

Operating manual

Conductivity meter

Type M4036



Revision

Version	Date	Changes
V1.10	05.09.2023	Valid for M4036 as of firmware version 1.00.18

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Operating notes

Warranty

Mostec AG grants a warranty of 2 years on the measuring device mentioned. The period for calculating the warranty period begins with the invoice date. During the warranty period, defects which are not due to improper use will be repaired free of charge. Excluded are damages caused by use, for example such as scratched front panels and displays, corroded potentiometers, entry of water or similar defects.

There is an extended warranty of additional 2 years on long term damages, should they be due to faulty manufacturing. This includes bad and cold solder joints, as well as assembly errors, which only become noticeable after a longer period of operation.

The warranty repair must in any case be carried out at Mostec. Postage and packaging expenses shall be paid by the customer. In the event of a warranty claim, the repaired unit will be returned at Mostec's expense. Transport damages are excluded from any warranty service and must be reported to the delivering carrier.

Technical description

The very compact conductivity meter type M4036 was developed for applications for automatic dosing or monitoring purposes. A bright and sunlight readable 3.5 inch IPS display allows reading of the measured value even in bright environments. The touch screen can be operated smoothly and enables intuitive and uncomplicated use.

The two-point controller consists of two potential-free limit contacts which can be electronically adjusted over the entire range. In order to control alarm devices, dosing valves and dosing pumps, among other things, these limit contacts can be used. The current measured value, the temperature, as well as the device status are continuously displayed.

A galvanically isolated wide range power supply from 20 to 253VAC/DC supplies the device and only a conductivity electrode is needed for the instrument to be ready for operation. Commercially available probes with K-factors 0.01, 0.1, 1.0 and 10.0 cover a dynamic range from 1 μ S to 200mS (example: M8836S). The cable length of the probe is internally automatically compensated has no influence on the measurement.

Temperature compensation is done either manually or with an external Pt-100 sensor. Defects of the Pt-100 sensor are immediately indicated and trigger an alarm. The conditions for such an alarm trigger can be defined. All device settings can be protected by means of an access code.

A USB stick can be used to automatically log the measured values. Two programmable, galvanically isolated signal outputs are available to send for example the measurement value and the temperature to a PLC.

Technical support

For questions or concerns, we can be reached by email or phone.

Current operating instructions can be found on our website www.mostec.swiss.

Contact details

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CH-4410 Liestal BL
Phone: +41 61 921 40 90
E-mail: info@mostec.ch

Safety instructions



Observe the customary national regulations and safety requirements for electrical, light and heavy current installations.



Read and observe the safety regulations of these operating instructions before using the device.



The device must be mounted in such a way that it is protected from moisture, vibrations and heavy soiling.



When working on the control panel, all lines leading to the device must be de-energized if there is a risk that the terminals located on the device could be touched.



The limit values for the variables specified in the data sheet must not be exceeded under any circumstances.



Wiring, commissioning and operation of the equipment must be carried out by suitably qualified personnel in accordance with local regulations.



If it can be assumed that the device can no longer be operated without danger, it must be taken out of service and secured against further operation by labeling.

