Operating Instructions
for
Hand-held Conductivity
Measuring Units

Model: HND-C110

1. Contents

Manufactured and sold by:

Kobold Messring GmbH
Nordring 22-24
D-65719 Hofheim
Tel.: +49(0)6192-2990
Fax: +49(0)6192-23398
E-Mail: info.de@kobold.com
Internet: www.kobold.com

2. Note

Please read these operating instructions before unpacking and putting the unit into operation. Follow the instructions precisely as described herein.
The instruction manuals on our website www.kobold.com are always for currently manufactured version of our products. Due to technical changes, the instruction manuals available online may not always correspond to the product version you have purchased. If you need an instruction manual that corresponds to the purchased product version, you can request it from us free of charge by email (info.de@kobold.com) in PDF format, specifying the relevant invoice number and serial number. If you wish, the operating instructions can also be sent to you by post in paper form against an applicable postage fee.

The devices are only to be used, maintained and serviced by persons familiar with these operating instructions and in accordance with local regulations applying to Health & Safety and prevention of accidents.

When used in machines, the measuring unit should be used only when the machines fulfil the EC-machine guidelines.

3. Instrument Inspection

Instruments are inspected before shipping and sent out in perfect condition.
Should damage to a device be visible, we recommend a thorough inspection of the delivery packaging. In case of damage, please inform your parcel service / forwarding agent immediately, since they are responsible for damages during transit.

Scope of delivery:
The standard delivery includes:

- Hand-held Conductivity Measuring Units Model: HND-C110

4. Regulation Use

Any use of the Hand-held Conductivity Measuring Units, model: HND-C110, which exceeds the manufacturer's specification, may invalidate its warranty. Therefore, any resulting damage is not the responsibility of the manufacturer. The user assumes all risk for such usage.

5. Operating Principle

The KOBOLD hand-held conductivity measuring units of model HND-C110 is a compact conductivity measuring units with solidly connected probes that can be used universally. Due to the double display, both the conductivity and the temperature value can be displayed simultaneously. The HND-C110 model offers functions like minimum/maximum value memory, hold function, auto-off function, and AutoRange (automatic adjustment of the optimum measuring range).
Due to the high temperature dependency in conductivity measurement, the manual measuring unit has automatic temperature compensation.
With the improved unit HND-C110, the determination of resistance, salinity and TDS are also part of the scope of functions.

6. Electrical Connection

6.1 Mains operation:

When using a power supply unit please note that operating voltage has to be 10.5 to 12 V_{DC}. Do not apply over-voltage!! Simple 12 V-power supply units often have excessive no-load voltage. We, therefore, recommend using regulated voltage power supply units. Trouble-free operation is guaranteed by our power supply HND-Z002. Prior to connecting the plug power supply unit with the mains supply make sure that the operating voltage stated at the power supply unit is identical to the mains voltage.

7. Operation / Configuration / Adjustments

7.1 Safety Requirements

This device has been designed and tested in accordance with the safety regulations for electronic devices. However, its trouble-free operation and reliability cannot be guaranteed unless the standard safety measures and special safety advises given in this manual will be adhered to when using the device.

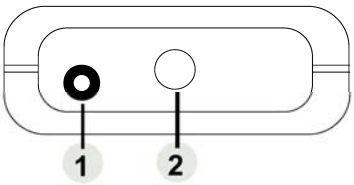
1. Trouble-free operation and reliability of the device can only be guaranteed if the device is not subjected to any other climatic conditions than those stated under chapter 16 Technical Data.
2. If the device is transported from a cold to a warm environment condensation may cause a failure of the instrument. In such a case make sure the device temperature has adjusted to the ambient temperature before trying a new start-up.
3. If the device is to be connected to other devices (e.g. via serial interface) the circuitry has to be designed most carefully. Internal connection in third party devices (e.g. connection GND and earth) may result in not-permissible voltages impairing or destroying the device or another device connected.

Warning: If device is operated with a defective mains power supply (short circuit from mains voltage to output voltage) this may result in hazardous voltages at the device (e.g. sensor socket, serial interface).

4. If there is a risk whatsoever involved in running it, the device has to be switched off immediately and to be marked accordingly to avoid re-starting.
   - there is visible damage to the device
   - the device is not working as specified
   - the device has been stored under unsuitable conditions.

In case of doubt, please return the device to manufacturer for repair or maintenance.

