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www.tempco.be

WATER ANALYSIS

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:	GMH 5430	GMH 5450	GMH 3431	GMH 3451	GLF 100	GLF 100 RW	G 1410	G 1420
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-pol.	2- or 4-pol.	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	• •	• •	•	•	•	•	• •	• •
		Calibration memory						
Interface	•	•	•	•				
Alarm / Data logger		•		•				

DEVICE INFORMATION:								
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	GMH 5530	GMH 5550	GMH 3511	GMH 3531	GMH 3551	GPH 114	G 1500	G 1501	HD-3456-2	GMH 5630	GMH 5650	GMH 3611	GMH 3651	GOX 20	G 1610	HD-3409-2
APPLICATION:																
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										•	•	•				•

	GMH 5530 / GMH 5550	GMH 3511 / GMH 3531 / GMH 3551	GPH 114	G 1500	G 1501	HD-3456-2	GMH 5630 / GMH 5650	GMH 3611 / GMH 3651	GOX 20	G 1610	HD-3409-2
EQUIPMENT:											
Measuring range — pH, mV; mg/l, % O₂; Temperature	• / rH · •	• / rH	pH	pH	•	• / χ, Ω, TDS, Sal, •	• / ppm, hPa · •	• / ppm, hPa · •	mg / l	•	• / mbar, •
Connections / Temperature	BNC-socket / 2 banana-jack	BNC-socket / 2 banana-jack	BNC-socket / --	BNC-socket / --	BNC-socket / 2 banana-j.	8-pole male connector	7 pin bayonet connection	6-pin Mini-DIN-socket	Electrode permanently connected to device		8-pole male connector
Temperature compensation	automatic and manual (Pt1000, NTC 10k)	automatic and manual (Pt1000)	manual	manual	automatic	automatic	automatic	automatic	automatic	automatic	automatic

	GMH 5530	GMH 5550	GMH 3511	GMH 3531	GMH 3551	GPH 114	G 1500	G 1501	HD-3456-2	GMH 5630	GMH 5650	GMH 3611	GMH 3651	GOX 20	G 1610	HD-3409-2
General functions: Min/Max, Hold, Auto-Off		•		•				•	•	•		•	•		•	•
adjustable calibration interval		•									•		•			
Interface	•	•		•	•				•	•	•	•	•			•
Analog output		•	•	•	•					•	•		•			
Calibration history		•			•				•				•			•
Alarm / Data logger		•			•			•	•		•		•			•
DEVICE INFORMATION:																
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Side tabs: HANDHELD INSTRUMENT · DISPLAY / CONTROLLER · LOGGER / BUS SYSTEMS · TRANSMITTER · TEMPERATURE PROBE · ALARM / PROTECTION, LEVEL

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:

WATER-PROOF DEVICE AND PLUG CONNECTIONS

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 measuring 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 only)	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)

Additional functions:

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 108)

GSOFT 3050
Art. no. 601336
Software for operation of logger devices (p.r.t. page 109)

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 113)

GKK 5001
Art. no. 611606
with cut-outs for 1 device of the GMH 5xxx-/7500 series and accessories for water analysis (395 x 295 x 106 mm), p.r.t. page 111

CONDUCTIVITY ELECTRODES

PURE AND ULTRA
PURE WATER

LF 200 RW
Art. no. 602841
Conductivity electrode stainless steel

Specifications:	
Measuring range:	0 ... 200 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
Scope of supply:	Measuring cell, manual

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
Scope of supply:	Measuring cell, manual

HD-22-3 with probe

Accessories and spare parts.

HD-22-3
Art. no. 700040
Freely positionable, flexible laboratory electrode holding arm. For probes with Ø 12 mm. (see picture)

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 mS/cm)

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
Shaft:	Epoxide, Ø 12 mm x 120 mm
Electrode:	4-pole graphite
Application:	Universal application, Economy Class
Cable length:	2 m
Scope of supply:	Measuring cell, manual

* 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
Conductivity electrode 4-pole graphite

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
Shaft:	PVC-C, Ø 16 mm x 145 mm
Electrode:	4-pole graphite
Application:	Tight tolerances, robust and precise for highest demands, High End Class
Cable length:	1 m
Scope of supply:	Measuring cell, manual

HANDHELD INSTRUMENT

DISPLAY / CONTROLLER

LOGGER / BUS SYSTEMS

TRANSMITTER

TEMPERATURE PROBE

ALARM / PROTECTION, LEVEL

CONDUCTIVITY MEASUREMENT SET

HANDHELD INSTRUMENTS INCL. ELECTRODE

ISO
ALARM
AUTOHOLD
AUTOOFF
LOGG
MIN MAX

e.g. GMH 5450

LF 425

LF 400

SET-GMH 5450
Art. no. 611246
Conductivity measurement set

General:

With our ready-to-use conductivity measurement set, you have everything you need for your work in a practical case and with the set price, you save 10 % in comparison with the prices for the individual components.