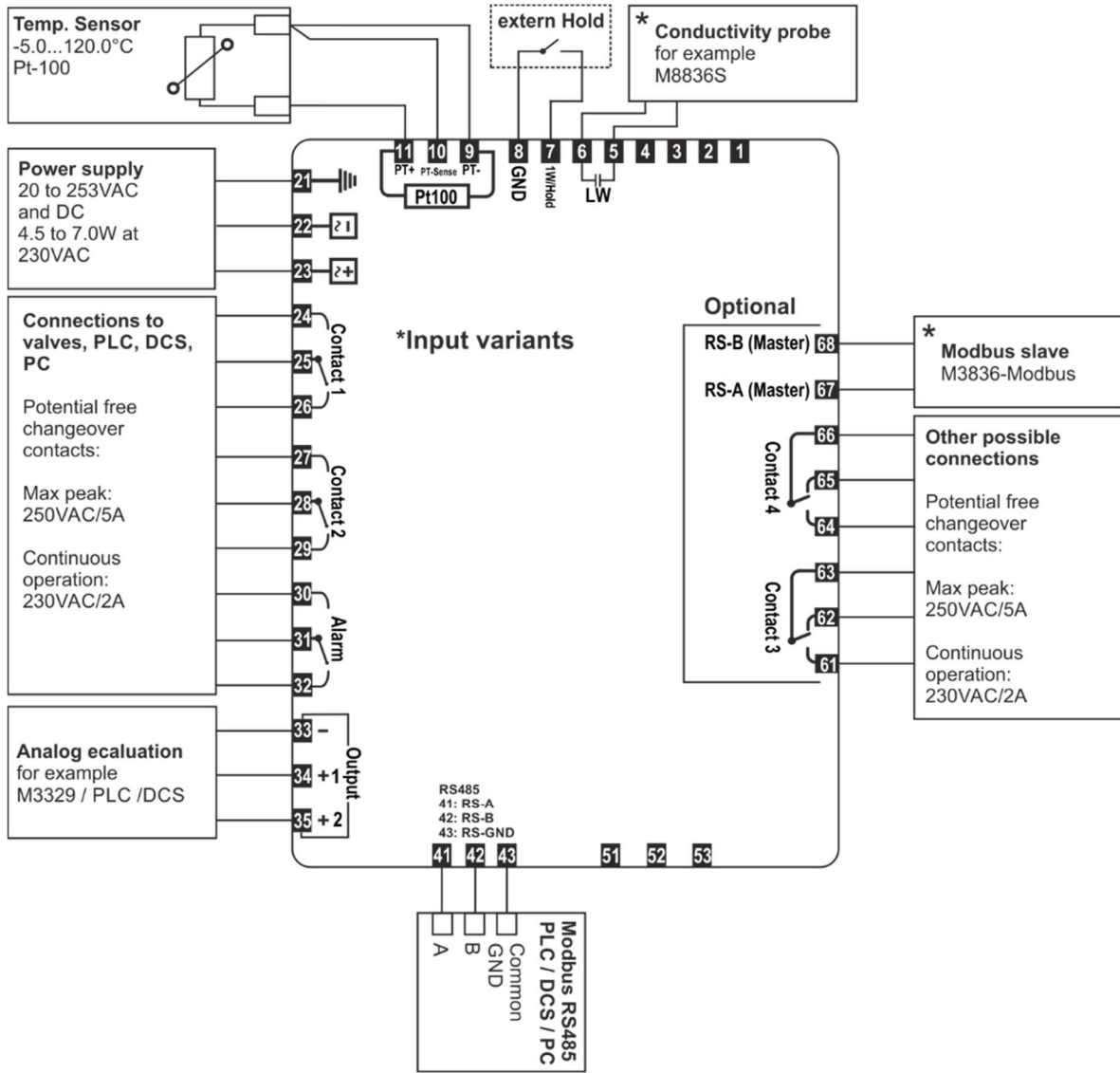


Failure to follow the safety instructions may result in damage to the device and injury to the operator.

Operating regulations

1. Connect the device according to the wiring diagram.
2. After all necessary connections have been made, the supply voltage of the system can be switched on.
3. Make the appropriate settings for the respective operation.