7.2 Connections



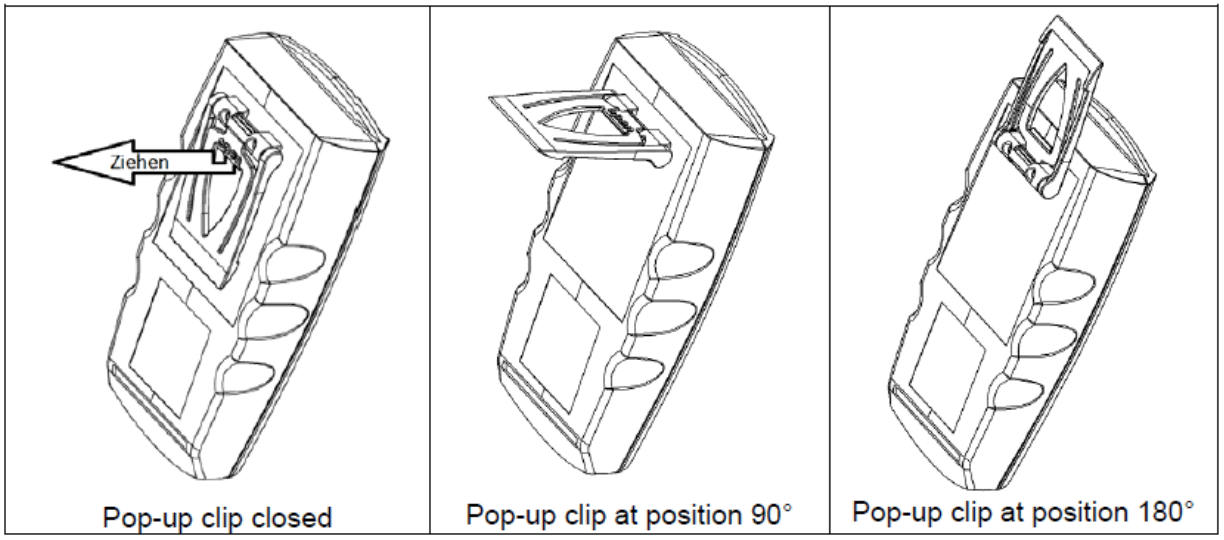
1 **Interface**: Connection for electrically isolated interface adaptor (accessories: HND-Z031)

2 **Electrode**: cable gland for fixed conductivity electrode

The mains socket is located at the left side of the instrument.

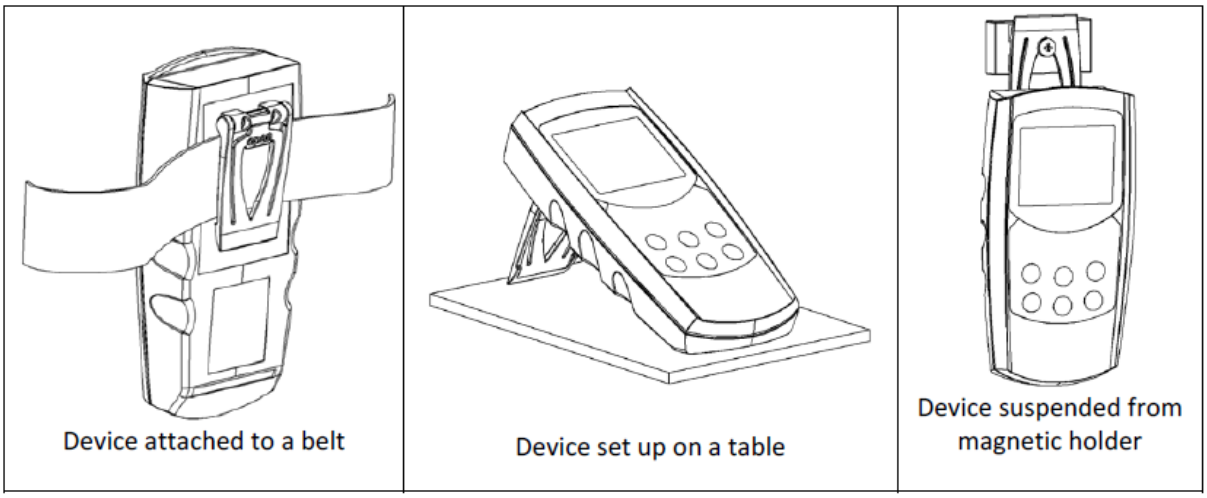
7.3 Pop-up clip

Handling:
- Pull at label “open” in order to swing open the pop-up clip.
- Pull at label “open” again to swing open the pop-up clip further.



