

## TOPAX LF1 / LF2

For Conductivity



EN

02

## Operation & Maintenance Instructions

Read these operation and maintenance instructions before start up!

To be held for future reference.

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## 1. General and Safety Instructions

### 1.1 General

This Operation & Maintenance Manual contains basic information to be noted during installation, operation and maintenance. It is therefore essential that the contractor read the manual before installing and commissioning the pump/system as well as by the relevant operating personnel/owner of the pump/system. It must remain accessible at the dosing pump/system for reference at all times.

In addition to the general safety instructions under this main heading of Safety, the special safety precautions outlined another section must also be observed.

### 1.2 Warning symbols used in this Operation & Maintenance Manual

This Operation & Maintenance Manual contains vital information, which may endanger people, the environment and the dosing pump/system if disregarded. These statements are identified by the following symbols:



**DANGER!** Refers to an imminent danger. Non-compliance can lead to death or serious injury.

**WARNING!** Refers to a potentially hazardous situation. Non-compliance can lead to death or serious injury.



**CAUTION!** Refers to a potentially hazardous situation. Non-compliance can lead to minor injury or property damage.

**NOTICE!** or **INFORMATION!** Appear in conjunction with safety instructions, which may endanger the pump/system and its operation if disregarded.

**IMPORTANT!** Draws attention to supplementary information to make the work easier and ensure trouble free operation.

### 1.3 Qualification and training of personnel

The personnel employed for installation, operation, inspection and maintenance work must be qualified to do so. The areas of responsibility, competence and supervision of the personnel must be precisely defined by the owner. Personnel who do not have the required knowledge must be duly trained and instructed. If necessary, this training can also be provided by the manufacturer/supplier on behalf of the dosing pump's owner. In addition, the owner of the system must ensure that the relevant personnel are fully familiar with and have understood the contents of this Operation & Maintenance Manual.

### 1.4 Important safety instructions

When installing and using this electrical equipment, basic safety precautions should always be followed, including the following:

1.) Read and follow all instructions!

**2.) WARNING! To reduce risk of injury, do not permit children to use this product unless they are closely supervised at all times.**



**WARNING!**

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**3.) WARNING! Risk of electric shock. Connect only to a grounding type receptacle protected by a ground-fault circuit-interrupter (GFCI). Contact a qualified electrician if you cannot verify that the receptacle is protected by a GFCI.**



**WARNING!**

4.) Do not bury the cord. Locate the cord to minimize abuse from lawn mowers, hedge trimmers, and other equipment.



**WARNING!**

**5.) WARNING! To reduce the risk of electric shock, replace damaged cord immediately.**

**6.) WARNING! To reduce the risk of electric shock, do not use an extension cord to connect the unit to the electricity supply; provide a properly located outlet.**



**WARNING!**

7.) Save these instructions!

### **1.5 Hazards due to non-compliance with safety instructions**

Failure to comply with safety instructions may endanger not only people, but also the environment and the dosing pump/system. Non-compliance with the safety instructions can lead to the loss of all entitlement to damages.

The following hazard in particular may arise:

- Danger to people due to electrical, mechanical and chemical effects.
- Failure of system functions.
- Danger to the environment due to leakage of hazardous substances.

### **1.6 Safe operation**

The safety instructions in this Operation & Maintenance Manual must be observed.

The owner is responsible for ensuring the compliance with local safety regulations.

### **1.7 Safety instructions for the owner/operator**

Leakages (e.g. due to ruptures in the lining) of hazardous substances (e.g. toxic or abrasive) must be discharged in such a way as to exclude all danger to people and the environment. Statutory regulations must be observed.

Danger due to electric current must be excluded (for further details, refer to the German VDE standards as well as local regulations or chapter 1.4).

### **1.8 Safety instructions for inspection-, maintenance-, and installation work**

The owner must ensure that all inspection, maintenance and installation work is undertaken by authorized and duly qualified personnel who have also studied this Operation & Maintenance Manual.

The dosing pump must always come to a complete stop before starting any work on the pump. The procedure specified in this Operation & Maintenance Manual for shutting down the Dosing/pump/system must be observed without fail.

Dosing pumps or systems in contact with potentially harmful media must be decontaminated.

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All safety mechanisms and guards must be refitted and reactivated as the work is completed.

### **1.9 Unauthorized modifications and production of spare parts**

The device may only be modified or converted in consultation with the manufacturer. Genuine spare parts and accessories authorized by the manufacturer ensure greater safety. The use of other parts can void the liability for the subsequent consequences.

### **1.10 General notes of instruction!**

Measuring cables must not be laid parallel or close to power supply or high-voltage current lines. Interferences would mutilate the measurement. At close distances, power supply and measuring lines may only cross at a 90° angle.

The admissible length of the measuring cables must be adhered to with regard to the sensor used. It is of decisive importance whether high-impedance (e.g. pH value) or low-impedance (e.g. free chlorine sensor) measurements are carried out. In the case high-impedance measurements, make sure that the (plug) connections are clean and dry (plug) and the lines do not become brittle due to sharp buckling. The screened cables normally used for such measuring lines must be handled according to the prescribed quality. Screening may only be connected to ground at one end of the cable (preferably at the controller).

Interface lines must be twisted and screened (see recommended cables).



**IMPORTANT!**

#### **IMPORTANT!**

**If possible, a continuous cable from sensor to measuring input should be used. An extension of the cable by plugs or terminal socket increases the risk of disturbances due to contamination, humidity or excessive transition resistances.**

### **1.11 Scope of delivery**



**IMPORTANT!**

#### **IMPORTANT!**

**Please unpack the dosing pump and ordered accessories with great care in order not to miss any small parts. Immediately compare the scope of delivery with the delivery note. The cause of any discrepancies must be determined.**

### **1.12 Disposal**

Should the device need to be permanently taken out of operation, please bear in mind that it contains electrolytic capacitors and must therefore be disposed of accordingly.

### 1.13 Overview of device functions

<b>Metering Unit</b>		
Metering range	TOPAX LF1 (conductive)	TOPAX LF2 (inductive)
	0.0 – 20.0 M $\Omega$ (C = 0,05) 0.0 – 2.0 $\mu$ S/cm (C = 0,05) 0.0 – 20.0 $\mu$ S/cm (C = 0,05) 0.0 – 200.0 $\mu$ S/cm (C = 0,05) 0.0 – 2.0 mS/cm (C = 0,2) 0.0 – 20.0 mS/cm (C = 1) 0.0 – 200.0 mS/cm (C = 10)	0.0 – 20.0 mS/cm (C = 6.4) 0.0 – 200.0 mS/cm (C = 6.4) 0.0 – 2000.0 mS/cm (C = 6.4)
Temperature range	-30.0 – +140.0 °C	
Displays	Measurement values with units Temperature with units Status signal sensor, calibration, controller & alarm	
Temperature compensation	manual or automatic with Pt100	
Temperature coefficient	0 – 8 %/°C	
<b>Controller Unit</b>		
Switch points	2 switch points with programmable effective direction	
Controller variants	IN/OUT-Controller, with optional hysteresis P-Controller as pulse-pause, pulse-frequency or continuous output controller PI-Controller as pulse-pause, pulse-frequency or continuous output controller	
Hysteresis	Freely adjustable over the metering range	
P-Range $X_p$	Freely adjustable over the metering range	
Integral time $T_N$	0 – 2000 sec.	
Minimum pulse	0.1 – 9.9 sec.	
Puls+pause-time	02 – 99 sec.	
Pulse frequency	100 – 7200 pulses/h	
Turn-on delay	0 – 200 sec.	
Alarm function	min. and max. threshold values und delay time	
<b>Connections</b>		
Relays	3 potential free contacts (2x controller, 1x alarm) 6 A, 250 V, max. 550 VA	
Analog output	0/4-20 mA electrically isolated max. load 500 Ohm	
Analog inputs	1 Measurement input for conductivity 1 Measurement input for Pt100	
Digital input	water deficiency safety	
Digitale Interfaces (Optional)	RS485, Baud rate 9600, dataformat 8Bit, 1start and 1stop bit, no even parity	

## 1.14 Technical data

Feature	Built-in casing	Wall-mounted casing
Installation site	in control cabinet	on panel or wall
Dimensions	96 x 96 x 127 mm (W x H x D)	165 x 160 x 80 mm (W x H x D)
Weight	0.8 kg	1.0 kg
Connections	Plug terminals for wiring up to max. 1.5 mm <sup>2</sup>	spring clamps for wiring up to max. 1.5 mm <sup>2</sup>
Protection rating	front IP54, with front door IP55	IP65
Supply voltage	230 V +6/-10%, 50/60 Hz alternating 110 V 50/60 Hz or 24 V 50/60 Hz	
Internal safety	none	230 V: 63 mA delayed 110 V: 125 mA delayed 24 V: 800 mA semi-delayed
Performance input	10 VA	
Displays	2-row LCD display, 2x16 characters, backlit, display of measurement values with relative units, additional temperature display, display of relay position	
Current output	0/4-20 mA, electrically isolated, max. load 500 Ohm	
Interfaces (Option)	RS485, baud rate 9600, data format 8 bit, 1 start and 1 stop bit	
Controller	ON/OFF-Controller with optional hysteresis, P- or PI-Controller as pulse-pause or pulse-frequency controller or continuous output controller, dual-direction PI-control possible, adjustable Turn-on delay, manual operation of relays, controller stop by external switch or gauge (water deficiency safety)	
Switch points	2 switch points, free set point within the measurement range	
Alarm function	with minimum and maximum limit values and time delay	
Contact load	6 A / 250 V, max. 550 VA ohmic resistive load (with RC protective circuit)	
Operating temperature	0 – +50°C	
Storage temperature	-20 – +65°C	
Atmospheric humidity	0 – 90% non-condensing	



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## 2. Device Installation and Connection

### Installation

Schematic diagrams and dimensions are provided over the next few pages.

