



OPTISYS IND 8100 Handbook

Conductivity measuring system

All rights reserved. It is prohibited to reproduce this documentation, or any part thereof, without the prior written authorisation of KROHNE Messtechnik GmbH.

Subject to change without notice.

Copyright 2022 by
KROHNE Messtechnik GmbH - Ludwig-Krohne-Str. 5 - 47058 Duisburg (Germany)

1	Safety instructions	5
1.1	Intended use	5
1.2	Safety instructions from the manufacturer	5
1.2.1	Copyright and data protection	5
1.2.2	Disclaimer	5
1.2.3	Product liability and warranty	7
1.2.4	Information concerning the documentation	7
1.2.5	Warnings and symbols used	8
1.3	Safety instructions for the operator	8
2	Device description	9
2.1	Scope of delivery	9
2.2	Device description	10
2.3	Nameplate	10
3	Installation	11
3.1	General notes on installation	11
3.2	Storage and Transport	11
3.3	Installation requirements	11
3.4	Process connection	12
3.5	Mounting of 3A marked products	13
3.6	Changing orientation of the display	14
3.7	Mounting and dismounting the remote cable connection	15
4	Electrical connections	17
4.1	Electrical connection	17
4.1.1	Electrical connection M12	17
4.1.2	Electrical connection cable glands	19
5	Operation	21
5.1	Menu	21
5.1.1	Communication via the touch screen display	21
5.1.2	Default settings	25
5.1.3	Quick setting for adjusting the current output	25
5.1.4	Display settings	25
5.2	Communication via Configuration Tool	26
5.2.1	Setup	26
5.2.2	Predefined concentration curves	27
5.2.3	User defined concentration curves	29
5.2.4	Media screens	30

6 Service	32
6.1 Spare parts availability	32
6.2 Availability of services	32
6.3 Returning the device to the manufacturer	32
6.3.1 General information	32
6.3.2 Form (for copying) to accompany a returned device	33
6.4 Disposal	33
7 Technical data	34
7.1 Measuring principle	34
7.1.1 Conductivity measurement - inductive	34
7.2 Technical data	35
7.3 Dimensions of compact and remote version	38

1.1 Intended use

**CAUTION!**

Responsibility for the use of the measuring devices with regard to suitability, intended use and corrosion resistance of the used materials against the measured fluid lies solely with the operator.

**INFORMATION!**

The manufacturer is not liable for any damage resulting from improper use or use for other than the intended purpose.

The intended use of the OPTISYS IND 8100 measuring system is the measurement of the electrical conductivity in conductive liquids.

1.2 Safety instructions from the manufacturer

1.2.1 Copyright and data protection

The contents of this document have been created with great care. Nevertheless, we provide no guarantee that the contents are correct, complete or up-to-date.

The contents and works in this document are subject to copyright. Contributions from third parties are identified as such. Reproduction, processing, dissemination and any type of use beyond what is permitted under copyright requires written authorisation from the respective author and/or the manufacturer.

The manufacturer tries always to observe the copyrights of others, and to draw on works created in-house or works in the public domain.

The collection of personal data (such as names, street addresses or e-mail addresses) in the manufacturer's documents is always on a voluntary basis whenever possible. Whenever feasible, it is always possible to make use of the offerings and services without providing any personal data.

We draw your attention to the fact that data transmission over the Internet (e.g. when communicating by e-mail) may involve gaps in security. It is not possible to protect such data completely against access by third parties.

We hereby expressly prohibit the use of the contact data published as part of our duty to publish an imprint for the purpose of sending us any advertising or informational materials that we have not expressly requested.

1.2.2 Disclaimer

The manufacturer will not be liable for any damage of any kind by using its product, including, but not limited to direct, indirect or incidental and consequential damages.

This disclaimer does not apply in case the manufacturer has acted on purpose or with gross negligence. In the event any applicable law does not allow such limitations on implied warranties or the exclusion of limitation of certain damages, you may, if such law applies to you, not be subject to some or all of the above disclaimer, exclusions or limitations.

Any product purchased from the manufacturer is warranted in accordance with the relevant product documentation and our Terms and Conditions of Sale.

The manufacturer reserves the right to alter the content of its documents, including this disclaimer in any way, at any time, for any reason, without prior notification, and will not be liable in any way for possible consequences of such changes.

1.2.3 Product liability and warranty

The operator shall bear responsibility for the suitability of the device for the specific purpose. The manufacturer accepts no liability for the consequences of misuse by the operator. Improper installation or operation of the devices (systems) will cause the warranty to be void. The respective "Standard Terms and Conditions" which form the basis for the sales contract shall also apply.

1.2.4 Information concerning the documentation

To prevent any injury to the user or damage to the device it is essential that you read the information in this document and observe applicable national standards, safety requirements and accident prevention regulations.

If this document is not in your native language and if you have any problems understanding the text, we advise you to contact your local office for assistance. The manufacturer cannot accept responsibility for any damage or injury caused by misunderstanding of the information in this document.

This document is provided to help you establish operating conditions, which will permit safe and efficient use of this device. Special considerations and precautions are also described in the document, which appear in the form of icons as shown below.

1.2.5 Warnings and symbols used

Safety warnings are indicated by the following symbols.



DANGER!

This warning refers to the immediate danger when working with electricity.



DANGER!

This warning refers to the immediate danger of burns caused by heat or hot surfaces.



DANGER!

This warning refers to the immediate danger when using this device in a hazardous atmosphere.



DANGER!

These warnings must be observed without fail. Even partial disregard of this warning can lead to serious health problems and even death. There is also the risk of seriously damaging the device or parts of the operator's plant.



WARNING!

Disregarding this safety warning, even if only in part, poses the risk of serious health problems. There is also the risk of damaging the device or parts of the operator's plant.



CAUTION!

Disregarding these instructions can result in damage to the device or to parts of the operator's plant.



INFORMATION!

These instructions contain important information for the handling of the device.



LEGAL NOTICE!

This note contains information on statutory directives and standards.



• **HANDLING**

This symbol designates all instructions for actions to be carried out by the operator in the specified sequence.

➡ **RESULT**

This symbol refers to all important consequences of the previous actions.

1.3 Safety instructions for the operator



WARNING!

In general, devices from the manufacturer may only be installed, commissioned, operated and maintained by properly trained and authorized personnel.

This document is provided to help you establish operating conditions, which will permit safe and efficient use of this device.

2.1 Scope of delivery

**INFORMATION!**

Inspect the packaging carefully for damages or signs of rough handling. Report damage to the carrier and to the local office of the manufacturer.

**INFORMATION!**

Do a check of the packing list to make sure that you have all the elements given in the order.

**INFORMATION!**

Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.



Figure 2-1: Standard scope of delivery

- ① Ordered conductivity measuring system
- ② Documentation

Optional accessories

- Hygienic mounting adapters for the OPTISYS IND 8100 are described in the additional data sheet "Hygienic accessories for measuring instruments".
- Configuration Tool XGP9 000010 (Configuration Tool software requires admin rights on a PC)

Spare parts available

- Display set (incl. communication ribbon cable and holding ring) XGBA000010
- Display (incl. communication ribbon cable) XGBA000020
- Communication ribbon cable XGBA000030
- Holding ring for display XGBA000040

2.2 Device description

The inductive measurement method enables maintenance-free acquisition of the individual conductivity of liquids.

The OPTISYS IND 8100 measuring system consists of an inductive conductivity sensor with transmitter, available as compact or remote system. 2 active 4-20 mA outputs allow for analog transmission of conductivity/concentration and temperature values. A selection from 4 pre-set measuring ranges is possible by digital inputs.

The optional display features a variety of selectable screens, user-specified "product labels" and optical warnings. It is equipped with 2 relays for alarm or control purposes. The transmitter and display can be programmed either via the touch screen, or the Configuration Tool (accessory) with PC software. Optional HART versions provide additional possibilities in terms of parameter settings and digital communication.

The background colour of the display can be set in three colours, white, green or red - steady or flashing, controlled by the alarm settings. Different media can be indicated by pre-defined conductivity ranges, e.g. PRODUCT, WATER, CAUSTIC.

2.3 Nameplate



INFORMATION!

Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.

The conductivity measuring system is specified on the labelling of the measuring system package and on the measuring system itself.

