Operating Manual

Conductivity Controller
Typ M3036

III MOSTEC

Warranty

Mostec warrants this product to be free of manufacturing defects for a 2-year period after the original date of purchase. Within this period, defective products will be repaired free of charge provided that the defect occurred during normal operation. This warranty does not cover damage to the product resulting from ordinary usage such as front panel scratches, broken control elements and corrosion, etc. The customer is responsible for shipping and packing charges for products returned under warranty to Mostec. Mostec warrants this product beyond the 2-year warranty period for an additional 2 years in case of long term damages due to improper manufacturing. Such damages as poorly soldered joints or other assembly problems are also covered by the warranty. Transportation damages are not covered by the warranty and should be referred to the respective delivery service.

A. Front Elements And Keyboard

This listing only refers to the main screen, which shows up 3 seconds after power on.

Nr.	Element	Function	Page
a.	LED1	Errors, limit contacts, USB, wire break **6**	-
b.	LED2	no function	-
c.	LED3	limit contact 1	6,8,16
d.	LED4	limit contact 2	6,8,16
	F1	setup menu, display limit contact 1	5
	F2	display limit contact 2	5
	F3	setting the measurement range	5, 8, 9
	F4	changing temperature measurement to man/auto	5
	ENT	display the setup menu, input	5
	ESC	display the main menu, exit	6
	+	plus	5-12
	-	minus	5-12

B. Setup menu, setting the range and temperature

Set the measuring range with (**F3**), fixed or automatic, depending on the selected cell constant. In automatic mode, see symbol ⟨A⟩, it selects the optimum range.

(**F4**) sets the temperature measurement to manual or auto. Basically, all settings can be made in the users menu. Other parameters can be changed during operation and are set from the main screen by (**ENT**). If an alarm message is displayed on the main screen, it has to be acknowledged to enable further parameter change. Setting the limits for the alarm relay in the setup menu is only possible when the alarm is set in the user menu: "Alarm SP1 enable" & "Alarm SP2 enable".
Quit the setup menu by (**ESC**), or, waiting a few seconds with no key operation. Values can be altered with (**+**) and (**-**), or, depending on the menu, with the (**F3**) as well.

Access to the menu item	Menu Item	Display Reaction	Change Values
press **ENT** 1x	**set limit contact value1** Limit 1 can also be set by (**F1**)	LMT1 symbol blinks Depending on the selected type of measurement, conductivity or the temperature is displayed (see E. Relay Settings)	Adjust the value with (**+**) and (**-**) . Set the range with (**F3**). This only works with conductivity monitoring = on. (**F1**) saves the settings and exits from the menu
press **ENT** 2x	**set limit contact value1** Limit 1 can also be set by (**F2**)	LMT2 symbol blinks Depending on the selected type of measurement, conductivity or temperature is displayed	Adjust the value with (**+**) and (**-**). (**F3**) sets the measuring range. This only works with conductivity monitoring = on. (**F1**) saves the settings and exits from the menu
press **ENT** 3x	**set manual temperature**	temperature display	(**+**) and (**-**) sets the value to +/- 0.1°C. (**F1**) saves the settings and exits from the menu
press **ENT** 4x	**slope**	slope blinks	(**+**) and (**-**) sets the value to +/- 0.01%/°C. (**F1**) saves the settings and exits from the menu
press **ENT** 5x	**USB**	USB-symbol blinks	Set the USB logger on/off

C. User Menu

Access to menu: press and hold (**ENT**) for 3 seconds
Navigation in the menu: (**+**) and (**-**)
Access to a menu item: (**ENT**) = ENTER
Exit a menu item: (**ESC**) = ESCAPE
Adjust values: (**+**) and (**-**)