Application:

No matter which sector you work in, our comprehensive SET-GMH 5450 never lets you down and stows away in the tidy practical case

Specifications:

Measuring range device

Number of measuring 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

Electrode

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
Shaft:	PVC-C, Ø 16 mm x 145 mm
Electrode:	4-pole graphite
Application:	Tight tolerances, robust and precise for highest demands, High End Class
Cable length:	1 m
Dimensions:	450 x 360 x 123 mm (case)
Weight:	approx. 1800 g
Scope of supply:	Device incl. silicone protection cover, measuring cell, software, interface converter , case, battery, calibration protocol, manuals

Accessories and spare parts:

GMH 5450
Art. no. 600037
Water-proof handheld device with analog output and data logger, without electrode

LF 425
Art. no. 602840
Conductivity electrode 4-pole graphite

GSOFT 3050
Art. no. 601336
Software for operation of logger devices (p.r.t. page 109)

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

GKK 3700
Art. no. 601064
Case with nap foam for universal application (450 x 360 x 123 mm)

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 5001
Art. no. 611606
with cut-outs for 1 device of the GMH 5xxx-/7500 series and accessories for water analysis (395 x 295 x 106 mm), p.r.t. page 111

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 **(GMH 3451 only)**
	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:	automatically or off, 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).
Pushbuttons:	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 plastic housing, membrane keyboard, transparent panel, integrated pop-up clip
Dimensions:	Device: 142 x 71 x 26 mm (H 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

ISO
AUTOOFF
HOLD
MIN MAX

ISO
AUTOOFF
HOLD
MIN MAX

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

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).

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 g / kg water	--
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	
Operating 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	

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

HD-22-3
Art. no. 700040
Freely positionable, flexible laboratory electrode holding
arm. For probes with Ø 12 mm.

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

HANDHELD INSTRUMENT

DISPLAY / CONTROLLER

LOGGER / BUS SYSTEMS

TRANSMITTER

TEMPERATURE PROBE

ALARM / PROTECTION, LEVEL

PRECISE CONDUCTIVITY MEASURING DEVICE

G 1410   G 1420

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

○ rapid measurement detection

DURABLE AND AFFORDABLE

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/clea-nest 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

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:	automatic measuring range shifting, automatic temperature compensation
Display unit environment:	-20 ... +50 °C, 0 ... 95 % RH
Power supply:	2 x AA battery, >1000 h operating time
Protection rating:	IP65 / IP67
Housing:	Break-proof ABS housing
Dimensions:	108 x 54 x 28 mm (H x W x D) 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)

HD-22-3
Art. no. 700040
Freely positionable, flexible laboratory electrode holding arm. For probes with Ø 12 mm.

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

ST-G1000
Art. no. 611373
Device protection bag with 1 round cut-out

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

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
Measuring range:	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 ... +105.0 °C	-5.0 ... +105.0 °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)	

HANDHELD INSTRUMENT

DISPLAY / CONTROLLER

LOGGER / BUS SYSTEMS

TRANSMITTER

TEMPERATURE PROBE

ALARM / PROTECTION, LEVEL

PH / ORP / TEMPERATURE MEASURING DEVICES

HIGHLIGHTS:

○ ORP mode allows for automatic conversion to hydrogen system electrodes

○ 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$_H$ (DIN 38404)
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 bzw. 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 plastic housing, membrane keyboard, transparent panel, integrated pop-up clip
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)
G**MH 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 (not 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 GF 1T-T3-B-BS (Pt1000), case GKK 3500, GAK 1400

GF 1T-T3-B-BS
Art. no. 611088
Pt1000 handheld sensor, Pt1000 Class B, with 2 banana plugs

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

GE 117-BNC
Art. no. 600730
pH electrode with integrated Pt1000 sensor (see p. 59)

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

GKK 3001
Art. no. 611605
with cut-outs for 1 device of the GMH 3xxx series and accessories for water analysis (395 x 295 x 106 mm)

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 108).