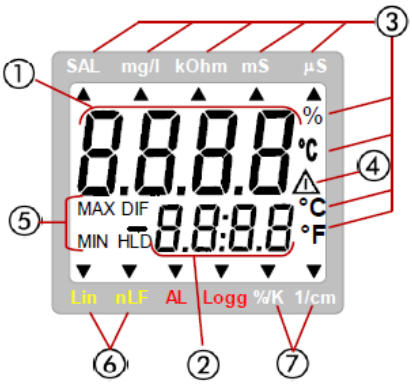
Pop-up clip closed | Pop-up clip at position 90° | Pop-up clip at position 180°

Function:
- The device with a closed pop-up clip can be plainly laid onto a table or attached to a belt, etc.
- The device with pop-up clip at position 90° can be set up on a table, etc.
- The device with pop-up clip at position 180° can be suspended from a screw or the magnetic holder



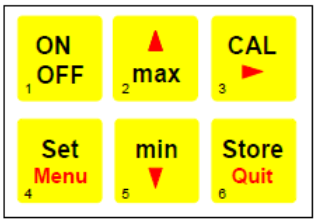
Device attached to a belt | Device set up on a table | Device suspended from magnetic holder

7.3.1 Displays



1	**Main display**:	conductivity (mS/cm, µS/cm) resistivity (kΩcm) TDS / total dissolved solids (mg/l) salinity (SAL)
2	**Secondary display**: measuring value temperature	
3	Arrows to selected **measuring unit**	
4	**Warning signal:**	indicates low battery or missing calibration
5	Display elements to show minimum / maximum / memorized measuring value	
6	**nLF, Lin**:	display element for selected **temperature compensation**
7	**%/K, 1/cm:**	additional configuration units

7.4 Pushbuttons



ON OFF	**On / Off key** press shortly: switch on/off instrument
Set Menu	**Set / Menu**: press shortly: change-over between measuring units (only if „InP: SEt“ is selected) press for 2 sec. (menu): invoke configuration menu
max + min	**min/max when taking measurements:** press shortly: min. or max. value is displayed press for 2 sec: the corresponding value is deleted **Configuration:** to enter values or change settings
CAL	**CAL**: only at mode ‘cond’=conductivity: press for 2 sec: start cell correction adjustment
Store Quit	**Store/Quit**: Measurement: hold and save current measuring value (‘HLD’ is displayed) Set/Menu: confirm settings, return to measuring

8. Start operation

Turn device on via ON/OFF key.

After segment test  the device displays some information on its configuration:

SCL if cell correction scale was changed (cell correction scale unequal 1.000) (see chapter 10 Automatic adjustment/calibration of cell correction)

Corr if zero point or slope correction is active
(see chapter 12 Adjustment of temperature input)
After that the device is ready for measuring.

9. Principles of the measurements

9.1 Basics about conductivity

Definition of conductivity γ: The ability of a material to conduct electric current:

$$\gamma = \frac{l}{R \cdot A}$$

l: length of the material diameter measured resistance
A: diameter
R: measured resistance

Unit $[\gamma] = \frac{\text{Siemens}}{\text{meter}} = \frac{S}{m}$ common for liquids: $\frac{mS}{cm}$ and $\frac{\mu S}{cm}$

The conductivity is the reciprocal value of the resistivity.
(The conductance is the reciprocal value of the measured resistance R)

9.2 Conductivity measurement

The conductivity measurement is a rather uncomplicated measurement. The standard electrodes are stable for a long time if used correctly and can be adjusted by an integrated Cal-function.

Measuring ranges: 0.0 – 200.0 µS/cm
0 - 2000 µS/cm
0.00 – 20.0 mS/cm
0.0 – 200.0 m

If the range selection is set to „Auto Range“, the range with the best resolution is automatically selected. However, interface operation requires a manual/fixed selection of the measuring range from the table above (No interface operation with Auto-range!).

9.3 Resistivity measurement

The resistivity is the reciprocal value of the conductivity and the device displays it in kOhm•cm.

Measuring ranges: 0.000 – 2.000 kOhm*cm
0.00 – 20.00 kOhm*cm
0.0 – 100.0 kOhm*c

If the range selection is set to „Auto Range“, the range with the best resolution is automatically selected. However, interface operation requires a manual/fixed selection of the measuring range from the table above (No interface operation with Auto-range!).

9.4 TDS measurement

At the TDS (total dissolved solids) measurement the filtrate dry residue is determined by means of the conductivity and a conversion factor (C.tdS). Well suited for easy concentration measurements of e.g. salt solutions. The determined value is displayed in mg/l.

