300 ... is especially suitable for detection of conducting media (water, etc.). It is less applicable for badly or non conducting media (oils or fatty liquids), conducting foaming liquids or media causing electrically isolating deposits on the electrodes.

Description:

The measuring method for level detection is based on the conductive principle, i.e. the electrical conductivity of the media is monitored. If the switching amplifier detects a value below the set conductivity the state “media detected” is output, otherwise “no media”.

Specifications:

Power supply:	18 V … 250 V AC/DC, wide-range power supply
Power consumption:	<2 VA
1 signal inputs:	
Triggering level:	<80 kΩ
Response time:	2 s
1 Relay output:	
Contact:	change-over contact, potential-free
Switching voltage:	≤250 V AC
Switching current:	≤5 A (ohmic load)
external alarm output:	
only GEWAS 300 FG:	8 V, 3 kHz, ≤5 mA
Protection class:	
GEWAS 300 SP:	IP20
GEWAS 300 FG:	IP65
Working temperature:	-20 … +60 °C
Storage temperature:	-40 … +80 °C
Condensation:	not allowed
Functions / displays:	
Red / green LED:	display for switching state of relay, switching state of sensors, status (supply) of device, status of battery
Acoustic alarm:	internal alarm buzzer with battery back-up (only for GEWAS 300 FG)
Battery back-up:	Monitoring and acoustic alarm are ensured even e.g. during power failures (only for GEWAS 300 FG)
Alarm reset:	alarm reset by GEWAS 300 SP: connection for external push-button GEWAS 300 FG: push-button at front side
Housing:	
GEWAS 300 SP:	22.5 x 75 x 110 mm (W x H x D)
GEWAS 300 FG:	100 x 100 x 60 mm (W x H x D) without PG cable glands
Scope of supply:	Device, manual

Accessories and spare parts:

Sensors see page 207

Protection device for universal application

GEWAS 200

Art. no.600279

Panel-mounted alarm protection device with volt-free relay output (snap-on mounting for top hat rail in special snap-on housing), without sensor

General:

The GEWAS 200 is a versatile DIN rail alarm and protection device. Its universal input (screw terminals) allows a lot of different external sensors to be connected. That includes sensors with a switching threshold <100 kOhm like water sensors, float switches, level switches, magnetic contacts, etc. A connected device (i.e. pump, machine) is switched on or off via potential-free change-over contact in case of an alarm. The alarm is reset by the use of an internal / external reset button.

Specifications:

Power supply:	220 / 240 V 50 / 60 Hz
Power consumption:	approx. 3 VA
Sensor input:	2-pole screw terminal
Switching threshold:	input resistance <100 kOhm (e. g. NPN no active, relay, reed contact, etc.)
Switching output:	potential-free change-over contact
Switching power:	250 V AC, 10 A (ohmic load), max. 2400 VA 150 V DC, 2 A (ohmic load), max. 240 W
red / green LED:	LED (green) for operation display LED (red) for alarm condition
Mounting:	universal foot base for all common DIN EN rails
Working conditions:	-20 ... +50 °C and 0 ... 80 % RH
Dimensions:	49 x 96 x 59 mm (L x W x H)
Scope of supply:	Device, manual

Options:

GEWAS 200 KL
Art. no. 600306
Screw terminal (2-pole) to connect an external reset button

GEWAS 200 AL
Art. no. 601041
Automatic alarm reset

Accessories and spare parts:

GWF-1
Art. no. 601712
water sensor without plug, 2 m

GSS-1
Art. no. 606016
level probe (plug-in float switch), 2 m cable for electrically non-conductive media (normally open/normally closed function can be selected by customer)

GNS-1
Art. no. 602531
plug-in level probe 2-pin (stainless steel electrodes)

Water sensor

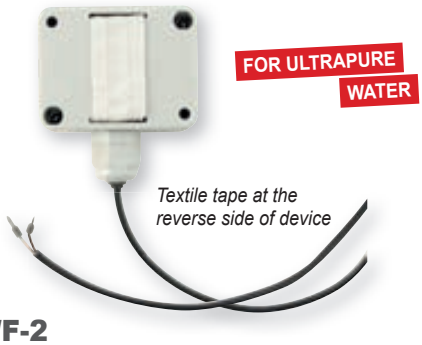
GWF-1
Art. no. 601712
Water sensor, 2 m, without plug