An opening of 92x92mm is necessary for the device casing. The device is to be inserted from the front and fastened with the lock-on clips provided on delivery.

The wall mount casing can be hung up or pushed under into the mounting slots. It must then be fastened on with two screws.

### CAUTION

**The device assembly site should be chosen such that the device is not subject to any mechanical load or chemical exposure!**



**CAUTION!**

Please note that the corresponding protection classes are:

Built-in casing: IP54 for the front end, with IP55 at the front door

Wall-mounted casing: IP65 (when the clamp cover is closed)

### Connections

Connection diagrams are provided on the following pages.

Please be aware of the supply voltage indicated on the rating plate at all times.

### CAUTION

**Input, output, and control lead wires and cables must always be installed separated from one another and, above all, separated from high voltage lines!**



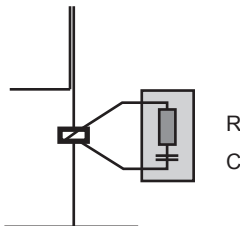
**CAUTION!**

All input and output wires and cables need to be shielded. The shielding can only be applied on one side.

pH measurement is very sensitive to parasitic induction. Be sure to use a special, double-shielded cable. Please use an impedance transformer at long cables, high humidity or other parasitic inductions.

For Pt100 temperature sensor connection, be sure to use a heavy gauge cable with the lowest resistance possible.

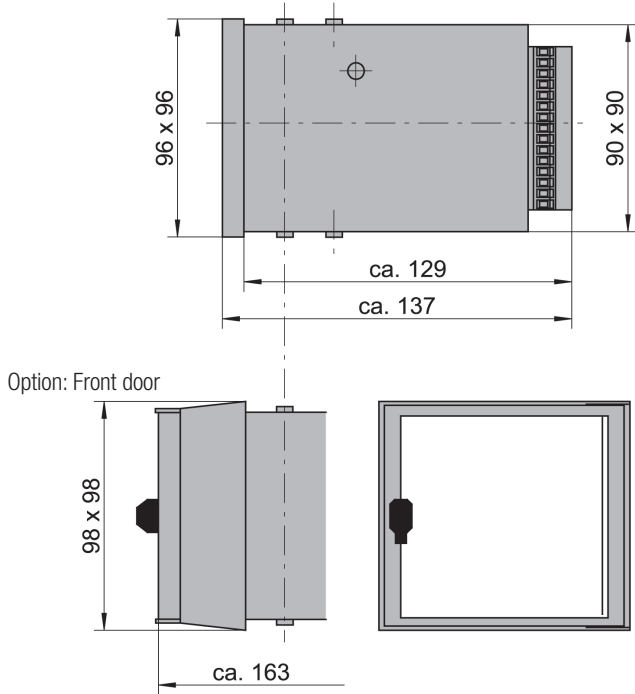
When connecting to the relays, bear in mind that inductive loads need to be interference-suppressed. If this is not possible, the device terminal strip relay contacts need to be provided with an RC-protective circuit. With direct current voltage, the relays or contactor coil need to be interface-suppressed using a freewheeling diode.



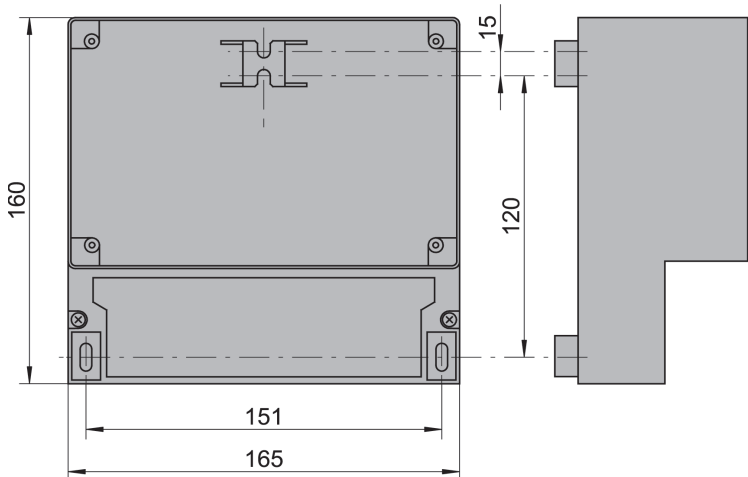
Current up to	Capacitor C	Resistance R
60 mA	10 nF 260 V	390 Ohm 2 Watt
70 mA	47 nF 260 V	22 Ohm 2 Watt
150 mA	100 nF 260 V	47 Ohm 2 Watt
1,0 A	220 nF 260 V	47 Ohm 2 Watt

## 2.1 Dimensions

### Built-in Casing



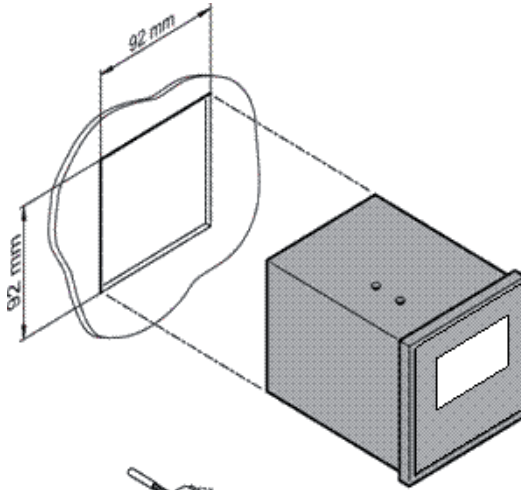
### Wall-mounted Casing



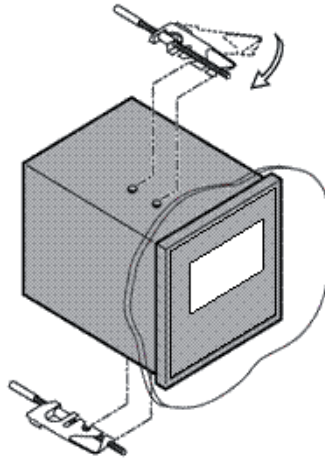
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## 2.2 Installation of built-in casing

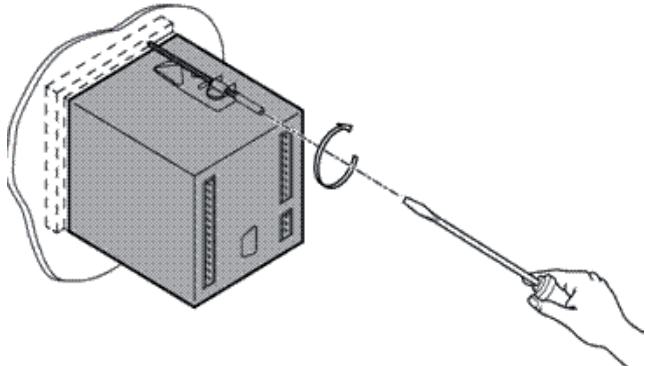
Prepare an opening of 92 x 92 mm.



Insert the device from the fore end firmly, and fixed it on using the appropriate lock-on clips provided on delivery.

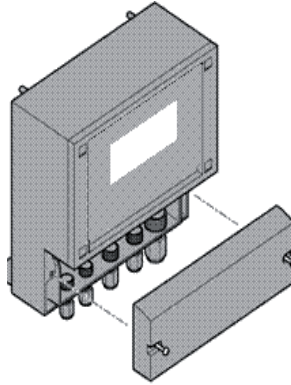


Use a screwdriver to adjust the lock-on clip screws until the device is firmly in place.