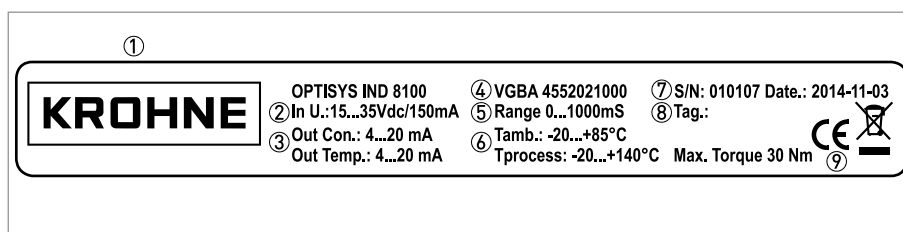


Figure 2-2: Example of a nameplate

- ① Manufacturer
- ② Power supply
- ③ Outputs
- ④ Modelcode
- ⑤ Measuring range
- ⑥ Ambient / process temperature
- ⑦ Serial number, manufacturing date
- ⑧ TAG number
- ⑨ CE marking

3.1 General notes on installation

**INFORMATION!**

Inspect the packaging carefully for damages or signs of rough handling. Report damage to the carrier and to the local office of the manufacturer.

**INFORMATION!**

Do a check of the packing list to make sure that you have all the elements given in the order.

**INFORMATION!**

Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.

3.2 Storage and Transport

- Store the conductivity measuring system in its original packaging in a dry and dust-free location. Keep it away from dirt.
- The original packaging serves the protection of the equipment. Therefore always use it for transport or return to the manufacturer.

3.3 Installation requirements

- Use KROHNE mounting adapters exclusively. If other systems are used, no guarantee can be given for proper functionality or leak-tightness.
- The connection thread must have direct electrical contact with the threaded sleeve and the metal tank or pipe.
- At the hygienic connection G1 do not use Teflon or paper gaskets between the conductivity measuring system and hygienic adapter. The PEEK sensor together with the Stainless Steel adapter will perform a hygienic tightening, assumed that the requirements have been followed.
- The tightening torque for the sleeve should be 25...30 Nm.
- To avoid turbulence problems the conductivity measuring system is recommended to be mounted in a distance of >1 meter from a bend.
- The device must not be heated by radiated heat (e.g. exposure to the sun) to a electronics housing surface temperature above the maximum permissible ambient temperature. If it is necessary to prevent damage from heat sources, a heat protection (e.g. sun shade) has to be installed.

3.4 Process connection

Hygienic mounting adapters for a broad variety of process connections are available. For more information please refer to the data sheet "Hygienic accessories for measuring instruments".

All hygienic process connections are FDA conform acc. to EU 1935/2004 and 2023/2006.

3A/EHEDG approvals only apply when the OPTISYS IND 8100 sensor is installed with one of the 3A/EHEDG approved mounting adapters. Special gaskets may be required (refer to the data sheet "Hygienic accessories for measuring instruments"). The sensor insertion depth increases by 1.5mm in combination with these adapters (from 37mm to 38.5mm, 60mm to 61.5mm, 83mm to 84.5mm).

For non-hygienic installations, the G1 connection can be mounted in any counter thread acc. to ISO 228.

The conductivity measuring system can be installed in any desired position.

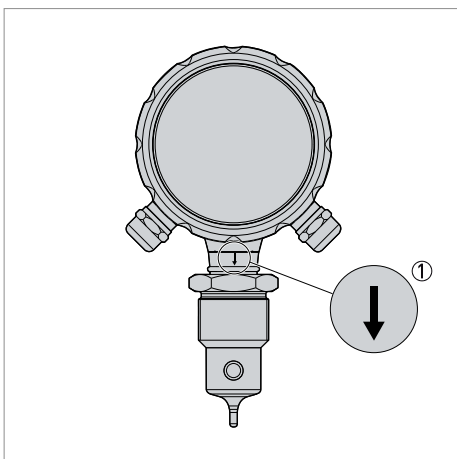


Figure 3-1: Arrow for the flow direction

The arrow on the sensor must correspond to the flow direction.

To obtain correct readings, the sensor tip with 37mm length must be immersed completely. Sensors with 60 or 83 mm nominal length must be immersed by at least 37mm. The measuring medium must not contain any air or gas bubbles.

3.5 Mounting of 3A marked products

The 3A mark is valid only when the product is mounted in a 3A marked counterpart and installed according to the installation manual. Use also a 3A marked O-ring or gasket if relevant.

The 3A marked products conforms to the 3A sanitary standards criteria. Materials and surfaces fulfill the FDA demands.

EPDM O-rings supplied with 3A marked products are conform to sanitary standards class II (8% milk fat).

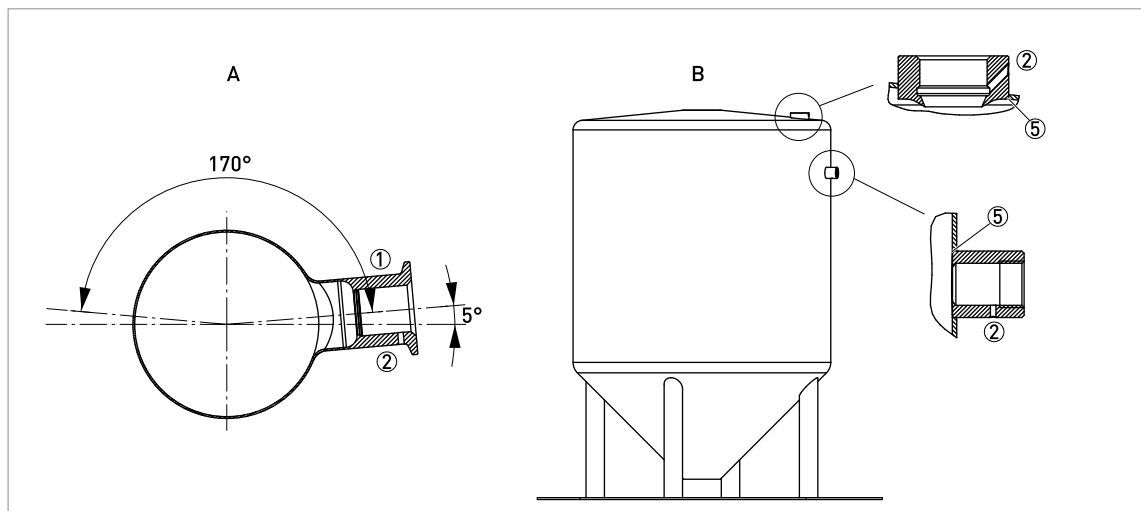


Figure 3-2: Mounting of 3A products in pipe installations (A) or tank installations (B)

- Use only 3A approved counterparts ① .
- The inspection hole should be visible and drained ② . Face it downwards that leaking can be observed.
- Mount the device in a self-drained position.
- Level the inner surface of the pipe with the counterpart.
- Weld from the inside of the tank ⑤ , if possible. Welds shall be free from cracks, crevices and grooves. Weldings should be grinded to $R_a = 0.8 \mu\text{m}$.



LEGAL NOTICE!

The EHEDG certificate is only valid in connection with the appropriate hygienic adaptors. These are marked with the "EHEDG Certified" logo:



3.6 Changing orientation of the display

Depending on the mounting location and orientation of the sensor, the facing and orientation of the display can be adjusted accordingly.

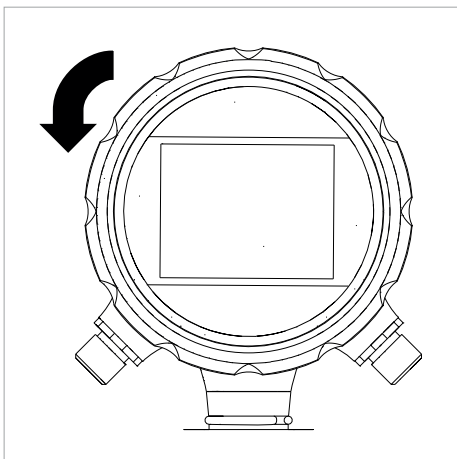


Figure 3-3: Opening of the housing



- Open housing by unscrewing the cover.

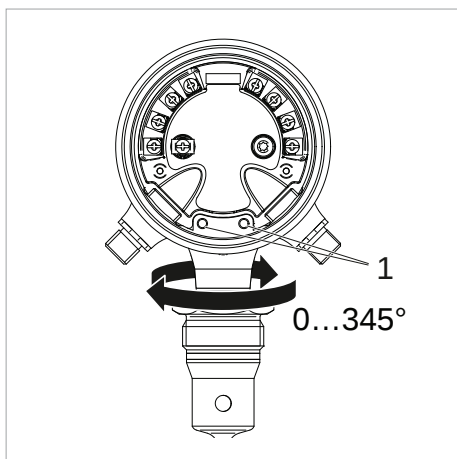


Figure 3-4: Turning head of sensor



- Lift display from housing.
- Loosen the 2 screws ① inside with a 2 mm Allen key.
- Turn head of sensor to the left (max. 345°).
- Tighten the 2 screws ① inside with a 2 mm Allen key.