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 GF 1T-T3-B-BS, buffer capsules 5 x GPH 4, 5 x GPH 7, 2 plastic wide mouth bottles GPF 100

Spare parts:

GE 114-BNC
Art. no. 604701
Spare electrode

GKK 3001
Art. no. 611605
with cut-outs for 1 device of the GMH 3xxx series and accessories for water analysis (395 x 295 x 106 mm)

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

WATER-PROOF DEVICE AND PLUG CONNECTIONS

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)
Operating conditions:	-25 ... +50 °C; 0 ... 95 % RH (non condensing)
Display:	two 4 ½ digit 7-segment displays (15 mm and 12 mm)
pH-Calibration	
Automatically:	1-, 2- or 3- point calibration, GREISINGER standard buffer or buffer to DIN19266 (A, C, D, F, G)
Manual:	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 108)

GSOFT 3050
Art. no. 601336
Software for operation of logger devices (p.r.t. page 109)

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 113)

GKK 5001
Art. no. 611606
with cut-outs for 1 device of the GMH 5xxx-/7500 series and accessories for water analysis (395 x 295 x 106 mm), p.r.t. page 111

Side tabs: HANDHELD INSTRUMENT | DISPLAY / CONTROLLER | LOGGER- / BUS SYSTEMS | TRANSMITTER | TEMPERATURE PROBE | ALARM / PROTECTION, LEVEL

HANDHELD INSTRUMENT

DISPLAY / CONTROLLER

LOGGER / BUS SYSTEMS

TRANSMITTER

TEMPERATURE PROBE

ALARM / PROTECTION, LEVEL

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 (GF 1T-T3-B-BS),
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 65)

GF 1T-T3-B-BS
Art. no. 611088
Pt1000 handheld probe
-70 ... +250 °C, Pt1000 class B
immersion probe Ø 3 mm made of V4A tube, black silicone handle up to +250 °C, 1 m,
silicone cable up to +230 °C permanently / +250 °C for 2 h, 2 x ø 4 mm banana plug
Response time T$_{90}$: water 0.4 m/s <2 s, air 2 m/s approx. 40 s
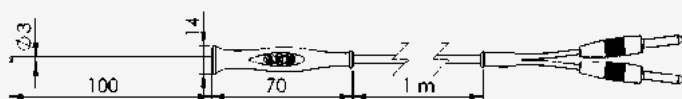
GE 100-BNC
Art. no. 600704
pH-electrode (p.r.t. page 65)

GR 105-BNC
Art. no. 607798
Redox-electrode (p.r.t. page 66)

PHL 4
Art. no. 601369
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:
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 GPF 100, 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

ISO

**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)
Operating conditions:	0 ... 45 °C; 0 ... 80 % RH (non condensing)
Storage temperature:	-20 ... +70 °C
Connection:	BNC bayonet
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, electrode, battery, manual

Accessories and spare parts:

GE 114-BNC
Art. no. 604701
Spare electrode

GPH 114 GL
Art. no. 606082
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. page 66

PH MEASUREMENT SET

NEW!

COMPLETE SET

SET-GMH 5550
Art. no. 611254
pH measurement set

General:

With our ready-to-use pH measurement set, you have everything you need for your work in a practical case and with the set price, you save 23 % in comparison with the prices for the individual components

Application:

No matter which sector you work in, our comprehensive SET-GMH 5550 never lets you down and stows away in the tidy practical case

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
Dimensions:	450 x 360 x 140 mm (case)
Weight:	approx. 5700 g
Scope of supply:	Device with silicone protective sleeve, pH electrode, 3 x buffer solution, KCL electrolyte, pepsin cleaning solution, Software, case, battery, calibration protocol, manual

Accessories and spare parts:

GMH 5550
Art. no. 600043
Waterproof handheld measuring device with analog output and data logger, without electrode (p.r.t. page 61)

GE 125-BNC
Art. no. 600732
waterproof pH electrode, incl. Pt 1000 temperature sensor with waterproof BNC plug and banana plug (p.r.t. page 65)

PHL 4
Art. no. 601369
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 3M
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.