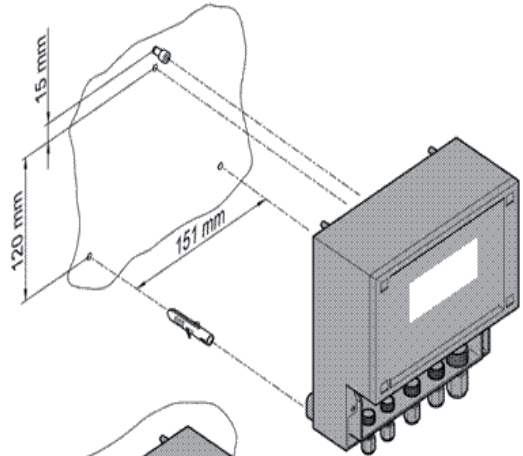


### 2.3 Installation of wall-mounted casing

First, remove the terminal covering.

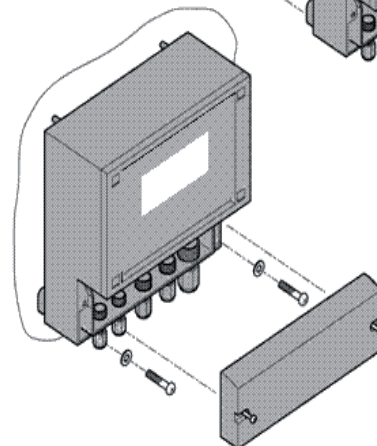


Prepare three drill holes (max. M5). Check the top hole, to ensure that the wall-mount casing can either be safely hung on or pushed under. If it is hung on, the top hole must be 120 mm above the bottom two. If it is pushed under, this distance must be 135 mm.

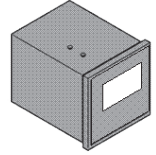


In both cases the screws must protrude outwards at least 3mm.

Hang the device onto the top screw or push it under, then fix it on via the two bottom screws. Either fit the terminal covering back on, or proceed directly with the various connections.



## 2.4 terminal connection diagram of built-in casing

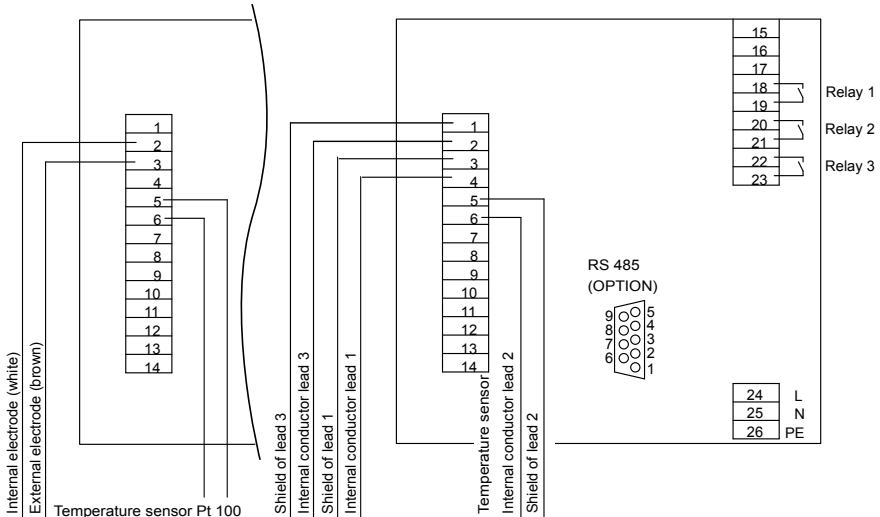


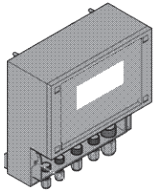
Connection	Terminals	Directions	
Conductivity sensor	1 - 4	TOPAX LF1 (conductive)	TOPAX LF2 (inductive)
		Order No. 4500001 ... 3	Order No. 45000011
		1 = none 2 = Internal electrode (white) 3 = external electrode (brown) 4 = none	Conductivity measurement 1 = shield of lead 3 2 = internal cond. lead 3 Generator voltage 3 = shield of lead 1 4 = internal cond. lead 1
Temperature sensor Pt100	5 + 6	(yellow, green) Polarity free	5 = shield of lead 2 6 = internal cond. lead 2
Analog Output	9 + 10	9 = +, 10 = -, maximum 500 Ohm load	
Digital Input	11 + 12	11 = +, 12 = -, external controller stop or water deficiency	
Relay 1	18 + 19		
Relay 2	20 + 21		
Relay 3	22 + 23	Alarm-Relay	
Power Supply	24 - 26	Check indications on rating plate!	
RS485 (Optional)	Sub-D	3 = +, 8 = -	
	Sub-D 4/7	Bridge circuits = termination impedance activated	

### Terminal connection of sensors for measurement

TOPAX LF1 (conductive)

TOPAX LF2 (inductive)





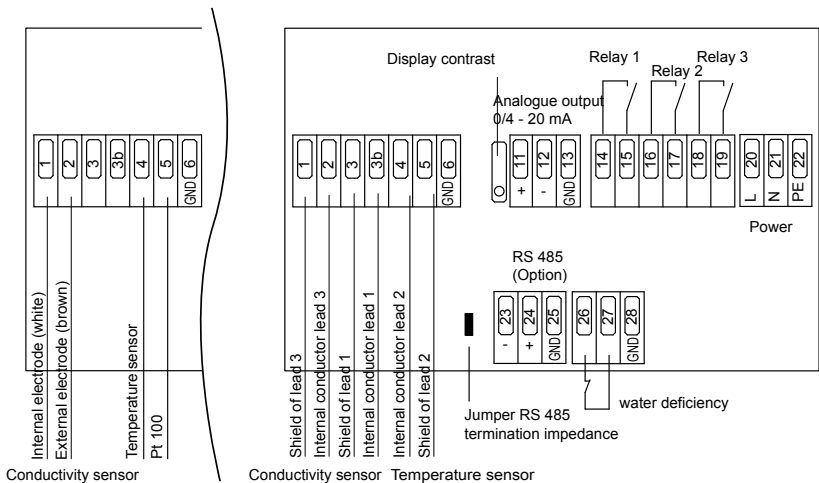
## 2.5 terminal connection diagram of built-in casing

Connection	Terminals	Directions	
Conductivity sensor	1 - 3b	TOPAX LF1 (conductive)	TOPAX LF2 (inductive)
		Order No. 4500001 ... 3	Order No. 45000011
		1 = none 2 = Internal electrode (white) 3 = external electrode (brown) 4 = none	Conductivity measurement 1 = shield of lead 3 2 = internal cond. lead 3 Generator voltage 3 = shield of lead 1 3b = internal cond. lead 1
Temperature sensor Pt100	4 + 5	(yellow, green) Polarity free	4 = shield of lead 2 5 = internal cond. lead 2
Display-contrast	Display	Trimmer for adjustment of display contrast	
Analog Output	11 + 12	11 = +, 12 = -, maximum 500 Ohm load	
Relay 1	14 + 15		
Relay 2	16 + 17		
Relay 3	18 + 19	Alarm-Relay	
Power supply	20 + 21 + 22	Check indications on rating plate!	
RS485 (Optional)	23 + 24	23 = -, 24 = + Jumper plugged in = termination impedance activated	
Digital Input	26 + 27	26 = +, 27 = -, external controller stop or water deficiency	

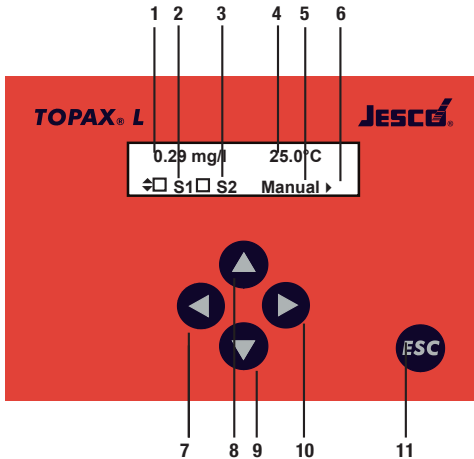
### Terminal connection of sensors for measurement

TOPAX LF1 (conductive)

TOPAX LF2 (inductive)



### 3. Instructions for Device Operation



- 1 Measurement value
- 2 Relay 1 activation mode
- 3 Relay 2 activation mode
- Relais OFF
- Relais ON
- 4 Temperature
- 5 Controller operation mode
- AUTO: Controller ON
- MANUAL: Controller OFF
- (Manual relay operation)
- 6 Direction indicator
- 7 LEFT arrow key ( ◀ )
- 8 UP arrow key ( ▲ )
- 9 DOWN arrow key ( ▼ )
- 10 RIGHT arrow key ( ▶ )
- 11 „ESC“ key

Once switched on, the device will initially display the measuring value data with the operating mode of the controller (Auto/Manual) and the activation mode of relays S1 and S2.