Variants:

GWF-1/5m
Art. no. 601717
Water sensor without plug, 5 m cable

GWF-1/10m
Art. no. 601723
Water sensor without plug, 10 m cable

suitable for:
Gewas 200, Gewas 300 FG



GWF-2
Art. no. 601778
Textile-tape water sensor, 2 m, without plug

Specifications:	
Housing:	made of ABS with two mounting holes and PG gland
Dimensions:	65 x 35 x 50 mm (L x W x H), without PG gland
Scope of supply:	Device

suitable for:
Gewas 200, Gewas 300 FG, Gewas 300 SG

2-pole level sensor

GNS-1
Art. no. 602531
level sensor 2-pole, cable 2 m

Water leak detector with solenoid valve

GEWAS 191 N
Art. no. 601742
Water leak detector with solenoid valve, complete and ready for use

GEWAS 191 AN
Art. no. 601744
Water leak detector with solenoid valve, complete and ready for use with switch-off mechanism for supervised device in case of alarm (up to 16 A, 230 V 50 Hz)

Application:
Washing machine, dish washer, surgeries (e.g. dentists' surgeries, water-cooled devices etc.), hospitals, industry, research, laboratories, any other devices and machines with water connection (e.g. hot drinks dispensers, cooling devices etc.)

General:
If a water film of more than 0.5 mm occurs at the water sensor the control unit automatically gives an acoustic alarm and switches the solenoid valve off. The design type GEWAS 191 AN turns off additionally the device connected to the control unit, too.

Specifications:	
Power supply:	220 / 240 V 50 / 60 Hz (control unit)
Power consumption:	approx. 3 VA
Control output:	via power socket at device housing (only for GEWAS 191 AN) the socket of GEWAS 191 N always provides mains voltage
max. switching current:	max. 16 A (ohmic load)
Water sensor:	highly sensitive plug-in water probe, 2 m cable. Alarm triggered as of ½ mm water film. Several water probes can be plugged-in and used simultaneously by means of socket outlet adaptor GAZ 1. 2 m, 5 m or 10 m plug-in extension cable available.
Solenoid valve:	glass fiber reinforced polyamide (as customary for washing machines). Safety-low voltage 12 V DC. Connections: Screw connection ¾" for direct fastening to water tap and the standard dish washer / washing machine connection hose ½" with ¾" wing or coupling nut to the solenoid valve outlet. In case of power breakdown the valve closes automatically. **Working pressure:** 6 bar servo-controlled; Minimal pressure difference between in- and outlet: inlet pressure min. 0.5 bar higher than outlet pressure
Device housing with electronics:	enclosed case (not suitable for use in humid environment), electronics, signal buzzer, plug connections for valve and water sensor. Housing with earthing pin plug connection and socket outlet with earthing contact. Looping-in socket outlet with earthing contact used for GEWAS 191 N; alarm controlled socket outlet with earthing contact used for GEWAS 191 AN
Working conditions:	0 ... +50 °C, 0 ... 90 % RH (non-condensing)
Dimensions:	control unit: 126 x 79 x 54 mm (L x W x H) solenoid valve: 82 x 102 x 41 mm
Scope of supply:	Water leak detector with solenoid valve, controller, water probe, signal buzzer, manual

Accessories and spare parts:

GMV191
Art. no. 601664
spare solenoid

GWF-1S
Art. no. 601706
plug-in water sensor, 2 m

GWF-1S / 5m
Art. no. 601708
plug-in water sensor, 5 m

GWF-1S / 10m
Art. no. 601710
plug-in water sensor, 10 m

GAZ-1
Art. no. 602748
branch adapter (required for each additional water sensor)

VEKA 2
Art. no. 601726
extension cable 2 m

VEKA 5
Art. no. 601728
extension cable 5 m

VEKA 10
Art. no. 601731
extension cable 10 m

Note:
Not suitable for ultrapure water!

Leak-water detector

Figure GEWAS 181 A

GEWAS 181 A

Art. no. 601734
leak-water detector with ½“ brass solenoid valve with ¾“ connections for hand installation, water sensor, alarm buzzer and switch-off of connected units 16 A, 230 V~

GEWAS 183 A

Art. no. 602999
leak water detector without solenoid valve, with water sensor, alarm buzzer and switchoff of connected devices 16 A, 230 V~

GEWAS 181 A-½“

Art. no. 601736
leak water detector with ½“ brass solenoid valve (flow quantity: approx. 20 l/min, installation length approx. 55 mm) for installation in the line, water sensor, alarm buzzer and switch-off of connected devices 16 A, 230 V~.