Wiring diagram



Connections

5	Probe + input	6	Probe - input	7	Hold input	8	GND
---	---------------	---	---------------	---	------------	---	-----

9	Pt-100 probe (-)	10	Pt-100 probe sense(-)	11	Pt-100 probe (+)
---	------------------	----	-----------------------	----	------------------

21	Protective earth PE	22	Supply power (-)	23	Supply power (+)
----	---------------------	----	------------------	----	------------------

24	Limit value 1: normally open contact (NO)	25	Limit value 1: changeover contact	26	Limit value 1: normally closed contact (NC)
----	---	----	-----------------------------------	----	---

27	Limit value 2: normally open contact (NO)	28	Limit value 2: changeover contact	29	Limit value 2: normally closed contact (NC)
----	---	----	-----------------------------------	----	---

30	Alarm contact: normally open contact (NO)	31	Alarm contact: changeover contact	32	Alarm contact: normally closed contact (NC)
----	---	----	-----------------------------------	----	---

33	Signal output GND	34	Signal output 1	35	Signal output 2
----	-------------------	----	-----------------	----	-----------------

41	Modbus RS485-A	42	Modbus RS485-B	43	Modbus RS485-GND
----	----------------	----	----------------	----	------------------

Additional clamp (optional)

61	Limit value 3: normally open contact (NO)	62	Limit value 3: normally closed contact (NC)	63	Limit value 3: Changeover contact
----	---	----	---	----	-----------------------------------

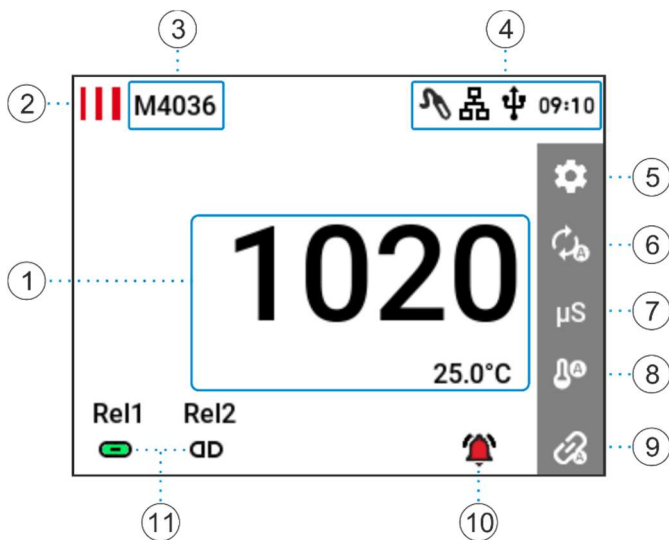
64	Limit value 4: normally open contact (NO)	65	Limit value 4: normally closed contact (NC)	66	Limit value 4: Changeover contact
----	---	----	---	----	-----------------------------------

67	Modbus RS485 Master-A	68	Modbus RS485 Master-B
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Instrument overview

Instrument elements

Measurement screen





1. Current measured values
2. Logo and "Device info" entry
3. Device label
4. Status bar with current time
5. Settings
6. Measuring range
7. Measurement unit
8. Temperature measurement source
9. Auto / manual operation
10. Alarm display and alarm log
11. Status limit contacts



All symbols marked with  can be selected

Meaning of the symbols



Conductivity probe type

-  Analog conductivity probe
-  4...20mA input (not available)
- MB** Modbus (not available)










USB

-  USB storage medium connected
-  USB storage medium is currently being accessed

Modbus

-  RS-485 communication connected to bus
-  RS-485 communication active

Other

-  Temperature source manual mode
-  Temperature source Pt-100 mode
-  Temperature source digital mode (only possible with probe type Modbus)
-  Instrument in manual mode
-  Instrument in automatic mode
-  No alarm active
-  Alarm active (flashing symbol)
-  Alarm acknowledged (steady symbol)
- CD** Switching contact open
-  Switching contact closed

User menu

The user menu has the following submenus. In these submenus, device-specific settings can be made.




The bar on the right side is a scroll bar



The default values are shown **[Bold]**

Settings

Enter the **Settings** menu by pressing the icon  .