It is possible to scroll through the menu using the operating keys:

Use key ▼ to go from the measuring value indication to the main menu.

Use key ▲ und ▼ to scroll upwards and downwards..

Use key ▶ to select a menu or a parameter.

Use key ◀ to exit a menu and to save/enter data.

To facilitate orientation, different triangles are visible on the display. They should serve as direction indicators, advising you in which directions you can scroll from your current position.

The “ESC” key will always bring you back to the measuring value indication.

---

### 3.1 Parameter settings

Temp. comp.  
↔ ▶ Manual comp.

1) When a parameter is selected its current setting is displayed.

Temp. comp.  
↔ ▶ Automat. comp.

2) Change to the next option by pressing the ▶ key.

Temp. comp.  
↔ ▶ Manual comp.

3) After scrolling through all the options, pressing the ▶ key again will return you to the original setting displayed.

#### Selection of the various options

In most cases, all that is required is a selection between the various options provided. For example, when you need to select either manual or automatic temperature compensation, simply use the ▶ key to scroll across from one option to the next, until you come back to the start point or until you reach the option required.

For these parameters, any changes are effective immediately upon selection. There is no need to enter an extra saving command for setting activation.

Enter Password  
▲ ▶ 058 Code

1) Select the parameter by pressing the ▶ key.

Enter Password  
◀ 058 ↔ Code

2) A double triangle appears behind the number and indicates that the number can now be changed using the ▲ and ▼ keys.

Enter Password  
▲ ▶ 062 Code

3) When you have set the desired value, save the setting by pressing the ◀ key. The double triangle will disappear – the new value has been saved.

#### Numeric parameter settings

Numeric parameter settings can generally only be modified when a double triangle is visible behind the number. This double triangle will first become visible when the number is selected with the ▶ key.

Change the number using the ▲ and ▼ keys. A short press of the key will increase or decrease the last digit by 1. When the key is held longer, the numeric value begins to change and will continue until the key is released.

Save your settings by pressing the ◀ key. The double triangle will disappear.



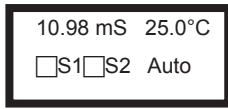
**NOTE!**

#### NOTE

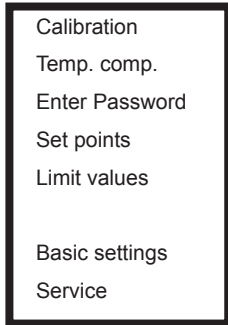
**If you do not wish to save a setting, press the “ESC” key instead of the ◀ key.**



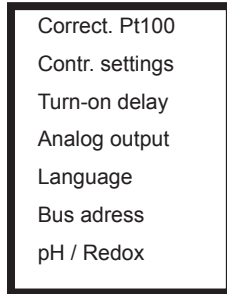
### 3.2 Menu overview



#### Main menu



#### Basic settings



Measurement value display

The main menu is reached by pressing the ▼ key:

Temperature compensation

Password function

Controller settings - Set points, P range, I-gain range

Alarm function

All parameters that, in principle, only have to be set once - when putting the device into operation the first time - are found in the "Basic settings" menu.

### Main menu and basic settings

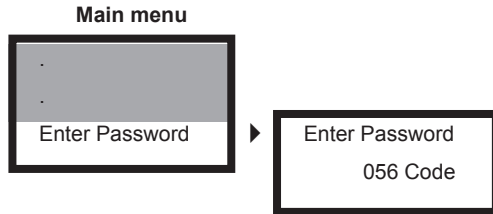
The parameters are divided into two menus. In the main menu all the functions which are used on a regular basis are listed. The basic settings menu includes those parameters which are only set once, when the device is being put into operation for the first time.

The manner in which parameters can be set and which parameters are important for your needs are described in the following pages. They are arranged according to the order of operational start-up:

- 1) Basic settings: Password codes and languages
- 2) Metering unit settings: calibration, temperature compensation and switching to redox measurement respectively
- 3) Controller setting: Selection of controller variant and corresponding parameters
- 4) Data readout settings: analog, digital and/or as alarm

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## 4. Password Codes and Languages



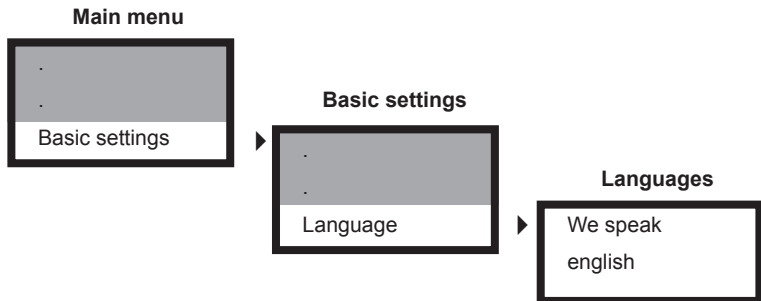
### Entering password codes

Before setting functions can be accessed, the corresponding password code must be entered:

Password code 11 allows access to commonly used functions such as “calibration”, “temperature compensation” and “controller setting”.

Password code 86 allows access to all parameters and functions.

Any other codes will not enable access to any parameter or function.



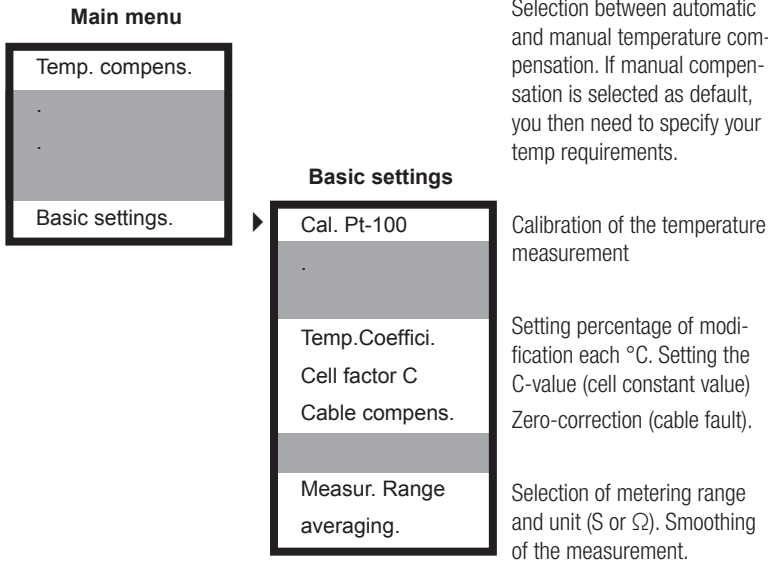
### Languages

There is a selection of languages available for device communication.

Since the language settings are part of the fundamental device settings, password code 86 is necessary. If a different password code has been set, you will immediately be requested to enter the required code number.

## 5. Metering Unit Settings

Selection of either automatic or manual temperature compensation; for manual compensation the temperature must be pre-set.



First of all start by selecting one among the various metering ranges. Then set the C-value shown by the sensor. The C-value accounts for geometrical sensor conditions and enables the device to standardize the measurements.

Conductivity measurements are dependant on the temperature influence. Compensation of temperature influence can either be performed manually or automatically. Manual compensation requires manual temperature settings whereas automatic compensation requires connection of a PT 100 temperature sensor. The compensation process occurs in a linear way with a temperature coefficient of %/°C that is subject to metering water.

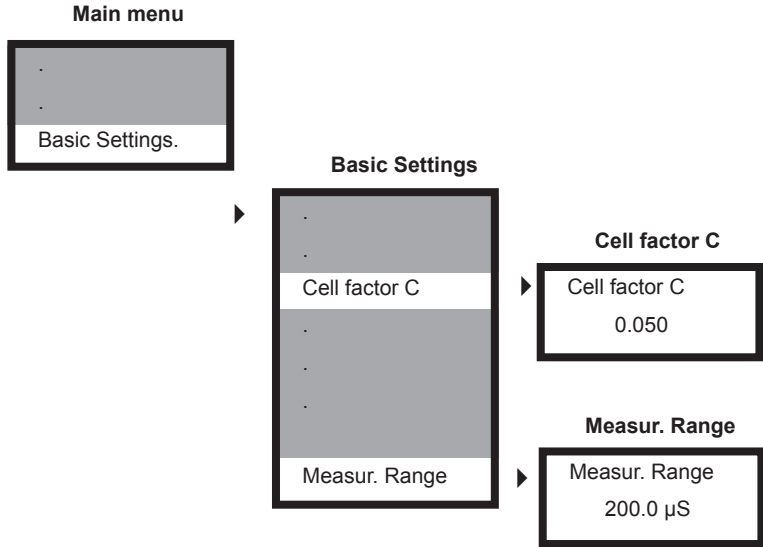
Cable capacitance can alter the measured value. To make up for this effect perform cable compensation.