Measuring ranges: 0,0 - 200,0 mg/l 0 – 2000 mg/l

Displayed value TDS = conductivity [in µs/cm, nLF-temp. comp. at 25°C] • C.tdS (input at menu)

Approximately:

C.tdS	
0.50	Monovalent salts with 2 ion types (NaCl, KCl, etc.)
0.50	Natural waters / surface waters, drinking water
0.65-0.70	e.g. salt concentration of aqueous fertilizer solutions

Attention: This are only approximate values – good for estimations, but no precise measurement.
For precise measurements the conversion value has to be determined for the corresponding solution for the relevant concentration range.
This may be done by comparison with known reference solutions or by actually evaporating a certain amount of solution with determined conductivity and subsequent weighing of the dry residue.

9.5 Salinity measuring

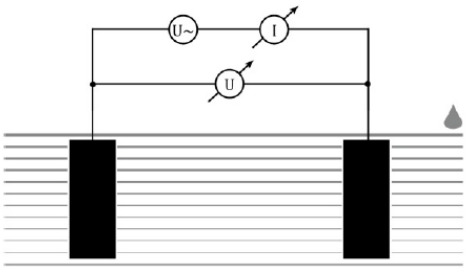
The salinity (salt content) of seawater can be determined in the measuring mode „SAL“ (basis: International Oceanographic Tables; IOT)
The salinity of standard-seawater is 35 ‰ (35 g salt per 1 kg seawater).
The values are displayed in ‰ (g/ kg).
Additionally, the term “PSU” (Practical Salinity Unit) is sometimes used, the displayed value is the same. The salinity measurement has its “own” temperature compensation, i.e. the temperature is automatically taken into account for the salinity measurement. The menu settings regarding the temperature compensation are ignored.

Attention: The salt composition of the different seas is not the identical. Depending on place, weather, tides, etc. there may be considerable divergences to the 35 ‰ according to IOT. Additionally, the salt composition may influence the ratio between salinity and actual salt content.

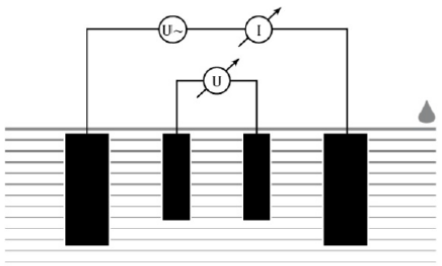
9.6 Electrodes / measuring cells

9.6.1 Design

Basically, there are two types of measuring cells: 2-pole and 4-pole cells. The operation is done similarly; the 4-pole measuring cells can compensate polarization effects and – up to some degree – soiling due to its complex measuring method.



2-pole measuring cell



4-pole measuring cell

9.7 Temperature compensation

The conductivity of aqueous solutions depends on its temperature. The temperature dependency is strongly dependent on the type of solution. The temperature compensation recalculates solutions’ conductivity to a consistent reference temperature. The most common reference temperature is 25 °C.

9.7.1 Temperature compensation “nLF” according to EN 27888

For most applications (e.g. in the area of fish farming, surface or drinking water measurements, etc.) the non-linear temperature compensation for natural water (“nLF”, according to EN 27888) is sufficiently accurate. The common reference temperature is 25 °C.
Recommended application range of nLF-compensation: between 60 µS/cm and 1000 µS/cm.

9.7.2 Linear temperature compensation and determination of temperature coefficient “t.Lin“

If the actual function needed for exact temperature compensation is not known, “linear temperature compensation” is normally selected (Menu, t.Cor = Lin, t.Lin corresponds TK_{lin}), i.e. one assumes that the actual temperature dependency at the considered concentration range is approximately equal:

$$LF_{Tref} = \frac{LF_{Tx}}{1 + \frac{TK_{lin}}{100\%} \bullet (Tx - Tref)}$$

Temperature coefficient of about 2.0 %/K are most common.
A temperature coefficient can be determined for example by measuring a solution with deactivated temperature compensation at two different temperatures (T1 and T2).

$$TK_{lin} = \frac{(LF_{T1} - LF_{T2}) \bullet 100\%}{(T1 - T2) \bullet LF_{T1}}$$

TKlin is the value input at the menu “t.Lin”. LFT1 conductivity at temperature T1 LFT2 conductivity at temperature T2

10. Device Configuration

Some menu points depend on current device settings.
For configuration of the device press Set Menu-key for 2 seconds. This will activate the configuration menu (main display: “SEt”). Pressing „Menu“ Set Menu changes between the menu points, pressing CAL jumps to the referring parameters, which can be selected with key CAL.
The parameter value can be changed with max or min. Pressing „Menu“ Set Menu again jumps back to the main configuration menu and saves the settings. Pressing „Quit“ Store Quit finishes the configuration.

Pressing “menu” and “store” at the same time for more than 2 seconds will reset the device to factory defaults.
If no key is pressed for more than 2 minutes the configuration will be aborted. All changes will be discarded!