Menu item	Submenu items	Section
Measurement settings	Current output 1 Current output 2 Range Cell constant Conductivity cell type Temperature Broken wire conductivity cell	Seite 10
Device settings	Language Access code Brightness screen Device label	Seite 12
Limit contact settings	Limit value 1 Limit value 2 Limit value 3 (optional) Limit value 4 (optional) Alarm contact	Seite 12
USB settings	Log interval Time Date Log Device settings	Seite 15
Modbus settings	Modbus address Modbus baud rate Modbus mode	Page 15
Device Info	Firmware version Serial number Device type Hardware Firmware update	Seite 15

Measurement settings

In this submenu, measurement-specific settings as well as settings for the current output can be made.

Menu item	Function/Comment	Possible values
Current output 1	Settings for signal output 1	See Signal output 1 & 2 settings
Current output 2	Settings for signal output 2	See Signal output 1 & 2 settings
Range	Current measuring range, depending on cell constant	2 μ S 20 μ S 200 μ S 2000 μ S 20mS 200mS auto [auto]
Cell constant	Setting the cell constant including correction value	Adjustable from: 0.0000 to 11.0000 [1.0000]
Conductivity cell type	Selects the conductivity cell type	analog 4-20mA (not available) modbus (not available) [analog]
Temperature	Temperature settings	See Temperature settings (Seite 11)
Broken wire conductivity cell	Sets the lower threshold for the broken wire detection of the conductivity cell.	Adjustable from: 0.0 to 25.5% of the measuring range [1.0%] 0.0 = Off

Signal output 1 & 2 settings

Menu item	Function/Comment	Possible values
Input min	Minimum conductivity / minimum temperature value for the lower value of the current output	Adjustable from: 0 to 2000 digits of the conductivity range, or -30.0°C to +100.0°C if temperature is selected [0 / 0.0°C]
Input max	Maximum conductivity / maximum temperature value for the upper value of the current output	Adjustable from: 0 to 2000 digits of the conductivity range, or -30.0°C to +100.0°C if temperature is selected -30.0°C to +100.0°C [0 / 100.0°C]
Output min	Current output signal at Input min value	Adjustable from: 0.000mA to 20.000mA [0.000mA]
Output max	Current output signal at Input max value	Adjustable from: 0.000mA to 20.000mA [20,000mA]
Switching unit	Setting the measurement unit of the signal output	µS/mS for conductivity °C for temperature [µS/mS]
Alarm mode	Behavior of the current output in case of alarm. With "off" the output is set according to the measured value.	off 3.6mA 22mA [off]
Hold mode	Behavior of the current output during hold mode	hold min max off [hold]

Temperature settings

Menu item	Function/Comment	Possible values
Mode	Selects the sensor type of the temperature measurement	Pt-100 Digital (only for sensor type Modbus) Manual [Pt-100]
Temperature manual	Temperature in "Manual" mode	Adjustable from: 0.0°C to 100.0°C [25.0°C]
Pt-100 zero offset	Zero offset of the temperature sensor	Adjustable from: -2.5°C to +2.5°C [0.0°C]
Temperature slope	Sets the temperature slope of the conductivity compensation. Reference temperature = 25.0°C	Adjustable from: 0.00 to 8.00 %/°C [2.25%/°C]

Device settings

Device specific settings are made in this submenu.

Menu item	Function/Comment	Possible values
Language	Setting the menu language	English German Français
Access code	Activate/deactivate the access code. When the access code is active, only the menu items "Sensor calibration" and "USB settings" can be accessed. Notice: Contact us if you have forgotten the access code.	Numeric access code Size: 4 digits [from]
Brightness	Screen brightness	Adjustable from: 5% to 100% [50%]
Device label	Changing the device label on the measurement screen	16 alphanumeric characters with special characters possible [M4036]

Limit settings

Submenu for the limit and alarm settings.