In the lower measuring ranges smoothing of the measurements can be performed by calculation of the mean value.

All these settings belong to default settings as they are to be set only once at start-up.

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## 5.1 Metering range and C-Value



### Metering range

The metering range can be selected between  $\mu\text{S}/\text{cm}$  and  $\text{S}/\text{cm}$  or you alternatively switch to  $\text{M}\Omega$ -Display in the lowest metering range.

### Cell constant (C-value)

Be sure to have the right sensor for the metering range you selected. Although in fact metering device is designed to cover the entire range  $\mu\text{S}/\text{cm}$  -  $\text{S}/\text{cm}$ , the sensor measuring range is conditioned by the area and spacing between the electrodes. The cell constant, also known as C-value, accounts for all of these geometrical parameters. The device uses the C-Value to convert the measurements into specific conductivity data.

The C-value is shown on the sensor.

### C-value based calibration

Slight changes of the C-value may occur due to the presence of contaminants, to surface modifications (resulting for instance from use of aggressive cleaning agents) or to different assembly conditions. In this event, it is possible to perform fine-calibration by assessing the water conductivity by means of a comparative method in order to adjust the C-value of the metering device so that the measurement value displayed on the device matches with the assessed water conductivity.

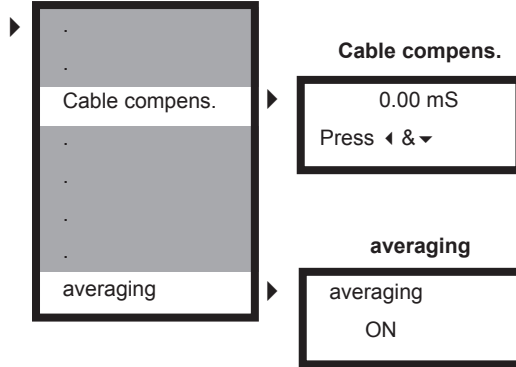
---

## 5.2 Zero-correction and smoothing

### Main menu



### Basic Settings



### Zero-point correction (cable compensation)

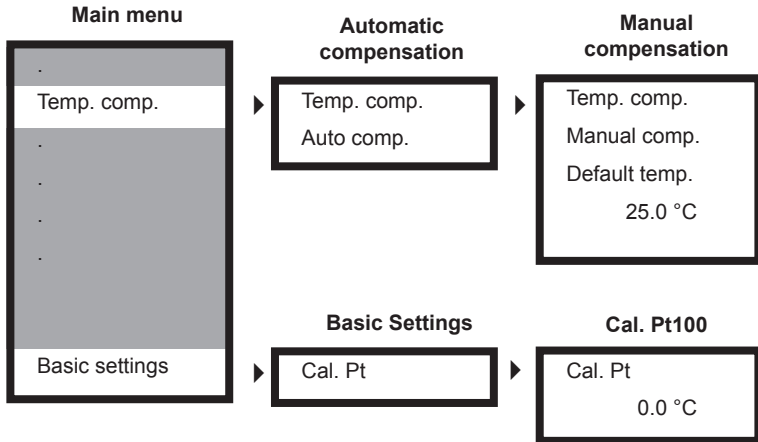
The cable to the conductivity sensor may cause a capacitance error that you may detect by hanging out the dry sensor free to the air after connection but before assembling it into the instrument. If a zero metering value is displayed, you need to perform zero-correction by ways of cable compensation. In this case press the relevant buttons and wait for the display to read out a zero-value.

### Averaging (calculation of a mean value)

When conductivity is low the signal may turn unsteady due to the high ohmic resistance. In this event you should activate the mean-value process by which data points are averaged with their neighbours in a series. This has the effect of blurring the sharp edges in the smoothed data suppressing high frequency signal and enhancing low frequency signal.

---

### 5.3 Temperature compensation of pH measurement



Two options are provided for temperature compensation:

1) Automatic compensation with temperature sensor connection

Ensure that the temperature sensor consistently records the temperature that the electrode is exposed to. When the temperature sensor and the electrodes are not in the same solution, we recommend that you opt for manual compensation.

2) Manual compensation

If the temperature remains sufficiently constant, it is also possible to set the temperature manually. The device then constantly compensates the measurement value based on the temperature influence of the temperature as set.

#### Temperature measurement calibration

If the temperature sensor is hooked up using dual-lead technology slight variations in temperature measurements may occur. The temperature measurement can thus be calibrated.

Measure the temperature once manually while putting the device into operation and correct for the temperature measurement accordingly.

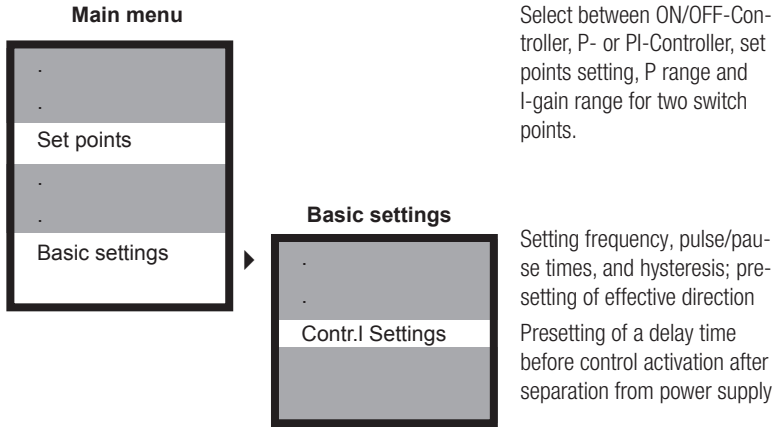
#### Temperature coefficient

Temperature has different effects on conductivity depending on system configuration. For this reason it is not possible to calculate it by means of a simple equation. Most practical cases have shown that a linear compensation in percentage of the measurement variation per degree would be suitable. The value increases for increased resistance. For tap-water a temperature coefficient of 2.5%/°C can be reasonably assumed against 8%/°C for pure water.



---

## 6. Controller Unit Settings



For control functioning, it is imperative that the set points and effective direction be set. This means you must determine which values you want to achieve with the metering and if the metering will increase or decrease the measurement value.

For control implementation, you can select from three controller variants:

### ON/OFF-Controller

The ON/OFF controller switches ON when a switch-point threshold is exceeded and goes OFF when a threshold is under-run, or vice versa, depending on effective operating direction. Metering is therefore always carried out at 100% (ON) or 0% (OFF). A hysteresis can be preset as one of the Contr. settings.

### P-Controller

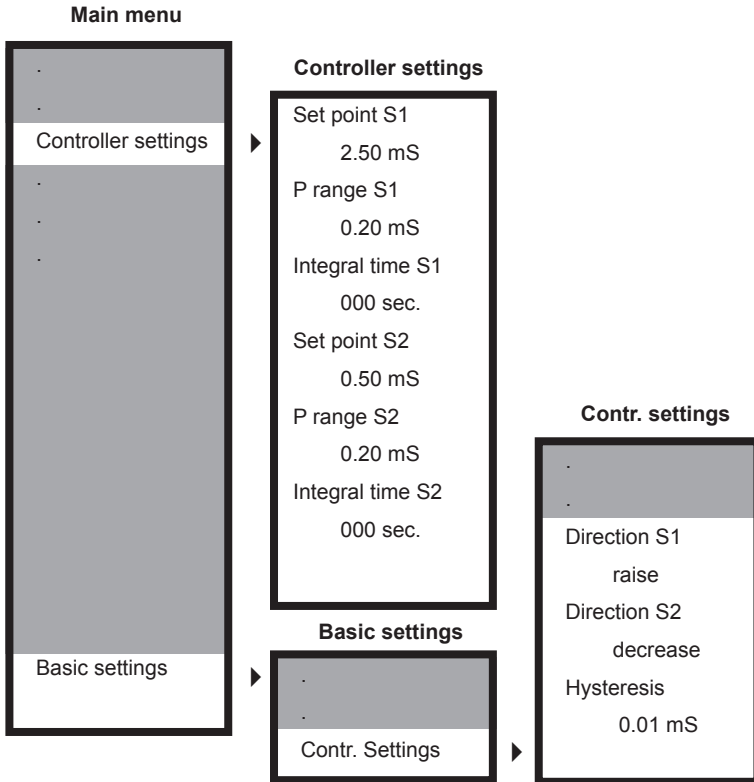
The P-Controller or Proportional Controller provides for metering reduction upon approaching of the set point, proportional to control deviation. This always occurs when using the power output as control output, when using the relay either via reduction of the switching frequency (pulse-frequency Controller) or via reduction of the time span of a preset switch frame with the relay CLOSED (pulse-pause controller). Setting of the P range is required and, depending on the application, the setting of the pulse frequency, pulse + pause time and minimum pulse parameters.