Menu	Parameter	Value	Description		
Set Menu	CAL	max or min			
SEt ConF	**Set Configuration: General configuration**				
	InP	**Input: Selection of measured variable**			
		Cond rESi tdS	Conductivity Resistivity Total dissolved solids		
		SAL	Salinity		
		SEt	Change-over measured variables by Set-key		
	t.tdS	**TDS measurement: conversion factor (only if Inp=tdS)**			
		0.40-1.00	Conversion factor for TDS measurement		
	CELL CorrF	**Cell Corr: Adjustment of cell correction: multiplication factor**			
		0.800-1.200	Multiplication factor of cell correction Factory setting: 1.000		
	rAnG	**Range: Selection of display range (conductivity, resistivity or tdS)**			
		Auto 200.0 µS/cm … 200.0 mS/cm	Automatic range selection Lowest selectable range (conductivity) … Highest selectable range (conductivity)		
	CAL	**Automatic adjustment/calibration with reference solution (only if InP=Cond)**			
		Edit **REF:S**	Manual adjustment to reference value Choice of standard reference solutions		
	rEF.S	**REF.S: Choice of standard solutions for automatic adjustment/cal.**			
		1413 µS/cm 2760 µS/cm 12.88 mS/cm 50 mS/cm 111.8 mS/cm	Reference solution 0.01 M KCL 0.02 M KCL 0.1 M KCL Sea-water reference solution KCL 1 M KCL		
	Unit t	**Unit t: Selection of temperature unit**			
		°C °F	All temperature values in degree Celsius All temperature values in degree Fahrenheit		
	t.Cor	**Temperaturecompensation (not for InP=SAL)**			
		oFF	No temperature compensation of conductivity measurement		
		nLF	Non-linear function for natural water according to EN 27888 (ISO 7888), ground, surface and drinking water		
		Lin	Linear temperature compensation		
	t.Lin	**Compensation coefficient (only if t.Cor=Lin)**			
		0.300 3.000	Temperature compensation coefficient in %/K		
	trEF	**Refernce temperature of temperature compensation (only if tCor=Lin or nLF)**			
		25 °C/77 °F 20 °C/68 °F	Reference temperature 25 °C/77 °F Reference temperature 20 °C/68 °F		
	CInt	**Adjustment/Calibration: Adjustment reminder period (factory setting: oFF)**			
		1…730 oFF	Adjustment reminder period (in days) No adjustment reminder		
SEt ConF	AutO	**Auto Hold: Automatic measuring value identification**			
		on **oFF**	Auto measuring value identification Auto Hold Standard hold function on keypress		
	PoFF	**Auto Power-Off: Selection of power-off delay**			
		1…120 **oFF**	Power-off delay in minutes Device will automatically switch off as soon as this time has elapsed if no key is pressed/no interface communication takes place. Automatic power-off function deactivated (continuous operation)		

Menu	Parameter	Value	Description		
Set Menu	CAL	max or min			
SEt OUt	**Set Output: Configuration of universal output**				
	OUt	**oFF** **SEr:**	Output off -> minimal power consumption Serial interface activated		
	Adr	**0,1,11…91**	Base adress for serial interface communication		
SEt Corr	**Set Corr: Measurement correction**				
	OFFS	**Zero point adjustment/offset of temperature measurement**			
		oFF **-5.0…5.0 °C**	No zero point adjustment for temperature measurement Offset of temperature measurement in °C		
	SCAL	**Slope adjustment of temperature measurement**			
		oFF **-5.00…5.00**	No slope adjustment for temperature measurement Slope correction of temperature measurement in [%]		
SEt CLOC	**Set Clock: Set real time**				
	CLOC	**HH:MM**	**Clock**: set time hours:minutes		
	YEAr	**YYYY**	**Year**: set year		
	dAtE	**TT.MM**	**Date**: Set date day.month		
rEAd CAL	**rEAD CAL: Read calibration data:** **see chapter 14.2 Calibration storage (rEAd CAL)**				

11. Universal output

If none of both is needed, we suggest to switch the output off, because battery life then is extended.

11.1 The Serial Interface

All measuring and setting data of the device can be read and changed by means of the serial interface and a suitable electrically isolated interface adapter (HND-Z031). In order to avoid transmission errors, there are several security checks implemented.
The following **standard software packages** are available for data transfer:

-**BUS-S20M:** 20-channel software to simultaneously display
conductivity (channel 1)
temperature (channel 2)
resistivity (channel 3)
TDS (channel 4) and/or
salinity (channel 5).