Menu item	Function/Comment	Section
Limit value 1	Opens the limit 1 settings	See Limit contact 1 & 2 settings
Limit value 2	Opens the limit value 2 settings	See Limit contact 1 & 2 settings
Limit value 3 (optional)	Opens the limit value 3 settings	See Limit contact 1 & 2 settings
Limit value 4 (optional)	Opens the limit value 4 settings	See Limit contact 1 & 2 settings
Alarm	Opens the alarm settings	See Alarm settings (Seite 14)

Limit contact 1 & 2 settings

Menu item	Function/Comment	Possible values
Set point	Set the setpoint of the limit contact range	Adjustable from: 0 to 2000 digits from conductivity range -30.0°C to +130.0°C when temperature selected GW1: [1600 / 45.0°C] GW2: [300 / 25.0°C]
Hysteresis	Set hysteresis of the setpoint	Adjustable from: 0 to 200 digits from conductivity range 0.5°C to 20.0°C when temperature selected [5 / 0.5°C]
Behavior limit relays	Upper limit: Relay output energizes when measurement value exceeds (setpoint + hysteresis) Lower limit value: Relay output energizes when measurement value falling below (setpoint – hysteresis)	Upper limit value Lower limit GW1: [upper limit value] GW2: [lower limit]
Switch-on delay	Relay output energizes after the switch-on delay	Adjustable from: 0s to 3600s [0s]
Switch-off delay	Relay output only deenergizes after the switch-off delay	Adjustable from: 0s to 3600s [0s]
Label	Customizing the limit contact label on the measurement screen	4 alphanumeric characters with special characters possible
Unit	Select the unit of the measurement value for the limit contact	µS/mS °C [µS/mS]
Relay	Invert the relay function	normal inverse [normal]
Status display	Invert display of the limit contact relay	normal inverse [normal]
Hold mode	Behavior of the limit contact during hold mode	off active inactive [off]

Alarm settings

Menu item	Function/Comment	Possible values
Alarm SP1	Opens the Alarm SP1 settings	See Alarm SP1 & SP2 settings
Alarm SP2	Opens the Alarm SP2 settings	See Alarm SP1 & SP2 settings
Relay	Invert the relay function	normal inverse [normal]
Status display	Invert display of the alarm relay	normal inverse [normal]
Relays active time monitoring	Time until an alarm is triggered when the limit contact is constantly activated	Adjustable from: 0s to 10800s [0s] (switched off)
Alarm when manual mode selected	Triggers an alarm when the device is set to manual mode	off on [off]
USB memory full	Triggers an alarm when USB memory is full	off on [off]
Broken wire conductivity cell	Triggers an alarm if a broken conductivity sensor wire is detected	on off [on]
Broken wire temperature sensor	Triggers an alarm if a broken Pt-100 sensor wire is detected	on off [on]
Hold mode	Behavior of the alarm contact during hold mode	off active inactive [off]

Alarm SP1 & SP2 settings

Menu item	Function/Comment	Possible values
Activation	Activate the alarm contact relays	off on [off]
Set points	Adjust the set points of the alarm contact relays	Adjustable from: 0 to 2000 digits from conductivity range -30.0°C to +100.0°C when temperature selected SP1: [1700 / 55.0°C] SP2: [200 / 15.0°C]
Hysteresis	Set hysteresis around the set point	Adjustable from: 0 to 200 digits from conductance range 0.5°C to 20.0°C when temperature selected [5 / 0.5°C]
Behavior		Upper limit value Lower limit value SP1: [upper limit value] SP2: [lower limit value]
Switch-on delay	Alarm relay output energizes after the switch-on delay	Adjustable from: 0s to 3600s [0s]
Units	Select the unit of the measurement value for the alarm contact	µS/mS °C [µS/mS]

USB settings

Menu item	Function/Comment	Possible values
Log interval	Time interval after a measurement is stored on the USB stick	Adjustable from: 1s to 7200s [5s]
Time	Set the current time	Adjustable from: 00:00 to 23:59
Log	Shows the status. In this menu logging can be started or stopped.	start? runs stop? stopped n. available
Device settings	Option to save or restore the device settings	save download n. available

Modbus settings

For further information see "M4020_M4036_M4005_Modbus_UserGuide_Vx.xx.pdf".