GEWAS 181 A-¾“

Art. no. 601738
leak water detector with ¾“ brass solenoid valve (flow quantity: approx. 91.5 l/min, installation length approx. 80 mm) for installation in the line, water sensor, alarm buzzer and switch-off of connected devices 16 A, 230 V~

GEWAS 181 A-1“

Art. no. 601740
leak water detector with 1“ brass solenoid valve (flow quantity: approx. 141.5 l/min, installation length approx. 95 mm) for installation in the line, water sensor, alarm buzzer and switch-off of connected devices 16 A, 230 V~

Application:

Any devices or machines with water connection. For direct mounting of solenoid valve in pipelines.

Mode of action:

If a water film of more than 0.5 mm occurs at the water sensor the control unit automatically gives an acoustic alarm and switches the solenoid valve and the device connected to the control unit off.
Solenoid valve:
Brass solenoid valve, energy-saving circuitry for hand installation (½” with ¾” glanding - suitable for any ½” tap or ½” tube) or with ½”, ¾” or 1” internal thread on both sides for line installation. De-energised when closed, for pressure loads from 0.5 ... 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).

Specifications:

Power supply:	220 / 240 V 50 / 60 Hz (control unit)
Power consumption:	approx. 2,5 Watt (control unit, approx. 6 W incl. solenoid valve)
Control output:	via power socket of safety plug adapter
max. switching current:	max. 16 A (ohmic load)
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.
Solenoid valve:	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.
max. working pressure:	10 bar, servo-controlled (pressure difference inlet/outlet >0.5 bar)
Working voltage:	200 V DC or 100 V DC in energy saving mode
Working temperature:	0 ... 50 °C
Dimensions:	control device: 110 x 65 x 45 mm (L x W x H), with suspension hook
Scope of supply:	Device, solenoid valve (not GEWAS 183 A), water sensor, manual

Accessories and spare parts:

GMV-½“ L
Art. no. 601645
Spare solenoid valve ½“ for direct cable connection, approx. 1 m cable, loose ends

GMV-½“ H
Art. no. 601646
spare solenoid valve ¾“ manual mounting, approx. 1 m cable, loose ends

GMV-¾“
Art. no. 601648
spare solenoid valve ¾“ for direct cable connection, approx. 1 m cable, loose ends

GMV-1“
Art. no. 601655
spare solenoid valve 1“ for direct cable connection, approx. 1 m cable, loose ends

GMV-½“ EZL
Art. no. 601657
add. solenoid valve 1/2“ for direct cable connection, with power saving connector, approx. 2 W, for direct connection to 230 VAC, suitable for GEWAS 183A or mains operation

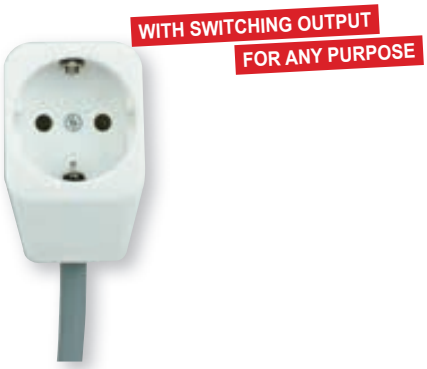
GMV-½“ EZH
Art. no. 601660
like before, but ¾“ valve for manual mounting

GMV-¾“ EZ
Art. no. 601662
like before, but ¾“ valve for direct cable connection

GMV-1“ EZ
Art. no. 601650
like before, but 1“ valve for direct cable connection

Plug-in water sensor, socket outlet adapter, extension cable p.r.t. GEWAS 191

Protection device for universal application



ALSCHU 480

Art. no. 602921

Alarm protection device, plug-in for 230 V~ (with grounding contact adapter plug), with or without alarm transmitter and relay switching output (changeover contact)

ALSCHU 480 P

Art. no. 602923

as above, but with volt-free switching output and looped socket

General:

The ALSCHU 480(P) is a versatile alarm and protection device. Its universal input (3.5 mm jack bush) allows a lot of different external sensors to be connected.
That includes sensors with a switching threshold <100 kOhm like water sensors, float switches, level switches, magnetic contacts, safety shut-off mat etc. In case of an alarm the internal buzzer sounds and a connected device (i.e. pump, machine) is switched on or off via the Schuko adaptor plug (ALSCHU 480). The desired switching function can be set via selector switch I / II. ALSCHU 480 P switches on/off external devices via a potential-free 2-pole switching output. The Schuko socket of ALSCHU 480 P is always current-carrying.