Menue Item	Submenue	Function/Comment
1/8 **Measurement settings**	conductivity cells K-factor, cell correction factor, input range, output range, signal current output range, temperature mode, slope and hold function	See section D
2-5/8 **Relay 1-4 settings**	Rel1-4: mode Rel1-4: set point Rel1-4: norm/inv Rel1-4: LED norm/inv Rel1-4: turn on delay Rel1-4: turn off delay Rel1-4: hysteresis Rel1-4: type of measurement Rel1-4: label	See section E
6/8 **Alarm settings**	Alarm SP1/2: on/off Alarm SP1/2: value Alarm SP1/2: mode Alarm SP1/2: delay Alarm Rel: norm/inv SP1-SP2: hysteresis Pump monitoring	See section F
7/8 **USB settings**	Time setup Date setup Data log period Remove memory stick	See section G
8/8 **Device settings**	Keyboard lock/unlock Language settings Custom label Factory setting Device info	See section H

D. Measurement settings

1) Press and hold (**ESC**) 3 seconds to enter the users menu.
2) Go to menu item 1/6, "Measurement settings" with (**+**).
3) Open menu item with (**ENT**)
4) Menu structure:

Menu Item	Change Values	Function/Comment
1/8 **Cell's K-factor**	Switch with (**+**) and (**-**) between the four cells K-factors and confirm the selection with (**ENT**) Caution: If a selection is confirmed with (**ENT**), then all ranges are set to auto!	Setting the cell K-factor based on the cells label. Setting a cell K-factor witout default value. For example: required cell K-factor = 0.22 1. Set the next smaller cell K-factor --> 0.1 2. Divide this cell K-factor by the required cell K-factor. 0.1 : 0.22 = 0.455 3. Set this value in the menu 2/7 correction factor.
2/8 **Cell correction factor**	change the value with (**+**) and (**-**) and confirm the selection with (**ENT**)	If necessary for fine-adjustment of conductivity
3/8 **Input range**	Not active	Setting the input range wich corresponds to the current output
4/8 **Output range**	change the minimum and maximum value with (**+**) and (**-**). 0.00...20.00mA is possible, skip to next parameter or confirm the selection with (**ENT**)	Set's the output range which corresponds to the measuring range
5/8 **Current output range**	change the measurement range with (**+**) and (**-**) for the current output and confirm the selection with (**ENT**)	Set the current output to the required measuring range. In auto mode, the current output adjusts to the measuring range
6/8 **Temperature mode**	change the value with (**+**) and (**-**) and confirm the selection with (**ENT**)	Set the measuring method for temperature sensing
7/8 **Slope**	change the value with (**+**) and (**-**) and confirm the selection with (**ENT**)	Adjust the slope of the temperature compensation
8/8 **Hold function**	Activate the external hold function with (**+**)	With activated Hold function, (jumper over terminal 20/21), the internal measured value is set to 0.0. The limit contacts and current output behave as if the measurement signal would be 0.0.

E. Relay Settings

1) Press and hold (**ESC**) 3 seconds to enter the customer menu.
2) Go to menu item 2/8 or 3/8, "Relay 1+2 settings" with (**+**), respectively to menu 4/8 or 5/8, "Relay 3+4 settings" (optional relays).
3) Open menu item with (**ENT**)
4) To confirm a selection press (**ENT**), exit with (**ESC**)
5) Menu structure:

Menue Item		Change Values
1/9	**Relay 1-4: behavior**	Switch with (**+**) between upper and lower limit, confirm the selection with (**ENT**)
2/9	**Relay 1-4: set point**	Change the setpoint value with (**+**) and (**-**) for conductivity or temperature monitoring. Selected the measuring range for conductivity monitoring with (**F3**)
3/9	**Relay 1-4: norm/inv?**	Switch with (**+**) between normal and inverse operation and confirm the selection with (**ENT**)
4/9	**Relay 1-4: Led norm/inv?**	Switch with (**+**) between normal and inverse operation and confirm the selection with (**ENT**) Note: There is no LED for relay 3/4 available
5/9	**Relay 1-4: turn on delay**	Change the time delay with (**+**) and (**-**), resolution is +/-1s
6/9	**Relay 1-4: turn off delay**	Change the time delay with (**+**) and (**-**), resolution is +/-1s
7/9	**Relay 1-4: hysteresis**	Change the hysteresis of both set points with (**+**) and (**-**), possible resolution is 5 to 200 parts of range
8/9	**Relay 1-4: type of measurement**	Switch with (**+**) between conductivity or temperature monitoring
9/9	**Relay 1-4: label**	Change characters with (**+**) and (**-**) and jump with (**F3**) and (**F4**) to the next character, confirm the label text with (**ENT**). Note: Displayed label text on main monitor shows up at relay 1/2 only