If you want to use the interface functions make sure to switch off the Auto-Range function.

The device has 2 channels:

- Channel 1: current measuring value Cond, rES, TDS oder SAL (base address)
- Channel 2: temperature value

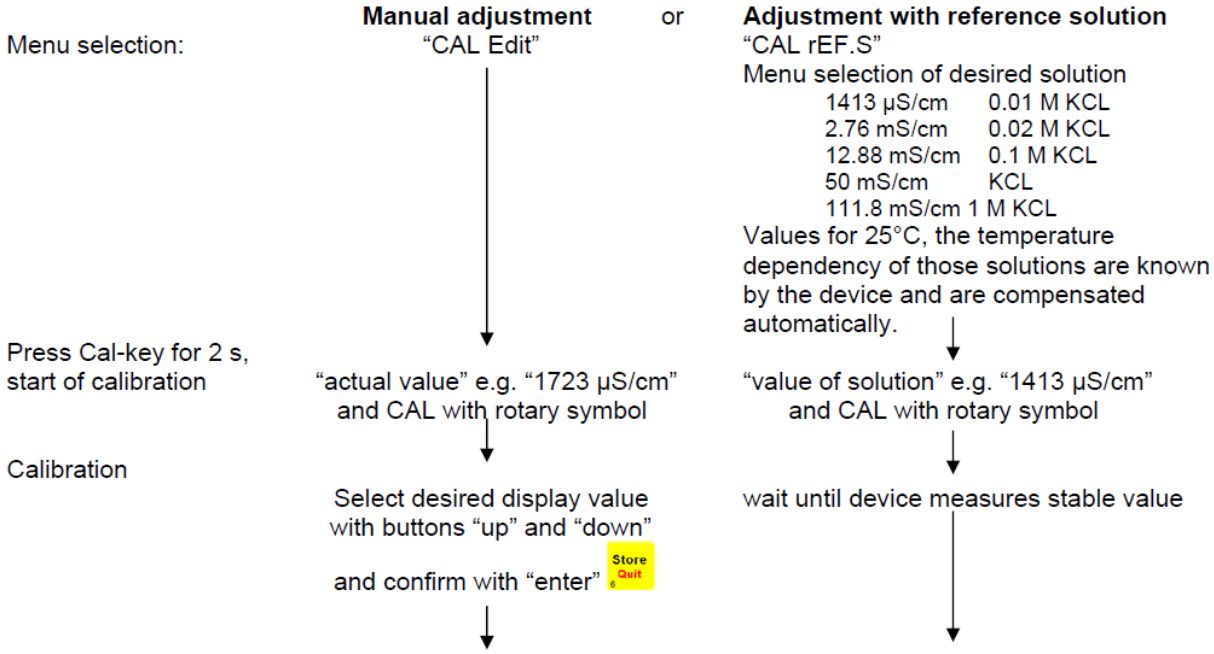
The measuring- and display range values read back from the interface are always in the selected measurement unit!

12. Adjustment of temperature input

The temperature input can be adjusted with offset and scale. A reasonable adjustment presumes reliable references (e.g. ice water, controlled precision water bath, etc.).
If the inputs are adjusted (i.e. offset and scale are different from default settings) the device will shortly display “Corr” after turned on.
Default setting for offset and scale are ‘off’ = 0.0, i.e. inputs are not changed.
Zero point correction: Displayed value = measured value – OFFS
Zero point and slope correction: Displayed value = (measured value – OFFS) * (1 + SCAL / 100)
Displayed value °F = (meas. value °F - 32°F - OFFS) • (1 + SCAL / 100)

13. Automatic adjustment/calibration of cell correction

Besides the direct input of the cell correction (see below) via the menu (“CELL Corr”) the cell correction can also be determined automatically:



Error messages of automatic adjustment/calibration:

CAL Err.1 Cell correction too high	Determined cell correction must not exceed 1.2
CAL Err.2 Cell correction too small	Determined cell correction must not fall below 0.8
CAL Err.3 Solution of wrong range	Wrong solution / far beyond tolerance
CAL Err.4 Wrong temperature	Beyond permitted temperature: 0.0 – 34.0 °C (or 0.0 – 27.0 °C at 111.8 mS/cm)

Alternative to automatic adjustment:
Manual calculation of cell correction with a reference solution
Example KCl-solution c= 0.01 M: 1413 µS cm-1 at 25°C
At other temperatures switch temperature compensation off (t.Cor = oFF) and use the referring conductivity!