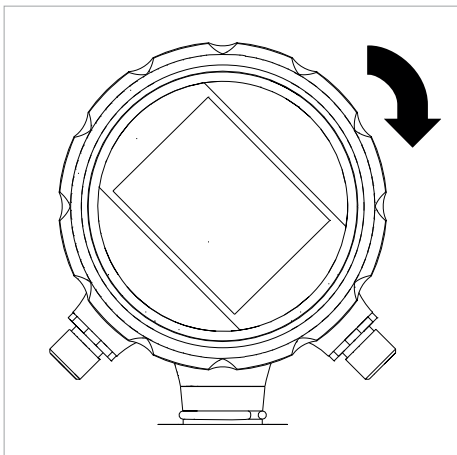


Figure 3-5: Closing of the housing



- Make sure not to damage connecting ribbon cable and put the display back in housing in the desired orientation.
- Close housing by screwing on the cover.

3.7 Mounting and dismounting the remote cable connection

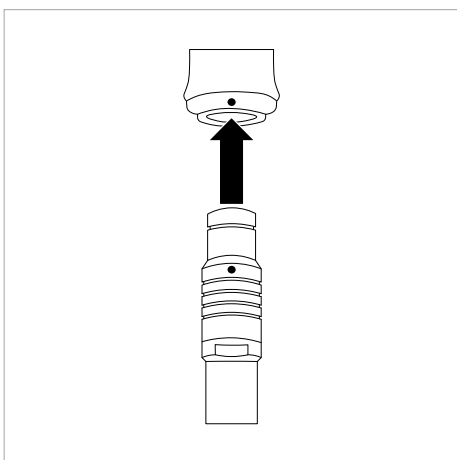


Figure 3-6: Mounting the remote cable connection



- To plug the cable in, align the 2 red points. To make sure that the connection is correct, pull at the cable carefully. A locking mechanism ensures that the cable cannot be pulled out unintentionally.

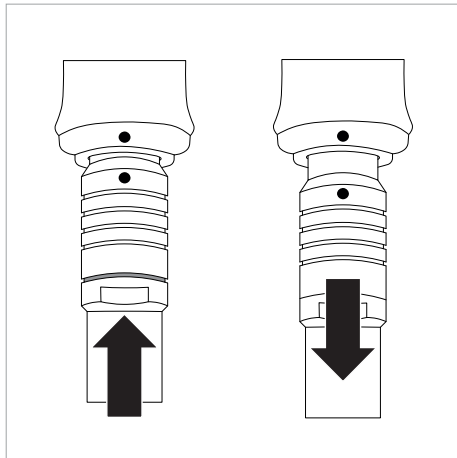


Figure 3-7: Dismounting the remote cable connection



- Press both ends of the locking mechanism together.
- Pull the cable out.

4.1 Electrical connection


DANGER!

Never install or operate the device in potentially explosive areas, it might cause an explosion that can result in fatal injuries!


DANGER!

All work on the electrical connections may only be carried out with the power disconnected.


DANGER!

Observe the national regulations for electrical installations!


WARNING!

Observe without fail the local occupational health and safety regulations.

Any work done on the electrical components of the measuring device may only be carried out by properly trained specialists.


INFORMATION!

Look at the device nameplate to ensure that the device is delivered according to your order.

4.1.1 Electrical connection M12


CAUTION!

Moisture on the sensor connector must be avoided! Moisture may cause a short-circuit and a malfunction of the sensor!

Depending on the desired signal outlets different configurations of the M12 plug are possible.

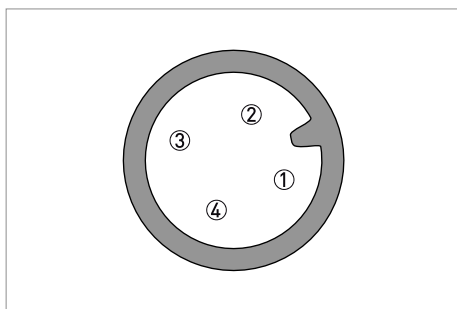


Figure 4-1: 4 pin connector (left side)

① 15...35 VDC (+) / Brown

② Conductivity (-) / White / 4...20 mA (HART*)

③ 15...35 VDC (-) / Blue

④ Conductivity (+) / Black / 4...20 mA (HART*)

* for HART versions

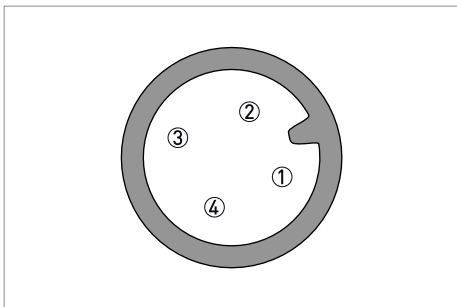


Figure 4-2: 4 pin connector (right side)

- ① S1 / Brown / external input
- ② Temperature (-) / White / 4...20 mA
- ③ S2 / Blue / external input
- ④ Temperature (+) / Black / 4...20 mA

A device with display is equipped with a 4 pin connector (left side) and a 8 pin connector (right side)

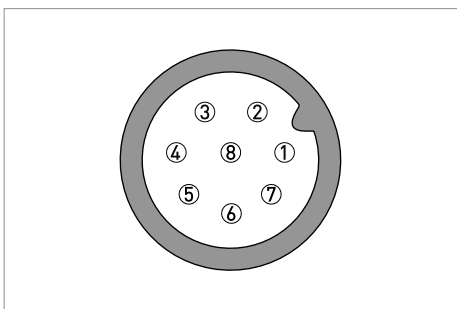


Figure 4-3: 8 pin connector (devices with display, right side)

- ① R1 (external input) / White
- ② Temp. (+) (4...20 mA) / Brown
- ③ Relay 2 / Green
- ④ Relay 2 / Yellow
- ⑤ Relay 1 / Grey
- ⑥ Relay 1 / Light red
- ⑦ Temp. (-) (4...20 mA) / Blue
- ⑧ R2 (external input) / Red

Current minus is internally connected as a common minus for both conductivity / concentration and temperature outputs (4...20 mA).

4.1.2 Electrical connection cable glands

Connector type	Cable diameter
M16 plastic	5...10 mm
M16 stainless steel	5...9 mm
M20 plastic	8...13 mm
M20 stainless steel	11...13 mm

Table 4-1: Electrical connection with cable gland

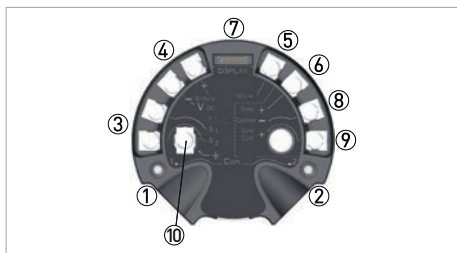


Figure 4-4: Connection overview transmitter

- ① COM 1
- ② COM 2
- ③ S1 and S2 (contact inputs)
- ④ Supply+ and Supply-
- ⑤ IO-Link
- ⑥ Temperature +
- ⑦ UnitCom (ribbon cable to display)
- ⑧ Common -
- ⑨ Conductivity / Concentration +
- ⑩ Ground

When using a cable gland and a screened cable, the ground connection (10) must be connected to the cable screen.

Range	S1 (contact input)	S2 (contact input)
1 (0...200 mS/cm)	Not connected	Not connected
2 (0...20 mS/cm)	24 VDC	Not connected
3 (0...2 mS/cm)	Not connected	24 VDC
4 (0...500 µS/cm)	24 VDC	24 VDC

Table 4-2: Connection of S1 and S2 (contact input); default settings for Range

Using more than 1 range is only recommended if conductivity readings cover a broad range with different media (e.g. in CIP processes) and a mA signal with high accuracy is required in all phases.

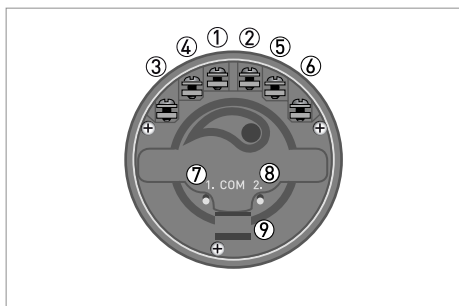


Figure 4-5: Overview display

- ① Not connected
- ② Not connected
- ③ Relay 2 / Green
- ④ Relay 2 / Yellow
- ⑤ Relay 1 / Grey
- ⑥ Relay 1 / Light red
- ⑦ COM 1
- ⑧ COM 2
- ⑨ UnitCom (ribbon cable to transmitter)

To connect the Configuration Tool

COM 1	Red clip
COM 2	Black clip

Table 4-3: Connection for configuration tool (Configuration Tool software requires admin rights on a PC)

5.1 Menu

For all versions, parameter settings are possible via display or the optional Configuration Tool with PC software (admin rights required).