F. Alarm settings

1) Press and hold (**ESC**) 3 seconds to enter the customer menu.
2) Go to menu item 4/6 "Alarm settings" with (**+**).
3) Open menu item with (**ENT**)
4) To confirm a selection press (**ENT**), exit with (**ESC**)
5) Menu structure

Menu Item	Change Values	
1/12 **Alarm SP1 enable**	Change with (**+**) between enable and disable, confirm the selection with (**ENT**)	
2/12 **Alarm SP1 value**	Change the value with (**+**) and (**-**) and change the measuring range with (**F3**).	
3/11 **Alarm SP1 behavior**	Toggle with (**+**) between functions "lower limit" and "upper limit", confirm the selection with (**ENT**)	
	upper limit	Alarm relay is activated when the measured value is higher than the nominal value
	lower limit	Alarm relay is activated when the measured value is lower than the nominal value
4/12 **Alarm SP1 delay**	Change the time delay with (**+**) and (**-**), resolution is +/-1s	
5/12 **Alarm SP2 enable**	Toggle with (**+**) between enable and disable, confirm the selection with (**ENT**)	
6/12 **Alarm SP2 value**	Change the value with (**+**) and (**-**)	
7/12 **Alarm SP2 behavior**	Toggle with (**+**) between functions "lower limit" and "upper limit", confirm the selection with (**ENT**)	
	upper limit	Alarm relay is activated when the measured value is higher than the nominal value
	lower limit	Alarm relay is activated when the measured value is lower than the nominal value
8/12 **Alarm SP2 delay**	Change the time delay with (**+**) and (**-**), resolution is +/-1s	
9/12 **Alarm Rel norm/inv?**	Toggle with (**+**) between normal and inverse operation, confirm the selection with (**ENT**)	
10/12 **SP1-SP2 hysteresis**	Change the hysteresis of both set points with (**+**) and (**-**), possible resolution is 5 to 200 parts of range	
11/12 **Pump monitoring**	Change the value with (**+**) and (**-**), to set the maximum pump run time until alarm (from 0s to 10800s, where zero seconds is "off")	

| Menu Item	Change Values
12/12 **Alarm "wire "break" activation**	Enable alarm "break detection" with (**+**) . If one of the wires ares broken (<1% of range) the signal current output goes to maximum value, the two limit contacts and the alarm relay are activated

Display Overflow

The conductivity meter has six ranges depending on the selected cell's K-factor:

Measuring range 1:	0...2.000µS	K = 0.1, K = 0.01
Measuring range 2:	0...20.00µS	K = 1.00, K = 0.1 K = 0.01
Measuring range 3:	0...200.0µS	K = 1.00, K = 0.1
Measuring range 4:	0...2.000mS	K = 1.00,
Measuring range 5:	0...20.00mS	K = 1.00
Measuring range 6:	0...200.0mS	K = 10.0

The display shows "-.-.-.x" if the input signal is higher than the maximum value of the range. The letter "x" corresponds to the current measurement range.

