

EN

G 1400 series

Handheld Conductivity Meter
/ EC-Meter



G 1409 G 1410 G 1420

Members of GHM GROUP:

GREISINGER
HONSBERG
Martens
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1 About this documentation

1.1 Purpose of the document

- This document is intended as a quick reference option.
- It does not replace the operating manual.
- For this reason, read the operating manual before operating the product for the first time.

1.2 Legal notices

This document is entrusted to the recipient for personal use only. Any impermissible transfer, duplication, translation into other languages or excerpts from this operating manual are prohibited.

The manufacturer assumes no liability for print errors.

1.3 Further information

Software version of the product:

- V1.5 or later

Link to the complete operating manual:

<http://www.greisinger.de>

For the exact product name, refer to the type plate on the rear side of the product.

NOTE

For information about the software version, press and hold the ON button to switch on the product for longer than 5 seconds. The series is shown in the main display and the software version of the product is shown in the secondary display.

2 Safety

2.1 Explanation of safety symbols



DANGER

This symbol warns of imminent danger, which can result in death, severe bodily injury, or severe property damage in case of non-observance.



CAUTION

This symbol warns of potential dangers or harmful situations, which can cause damage to the device or to the environment in case of non-observance.



NOTE

This symbol indicates processes, which can have a direct influence on operation or can trigger an unforeseen reaction in case of non-observance.

2.2 Foreseeable misuse

The fault-free function and operational safety of the product can only be guaranteed if applicable safety precautions and the device-specific safety instructions for this document are observed.

If these notices are disregarded, personal injury or death, as well as property damage can occur.

**DANGER****Incorrect area of application!**

In order to prevent erratic behaviour of the product, personal injury or property damage, the product must be used exclusively as described in the chapter Description in the operating manual.

- Do not use in safety / Emergency Stop devices!
- The product is not suitable for use in explosion-prone areas!
- The product must not be used for diagnostic or other medical purposes on patients!
- The product is not intended to come into direct contact with food. For measurement in foods, samples must be taken and discarded after the measurement!
- Not suitable for use with requirements on functional safety, e.g. SIL!

2.3 Safety instructions

**NOTE**

This product does not belong in children's hands!

2.4 Intended use

The product is designed for measuring the conductivity in liquids. The measuring cell is connected permanently.

3 The product at a glance





3.1 G 1400 series



Front view

3.2 Display elements

Display

 Battery indicator	Evaluation of the battery status
 Unit display	Display of units or type of mode, min/max/hold
 Main display	Measurement of the current conductivity value or value for min/max/hold
 Auxiliary display	Corresponding temperature value for the value shown in the main display. If applicable, alternating with the temperature compensation.

3.3 Operating elements



On / Off button

Press briefly	Switch on the product Activate / deactivate lighting
Long press	Switch off the product Reject changes in a menu



Up / Down button

Press briefly	Display of the min/max value Change value of the selected parameter
Long press	Reset the min/max value of the current measurement
Both simultaneously	Rotate display, overhead display



Function key

Press briefly	Freeze measurement (Hold) Return to measurement display Call up next parameter
Long press, 2s	Open menu, frozen measurement is displayed Close menu, changes are saved

4 Measurement Basics

For additional information, refer to the operating manual!

4.1 General information about conductivity measuring

During the measurement, the conductivity measuring cell must be dipped at least in so far, that at least 30 mm beginning from the top of the measuring cell, is located in the medium. The maximum immersion depth for continuous operation should not exceed 110 mm

The measuring cell can either be stored dry or in water. After dry storage wetting time will be prolonged slightly. If changing over from one liquid to another with conductivities varying widely make sure to properly rinse and shake dry measuring cell.

If conductivity measured is much higher or lower than expected this may be due to the electrode being soiled with non-conducting or conducting foreign materials. Measuring cell has to be cleaned with a watery soap solution. When measuring media with low conductivities the electrode has to be stirred sufficiently.



NOTE

Measuring cell must never come into contact with water-repellent materials such as oil or silicone.

5 Operation and maintenance

5.1 Operating and maintenance notices

! NOTE

The product and conductivity measuring cell must be handled with care and used in accordance with the technical data. Do not throw or strike.

! NOTE

If the product is stored at a temperature above 50 °C, or is not used for an extended period of time, the batteries must be removed. Leaks from the batteries are avoided as a result.

The device is calibrated at the factory with the permanently connected conductivity measuring cell. The highest system precision can be achieved in this manner. If desired, a gradient correction can be carried out for the product in order to further optimise the accuracy in a narrow range. This is only necessary for normal use. See Adjustment of the measuring input.

5.2 Battery

5.2.1 Battery indicator

For additional information, refer to the operating manual!

