

EN

304 series

Handheld conductivity measuring device

Quick reference guide

European catalogue number:

EU connection: 663-0348 HCO 304, 663-0349 LCO 304

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1 Legal address of the manufacturer

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2 About this documentation

2.1 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.

2.2 Warranty

VWR guarantees that this product will remain free from material and production defects for a period of two (2) years from the time of delivery. If there is a defect, VWR shall decide on its own discretion whether to repair or replace the product free of charge or to provide the customer with a refund of the purchase price of the product, insofar as it is sent back during the warranty period. This warranty shall be voided if the product was damaged accidentally or intentionally due to improper use or normal wear. Insofar as the necessary maintenance tasks and inspections are not carried out in accordance with the operating manual and the local requirements, the warranty shall be voided, unless this omission is not causal for the defects of the product.

The customer must insure returned articles against damage and loss. This warranty is limited to the aforementioned rights. IT IS EXPRESSLY AGREED THAT THIS WARRANTY APPLIES INSTEAD OF ANY WARRANTY OF FITNESS AND INSTEAD OF WARRANTY OF GENERAL MERCHANTABILITY.

2.3 Compliance with local laws and other legal regulations

The customer is responsible for obtaining the necessary official approvals and other authorisations that are necessary for operation and use of the purchased product in its place of use. VWR can only be held liable if the customer fails to carry out the necessary activities for this purpose or authorisations are not issued unless a corresponding rejection is based on a defect of the product.

2.4 Further information

Software version of the product:

- V1.3 or later

Link to the complete operating manual

<http://www.vwr.com>

<http://www.conrad.com/downloads>

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.

3 Safety

3.1 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.

3.2 Foreseeable misuse

The fault-free function and operational safety of the product can only be guaranteed if generally 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!

3.3 Safety instructions

This product has been designed and tested according to the safety requirements for electronic measuring devices.

CAUTION

Erratic behaviour!

On suspicion that the product can no longer be operated without danger, it must be decommissioned and prevented from recommissioning with appropriate labelling. The safety of the user can be impaired by the device if, for example, if it shows visible damage, it no longer works as specified or if it was stored for an extended period of time under unsuitable conditions.

- Visual inspection!
- In case of doubt, send the product to the manufacturer for repair or maintenance!

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.

NOTE

This product does not belong in children's hands!

3.4 Intended use

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

Measuring range		HCO304	LCO304
	Conductivity	0 .. 2000 $\mu\text{S/cm}$ 0.00 .. 20.00 mS/cm 0.0 .. 100.0 mS/cm	- - -
	Specific resistance	0.000 .. 2.000 $\mu\text{S/cm}$ 0.00 .. 20.00 $\mu\text{S/cm}$ 0.0 .. 100.0 $\mu\text{S/cm}$	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	0.0 .. 50.0 g/kg	-
	TDS	0 .. 2000 mg/l	-
	Temperature	-5.0 .. +100.0 °C (23.0 .. +212.0 °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.	
	Operating conditions	-20 to 50 °C; 0 to 95 % r.h. (temporarily 100 % r.h.)	
Storage temperature		-20 to 70 °C	
Protection rating		IP65 / IP67	

4 The product at a glance

4.1 304 series



LCD Display



HCO304



LCO304



HCO304



LCO304

4.2 Display elements

Display



Battery indicator

Evaluation of the battery status



Unit display

Display of units, if applicable, with unstable symbol 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.

4.3 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

Return to measurement display

Call up next parameter

Long press, 2s

Open menu, frozen measurement is displayed

Close menu, changes are saved

5 Bases for measurement

For additional information, refer to the operating manual!

6 Maintenance

6.1 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

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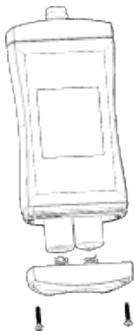
The device is calibrated at the factory with the permanently connected conductivity measuring cell. The highest system precision can be achieved in this manner. If desired, a gradient correction can be carried out for the product in order to further optimise the accuracy in a narrow range. This is only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

6.2 Battery

6.2.1 Battery indicator

For additional information, refer to the operating manual!

6.2.2 Changing battery



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

For additional information, refer to the operating manual!

7 Operation

Parameter	Values	Meaning
	 	
Input		
inP		
	ϵ_{ond}	Measured variable - conductivity
	rES	Measured variable - specific resistance
	SR_L	Measured variable - salt content / salinity
	t_{dS}	Measured variable - total dissolved solids
Factor for TDS		
$ctdS$		
	$0.40 \dots 1.00$	Conversion factor for TDS measurement
Temperature compensation		
t_{cor}		
	oFF	Do not compensate conductivity measurement
	nLF	Non-linear function for natural water in accordance with EN 27888 (ISO 7888) Ground water, surface water or drinking water
	nR_{cl}	Compensation of weak NaCl solutions only in pure and ultrapure water
	L_n	Linear temperature compensation
Compensation coefficient		
t_{L_n}		
	$0.300 \dots 3.000$	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_{OFF}		
	OFF	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

Backlighting

L, t_E		
	OFF	Backlighting deactivated
	15 30 60 120 240	Automatic shut-off of the backlighting after a selected time in seconds, during which no buttons have been pressed
	ON	No automatic shut-off of the backlighting

Temperature unit

U_{in}, t		
	°C	Temperature display in °C
	°F	Temperature display in °F

Factory settings

I_{in}, t		
	NO	Use current configuration
	YES	Reset product to factory settings. I_{in}, t done appears in the display

8 Error and system messages

Display	Meaning	Possible causes	Remedy
----	Range switching or measured value unstable	Measuring cell defect	Wait for the transient effect of the controller
	Measurement far outside of the measuring range	Contamination or air bubbles	Measurement leaves the permissible range Send in for repair
No display, unclear characters or no response when buttons are pressed	Battery depleted	Battery depleted	Replace battery
	System error	Error in the product	Send in for repair
	Product is defective	Product is defective	
bAt	Battery depleted	Battery depleted	Replace battery
Err.1	Measuring range exceeded	Measurement too high	The measurement is above the permissible range
		Measuring cell defect	Check the measuring cell Send in for repair
Err.2	Measuring range is undercut	Measurement too low	The measurement is below the permissible range
		Measuring cell defect	Check the measuring cell Send in for repair
555 Err	System error	Error in the product	Switch product on/off Replace batteries Send in for repair

9 Service

9.1 Online resources

The following information is provided on the VWR website at www.vwr.com:

- All contact information of the technical customer service
- VWR online catalogue and information about accessories and compatible products
- Additional product information and special offers

Contact If you require information or technical support, please contact your VWR sales centre or visit our website: www.vwr.com.