Specifications:

Power supply:	220/240 V 50/60 Hz
Power consumption:	approx. 1 VA
Sensor input:	2.5 mm jack bush
Switching threshold:	input resistance <100 kOhm (e.g. NPN no active, relay, reed contact, etc.)
Switching output:	
480:	via isolated ground receptacle (Schuko)
480 P:	potential-free normally open/ closed contact via 2-pole cable, brought out 0.5 m
Switching function:	
I:	switching output current-carrying in alarm condition
II:	switching output currentless in alarm condition
Switching power:	
480, 480 P:	250 VAC, 10 A (ohmic load), max. 2400 VA
480 P:	120 VDC, 2A (ohmic load), max. 240 W
Controlling device:	LED for operation display, device-on/off, selector switch I / II for switching function
Working conditions:	-20 ... +50 °C; 0 ... 80 % RH
Dimensions:	112 x 71 x 48 (L x W x H)
Scope of supply:	Device, manual

Accessories and spare parts:

GWF-1S
Art. no. 601706
plug-in water sensor, 2 m

Accessories

GNS-1S

Art. no. 602526
plug-in level probe 2-pin

General:

PVC body with 2 stainless steel pins, 2 m PVC cable and 2.5 mm jack plug

GWF-1S

Art. no. 601706
Plug-in high-sensitive water probe

General:

2 m cable length, with 2.5 mm jack plug; multiple water probes can be connected simultaneously with a GAZ-1 socket-outlet adapter

VEKA 5

VEKA 2

Art. no. 601726
Extension cable 2 m

VEKA 5

Art. no. 601728
Extension cable 5 m

VEKA 10

Art. no. 601731
Extension cable 10 m

General:

Connections:
1 x 2.5 mm jack plug, 1 x 2.5 mm jack socket

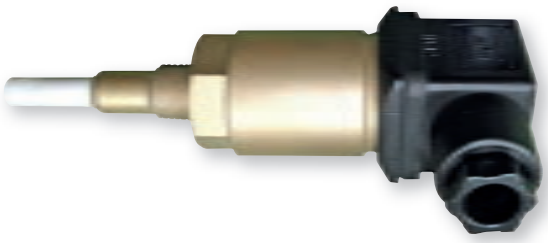
GAZ-1

Art. no. 602748
branch adapter

General:

with 2 x 2.5 mm jack socket and 1 x 2.5 mm jack plug; required for each additional water sensor

Device for monitoring the level (capacitive)



GNS-SCV-W
Art. no. 603168
Probe for application in water and all conductive liquids

GNS-SCV-Z
Art. no. 603169
Probe for application in oil and all no-conductive liquids

General:

The GNS-SCV capacitive probes are the best way to monitor the level condition of liquids as water, oil gasoline and solid products as powder and garanular.
- Sealed
- No moving parts
- very reliable

Application:

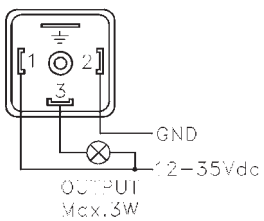
- Water
- Oil
- Gasoline
- Solid products as powder or granular

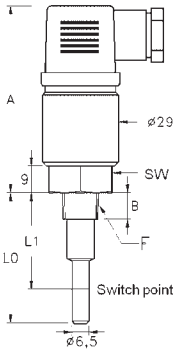
Specifications:

Power supply:	12 ... 35 V DC / 5 mA
Switch output:	NPN no-active / max. 3 W
Electrical connection:	elbow-type plug acc. to EN 175301-803/A
Process connection:	1/4“ NPT, Brass
Switch delay:	4 s
Electrode:	Cu-Zn
Electrode coating:	PTFE
Electrode length:	50 mm
Switch point:	
40 mm ± 2 mm	vertical mounting
on the axis of SCV	horizontal mounting
Pressure max.:	25 bar
Temperature max.:	-30 ... +125 °C