Settings for the conversion of conductivity readings into concentrations require the Configuration Tool or HART.

For HART versions, a HART DD is available.

The menu that is accessible via display is shown in the next section. More options are available by using the Configuration Tool or HART. Menu structures differ from each other.



DANGER!

If the instrument shall be used to display and/or output concentration values, familiarize yourself beforehand with the special features of converting conductivity readings into concentration values. Depending on the medium, the measured conductivity reading may represent 2 or more completely different concentration values.

Therefore, the conversion for the 4 pre-defined curves (optional Configuration Tool required) is only correct within the specified range. Measured conductivity values outside the specified range will definitely lead to invalid concentration values and must not be used under any circumstances.

This is also valid for user-defined curves (Configuration Tool or HART required). A user-defined curve may only contain ascending values (rising conductivity = rising concentration). This means that only a reduced selection, resp. sections of conductivity / concentration curves, can be entered.

In any case, make sure that the data used for the curves accurately reflect the situation at the measuring point. The responsibility for the correctness of the data lies solely with the user.

It is strongly recommended to set alarms at the measuring range limits. If an alarm was triggered, the concentration values displayed afterwards must not be used for the time being. Check the real concentration independently, e.g. by taking a grab sample and performing a check in the laboratory. Return to normal operation is possible when lab and process readings match and are within the defined measuring range.

It is recommended to confirm process readings by lab checks on a regular base.

5.1.1 Communication via the touch screen display



- Start with one touch of the display
- ➡ The button **Menu** appears in the display
- Touch the button to get in the menu overview
- ➡ Now you can choose the required menu

Vertical navigation is enabled using the ↑ and ↓ button.

Menu overview

Menu	OSYS menu (OPTISYS)
	Display menu
	Data display mode
	• Transmitter value (default) • Display conversion

OSYS Menu

Identification			
	Product data	Model mode, Serial no., Prod. date, Firmware	
	Prod. Identification	User date, Tag no.	
	Communication data	Poll address, Desc, Message, Message start	
	Poll address	Write address number*	
	Loop current mode	Enable (Default) / Disable*	
Input config			
	Conductivity ranges	Conductivity range 1 (Default measuring range)	Select range*
		Conductivity range 2	Select range*
		Conductivity range 3	Select range*
		Conductivity range 4	Select range*
	Temp. compensation	Range 1 [%/K]	Compensation value*
		Range 2 [%/K]	Compensation value*
		Range 3 [%/K]	Compensation value*
		Range 4 [%/K]	Compensation value*
		Advanced compensation	Define advanced comp. ¹⁾
Output config			
	Output mode	Conductivity mode*	
		Concentration mode*	
	Conductivity mode	Range 1	Cond. at 4 mA* ²⁾
			Cond. at 20 mA* ²⁾
		Range 2	See Range 1*
		Range 3	See Range 1*
	Range 4	See Range 1*	
Concentration mode	Use a PC* ³⁾		
	Temperature output	Temp. at 4 mA	Temperature value*
		Temp. at 20 mA	Temperature value*
		Output temp. unit	Celsius / Fahrenheit*
	Output current limits	Lower current limit	Current value*
		Upper current limit	Current value*
		Lower temp. curr. limit	Current value*
		Upper temp. curr. limit	Current value*
	Error output	Error output current	Current value*
		Error output channel	Select channel*
	Output damping	Damping value*	
Max. decimals	Decimal value*		

Diagnosis			
	Factory reset	Yes / No*	
	Calibrate conductivity	Calibration value* ⁴⁾	
	Calibrate temperature	Calibration value* ⁴⁾	
	Reset user calibration	Yes / No*	

Table 5-1: Conductivity measuring system menu

*Enter or choose parameter

¹⁾ Advanced compensation: allows for changing reference temperature (other than 25°C); temperature source (via HART signal, or user-defined fix value); temperature coefficient (%/K or %/K²)

²⁾ Default values in "Conductivity mode": 4 mA = 0 µS/cm; 20 mA follows range setting from "Input configuration". Adjustments are possible.

³⁾ Settings in "Concentration mode" require either the Configuration Tool with PC software, or device versions with HART communication

⁴⁾ Use standard solution, or measuring value from reference instrument to adjust conductivity or temperature (offset / 1-point calibration).

Display menu

Configuration			
	Identification	Tag, S/N, Date, Prod. Date	
	Input	Input at 0%	Current value*
		Input at 100%	Current value*
		Damping	Damping value*
		Lin. Correction	Enable / Disable*
	Display Output	Display at 0%	Display value*
		Display at 100%	Display value*
		Decimal	Select from list*
		Unit	Select from list*
		ABS / REL	Select, when pressure*
	Error / Warning	High error	High error limit
			High error indication
			High error backlight
		High warning	See high error*
		Low error	See high error*
		Low warning	See high error*
	Relay setup	Relay 1 mode	AO / AC / NO / NC*
		Rel. 1 set point	Set point value*
		Rel. 1 reset point	Set point value*
		Relay 2 mode	AO / AC / NO / NC*
		Rel. 2 set point	Set point value*
		Rel. 2 reset point	Set point value*
Display setup			
	Screen layout	Standard screen	Select display design*
		OSYS specific screen	Select display design*
	Back light	Colour	White / Green / Red*
		Intensity	10% - 140%*
	Language	EN / DK / DE / FR*	
	Password	Password Enable	Enable / Disable*
		New password	Create new password*
	Menu timeout	Timeout value*	
Diagnostics			
	Statistics	Min. / Max / Errors / Uptime	
	Demo setup	Select demo mode	Disabled / Static / Cyclic*
		Static demo value	Current value*
	Factory setting	Accept / Cancel*	
	Service menu	For service personnel*	

Table 5-2: Display menu

*Enter or choose parameter

5.1.2 Default settings

The OPTISYS IND 8100 will be delivered with the following default values for conductivity and temperature:

Conductivity range 1	0...200 mS/cm (Default working range)
Conductivity range 2	0...20 mS/cm
Conductivity range 3	0...2 mS/cm
Conductivity range 4	0...500 µS/cm
Temperature	0...150°C
Temperature coefficient	2 %/K
Advanced compensation	Disabled
Output damping	0 s
Max. decimals	2



INFORMATION!

The table of the conductivity ranges above shows the default settings from the factory and can be changed over the menu.

5.1.3 Quick setting for adjusting the current output

Menu
OSYS menu
Output config
Conductivity mode
Range 1
conductivity at 4 mA, change if necessary by using the change button
conductivity at 20 mA, change if necessary by using the change button

Menu
OSYS menu
Output config
Temperature output
Temp. at 4 mA, change if necessary by using the change button
Temp. at 20 mA, change if necessary by using the change button
Output temp. unit, change if necessary by using the change button



INFORMATION!

The end value for conductivity can be freely chosen to the customer requirement.

Save the correct values and leave the menu by pushing the “back” button several times.

5.1.4 Display settings

All display settings can be performed directly at the display (refer to *Communication via the touch screen display* on page 21 for the menu structure and options).

It is also possible to make settings by using the Configuration Tool.

For the Setup procedure of the Configuration Tool Software first refer to *Setup* on page 26 before connecting the configuration tool.



- Connect the Configuration Tool to the “OPTISYS IND 8100 Display” by using COM 1 (red clip) + COM 2 (black clip) (refer to *Electrical connection cable glands* on page 19, figure "Overview display").
- Select “OPTISYS IND 8100 Display” on the left side of the initial screen (refer to *Setup* on page 26).

A huge variety of display views is possible, as shown below.