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

GSOFT 3050
Art. no. 601336
Windows-software for handheld instruments with logger (p.r.t. page 109)

USB 5100
Art. no. 601095
galvanically isolated interface converter with device power supply via USB

GKK 2019
Art. no. 611147
Case with cut-outs for 1 device of the GMH 5000 series and accessories (450 x 360 x 140 mm)

G 1501-Set
Art-Nr: 611385
Complete set for pH/temperature measurement

General:

Affordable set for temperature-compensated pH measurement

Application:

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

Specifications:

Measuring range:	0.00 ... 14.00 pH
Resolution:	0.01 pH
Accuracy (device):	±0.02 pH ±1 digit (at nominal temperature 25 °C)
Temperature (G 1501 only):	
Measuring input:	2 x 4 mm banana for Pt 1000, 2-wire
Measuring range:	-5.0 ... +105.0 °C or 23.0 ... 221.0 °F
Accuracy:	±0.2 °C ±1 digit (at nominal temperature 25 °C)
Redox (OPR) (G 1501 only):	
Measuring input:	BNC socket (Redox or pH measurement adjustable via menu)
Measuring range:	-1500 ... 1500 mV or -1293 ... 1707 mV$_H$
Accuracy:	±0.1 % FS ±1 digit (at nominal temperature 25 °C)
Scope of supply:	G 1501 incl. electrode GE 114-WD, temperature sensor, buffer capsules, wide-neck bottle GPF 100

Accessories and spare parts:

See page 64

PRECISE PH MEASURING DEVICE

AUTOHOLD

HOLD

ISO

MIN MAX

DURABLE AND AFFORDABLE

HIGHLIGHTS:

○ Modern and functional housing

○ 3-line display / overhead display at the push of a button

○ Backlighting

○ Waterproof (IP65 / IP67)

○ Durable, long battery life

○ BNC connection for alternating electrodes

NEW: G 1501

○ with Redox (ORP) and temperature measurement

○ Alarm function

NEW!

ADDITIONAL FUNCTIONS G 1501:

ALARM

Connection G 1500   *Connection G 1501*

G 1500
Art. no. 609850
Precise pH measuring device, incl. pH electrode GE 114 WD

G 1501
Art-Nr: 611725
pH/Redox(ORP)/temperature measuring device with alarm function, 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.
Additional with G 1501:
The G 1501 also enables Redox (ORP) measurement (with temperature-compensated conversion of the Ag/AGCl reference system to a hydrogen system in accordance with DIN 38404 part 6, table 1) and automatic temperature compensation with connected Pt 1000 temperature sensor for pH and mVH measurements. An optical and visual alarm signal (min/max) is also included.

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

Specifications:

Measuring range:	0.00 ... 14.00 pH
Resolution:	0.01 pH
Accuracy (device):	±0.02 pH ±1 digit (at nominal temperature 25 °C)
Temperature (G 1501 only):	
Measuring input:	2 x 4 mm banana for Pt 1000, 2-wire
Measuring range:	-5.0 ... +105.0 °C or 23.0 ... 221.0 °F
Accuracy:	±0.2 °C ±1 digit (at nominal temperature 25 °C)
Redox (OPR) (G 1501 only)	
Measuring input:	BNC socket (Redox or pH measurement adjustable via menu)
Measuring range:	-1500 ... 1500 mV or -1293 ... 1707 mV$_H$
Accuracy:	±0.1 % FS ±1 digit (at nominal temperature 25 °C)
Display:	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 D) without sensor connection
Weight:	approx. 130 g (without electrode)
Scope of supply:	Device, electrode, calibration log, 2 x battery, manual

Accessories and spare parts:

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

G 1501-GL
Art. no. 611483
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. 601369
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.

ST-G1000
Art. no. 611373
Device protection bag with 1 round cut-out

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

Accessories for G 1501:

GF 1T-T3-B-BS
Art. no. 611088
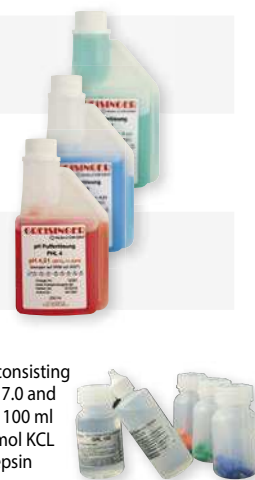Pt1000 handheld sensor, Pt1000 Class B, with 2 banana plugs