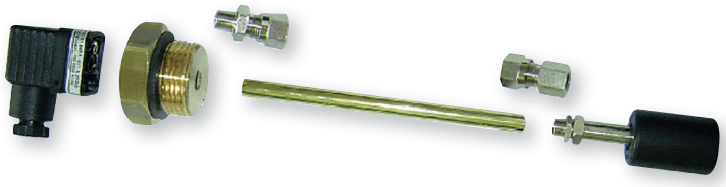
Dimensions [mm]:

SW	A	B	L0	L1
24	74	10	50	40 ±2





Level switch



GNS-KIT
Art. no. 603164
Level switch, without rod tube (state rod tube length when ordering)

General:

The user can add by himself the level switch in the desired length the rod tube between the process connection and the float contact unit. The float contact unit is under water protected.
- Sealed under water protected contact
- Rod tube in 500 mm / 1000 mm / 1500 mm available state when ordering
- IP65 protection class

Specifications:

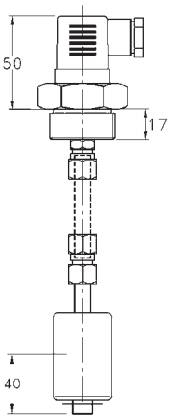
Float-contact unit:	Nickel plated brass
Density:	>0.35 g/cm³
Pressure max.:	20 bar
Temperature max.:	105 °C
Connection:	1/8”
Reed-contact:	SPDT: 230 V, 60 VA, 1.0 A
Process connection:	Thread G1”, Brass
Electrical connecton:	Plug EN 175301-803/A
Protection Class:	IP65
Seal:	NBR, oil resistant
Rod-tube:	Ø 8 mm, brass

Accessories and spare parts:

GNS ROHR-0500
Art. no. 603165
Rod-tube for GNS KIT, 500 mm

GNS ROHR-1000
Art. no. 603166
Rod-tube for GNS KIT, 1000 mm

GNS ROHR-1500
Art. no. 603167
Rod-tube for GNS KIT, 1500 mm



Level Switch Standard Unit

GSS-F25

Art. no. 603245

Level switch standard unit

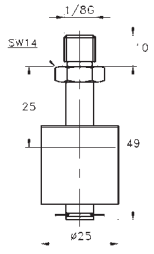
General:

The level switches offer to the user a simple and reliable solution in the liquid level control application. These standard units are available with cable length of 3.0 m.
The working principle is based on the movement of the magnetic float which drives the reed switch inside the level-stem. The cable and switch are epoxy sealed inside the stem and the sealing process is produced by a temperature controlled heating system. A rugged and free of maintenance product.

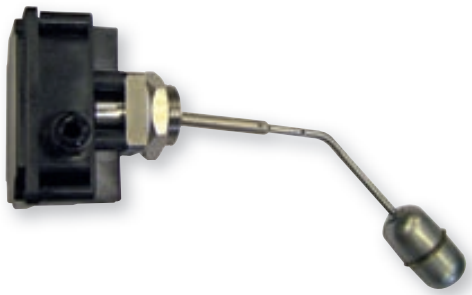
- Constructions up to 180 °C working temperature on request
- Protection class IP65
- Constructions ATEX on request

Specifications:

Float:	PVDF
Density:	≥0,65 g/cm³
Stem:	PVDF
Pressure max.:	6 bar
Temperature max.:	130 °C
Contact:	SPST (NO)
Power:	70 VA / 50 W
Voltage:	300 V AC / 300 V DC
Current:	0.5 A AC / 0.7 A DC
Connection:	1/8"
Switching difference:	25 mm
Accuracy switching point:	±3 mm
Cable:	3.0 m
Electric connection:	
Working temperature:	-30 ... +55 °C
Relative humidity:	0 ... 90 % RH
Scope of supply:	Device, manual



Level Switch



GNS-C1

Art. no. 606051

Level Switch (with 1 microswitch), Body material: natural brass

GNS-C2

Art. no. 606210

Level Switch (with 2 microswitches), Body material: natural brass

General:

These level switches offer the most reliable solution for liquid level control were side mounting system is required.