Conductivity displayed = 1500 µS cm-1 if selected cell correction is 1.000 cm-1
(CELL Corr = 1.000)
Conductivity of solution at solution temperature 25 °C: Conductivity real = 1413 µS cm-1
Cell correction c = conductivity real / conductivity displayed [cm-1]
= 1413 / 1970 * cm-1 = 0.942 cm-1 (Enter CELL Corr of 0.942)

14. GLP

GLP (Good Laboratory Practice) includes regular check of devices and accessories. For pH measurements it is highly important to ensure correct pH calibration. The device provides the following functions to help with this.

14.1 Calibration interval (C.Int)

You can input the interval after which the device reminds you to recalibrate.
The interval times should be chosen according to the application and the stability of the electrode. “CAL” flashes on the display as soon as the interval has expired.

14.2 Calibration storage (rEAd CAL)

The last 16 calibrations are stored with results and date and can be read out.
Display calibration data:
Historical calibration data can be comfortably read out via PC software HND-Z034 or displayed directly at the device:

Press for 2 seconds: The display will   show: or (configuration level)

Press several times until this is displayed:  read cal. = „read calibration data“

Press shortly: switch between:
- CELL = cell correction
- C.rEF = reference value, at which cell correction has been adjusted
- Display of date+time of data set

or 

Change between the different calibration data sets

Quit calibration data set display

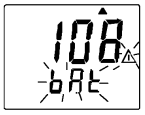
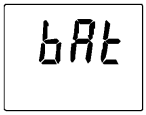
14.3 Real Time Clock (“CLOC”)

The real time clock is used for chronological assignment of the calibration points. Please check the settings when necessary.

14.4 Accuracy Check / Adjustment Service

You can send the device to the manufacturer for adjustment and inspection. Calibration certificate - DKD certificate - official certifications:
If the measuring instrument is supposed to receive a calibration certificate, it has to be sent to the manufacturer (declare test points).
If the device is certificated together with a suitable sensor very high overall accuracies are possible. Basic settings can only be checked and – if necessary – corrected by the manufacturer. A calibration protocol is enclosed to the device ex works. This documents the precision reached by the production process.

14.5 Error and System Messages

Display	Description	Remedy
	Low battery voltage, device will only continue operation for a short time	replace battery
	Low battery voltage If mains operation:	replace battery replace power supply, if fault continues to exist: device damaged
no display or confused characters	Battery voltage too low If mains operation: power supply defective or wrong voltage/polarity System error Device defective	replace battery check/replace power supply disconnect battery or power supply, wait for a short time, re-connect return to manufacturer for repair
Err.1	Values exceeding meas. range	Check: are there any values exceeding the specified meas. range? - measuring instrument not suitable! cable of measuring cell defective -> replace
Err.2	Values falling below meas. range	Check: are there any values falling below the specified meas. range? - measuring instrument not suitable! cable of measuring cell defective -> replace
Err.7	System fault	disconnect battery, wait for 10 sec. and re-connect battery, switch on device once again. If fault continues to exist device is defective -> return to manufacturer for repair.
----	Could not calculate display value • Measuring range or input range exceeded • Measured values are instable	Check range parameter Wait for signal regulation of the device
>CAL< *CAL flashing in upper display*	Either preset calibration interval has expired or last calibration is not valid	Device has to be calibrated!

Error messages for automatic cell correction adjustment/calibration:

CAL Err.1	Cell correction too high	Determined cell correction must not exceed 1.2
CAL Err.2	Cell correction too small	Determined cell correction must not fall below 0.8
CAL Err.3	Solution of wrong range	Wrong solution/far beyond tolerance
CAL Err.4	Wrong temperature	Beyond permitted temperature: 0.0-34.0 °C (or 0.0-27.0 °C at 111.8 mS/cm)

If **"bat"** is flashing, the battery will be exhausted soon. Further measurements are possible for short time. If "bat" is displaced continuously the battery is ultimately exhausted and has to be replaced. Further measurements aren't possible anymore.

15. Maintenance

15.1 Battery change

If ⚠ and ´bAt´ are shown in the lower display the battery has been used up and needs to be replaced. The device will, however, operate correctly for a certain time. If ´bAt´ is shown in the upper display the voltage is too low to operate the device; the battery has been completely used up.

Please note: The battery has to be taken out, when storing device above 50 °C. We recommend taking out battery if device is not used for a longer period of time.

1) Treat device and sensor carefully. Use only in accordance with above specification (do not throw, hit against etc.).
   Protect plug and socket from soiling.
2) To disconnect sensor plug do not pull at the cable but at the plug. Don't connect electrode canted! When connecting the probe, the plug will slide in smoothly if the plug is entered correctly. If plug is entered incorrectly the connecting pins of the plug can be damaged. => Plug can no longer be used and connecting cable needs to be replaced.