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

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

PH ELECTRODES

STERILIZABLE

	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]	without	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 or 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
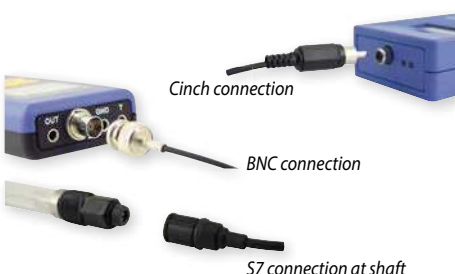
Options:
Longer cable for [1] [2]
(available cable lengths: up to 5 m)
Special designs
(electrodes with thread, other lengths, special applications etc.)

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

Cinch connection

BNC connection

S7 connection at shaft

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

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

ceramic rod

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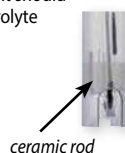**Application:**
low-ion or heavily soiled samples

glass sleeve

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.

Pellon strap

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.

HANDHELD INSTRUMENT
DISPLAY / CONTROLLER
LOGGER- / BUS SYSTEMS
TRANSMITTER
TEMPERATURE PROBE
ALARM / PROTECTION, LEVEL

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 ELECTRODES

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

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

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

GR 175-S7
Art. no. 607802
ORP electrode 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-Elektrolyt
Diaphragm:	2 x ceramic	1 x ceramic
Metal electrode:	Platin dome Ø 5 mm	
Thread:	without	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	

Options:

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

Buffer capsules and buffer solutions:

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.

PHL 4   *Art. no. 601369*
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

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

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

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
Device	
Dimensions:	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	
Measuring 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	
Measuring range:	-1.999.9 ... +1.999.9 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 ... 1.999 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	
Measuring 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 °C 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):	1.413 μS / cm
Measurement of temperature by instrument	
Resolution:	0.1 °C
Accuracy:	±0.25 °C
Scope of supply:	Instrument HD-3456-2, 3 x 1.5 V alkaline batteries, manual and DeltaLog9 version 2.0.

pH/mV electrodes, conductivity probes, oxygen sensor, 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
Freely positionable, flexible laboratory electrode holding arm. For probes with Ø 12 mm.

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, 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.).

HANDHELD INSTRUMENT

DISPLAY / CONTROLLER

LOGGER / BUS SYSTEMS

TRANSMITTER

TEMPERATURE PROBE

ALARM / PROTECTION, LEVEL

WATERPROOF HANDHELD MEASURING DEVICE FOR MEASURING DISSOLVED OXYGEN IN WATER

AUTOHOLD
AUTOOFF
MIN MAX

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

HIGHLIGHTS:

○ Significantly lower inward flow required than with the predecessor model

○ Dry storage possible for long-term storage needs

○ Compact 12 mm diameter retained!

GMH 5630
Art. no. 606880
Waterproof dissolved O₂ handheld measuring device without accessories

GMH 5650
Art. no. 606882
Waterproof dissolved O₂ 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)	O_2, 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 m.v. ±0.2 mg/l (0 ... 25 mg/l) bzw. ±2.5 % of m.v. ±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 ... +50 °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 (2 x AAA), 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, easy calibration to air at the push of a button
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.

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
Art. no. 608824
Depth measuring device

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

GCAL 3610
Art. no. 611371
Calibration bottle

HANDHELD INSTRUMENT | WATER ANALYSIS

HANDHELD INSTRUMENT

DISPLAY / CONTROLLER

LOGGER / BUS SYSTEMS

TRANSMITTER

TEMPERATURE PROBE

ALARM / PROTECTION, LEVEL

MEASUREMENT SET FOR DISSOLVED OXYGEN

ALARM
AUTOHOLD
AUTOOFF
LOGG
MIN MAX

NEW!