### PI-Controller

The PI-Controller is a P-Controller with an additional I-function. Set-up is carried out as per the P-Controller, whereby the additional setting of a Integral time, corresponding to the "I" integral gain, is also required. The "I" gain locks on later than the P-Controller and principally eliminates residual control deviation, which is always present with the P-Controller.



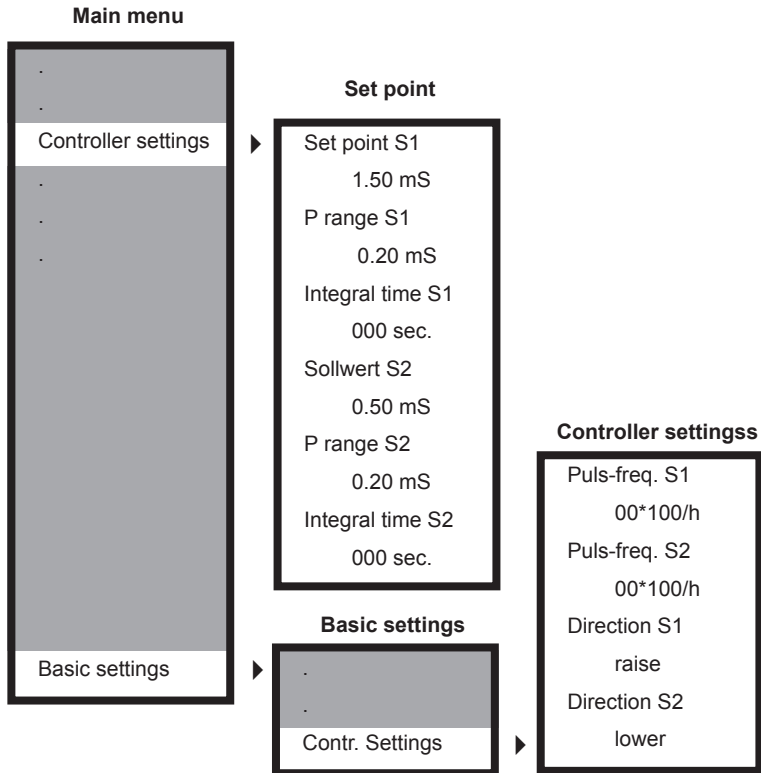
## 6.1 ON/OFF-Controller



The following parameters must be set for the ON/OFF-Controller:

- 1) Set points S1 and S2  
S1 corresponds to Relay 1, S2 to Relay 2.
- 2) P range and Integral time for S1 and S2  
Set the P range = 0 and Integral time = 0, such that your controller functions as an ON/OFF-Controller.
- 3) Effective operating direction for S1 and S2  
Set the “raise” option, if the metering increases the measurement value.  
Set the “lower” option if the metering decreases the measurement value.
- 4) Optional hysteresis  
The hysteresis prevents the relay from constantly switching back and forth when approaching the set point. When the hysteresis is set, the relay does not switch until the set point has been exceeded or under-run by half of the hysteresis.

## 6.2 P-/PI-Controller as pulse-frequency controller



Different controller settings can be selected for S1 and S2.

The following parameters must be set for the Pulse-frequency controller:

1) Set points S1 and S2

S1 corresponds to Relay 1, S2 to Relay 2.

2) P range and Integral time for S1 and S2

Enter a P range > 0.

For a P-Controller it is necessary that Integral time = 0,

for a PI-Controller the Integral time must be > 0.

3) Pulse-frequency for S1 and S2

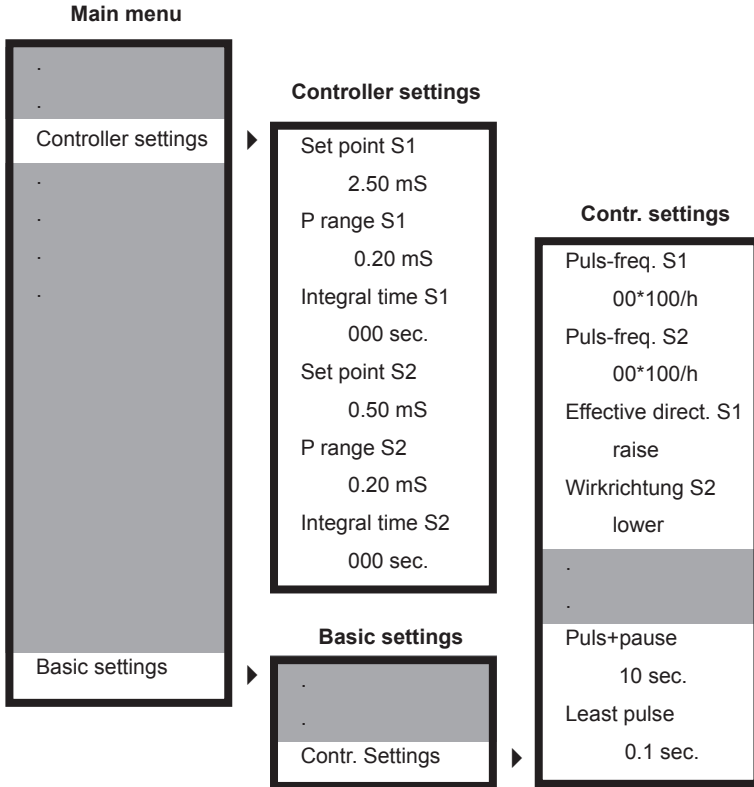
Preset the maximum pulse frequency, which would correspond to a metering of 100%.

4) Effective operating direction for S1 and S2

Set the "raise" option, if metering increases the measurement value.

Set the "lower" option if metering decreases the measurement value.

### 6.3 P-/PI-Controller as pulse-pause controller



Different controller settings can be selected for S1 and S2. The pulse+pause time must be at least twice as great as the minimum pulse time. The following parameters must be set for the pulse-pause controller:

- 1) Set points S1 and S2: S1 corresponds to Relay 1, S2 to Relay 2.
- 2) P range and Integral time for S1 and S2: Enter a P range > 0. For a P-Controller it is necessary that Integral time = 0, for a PI-Controller the Integral time must be > 0.
- 3) Pulse-frequency for S1 and S2: Both frequencies must be set to 00 otherwise the controller functions as a pulse-frequency controller.
- 4) Effective operating direction for S1 and S2:  
Set the "increase" option, if metering increases the measurement value.  
Set the "decrease" option if metering decreases the measurement value.
- 5) Pulse+pause time: Define a time frame in which the relay is CLOSED (pulse) and OPEN (pause) proportional to the control deviation.
- 6) Minimum pulse time: Set the minimum time that the relay must be CLOSED such that the connected actuator meters out any amount at all.

---

## 6.4 Controller activation and deactivation

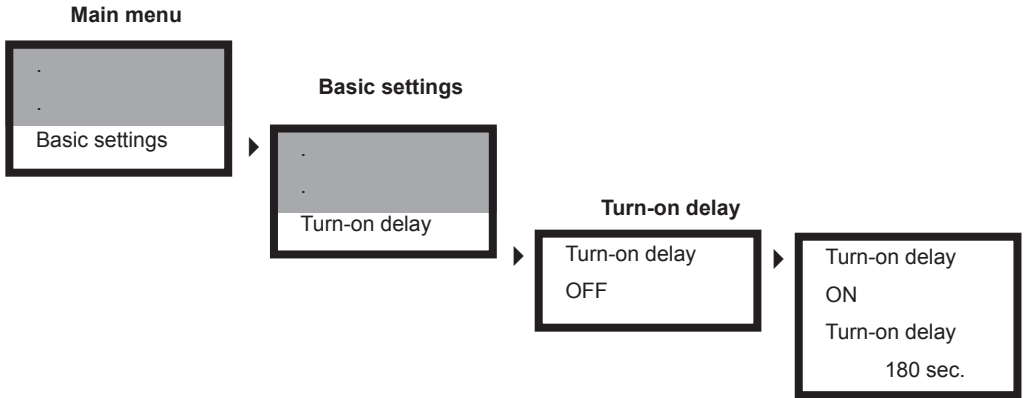
The controller can be activated and deactivated directly from the measurement value display by pressing the ▶ key. With this, operation is changed from manual (controller OFF) to automatic (controller ON) and vice versa. The current operating mode will appear on the display.