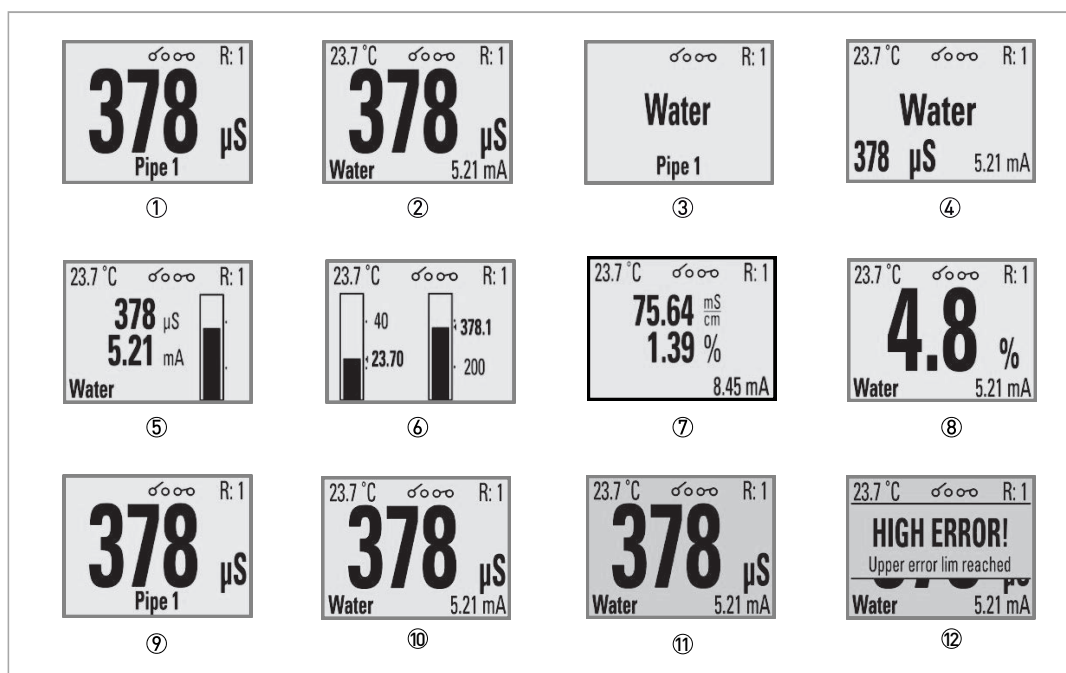


Figure 5-1: Examples of display settings

- ① Conductivity / concentration + tag
- ② Conductivity / concentration + details
- ③ Media label + tag
- ④ Media label + details
- ⑤ Conductivity / concentration bar
- ⑥ Conductivity / concentration + temperature bar
- ⑦ Conductivity + concentration / temperature
- ⑧ Conductivity / concentration + details
- ⑨ White background
- ⑩ Green background
- ⑪ Red background
- ⑫ Error message and red background

5.2 Communication via Configuration Tool

5.2.1 Setup



INFORMATION!

Do not connect the Configuration Tool to your computer before having installed the Configuration Tool standalone software on it !

The Configuration Tool standalone software is available from the KROHNE download center.



- To find it, type in: Product name = OPTISYS IND 8100; Document type = Software; Name = Configuration Tool



- Step 1: Install the software and start it. The initial screen of the Configuration Tool Software is shown (refer to figure "Initial screen of Configuration Tool Software" below).
- Step 2: Connect the Configuration Tool to the OPTISYS IND 8100 by using COM 1 (red clip) + COM 2 (black clip) (refer to *Electrical connection cable glands* on page 19, figure "Connection overview transmitter").



WARNING!

Do not connect the OPTISYS IND 8100 to external power!



- Step 3: Connect the USB cable from the Configuration Tool to your computer and wait until the USB connection is established.

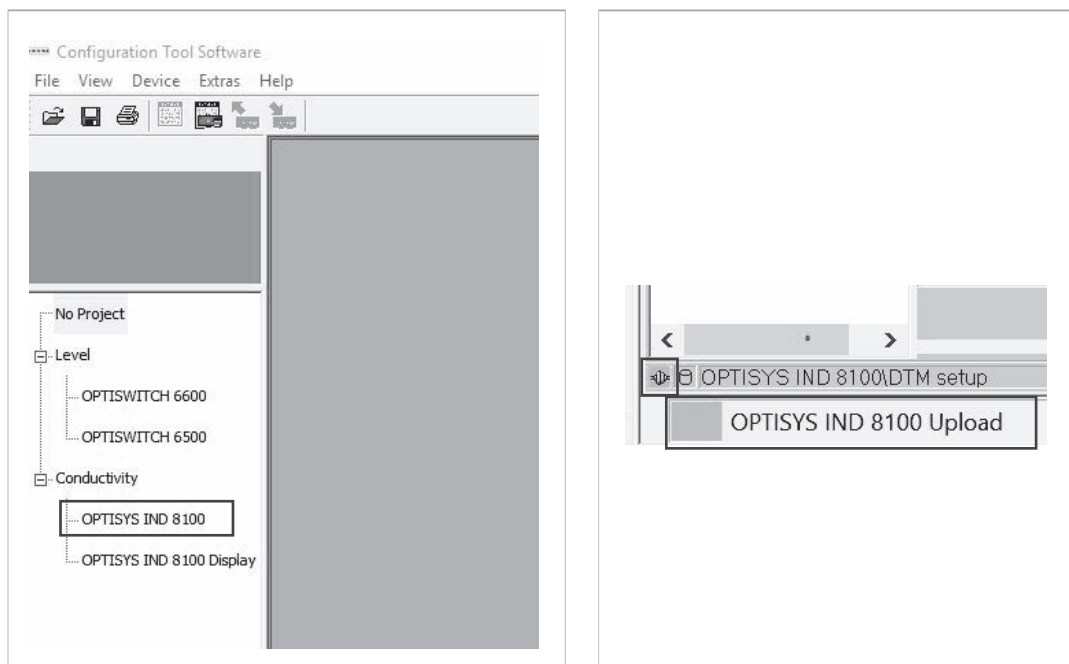


Figure 5-2: Initial screen of Configuration Tool Software



- Click on OPTISYS IND 8100. As soon as the device is shown in the display, data can be uploaded from the device by clicking "Device" and "Load from device". The "connected" symbol is shown together with a progress bar in the lower left corner.

5.2.2 Predefined concentration curves

4 predefined concentration curves are available for each measuring range.



- Set "Select measurement mode" to "Concentration".