For example: cell = K1.0, cell K-factor = 1.00, medium = 47.5mS

The measured value is higher than the display limit of the 20mS range, with range #5 selected.
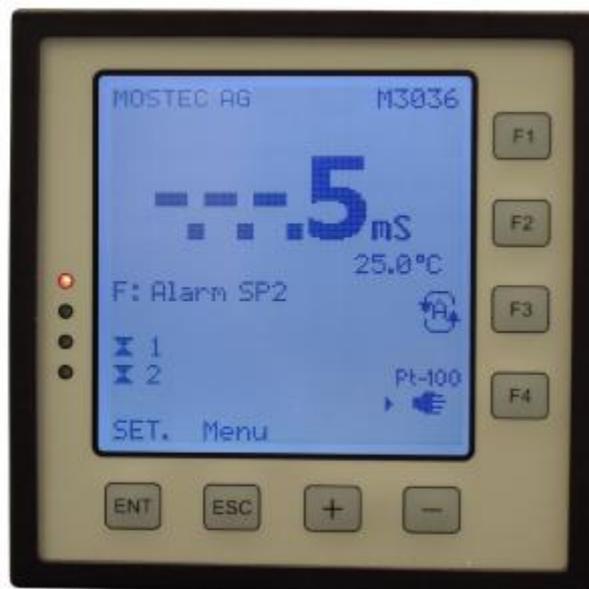
Note:
An alarm message can be acknowledged by (**ENT**) on main screen.

G. USB settings

1) Press and hold (**ESC**) 3 seconds to enter the user menu.
2) Go to menu item 5/6 "USB settings" with (**+**).
3) Open menu item with (**ENT**)
4) To confirm a selection press (**ENT**), exit with (**ESC**)
5) Menu structure:

Menu Item	Change Values	Function/Comment
1/4 **Clock setup**	Toggle with (**+**) between 12h and 24h format, confirm it with (**ENT**)	Set time format and time for logging mode
2/4 **Date setup**	Toggle with (**+**) between DDMMYY and MMDDYY format, confirm with (**ENT**)	Set date format and date for logging mode
3/4 **USB logging period**	Set recording time interval with (**+**) and (**-**) from1 to 7200sec . Resolution: 1sec	
4/4 **Remove memory stick**	Toggle with (**F3**) between stop/start logging	Close the current logging cycle before removing the memory stick. When the message "USB: Start logger?" shows up, you may remove the memory stick

USB characteristics

- Device accepts empty and FAT32 formatted memory sticks only.
- Date and clock settings remain stored up to 3 hours without power supply connection
- Set date and time before recording with the memory stick.
- Device starts automatically with logging data when memory stick is connected.
- **6**: Wait with removing the memory stick. It may take up to 5 minutes to write data to the stick.
- Internal data sets are stored in CSV format every 15 minutes. The file name characteristics after a secure ejection, removing the memory stick in the USB sub menu, are:
  "JJMMDDXX.csv"
  JJ = last 2 digit of current year
  MM = current month
  DD = current day
  XX = file counter 0-99
- Data will appear in a spreadsheet program as below:

Date	Time	T[1/10°C]	LW[µS]
04.05.2011	12:12:55	199	550
04.05.2011	12:13:03	200	550
04.05.2011	12:13:04	200	400
04.05.2011	12:13:06	200	400
04.05.2011	12:13:07	199	399

A. USB error code

● ⟨↞ E: xx	error description
01	drive not formatted
02	drive wrong formatted
03	drive is write protected
04	sector size not supported

H. Device settings

1) Press and hold (**ESC**) 3 seconds to enter the user menu.
2) Go to menu item 6/6 "Device settings" with (**+**).
3) Open menu item with (**ENT**)
4) To confirm a selection press (**ENT**), exit with (**ESC**)
5) Menu structure:

Menu Item	Change Values	Function/Comment
1/5 **Keyboard lock/unlock**	Set a code with (**+**) and (**-**) between 1 and 999 to lock or unlock the device, confirm the code with (**ENT**)	If the keyboard is locked, you won't be able to make changes in the settings, until you have unlocked it with the valid code. The only exception is calibrating the probe which works without any code. **Note:** Please contact us if you miss the code.
2/5 **Language setting**	Set the required language with (**+**) and (**-**)	
3/5 **Customer label**	Change characters with (**+**) and (**-**), switch position with (**F3**) and (**F4**), confirm Text with (**ENT**).	Shows a customer label on main screen. Maximum 16 characters are possible.
4/5 **Factory setting**	Sets all values to default, confirm with (**ENT**) or exit with (**ESC**)	
5/5 **Device info**	Exit with (**ENT**)	Shows firmware version, serial number and calibrating points.

I. Factory Settings

Measuring settings:

Cell K-factor:	----
Cell correction factor:	1.0000
Input range:	not available
Output range:	Min: 0.00mA, max: 20.00mA
Range switching:	auto
Output current range:	auto
Temperature :	25°C
Slope:	2,25%/°C
Hold function:	off

Relay 1/2 settings:

Rel 1: behavior	upper limit
Rel 1: set point	----
Rel 1: norm / inv	normal
Rel 1: LED norm / inv	normal
Rel 1: turn on delay	0s
Rel 1: turn off delay	0s
Rel 1: hysteresis	5
Rel 1: type of measurement	conductivity
Rel 1: label	1
Rel 2: behavior	lower limit
Rel 2: set point	----
Rel 2: norm / inv	normal
Rel 2: LED norm / inv	normal
Rel 2: turn on delay	0s
Rel 2: turn off delay	0s
Rel 2: hysteresis	5
Rel 2: type of measurement	conductivity
Rel 2: label	2

Alarm settings:

Alarm SP1: on / off	off
Alarm SP1: value	----
Alarm SP1: behavior	upper limit
Alarm SP1: delay	0s
Alarm SP2: on / off	off
Alarm SP2: value	----
Alarm SP2: behavior	upper limit
Alarm SP2: delay	0s
Alarm Rel: norm / inv	normal
SP1 – SP2: hysteresis	5
Pump monitoring	0s (off)
wire break detection:	on

USB settings:

Clock setup:	24h
Date setup:	DDMMYY
Log period:	1s

Device settings:

Switch lock/unlock	off

J. Mechanical Dimensions

Side view:
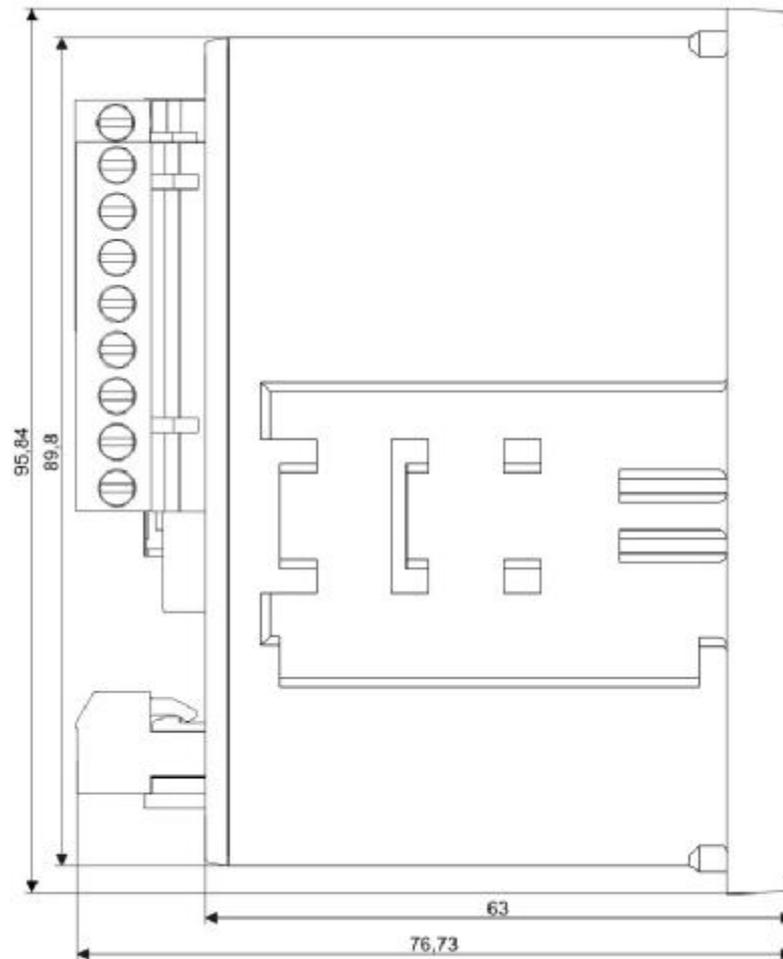
Rear view:
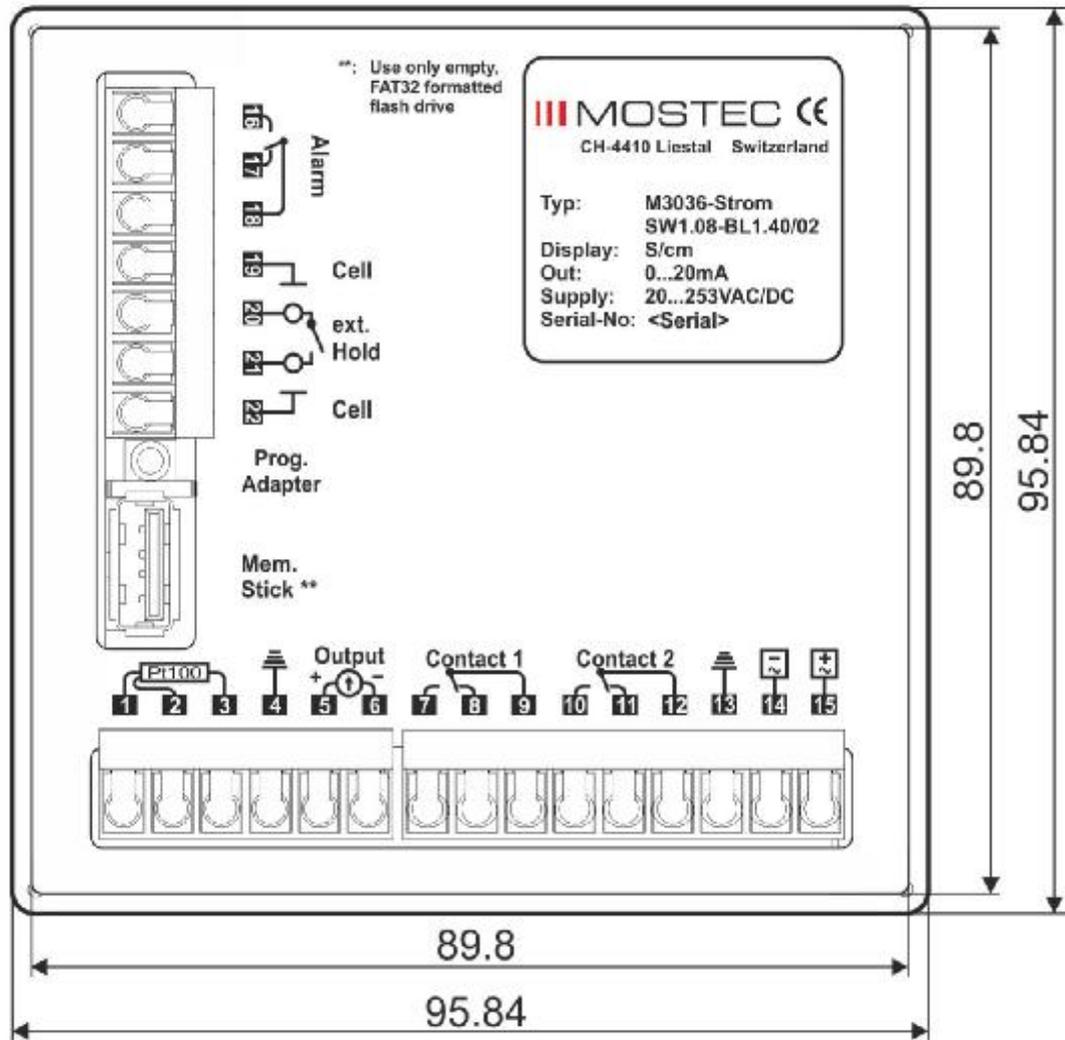
K. Technical Data