**WARNING!**

### **WARNING!**

**Ensure that the controller is deactivated before connecting metering pumps or other similar devices to the unit!**



## 6.5 Turn-on delay

With the Turn-on delay, upon putting the device into operation the first time or on subsequent occasions or after disconnection from the main power supply, you can enter a time which must elapse before the controller becomes active. This delay time gives the measuring processes time to settle and stabilise, thereby preventing false metering incidents in the device start-up phases.

## 6.6 External controller stop

It is also possible to switch the device ON and OFF externally. No settings are required to do so. You must simply connect an external switch to the digital input. When the input is opened, the controller stops and the “Water Deficiency” message will come up on display.



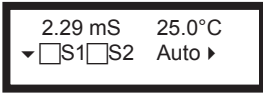
**NOTE!**

### **NOTE!**

**This function can also be utilised as a water deficiency protection by connecting a float gauge.**

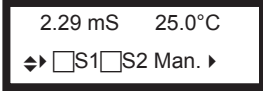
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## 6.7 Manual relay control

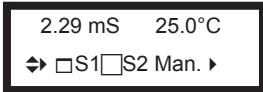


If the controller is set to automatic, change it to manual operation by pressing the ▶ key.

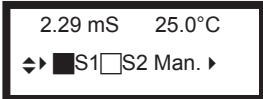
Instead of "Auto", "Manual" will appear in the display.



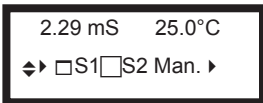
2) Change into the S1 switch mode by pressing the ▲ key. The box to the left of S1 will begin to blink.



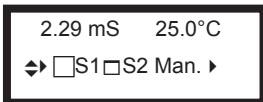
3) Switch Relay 1 ON by pressing the ▶ key. The box to the left of S1 will become dark.



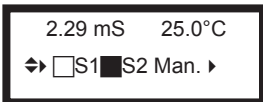
4) By again pressing the ▶ key, the relay is switched OFF again. The box will become light again.



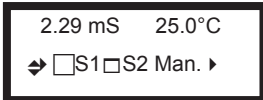
5) Change to the S2 switch mode by pressing the ▲ key. The box to the left of S2 will begin to blink.



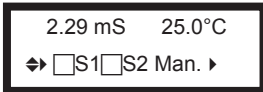
6) Switch the relay ON by pressing the ▶ key. The box to the left of S2 will become dark.



7) By again pressing the ▶ key, the relay is switched OFF again. The box will become light again.



8) Exit the S2 switch mode by pressing the ▲ key.



When both boxes are light and neither is blinking you have exited the switch mode.

Manual control of the relay is possibly directly from the measurement value display.

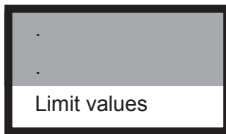
With the ▶ key, switch the controller to manual operation.

Using the ▲ key, change between manual operation <> S1 switch mode <> S2 switch mode <> manual operation.

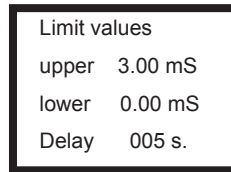


**WARNING!**

**Main menu**

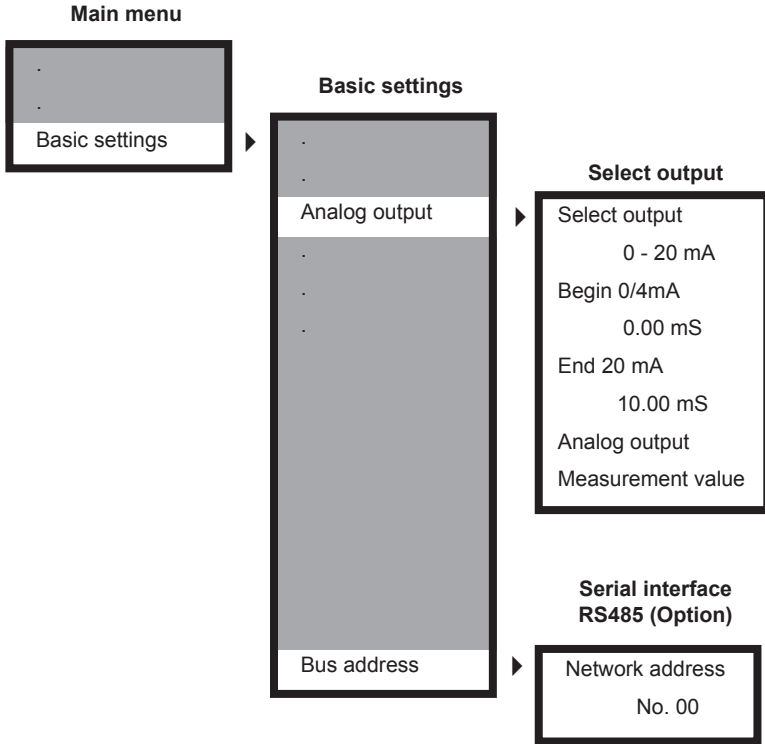


**Limit values**



**NOTE!**

In switch mode, the selected relay can be switched on and off using the ▶ key.



A blinking box signifies a relay in switch mode.

A dark box signifies an activated relay.

A light box signifies a deactivated relay.

### **WARNING!**

**Manually activated relays remain activated until they are manually switched off!**

### **6.8 Alarm**

You can set two threshold values. Threshold value 1 is an upper threshold value. If it is exceeded, the alarm will be activated. Threshold value 2 is a lower threshold value. If it is under-run, the alarm will be activated.

In both cases, the display will show the advisory “Threshold value exceeded“, and Relay 3 will switch. This can, in turn, activate an external sound warning such as a horn, or a warning lamp.

### **NOTE!**

**The alarm function is only active if the controller is switched on, with the display showing it is in AUTO mode. If the controller is switched to MANUAL, the alarm**



**CAUTION!**

---

**alert is cancelled and the relay will switch OFF.**

### **Alarm delay**

Depending on the type of control processes being run, threshold values can also be exceeded during standard operations. To prevent that during any such brief overshoots an alarm is set off, it is possible to set a delay time that must elapse before the alarm is activated.

In other words, the alarm will be activated only when the threshold value is either exceeded or under-run for a longer period of time than the delay time setting.



**CAUTION!**



---

## 7. Data Readout

Select

- between 0-20 mA and 4-20 mA
- the measurement value at 4 mA
- the measurement value at 20 mA
- between register output and controller output

If the controller is integrated into a data network, a Network address between 1 and 15 must be entered.

### **CAUTION!**

**The network address “10” is not allowed.**



**WARNING!**

## 7.1 Current output

You can read out the measurement values as a 0/4-20 mA signal over the current output. By setting the 4-20 mA signal, resolution is indeed lost; defective cable connections are, however, immediately recognizable.

With the start value and end value parameters, you can decide which section of the measurement range you register over the current output.

As an alternative, you can also use the current output as a permanent register output and assign the actuating variable of S1 or S2. In this case, the start and end values should not be taken into account.

## 7.2 RS485 Serial interface (optional)

The devices can be supplied with an optional RS485 interface for data bus integration. The interface does allow for readout of all data and settings. All information for the communication is available on request.

## 7.3 Assembly of a Data Network (TopView).

With the (optional) RS 485 computer interface it is possible to transfer data to a PC. Furthermore multiple TOPAX L/LFs can be connected to a network. Each TOPAX L/LF (with RS 485) has to be allocated an address for this purpose.

The maximum length of data transfer amounts to 1000 m. Up to 14 TOPAX L/LFs can be connected with a PC to a network. The data line has to be attached directly to the TOPAX L/LF's RS 485 terminal:

Casing	Connection		Allocation	
wall assembly	terminal	18	+	A
		17	-	B
mounting	sub-D	3	+	A
		8	-	B



**WARNING!**



**CAUTION!**

### **CAUTION!**

**Separate connection sockets or junction boxes within the data line have to be avoided. One must use a cable type "KAT.5, 2X2XAWG24/1 (Lapp cable) or better. The manufacturer is not liable for this.**

Due to electromagnetic compatibility the cable's screen has to be connected on both sides before the device connections large surface area and conduct well with the protective earth. For this it has to be confirmed that no potential current loss can escape over the screen.

Today's computers are equipped with a serial computer interface RS 232 (9-pin Sub-D connector) and/or with a USB-connector. In this case an additional connector converter has to be inserted in the PC (RS 485 to RS 232 or RS 485 to USB).