SET-GMH 5650
Art. no. 611255
Measurement set for dissolved oxygen

General:
With our ready-to-use measurement set for dissolved oxygen, you have everything you need for your work in a practical case and with the set price, you save 13 % in comparison with the prices for the individual components

Application:
No matter which sector you work in, our comprehensive SET-GMH 5650 never lets you down and stows away in the tidy practical case

Specifications:
Measuring channels:	O_2, T, air pressure (integrated) / measuring depth *1)
Measuring range:	
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:	300 ... 5000 hPa abs
Measuring depth:	0 ... 40.0 m water column *
Dimensions:	450 x 360 x 123 mm (case)
Weight:	approx. 1900 g
Scope of supply:	Device incl. protective silicone case, sensor, protective cap, software, interface converter, spare membrane cap, spare electrolyte, case, battery, calibration protocol, manuals

Accessories and spare parts:
GMH 5650
Art. no. 606882
Waterproof dissolved O_2 handheld measuring device without accessories with data logger and alarm

GWO 5610-L02
Art. no. 607386
Dissolved oxygen sensor with 2 m cable

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

GSOFT 3050
Art. no. 601336
Windows-software for handheld instruments with logger (p.r.t. page 109)

USB 5100
Art. no. 601095
galvanically isolated interface converter with device power supply via USB

GWOK 02
Art. no. 608012
Spare membrane cap

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

GKK 3700
Art. no. 601064
Case with nap foam for universal application (450 x 360 x 123 mm)

HANDHELD MEASURING DEVICE SETS

OXYGEN MEASURING DEVICE

READY-TO-USE

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

Varianten:

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

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

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

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

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

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

Accessories and spare parts:

GKK 5001
Art. no. 611606
with cut-outs for 1 device of the GMH 5xxx-/7500 series and accessories for water analysis (395 x 295 x 106 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

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 % of 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
Housing:	impact-resistant ABS housing
Dimensions:	106 x 67 x 30 mm (H x W x D)
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

PRECISE DISSOLVED OXYGEN MEASURING DEVICES (DO)

HOLD

MIN MAX

O / S-CORR

DURABLE AND AFFORDABLE

HIGHLIGHTS:

○ Modern and functional housing

○ 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

G 1610
Art. no. 610003
Waterproof dissolved oxygen measuring device (DO) with sensor, 2 m cable

G 1610-4
Art. no. 408380
Waterproof dissolved oxygen measuring device (DO) with sensor, 4 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 or 4 m cable, permanently connected to the device, with integrated temperature sensor
Response time T_{95}:	10 s at nominal temperature
Operating pressure:	max. 3 bar (~30 m water depth)
Sensor range of application:	0 ... 40 °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:	stability recognition, automatic adjustment to environmental air
Display unit environment:	-20 ... +50 °C, 0 ... 95 % RH
Power supply:	2 x AA battery, battery life >3000 h
Protection rating:	IP65 / IP67
Housing:	Break-proof ABS housing
Dimensions:	108 x 54 x 28 mm (H x W x D) without sensor
Weight:	240 g (device incl. sensor)
Scope of supply:	Device, sensor, GWOK 02 spare membrane cap and KOH 100 spare electrolyte, 2 x battery, manual

Accessories and spare parts:

GWOK 02
Art. no. 608012
Spare membrane cap

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

GCAL 3610
Art. no. 611371
Kalibrierflasche

ST-G1000
Art. no. 611373
Device protection bag with 1 round cut-out

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

GSKA 3600 mounted on the sensor

DISPLAY / CONTROLLER

LOGGER- / BUS SYSTEMS

TRANSMITTER

TEMPERATURE PROBE

ALARM / PROTECTION, LEVEL

HANDHELD INSTRUMENT

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OXYGEN MEASURING DEVICES FOR DISSOLVED OXYGEN IN LIQUIDS

AUTO OFF

HOLD

MIN MAX

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 range: (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: 300 ... 5000 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 (O$_2$ 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

GCAL 3610
Art. no. 611371
Calibration bottle

BENCH-TOP DISSOLVED OXYGEN METER

HIGHLIGHTS:

○ Primary water treatment

○ Laboratory instrument

○ Integrated pressure sensor (automatic compensation)

○ Rapid calibration function for the O_2 probe

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 basic device: (Please note probe 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-1A
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/1A
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	
Measuring 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	
Measuring range:	0.0 ... 600.0 %
Resolution:	0.1 %
Accuracy:	±0.3 % ±1 digit (in range of 0.0 ... 199.9 %) ±1 % ±1 digit (in range of 200.0 ... 600.0 %)

Automatic temperature compensation:	0 ... 50 °C
Measurement of barometric pressure	
Measuring range:	0,0 ... 1.100,0 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	
Measuring range:	0.0 ... 45.0 °C
Resolution:	0.1 °C
Accuracy:	±0.1 °C ±1 digit (device), additional error by sensor: ±1 % FS
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.

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