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

Accuracy: 0.5%
Display: Graphic LCD 128x128 pixel
Pixel size: 0.4x0.4mm
Temperature drift: Max. 50µV/°C
Max. humidity: Non condensing
Temp. compensation: Manual from 0 to 130°C.
Automatic with external Pt100, 3-wire sensor. At wire break of the Pt100 sensor, the device switches to 25°C.
Manual / automatic with (F4)
Temperature slope: 0.00%/°C (no compensation) to 8.00%/°C
Self conductivity of water: controlled and compensated to 25°C
Reference temperature: 25°C
Max. lenght of cell cable: Cable capacity is compensated until max capacity of 10nF or (10^{-8}F)
ENT key: Quick access to settings or to save parameters
ESC key: Access to the main menu, press and hold for 3 seconds, or exit menu item
+ / - key: Set values or control relays
F3 Taste: Change measuring range, limit contacts and alarm
Programming functions: Company label and various setting options via software
Signal current output: 0...20mA, isolated against electronic ground and adjustable over full range
  Max load: <500Ω
  Output impedance: Typ. >1MΩ
Relay contact: Adjustable over the full range
Hysteresis: 5 - 200 digits adjustable
Limit value status: Displayed with green LED's for contact 1/2, no LED's for optional contact 3/4
Relay outputs: Floating changeover contacts, max. 6A, 2A at 230VAC continuous inductive load
Alarm functions: 2 programmable limits, Pt100 alarm if wires are broken, "1Wire" alarm if wires are broken, alarm if the pump's max. run time is out and an USB alarm if the stick/media is full. The alarm is displayed with the red LED and on display. Alarm can be acknowledged.
Alarm relay: Same specifications as above
USB: Logger function, programmable log-time, 1 to 7200 sec. **Use only FAT32 formatted, empty USB flash drives.** Stop logging mode before removing.
Supply: 20..253VAC/DC, up to 3W
CE-conformity: Fullfilled
Terminals:

(n.o. =normally open contact, n.c. =normally closed contact, c.o. =changeover contact)

1	Pt100 sense -	11	contact 2 n/c	21	Digital Input - ISM InPro/ * hold function	
2	Pt100 -	12	contact 2 c/o	22	conductivity cell input-	
3	Pt100 +	13	PE supply	23	contact 3 n/o*	
4	PE Pt100/ current output	14	N supply	24	contact 3 n/c*	
5	current output +	15	L1 supply	25	contact 3 c/o*	
6	current output -	16	alarm contact n/o	26	contact 4 n/o*	
7	contact 1 n/o	17	alarm contact n/c	27	contact 4 n/c*	
8	contact 1 n/c	18	alarm contact c/o	28	contact 4 c/o*	
9	contact 1 c/o	19	conductivity cell input+			
10	contact 2 n/o	20	Digital Input + ISM InPro/* , hold function			

*optionally available

Terminals: Plug-in terminals on the back panel
Weight: 304g
Hardware: 2 quick-mounting clips
1 operating instructions with wiring diagram
Warranty: 2 years
Other options: – special measuring range / signal output
– customer functions, customer home screen / logo
– 2 additional relay outputs (contact 3/4)
– Transparent cover IP55