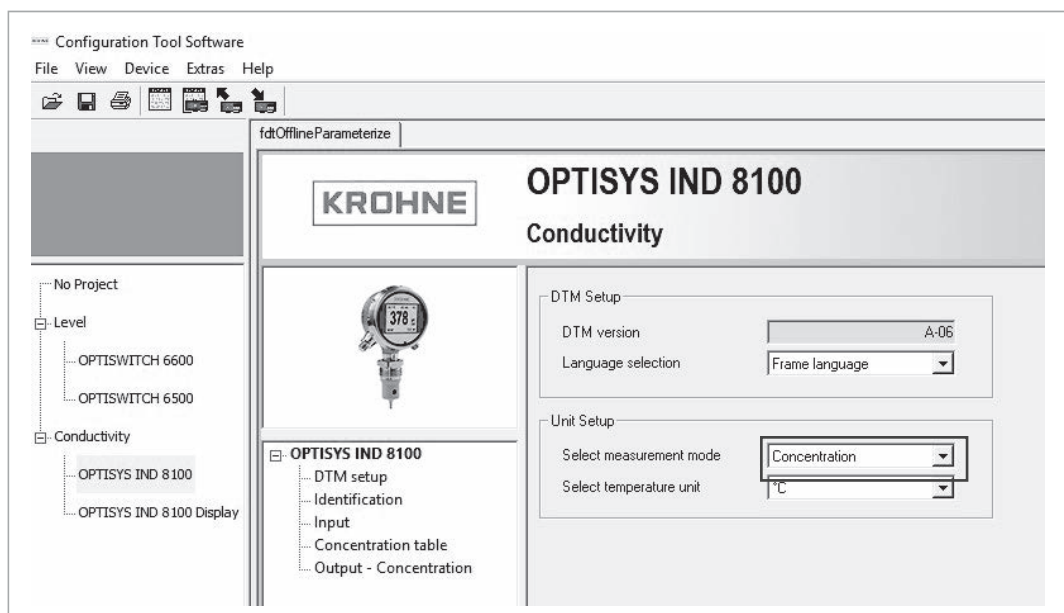


Figure 5-3: Measurement mode selection: conductivity or concentration

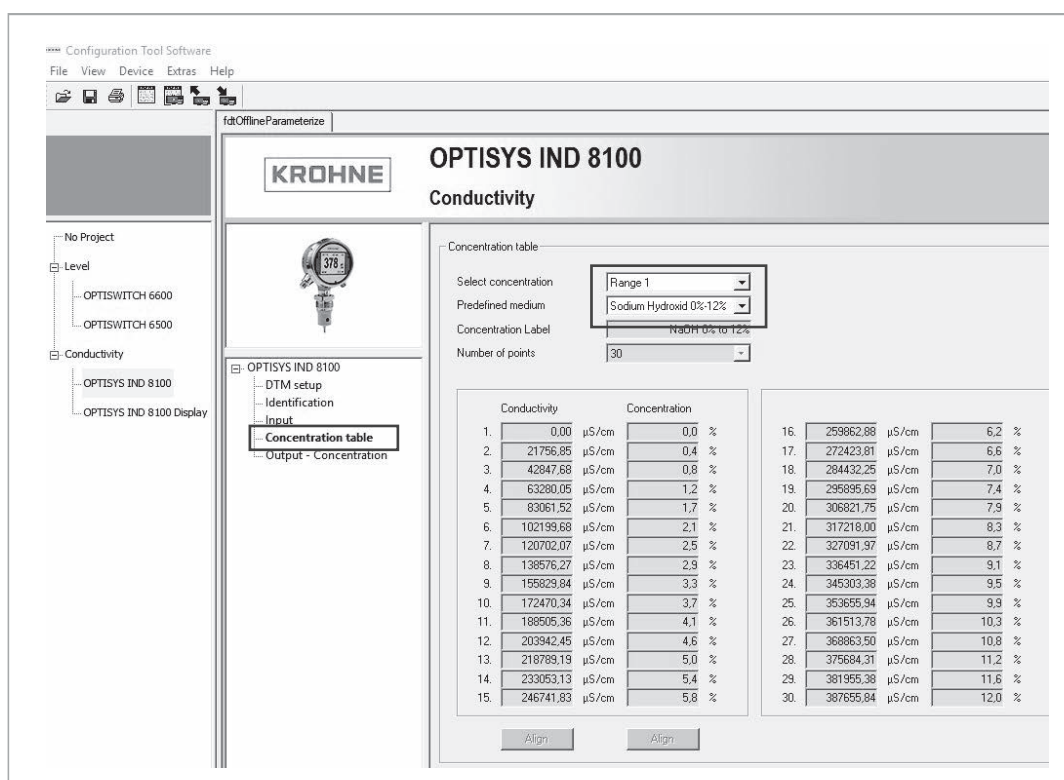


Figure 5-4: Definition of the conductivity / concentration curve



- Click on "Concentration table" to set Range and Predefined medium. The mA output range is adjusted to the concentration indicated (here 0...12% NaOH).

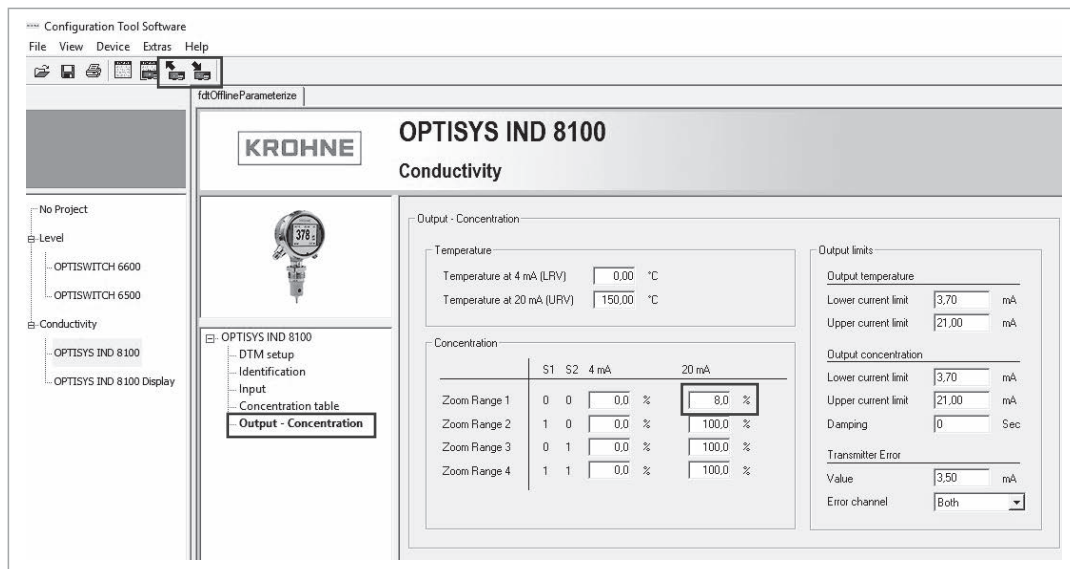


Figure 5-5: Output adjustment and saving of changes



- If it is necessary to adjust the mA output, click on “Output – Concentration” to zoom Range 1 to the desired value.
(Default setting: full range, e.g. 4 mA = 0%, 20 mA = 12 % for NaOH).
As shown, 20 mA was manually set to 8% NaOH in this example.



- Store changes to the device by clicking “Device” and “Store to device”, or the toolbar symbol (right side).

5.2.3 User defined concentration curves

When setting “Concentration table” to “User defined”, a set of values for (compensated) conductivity and concentration must be entered.



- Define “Concentration Label” and “Number of points” first and fill table with lab values completely. Rising values must be entered for conductivity and concentration.

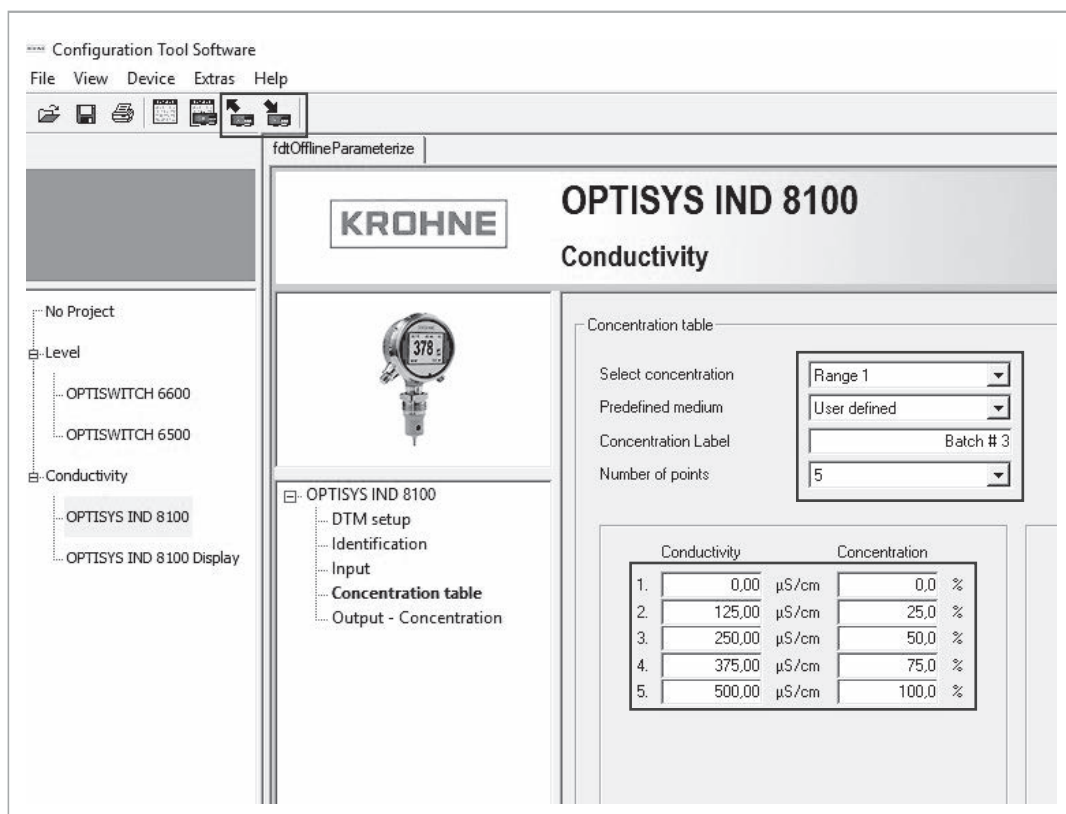


Figure 5-6: Definition of a user defined conductivity / concentration curve

Click on "Output – Concentration" to zoom Range 1 to desired values, as shown before. (Default is full range, e.g. 4 mA = 0%, 20 mA = 100 %).

Store changes to the device by clicking "Device" and "Store to device", or the toolbar symbol (right side).

5.2.4 Media screens

Different "Media screens" can be defined in Measurement mode "Conductivity" (DTM setup page). Depending on the measured conductivity value, different texts for the medium will be shown at the display, e.g. WATER, PRODUCT, CLEANING AGENT.



INFORMATION!

It is absolutely necessary that the defined ranges are clearly separated from each other.

fdtOfflineParameterize

KROHNE **OPTISYS IND 8100**
Conductivity

Media Screen

Figure does not scale

Illustration	Label	Range start		Range end	
A	WATER	400.00	μS/cm	900.00	μS/cm
B	PRODUCT	1500.00	μS/cm	5000.00	μS/cm
C	CLEANING AGEN	20000.00	μS/cm	150000.00	μS/cm
D		150000.00	μS/cm	150001.00	μS/cm
	MIX	Outside any of the above ranges			

Figure 5-7: Media screen settings



- Click on “Media screen” and fill column “Label” with texts that shall appear in the display. Define appropriate ranges in columns “Range start” and “Range end”.
- Store changes to the device by clicking “Device” and “Store to device”, or the toolbar symbol.