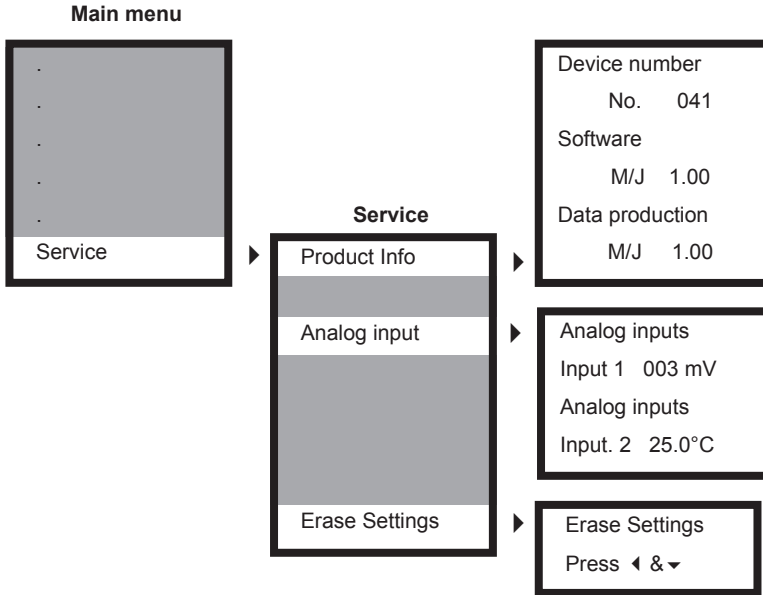
### **120 ohm cut-off resistances.**

At both ends of the network the data line has to be cut off with a resistance of 120 ohm. It is possible to put the switch for the resistance on the last TOPAX L/LF in the network



**NOTE!**

through the composition of jumpers (see chapter 2.4 and 2.5).



If the connector converters with order no. 44300101 (RS 232 to RS 485) or no. 44300102 (USB to RS 485) are attached to the PC, the cut-off resistance of the PC's sides is already activated.

### **Pull-up/pull-down resistance.**

The data line has to be set at a fixed potential. A cut-off of the cable with Pull-up/Pull-down resistances is fundamentally necessary for the RS485-connections, in the times, in which the data sender is active, in order to exact the quiescent level on the bus system. Without this measure it is not possible to transfer data.

To activate all resistances jumpers have to be attached to the TOPAX DE (see following illustration). For this purpose the device front has to be unscrewed and flipped up.

### **CAUTION!**

**It is not at all possible to install resistances for Pull-up/Pull-down on a TOPAX L/LF. (However, the resistances for Pull-up/Pull-down can be activated on a TOPAX DE or TOPAX DX).**

To guarantee the transfer of data with only TOPAX L/LF devices and/or with a TOPAX L/LF to the network end, one must install an additional bus terminal (order no. 41900001) to the PC. The Pull-up/Pull-down resistances are inserted into it.

### **TopView**

To visualize the data read out in the network we offer the application TopView 2.0 in two versions: Standard and Mini. The programme "TopView 2.0 Standard" has the order no.

---

78349. The Software “TopView 2.0 Mini” is free to download from the manufacturer’s website.

---

## 8. Operation and Maintenance

### Device maintenance

Device operation is maintenance free. No check settings are required during operation. Should you however require a verification of your device at any time, you can forward it to us. It shall be returned to you within two weeks together with a protocol test report.

### Display contrast

The display contrast of the device can be adjusted in the wall-mounted casing using a potentiometer. The potentiometer is designated by "Display" in the connection diagram.

### Safety protection replacement

Wall mounted devices are equipped with an internal safety protection that may have to be replaced under some circumstances. A spare safety protection is accordingly provided on issue with the device. You will find it is stored in the terminal covering. Instructions regarding safety protection are provided under the "Technical Specifications" section herein.

For safety protection replacement, it is necessary to unscrew and remove the front end of the device by carefully flipping it upwards. The safety protection is located below and on the right hand side. It is locked on with a bayonet catch. Rotate the catch leftwards, until the safety protection slips out. Exchange it with the spare safety protection and fasten it in place by turning the catch rightwards. Replace the front end of the device again and screw it on firmly.

### **WARNING!**

**Prior to opening the device, make sure that it is completely powered down!**

### **CAUTION!**

**During service and maintenance operations, be careful with the connection cable located on the front of the device!**

### Cleaning

Please ensure that during cleaning operations, the face end of the device does not come into contact with solvents such as methanol, alcohol or methylated spirits. Take care that no water leaks into the device. We recommend cleaning the device by simply wiping it with a clean, damp cloth.

### Measurement maintenance of pH or redox measurement

The metallic surface of the ORP electrode must be cleaned regularly. pH and reference electrodes change with time, so their characteristics have to be determined regularly by means of calibration.

### **NOTE!**

**During each calibration, the device tests the utility of the sensors and specifies when a sensor needs to be cleaned or replaced. For more details, please refer to the "Error Advisory" section of this manual.**

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## 12. Declaration of conformity

This declaration is no assurance of characteristics in the sense of the product liability law. The safety notes in the operation & maintenance instructions must be observed.

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### EG - Konformitätserklärung

Hiermit erklären wir,                   Lutz-Jesco GmbH  
Am Bostelberg 19  
D - 30900 Wedemark

dass das nachfolgend bezeichnete Produkt aufgrund seiner Konzipierung und Bauart in der von uns in Verkehr gebrachten Ausführung den einschlägigen grundlegenden Sicherheits- und Gesundheitsanforderungen und den unten aufgeführten EG-Richtlinien entspricht.  
Bei einer nicht mit uns abgestimmten Änderung des Produktes verliert diese Erklärung ihre Gültigkeit.

Bezeichnung des Produktes:       Mess- und Regeleinheit  
-----  
Typenbezeichnung:               TOPAX L  
  
Einschlägige EG-Richtlinien:    EG-Niederspannungsrichtlinie (73/23/EWG)  
EG-Richtlinie Elektromagnetische Verträglichkeit  
(89/336/EWG) i.d.F. 93/31/EWG  
  
Angewandte harmonisierte:    EN 55011 :1998 +A1:1999 +A2:2002 Störaussendung,  
Industrieumgebung  
EN 61000-6-2 :2001 Störfestigkeit, Industrieumgebung  
  
Datum, Hersteller-Unterschrift:  19.12.2006.....i.V.....*Albus*   *MA*  
  
Angaben zum Unterzeichner:    Herr Klaus Albert, Dipl. Ing.  
Leiter Technik

Die Anhänge sind Bestandteil dieser Erklärung.

Diese Erklärung bescheinigt die Übereinstimmung mit der genannten Richtlinie, beinhaltet jedoch keine Zusicherung von Eigenschaften.

Die Sicherheitshinweise der mitgelieferten Produktinformation sind zu beachten

19.04.2007



**Anhang zur EG - Konformitätserklärung  
zur Niederspannungs-Richtlinie 73/23/EWG**

Produkt : **TOPAX L**

Angewendete Normen und technische Spezifikationen:

unter Berücksichtigung folgender EMV- Grundnormen:

- EN 61000-4-2: 1995 +A1:1998 +A2:2001
- EN 61000-4-3: 2002 +A1:2002
- EN 61000-4-4: 2004
- EN 61000-4-5: 1995 +A1:2001
- EN 61000-4-6: 1996 +A1:2001
- EN 61000-4-11: 2004

EN 61010-1 :2002-08 Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte

### 13. Revision

This Operating Manual is valid for the following devices:

Device	Revision
TOPAX LF1	11/06
TOPAX LF2	11/06

It contains all the technical information required for installation, start-up and maintenance. Should you have any questions or require further information regarding these operating instructions, please contact the manufacturer firm or its official national representative.

---

## 14. Warranty Application

Please copy and send with the device.

If the device breaks down within the period of warranty, please return it in a cleaned condition with the complete warranty application, filled out.

---

Sender

Company:..... Phone:..... Date:.....

Address:.....

Contact person: .....

Order-no.:..... Delivery date:.....

Device type:..... Serial no.:.....

Nominal capacity/nominal pressure: .....

Description of fault: .....

.....

.....

---

Type of fault:

1. Mechanical fault

- premature wear

- wear parts

- breakage/other damage

- damage in transit

3. Leaks

- connections

- dosing head

2. Electrical fault

- loose connections such as plug connector or cable

- operating elements (e.g.. switches/buttons)

- electronics - corrosion

4. No or inadequate suction

- defective diaphragm

- other

---

Service conditions of the device

Point of use / system designation:.....

Accessories used:.....

.....

.....

Commissioning (date):.....

Duty period (approx. operating hours):.....

Please describe the specifics of the installation and provide a simple diagram with details of the material, diameter, length and levels.



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