- Switch head magnetically actuated
- 1 or 2 microswitches
- Adjustable stem length
- Brass or AISI-316 construction
- good repeatabilty
- very reliable

Specifications:

Processconnection:	G1"
Density medium:	>0,7 g/cm³
Pressure max.:	25 bar
Temperature max.:	180 °C
Working temperature:	-30 ... +55 °C
Relative Humidity:	0 ... 90 % RH
Hysteresis max.:	20 mm
Weight:	440 g
Body materials:	Natural brass or stainless steal (AISI-316)
Float material:	Stainless steal (AISI-316)
Microswitch:	1x or 2x SPDT
Voltage:	250 V AC / 48 V DC
Current:	3A AC / 3A DC
Electr. Connection:	via screw terminals
Wiring:	Independent micro switches separately wired SPDT
Protection Class:	IP65 (Housing)

Options:

GNS-C1-S

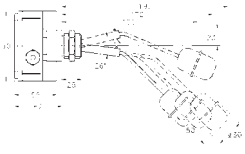
Art. no. 607988

Level switch with 1 microswitch, body material stainless steel AISI - 316

GNS-C2-S

Art. no. 605151

Level switch with 2 microswitches, body material stainless steel AISI - 316



Stem position:

	1 Microswitch		2 Microswitch	
	ON	OFF	ON	OFF
Long	-46 mm	-63 mm	-32 mm	-49 mm
Medium	-48 mm	-61 mm	-34 mm	-47 mm
Short	-50 mm	-60 mm	-36 mm	-46 mm

Switch point tolerance: ±5 mm

Float switch

RWI-016PPK

Art. no. 602912

Float switch (polypropylene)

RWI-016PVK

Art. no. 602913

Float switch (PVDF)

RW-015HKL

Art. no. 606211

Float switch (stainless steel)

General:

Mechanical level controller for liquids. A magnet-equipped float triggers a pre-fixed reed switch.

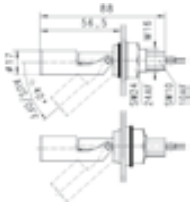
- wall mounting
- reliable and with good repeatabilty
- stainless steel design for high temperatures

Application:

Sensor suitable for: water, oil

Specifications:

	RWI-016PPK	RWI-016PVK	RW-015HKL
Measuring principle:	reed switch	reed switch	reed switch
Switch type:	n.c. or n.o depending on installation position		
Switching power:	250 V AC, 0.5 A, 50 VA	250 V AC, 0.5 A, 50 VA	220 V AC, 0.28 A, 30 VA
Density medium:	>0.6 g/cm³	>0.75 g/cm³	>0.70 g/cm³
Working temperature:	max. 90 °C	max. 130 °C	max. 200 °C
Working pressure:	PN = 3 bar	PN = 6 bar	PN = 5 bar
Mounting position:	horizontal	horizontal	horizontal
Protection class:	IP 65	IP 65	IP 65
Electrical connection:	~50 cm cable	~50 cm cable	~60 cm braid
Materials:			
Body:	PP	PVDF	stainl. steel 1.4571
Float:	PP	PVDF	stainl. steel 1.4571
Seal:	viton	viton	
Weight:	approx. 75 g	approx. 75 g	approx. 120 g