6.1 Spare parts availability

The manufacturer adheres to the basic principle that functionally adequate spare parts for each device or each important accessory part will be kept available for a period of 3 years after delivery of the last production run for the device.

This regulation only applies to spare parts which are subject to wear and tear under normal operating conditions.

6.2 Availability of services

The manufacturer offers a range of services to support the customer after expiration of the warranty. These include repair, maintenance, technical support and training.



INFORMATION!

For more precise information, please contact your local sales office.

6.3 Returning the device to the manufacturer

6.3.1 General information

This device has been carefully manufactured and tested. If installed and operated in accordance with these operating instructions, it will rarely present any problems.



WARNING!

Should you nevertheless need to return a device for inspection or repair, please pay strict attention to the following points:

- *Due to statutory regulations on environmental protection and safeguarding the health and safety of the personnel, the manufacturer may only handle, test and repair returned devices that have been in contact with products without risk to personnel and environment.*
- *This means that the manufacturer can only service this device if it is accompanied by the following certificate (see next section) confirming that the device is safe to handle.*



WARNING!

If the device has been operated with toxic, caustic, radioactive, flammable or water-endangering products, you are kindly requested:

- *to check and ensure, if necessary by rinsing or neutralising, that all cavities are free from such dangerous substances,*
- *to enclose a certificate with the device confirming that it is safe to handle and stating the product used.*

6.3.2 Form (for copying) to accompany a returned device



CAUTION!

To avoid any risk for our service personnel, this form has to be accessible from outside of the packaging with the returned device.

Company:		Address:	
Department:		Name:	
Telephone number:		Email address:	
Fax number:			
Manufacturer order number or serial number:			
The device has been operated with the following medium:			
This medium is:		radioactive	
		water-hazardous	
		toxic	
		caustic	
		flammable	
		We checked that all cavities in the device are free from such substances.	
		We have flushed out and neutralized all cavities in the device.	
We hereby confirm that there is no risk to persons or the environment caused by any residual media contained in this device when it is returned.			
Date:		Signature:	
Stamp:			

6.4 Disposal



LEGAL NOTICE!

Disposal must be carried out in accordance with legislation applicable in your country.

Separate collection of WEEE (Waste Electrical and Electronic Equipment):



According to the directive 2012/19/EU or UK Regulation 2013 No. 3113, the monitoring and control instruments marked with the WEEE symbol and reaching their end-of-life **must not be disposed of with other waste.**

The user must dispose of the WEEE to a designated collection point for the recycling of WEEE or send them back to our local organisation or authorised representative.

7.1 Measuring principle

7.1.1 Conductivity measurement - inductive

The inductive measurement method enables largely maintenance-free acquisition of conductivity, even in the toughest media conditions. In the principle of inductive measurement, the sensor consists of a sender-recipient-coil. This principle is used here to determine conductivity at solutions with higher values, where direct contact measurement is not well suited. A magnetic field is generated by an electrical coil and a second electrical coil is placed next to it, a certain amount of electric energy will be transferred to it. With an inductive conductivity sensor, the process media flows directly through the middle of the sensor. As the voltage in the first coil is constant, the amount of energy transferred to the second coil is directly proportional to the electrical resistance of the solution. Due to said voltage and the cell constant the conductivity can be measured. Also built into the PEEK body is a Pt100 sensor placed in the tip of the sensor. This is measuring the actual media temperature to enable fast temperature compensation of the conductivity signal, which is very temperature dependent. The OPTISYS IND 8100 also features an analogue 4...20 mA output signal.

The whole sensor is encapsulated in a PEEK sensor body, which has a surface with surface roughness (Ra) <0.8 µm. It is therefore well suited for use in hygienic processes or directly in concentrated acids or alkalis.

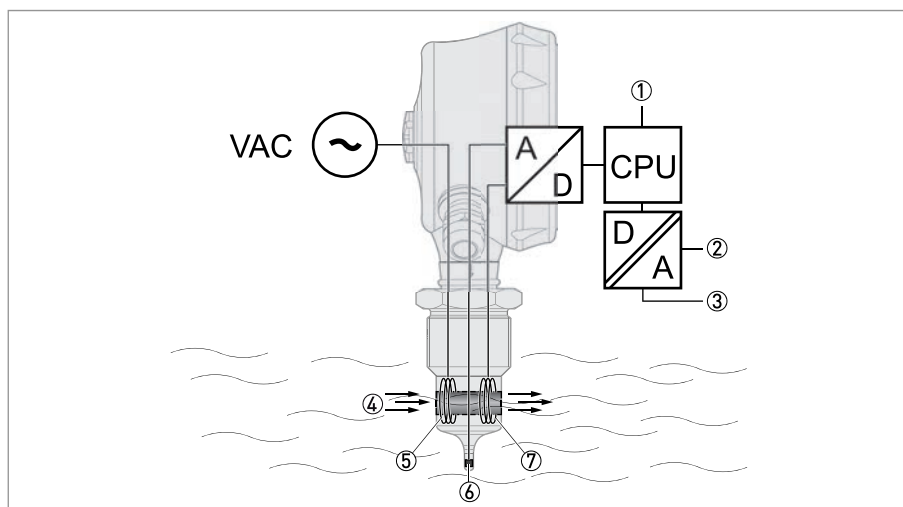


Figure 7-1: Working principle

- ① Range setting ...via input S1 and S2
- ② Conductivity / concentration 4...20 mA output
- ③ 4...20 mA output temperature
- ④ Flow direction
- ⑤ Primary coil
- ⑥ Pt100 sensor
- ⑦ Secondary coil

7.2 Technical data



INFORMATION!

- The following data is provided for general applications. If you require data that is more relevant to your specific application, please contact us or your local sales office.
- Additional information (certificates, special tools, software,...) and complete product documentation can be downloaded free of charge from the website (Downloadcenter).

Measuring system

Measuring principle	Inductive, 2 toroidal core transformers
Measuring range	Conductivity: 0...500 µS/cm up to 1 S/cm, 14 selectable ranges
	Detection limit $\geq 50 \mu\text{S/cm}$
	Concentration: 4 factory set media/ranges ¹⁾ , up to 4 user-defined media/ranges ²⁾
	Temperature: -20...+150°C, free programmable range
	Minimum measuring span 500 µS/cm

¹⁾ Configuration Tool required

²⁾ Configuration Tool required, or via HART

(Configuration Tool Software requires admin rights on a PC)

Design

Sensor design	Compact or remote
Temperature sensor	Pt100
Display (option)	Conductivity, temperature, concentration, relay status

Measuring accuracy

Accuracy (conductivity measuring system incl. transmitter at +25°C/77°F ambient)	Conductivity: • $\leq 1.5\%$ at 0...500 µS/cm FSR (full scale range) • $\leq 1.0\%$ at 0...1 mS/cm - 0...500 mS/cm FSR (full scale range) • $\leq 1.5\%$ at 0...1 S/cm FSR (full scale range) Temperature: • $\pm 0.4 \text{ K}$
--	--

Operating conditions

Process pressure	$\leq 25 \text{ bar} / 362 \text{ psi}$
Temperature range	-20...+140°C / -4...+285°F (150°C / 302°F < 1 hour)
Ambient temperature with display	-30...+80°C / -22...+176°F
Ambient temperature without display	-40...+85°C / -40...+185°F
Relative humidity (IEC 68.2.38)	98% condensing

Materials

Housing	Ø 80 mm, stainless steel 1.4301, AISI 304
M16 / M20 cable gland	Plastic or stainless steel
M12 plug	Stainless steel
Sensor	Virgin PEEK, 1.4404 (316L) Ra ≤ 0.8µm

Installation conditions

Ingress protection	IP67 / IP69 K with appropriate cable
Process connection	G1 hygienic, rotating
Vibrations (sinusoidal) (EN 60068-2-6)	1.0 mm p-p (2...13.2 Hz), 0.7 g (13.2...100 Hz), 1 octave / min.