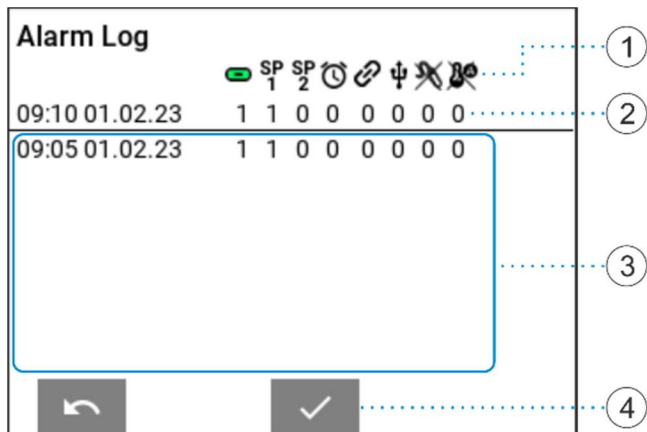
Menu item	Function/Comment	Possible values
Modbus address	Slave address of the device	Adjustable from: 1 to 247 [1]
Modbus baud rate	Set the requested baud rate	4800 9600 19200 38400 57600 115200 [38400]
Modbus mode	8 data bits N: no parity bit E: even parity bit O: odd parity bit 1 or 2 stop bits	8-N-1 8-N-2 8-E-1 8-E-2 8-O-1 8-O-2 [8-N-1]

Devices Info

Menu item	Function/Comment	Possible values
Firmware version	Shows the current firmware	
Serial number	Shows the serial number of the device	
Device type	Shows the device type	M4036
Hardware	Hardware Info	
Firmware update	Performs a firmware update	See Firmware update (Seite 17)

Operation of the device

Alarm Log



1. Alarm Log Symbols
2. Current alarm state
3. Alarm state history
4. Alarm acknowledgement

Explanation of the Alarm Log Symbols

- Alarm contact active
- Switching points have triggered alarm
- Relays active time monitoring, time exceeded
- Device switched to manual operation
- USB storage medium with errors
- Broken wire conductivity sensor
- Broken wire Pt-100 temperature sensor

USB Logger

Features of the USB Logger

- The device only accepts USB sticks which are FAT32 formatted and empty.
- Time and date must be set before inserting the USB stick. A backup battery keeps the settings also during the de-energized state. (Life span of the battery approx. 10 years)
- In the Log interval menu, the interval time between the data sets written to the stick can be set.
- As soon as a valid storage medium is detected by the device, the USB symbol appears on the measurement screen and the logging process starts automatically.
- Do not remove the USB flash drive when the USB icon is red.
- For safe removal of the USB stick, stop the recording function in the user menu under the USB settings.
- The device creates a new log file after 60'000 log entries and archives the old one.
- Back up the data and empty the USB - stick from time to time (e.g. every year).

File name / file format

The data is saved in CSV format under the following file name key:

"JJMMDDXX.csv

YY= last 2 digits from current year (e.g. 2018 = "18")

MM= current month

TT= current day

XX= numbering (0-99)

The CSV format can be opened with the most common spreadsheet programs.

The separator used is a ';' character and the encoding is Unicode (0x00-0xFF).

Example

Device:	M4036														
Serial:	100														
FW/HW Version:	1.00.16/M01R1-20Q1														
Date	Time	Temperature	Conductivity	Unit	Conductivity[μS]	Relay 1	Relay 2	Relay 3	Relay 4	Relay 5	Alarm	Auto Temperature	Auto Relay		
11.04.2023	13:09:28	20	11.43	μS	11.433	1	1	0	0	0	0x00	0	1		
11.04.2023	13:09:33	20	11.43	μS	11.434	1	1	0	0	0	0x00	0	1		

Saving and restoring the device settings

This option can be found in the USB settings. Here, the current settings of the device can be saved to a USB stick or restored.