RWI/016...
Assembly internally:
Hole diameter Ø 16.5 mm

Assembly externally:
Hole diameter Ø 23 mm

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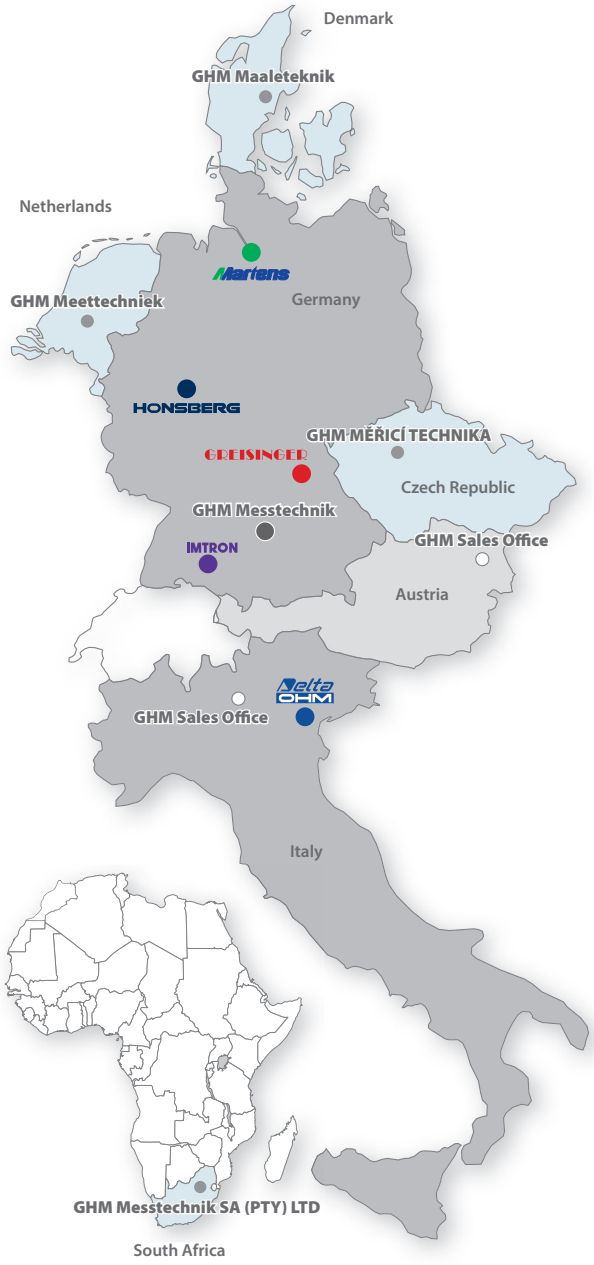
GHM Messtechnik GmbH
Location Greisinger
Hans-Sachs-Straße 26
93128 Regenstauf / Germany
☎ +49-9402-9383-0
🖷 +49-9402-9383-33
www.greisinger.de
info@greisinger.de

GHM Messtechnik GmbH
Location Honsberg
Tenter Weg 2-8
42897 Remscheid / Germany

GHM Messtechnik GmbH
Location Martens
Kiebitzhörn 18
22885 Barsbüttel / Germany

GHM Messtechnik GmbH
Location Imtron
Carl-Benz-Straße 11
88696 Owingen / Germany

Delta OHM S.r.l.
35030 Caselle di Selvazzano,
Padova (PD) / Italy
www.deltaohm.com
info@deltaohm.com



Sales Offices

Austria
Alfred Fröstl
Breitenseer Str. 76/1/36
1140 Vienna / Austria
☎ +43-660-733 56 03
a.froestl@ghm-messtechnik.de

Italy
Andrea Casati
Via Marconi 5
35030 Caselle di Selvazzano
Padova (PD) / Italy
☎ +39-049-89 77 150
a.casati@ghm-messtechnik.de

Sales Subsidiaries

Netherlands
GHM Meettechniek BV
Zeeltweg 30
3755 KA Eemnes / Netherlands
☎ +31-35-53805-40
🖷 +31-35-53805-41
www.ghm-nl.com
info@ghm-nl.com

Czech Republic / Slovakia
GHM Greisinger s.r.o.
Ovci hajek 2/2153
158 00 Prague 5
Nove Butovice / Czech Repuplic
☎ +420-251-613828
🖷 +420-251-612607
www.greisinger.cz
info@greisinger.cz

Denmark
GHM Maaleteknik ApS
Maarslet Byvej 2
8320 Maarslet / Denmark
☎ +45-646492-00
🖷 +45-646492-01
www.ghm.dk
info@ghm.dk

South Africa
GHM Messtechnik SA (Pty) Ltd
16 Olivier Street
Verwoerdpark, Alberton 1453 / South Africa
☎ +27-74 459 0040
j.grobler@ghm-sa.co.za

Italy
Delta OHM S.r.l.
Via Marconi 5
35030 Caselle di Selvazzano
Padova (PD) / Italy
www.deltaohm.com
info@deltaohm.com

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Schloßstraße 6
88453 Erolzheim
Deutschland
☎ +49-7354-937233-0
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GHM Messtechnik GmbH
Standort Greisinger

93128 Regenstauf | Hans-Sachs-Straße 26
+49-9402-9383-0 | www.greisinger.de
+49-9402-9383-33 | info@greisinger.de

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