5.2.2 Changing battery

Only use new, high-quality and suitable alkaline batteries!




For additional information, refer to the operating manual!



6 Operation

6.1 Opening the configuration menu

1. Press the *Function key* for 2 seconds to open the **Configuration** menu.
2. Cond appears in the display. Release the *Function key*.

Parameter	Values	Meaning
	 	
Input		
inP		
	Cond	Measured unit - conductivity
	rES	Measured unit - specific resistance (G 1420 only)
	EC	Measured unit – EC (~ mS/cm) (G 1409 only)
	CF	Measured variable – CF (~ 10 x EC) (G 1409 only)
	SRL	Measured variable - salt content / salinity (G 1410 only)
	tdS	Measured variable - total dissolved solids (G 1410 and G 1409 only)
Factor for TDS		
	ctdS	(G 1410 and G1409 only)
	$0.40 \dots 1.00$	Conversion factor for TDS measurement commonly used: 0.500 or 0.700

Temperature compensation

t_{cor}		
	α_{FF}	Do not compensate conductivity measurement
	n_{LF}	Non-linear function for natural water in accordance with EN 27888 (ISO 7888) Ground water, surface water or drinking water
	n_{RCl}	Compensation of weak NaCl solutions only in pure and ultrapure water (G 1420 only)
	$t_{L n}$	Linear temperature compensation (G 1420 only)

Compensation coefficient

$t_{L n}$		(G 1420 only)
	0.300 .. 3.000	Temperature compensation coefficient in %/K

Reference temperature for temperature compensation

t_{rEF}		
	25 °C	Reference temperature 25 °C or 77 °F
	20 °C	Reference temperature 20 °C or 68 °F

Shut-off time

$P_{\alpha FF}$		
	α_{FF}	No automatic shut-off
	15 30 60 120 240	Automatic shut-off after a selected time in minutes, during which no buttons have been pressed

Backlight

U E

<i>oFF</i>	Backlight deactivated
<i>15 30 60 120 240</i>	Automatic shut-off of the backlight after a selected time in seconds, during which no buttons have been pressed
<i>on</i>	No automatic shut off of the backlight

Display unit

U n E

<i>°C</i>	Temperature display in °C
<i>°F</i>	Temperature display in °F

Factory settings

i n E

<i>no</i>	Use current configuration
<i>YES</i>	Reset product to factory settings. <i>i n E done</i> appears in the display

6.2 Adjustment of the measuring input

For additional information, refer to the operating manual!

7 Error and system messages

Display	Meaning	Possible causes	Remedy
----	Range switches or value unstable Measurement far outside of range	Controlling instable Measuring cell defect Contamination or air bubbles	Wait for the transient effect of the controller clean contamination /bubbles Keep measurement within the permissible range Send in for repair
(, ,)	Cable defect	Cable breakage	Send in for repair
5Err5 Error	Sensor or probe defect Measuring range exceeded or undercut	sensor or probe defect Measurement outside range	Send in for repair
No display, unclear characters or no response to buttons	Battery depleted System error Product defect	Battery depleted Error in the product Product defect	Replace battery Send in for repair
bAtt	Battery depleted	Battery depleted	Replace battery
Err1	Measuring range exceeded	Measurement too high Measuring cell defect	Stay within allowable measurement range Check the measuring cell/ send in for repair
Err2	Measuring range is undercut	Measurement too low Measuring cell defect	Stay within allowable measurement range Check the measuring cell/ send in for repair
545 Err	System error	Error in the product	Switch product on/off Replace batteries Send in for repair

8 Technical data

G 1409

Measuring range	Conductivity	0 .. 5000 $\mu\text{S/cm}$
	EC	0 .. 5.000 EC (corresponds to mS/cm)
	CF	0.00 .. 50.00 CF (corresponds to 10 x EC)
	TDS	0 .. 2000 mg/l
	Temperature	-5.0 .. +80.0 °C (23.0 .. +176.0 °F).
Accuracy	Conductivity	typ. $\pm 1\%$ of measured value $\pm 0.5\%$ FS (0 .. 2000 $\mu\text{S/cm}$)
	Temperature	$\pm 0.3\text{ °C}$
Measuring cycle		approx. 10 measurements per second Updating of the display approx. 2 times per second
Display		3-line segment LCD, additional symbols, illuminated (adjustable white, permanent illumination)
Additional functions		Min/Max/Hold
Adjustment		Offset and gradient correction - temperature, Gradient correction - conductivity
Housing		Break-proof ABS housing
	Protection rating	IP65 / IP67
	Dimensions L*W*H [mm] and weight	108 * 54 * 28 mm without measuring cell or kink protection 180 g, incl. battery and measuring cell
Operating conditions		-20 to 50 °C; 0 to 95 % r.h. (temporarily 100 % r.h.)
Storage temperature		-20 to 70 °C