When saving and restoring, all customer-adjustable settings are accepted or overwritten. These two functions are not available if the instrument is locked using an access code.

Firmware update

The device can be updated to the latest version in the field with a firmware update.

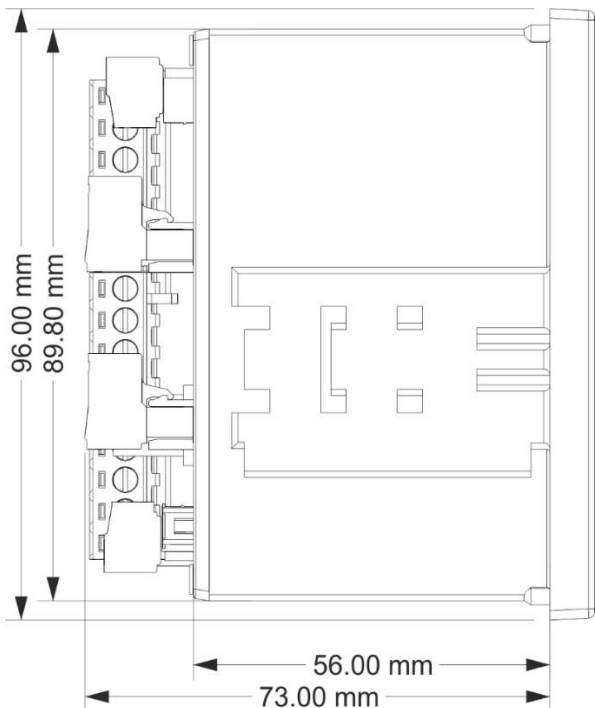
Please ask us, see Contact details.

Appendix

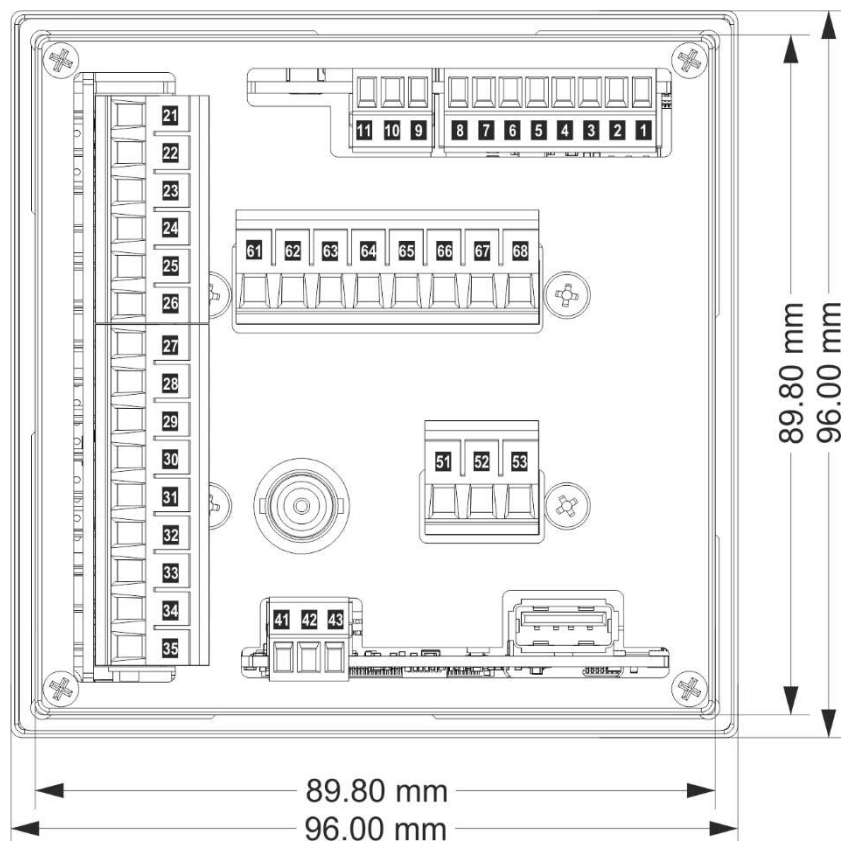
Dimensions

Front panel mounting requires a cutout of 91x91mm.