Power supply

Power	15...35 VDC, 100 mA maximum
Response time conductivity	T ₉₀ < 2 seconds
Response time temperature	T ₉₀ < 15 seconds

Input and output

Output, conductivity	
Temperature compensation	0...5% / K, adjustable
Compensation range	-20...+150°C / -4...+302°F
Start-up time	≤ 16 seconds
Output	4...20 mA or 4...20 mA (HART®7), active
Overrange	21.6 mA
Reference temperature	+25°C / +77°F (adjustable)
Output, temperature	
Measuring range (free programmable)	-20°C...+150°C / -4°F...+302°F
Accuracy	± 0.4 K
Output	4...20 mA, active
Overrange	21.6 mA

Output, concentration selectable	
NaOH (caustic soda) ¹⁾	0...12% by weight (0...+90°C / +32...+194°F) 20...50% by weight (0...+90°C / +32...+194°F)
HNO ₃ (nitric acid) ¹⁾	0...25% by weight (0...+80°C / +32...+176°F) 36...82% by weight (0...+80°C / +32...+194°F)
Customer specific ²⁾	The customer can define the measuring range (30 point linearisation)
Relay output	
Contacts	2 x solid state relays in the optional display
Load current	75 mA
Voltage	60 V _p
Input	
Contact input	S1 and S2, to select one of the 4 measuring ranges

¹⁾ Configuration Tool required

²⁾ Configuration Tool required, or via HART

(Configuration Tool Software requires admin rights on a PC)

Approvals

CE	This device fulfils the statutory requirements of the EC directives. The manufacturer certifies successful testing of the product by applying the CE mark.
	Shock resistance: IEC 60068-2-31, Environmental testing – Part 2: Test Fc
	Electromagnetic compatibility: acc. to EN 61326, NAMUR NE 21
	Low voltage directive: Safety requirements for electrical equipment for measurement, control, and laboratory use in accordance with EN 61010-1:2001
Immunity (EMC)	EN 61326-1:2013
Emission (EMC)	EN 50081-1
Hygienic	FDA, 1935 / 2004, 2023 / 2006
	3A / EHEDG in combination with approved mounting adapters only

7.3 Dimensions of compact and remote version

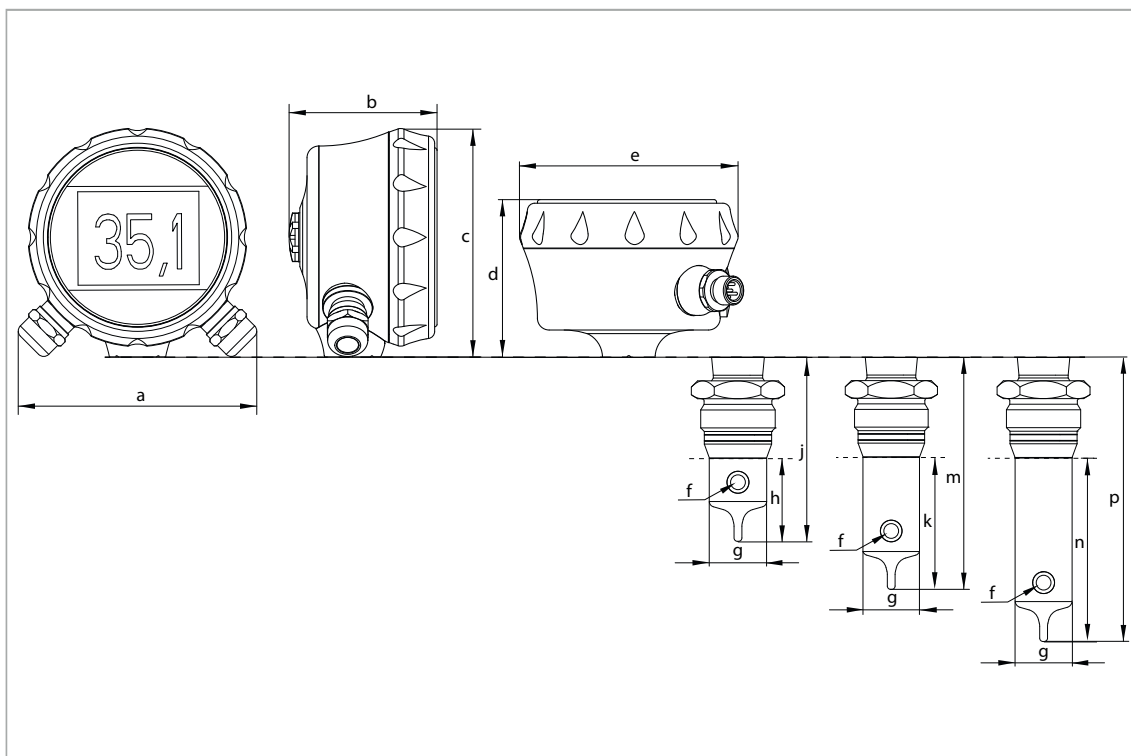


Figure 7-2: Dimensions compact version

	Dimensions [mm]	Dimensions [inch]
a	100	3.94
b	62	2.44
c	95	3.74
d	66	2.60
e	91	3.58
f	6.6	0.26
g	25.5	1.01
h	37*	1.46*
j	82	3.23
k	60*	2.36*
m	105,5	4,15
n	83*	3.27*
p	128	5.04

Table 7-1: Dimensions compact version in mm and inch

* The sensor insertion depth increases by 1.5 mm / 0.059" in combination with 3A / EHEDG approved mounting adapters.

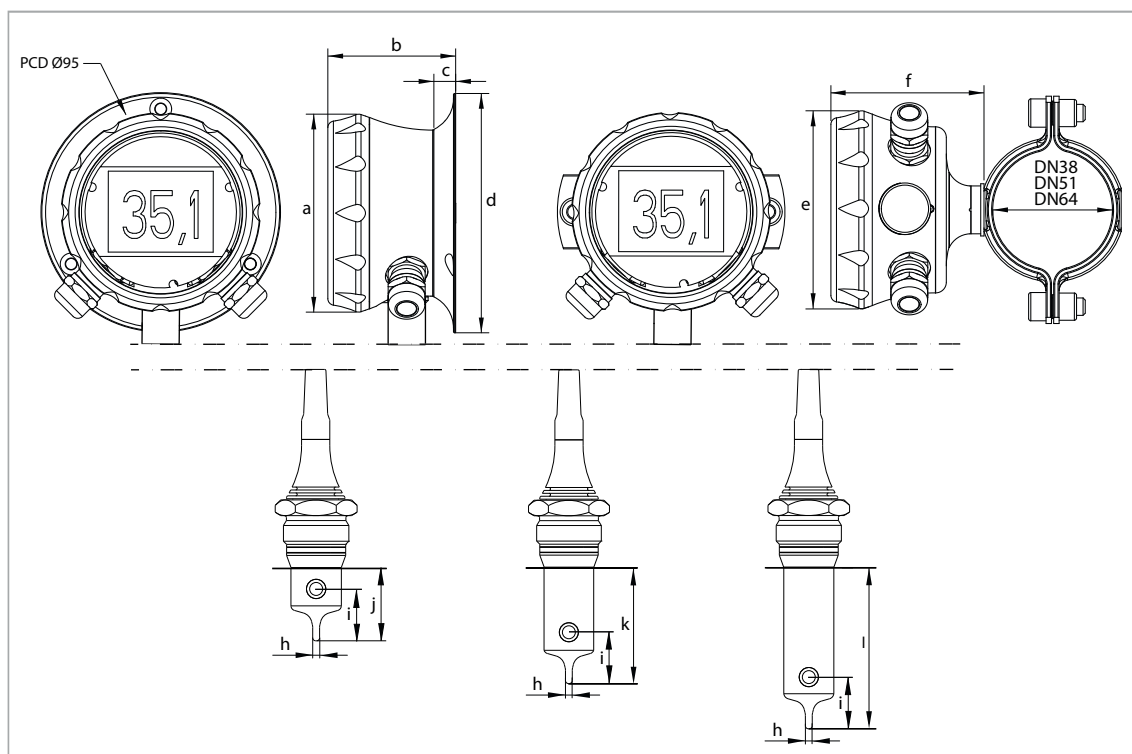


Figure 7-3: Dimensions remote version for wall mounting and pipe mounting

	Dimensions [mm]	Dimensions [inch]
a	91	3.58
b	59	2.32
c	10	0.39
d	110	4.33
e	91	3.58
f	70	2.76
h	3.6	0.14
i	26	1.02
j	37*	1.46*
k	60*	2.36*
l	83*	3.27*

Table 7-2: Dimensions remote version in mm and inch

* The sensor insertion depth increases by 1.5 mm / 0.059" in combination with 3A / EHEDG approved mounting adapters.

KROHNE – Products, Solutions and Services

- Process instrumentation for flow, level, temperature, pressure measurement and process analytics
- Flow metering, monitoring, wireless and remote metering solutions
- Engineering, commissioning, calibration, maintenance and training services

Head Office KROHNE Messtechnik GmbH
Ludwig-Krohne-Str. 5
47058 Duisburg (Germany)
Tel.: +49 203 301 0
Fax: +49 203 301 10389
info@krohne.de

The current list of all KROHNE contacts and addresses can be found at:
www.krohne.com

KROHNE