Power supply		2*AA battery (included in the scope of delivery)
	Current requirement/ battery life	approx. 2.2 mA, approx. 3.5 mA with lighting Service life > 1000 hours with alkaline batteries (without backlighting)
	Battery indicator	4-stage battery status indicator, Replacement indicator for depleted batteries: "BAT"
Auto-power-OFF function		The device switches off automatically if this is activated
Directives and standards		<p>The devices conform to the following Directives of the Council for the harmonisation of legal regulations of the Member States:</p> <p>2014/30/EU EMC Directive</p> <p>2011/65/EU RoHS</p> <p>Applied harmonised standards:</p> <p>EN 61326-1:2013 Emission limits: Class B Immunity according to Table 1 Additional errors: < 1 % FS</p> <p>EN 50581:2012</p> <p>The device is intended for mobile use and/or stationary operation in the scope of the specified operating conditions without further limitations.</p>

G 1410

Measuring range	Conductivity	0 .. 2000 S/cm 0.00 .. 20.00 mS/cm 0.0 .. 100.0 mS/cm
	Specific re- sistance	-
	Salinity	0.0 .. 50.0 g/kg
	TDS	0 .. 2000 mg/l
	Temperature	-5.0 .. +105.0 °C (23.0 .. +221.0 °F) – the conductivity measuring cells can be exposed temporarily to temperatures of up to 100 °C and permanently to temperatures of up to 80 °C.
Accuracy	Conductivity	± 0.5 % of measured value ± 0.5 % FS
	Temperature	± 0.3 °C
Measuring cycle		approx. 10 measurements per second Updating of the display approx. 2 times per second
Display		3-line segment LCD, additional symbols, illuminated (adjustable white, permanent illumination)
Additional functions		Min/Max/Hold
Adjustment		Offset and gradient correction - temperature, Gradient correction - conductivity
Housing		Break-proof ABS housing
	Protection rating	IP65 / IP67
	Dimensions L*W*H [mm] and weight	108 * 54 * 28 mm without measuring cell or kink protection 180 g, incl. battery and measuring cell

Operating conditions		-20 to 50 °C; 0 to 95 % r.h. (temporarily 100 % r.h.)
Storage temperature		-20 to 70 °C
Power supply		2*AA battery (included in the scope of delivery)
	Current requirement/ battery life	approx. 2.2 mA, approx. 3.5 mA with lighting Service life > 1000 hours with alkaline batteries (without backlighting)
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G 1420

Measuring range	Conductivity	0.000 .. 2.000 $\mu\text{S}/\text{cm}$ 0.00 .. 20.00 $\mu\text{S}/\text{cm}$ 0.0 .. 100.0 S/cm
	Specific resistance	10.0 .. 200.0 $\text{k}\Omega/\text{cm}$ 0.010 .. 2.000 $\text{M}\Omega/\text{cm}$ 0.01 .. 20.00 $\text{M}\Omega/\text{cm}$
	Salinity	-
	TDS	-
	Temperature	-5.0 .. +105.0 °C (23.0 .. +221.0 °F) – the conductivity measuring cells can be exposed temporarily to temperatures of up to 100 °C and permanently to temperatures of up to 80 °C.
Accuracy	Conductivity	Typ. $\pm 1\%$ of measured value $\pm 0.5\%$ FS
	Temperature	$\pm 0.3\text{ °C}$
Measuring cycle		approx. 10 measurements per second Updating of the display approx. 2 times per second
Display		3-line segment LCD, additional symbols, illuminated (adjustable white, permanent illumination)
Additional functions		Min/Max/Hold
Adjustment		Offset and gradient correction - temperature, Gradient correction - conductivity
Housing		Break-proof ABS housing
	Protection rating	IP65 / IP67
	Dimensions L*W*H [mm] and weight	108 * 54 * 28 mm without measuring cell or kink protection

		210 g, incl. battery and measuring cell
Operating conditions		-20 to 50 °C; 0 to 95 % r.h. (temporarily 100 % r.h.)
Storage temperature		-20 to 70 °C
Power supply		2*AA battery (included in the scope of delivery)
	Current requirement/ battery life	approx. 2.2 mA, approx. 3.5 mA with lighting Service life > 1000 hours with alkaline batteries (without backlighting)
	Battery indicator	4-stage battery status indicator, Replacement indicator for depleted batteries: "BAT"
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9 Service

9.1 Manufacturer

If you have any questions, please do not hesitate to contact us:

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