Side view:



Rear view:



Technical data

Measuring ranges:	0...2.000µS K = 0.1, K = 0.01 0...20.00µS K = 10.0, K = 1.00, K = 0.1 K = 0.01 0...200.0µS K = 10.0, K = 1.00, K = 0.1 0...2.000mS K = 10.0, K = 1.00, K = 0.1 0...20.00mS K = 10.0, K = 1.00 0...200.0mS K = 10.0
Conductivity measurement:	direct connection to terminals
-Slope adjustment:	0.00%/°C to 8.00%/°C (reference temperature 25°C)
-Measurement frequencies:	between 80Hz and 10kHz
- Influence line capacity:	automatic compensation up to a max. capacity of 10nF
- Intrinsic conductivity of water:	automatically compensated
Accuracy typical:	0.5% at 23°C ambient temperature
-Reproducibility:	0.1%
-Temperature coefficient:	Zero drift: 30ppM/°C , gain drift: 25 ppM/°C
-Long-term stability:	±0.15% after 3 months
Display:	sunlight readable 3.5" IPS graphic display, 320x240 pixels
-Resolution:	1 Digit
-Display range:	0...2150 digit
Working temperature range:	-5°C to +45°C, higher Temperatures can be ordered optionally
Max. Humidity:	95%, non-condensing
Temperature input:	By means of PT-100 sensor 3-wire technology or manually
- PT-100 range:	-5.0 to 120.0°C
- PT-100 transmitter Accuracy:	0.3°C
Current output:	2 outputs, 0 to 20mA, galvanically isolated, freely adjustable to conductivity or temperature, common reference, in case of alarm 3.6mA/22mA/off programmable. in hold mode: hold/min/max/off programmable
-Max. Load:	500Ω
-Output impedance:	Type. > 1MΩ
Relay contacts:	3 relays, alarm contact included
-Output:	potential-free changeover contacts, max. 5A, continuous 2A at 230V
-Mode:	automatic or manual
-Limits:	freely adjustable to conductivity / temperature or other signals
-Hysteresis:	5-200 digits adjustable
-Delay:	0-3600s On and/or off delay
-Minimum switch-on time:	0-10.00s
-Display labeling:	4 characters
-Hold mode:	active/inactive/off adjustable
Alarm:	2 limit values adjustable, wire break at PT-100, wire break conductivity electrode, warning when USB disk full, pump runtime monitoring of switch contact 1 & 2, manual operation monitoring, alarm relay contact can be acknowledged on the display, behavior in hold mode active/inactive/off adjustable
Digital interface:	RS-485, Modbus RTU protocol (standard: 38'400, 8N1)
USB:	Logger, recording period (1-7200s)

Further features	<ul style="list-style-type: none"> -16 characters available for labeling on the main screen -hold function of the current outputs/relays controlled by external normally open contact -settings can be copied from device to device via USB stick -firmware updates via USB stick -device settings can be blocked with a 4-digit access code.
Supply:	Wide range power supply: 20 to 253VAC or DC
Power consumption:	4.0W to 7.0W at 230VAC
CE conformity:	fulfilled
Connection type:	<p>Connector terminals: 2x 3 pin, 1x 6 pin, 1x 8 pin, 1x 9 pin, 1x 8pin 1x USB-A connector When 5 relay contacts are used, an additional 1x 8Pol plug terminal is added</p>
Mounting:	2 quick release fasteners
Weight:	330g
Protection class:	Front IP64 protected
Warranty:	2 years
Options	<ul style="list-style-type: none"> -additional 2 relay contacts (5 relay contacts with expansion card) -IoT gateway module for remote monitoring and alarming via LTE network (more information on request).