16. Technical Information

Measuring principle:	2-electrode conductivity measuring cell with temperature sensor integrated into the shaft Electrode material: graphite
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 (manually adjustable or automatically)
• Temperature	-5.0...+100.0 °C 23.0...212.0 °F
Accuracy:	(± 1 digit, at nominal temperat. 25 °C)
• Conductivity	±0.5 % MV ±0.3 % FS or ±2 µS/cm
• Temperature	±0.2 K

Resolution:	
• Conductivity	0.1 µS/cm, 1 µS/cm, 10 µS/cm or 0.1 mS/cm
• Temperature	0.1 °C
• Resistance	0.001 k., 0.01 k. or 0.1 k.
• Salinity	0.1
• TDS	1 mg/L
Display:	two 4-digit LC-displays
Operating temp.:	0 to +50 °C (housing), Meas. cell: -5 to +80 °C (continuous) to +100 °C (short-term)
Storage temp.:	-25 to +70 °C
Storage humidity:	0 to +95 % rH (non-condensing)
Electrode:	2-electrode conductivity measuring cell with temperature sensor integrated into the shaft. Electrode material: graphite, solidly mounted with 1 m cable
Output:	serial interface (via 3-pin jack, transformer on RS232 or USB optional)
Power supply:	9 V-monobloc battery (included in the scope of delivery), external 10.5-12 V_{DC} via jack
Material:	housing made of impact-resistant ABS plastic
Protection:	IP 65, front
Dimensions:	housing 142 x 71 x 26 mm (H x W x D), electrode max. Ø approx. 12 mm, length approx. 120 mm
Weight:	approx. 255 g (incl. battery and electrode)

Scope of functions:
Min-/Max value memory
Hold function: »freezing« of the current value
Automatic-off function: 1...120 min (can be deactivated)
AutoRange: Automatic measuring range adjustment
(can be deactivated)
Automatic temperature compensation
Replace battery display
Resistivity, salinity, and TDS-determination
Temperature coefficients that can be selected:
Natural water, linear compensation or no compensation
Increased temperature measuring range

17. Order Codes

Order-no.	Housing design
HND-C110	Conductivity measuring unit with additional functions (see Technical Information)

17.1 Accessories

Order-no.	Description
HND-Z002	Plug power supply (220/240 VAC, 50/60 Hz), 10.5 VDC / 10 mA
HND-Z021*	Case with recess (275 x 229 x 83 mm)
HND-Z022*	Universal case with egg crate foam (275 x 229 x 83 mm)
HND-Z023*	Large case with recess (394 x 294 x 106 mm)
HND-Z031	Interface converter on RS232, galvanically isolated
HND-Z032	Interface converter on USB, galvanically isolated
HND-Z033	Adapter RS232 converter on USB-interface
BUS-S20M	Software for recording measurement data on a computer, for instruments of the HND-series without logger function

*observe instrument dimension

Additional accessories upon request.

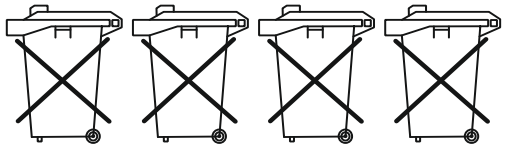
18. Disposal

Note!

- Avoid environmental damage caused by media-contaminated parts
- Dispose of the device and packaging in an environmentally friendly manner
- Comply with applicable national and international disposal regulations and environmental regulations.

Batteries

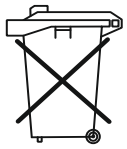
Batteries containing pollutants are marked with a sign consisting of a crossed-out garbage can and the chemical symbol (Cd, Hg, Li or Pb) of the heavy metal that is decisive for the classification as containing pollutants:



Cd[1] Hg[2] Pb[3] Li[4]

1. „Cd" stands for cadmium
2. „Hg" stands for mercury
3. „Pb" stands for lead
4. „Li" stands for lithium

Electrical and electronic equipment



19. EU Declaration of Conformance

We, KOBOLD Messring GmbH, Hofheim-Ts, Germany, declare under our sole responsibility that the product:

Hand-held Conductivity Measuring Units Model: HND-C110

to which this declaration relates is in conformity with the standards noted below:

EN 61326-1:2013
Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements

EN 50581:2012
Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Also, the following EU guidelines are fulfilled:

2014/30/EU	Electromagnetic compatibility
2011/65/EU	**RoHS** (category 9)
2015/863/EU	Delegated Directive (RoHS III)

Hofheim, 17 Nov. 2021

H. Volz
General Manager

ppa. M. Wenzel
Proxy Holder