

Mounting and Startup Instructions

Turbidity Measuring Unit TRM-100

Important safety instructions please read and note

A precondition for perfect, safe operation of the turbidity measurement device is proper transport, storage, mounting, correct installation and commissioning, operation as intended and maintenance.

Not used cable glands must be closed with plugs.

Only persons with the necessary technical knowledge and qualification may carry out this work. The pertinent safety regulations for the installation and operation of electrical devices must be observed.

When installing or if maintenance work be carried out disconnect the device before beginning.

All electrical connections must be made without power.

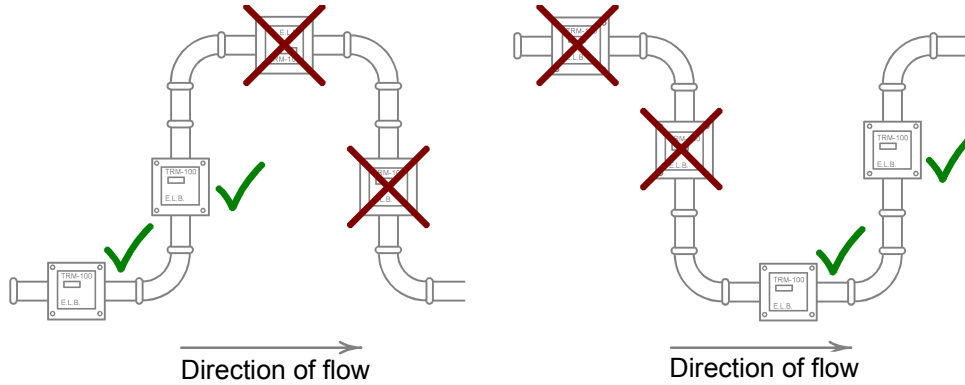
If the information in these instructions should prove insufficient, the manufacturer should be contacted.

Important note:

The TRM-100 has been calibrated with the internationally defined standard suspension **Formazine**. The measured value indicates the concentration and not the light intensity measured. This means for the measuring results in a different liquid that this liquid causes the same light scatter as the standard suspension of the concentration indicated. Measured values from other turbidity measuring devices using different calibration suspensions and measuring angles cannot be directly compared with those using measuring devices calibrated with Formazine!

1 Application

The TRM-100 turbidity measuring unit is a compact device to measure turbidity in liquids. The turbidity measuring unit determines turbidity with two infrared transmitters and one infrared receiver. It works using the scattered light method (90 degree angle) at 0...1.000 FNU or the transmitted light method (180 degree angle) from 500...4.000 FAU.



The device must be installed so that the fitting is always completely filled.

Air or air bubbles are recorded as turbidity.

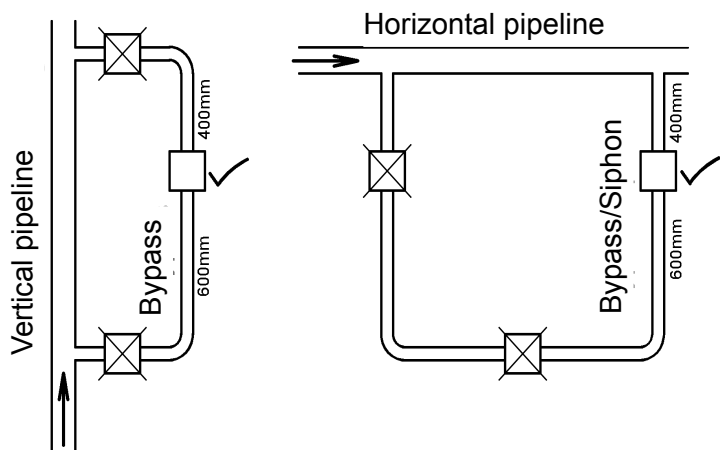
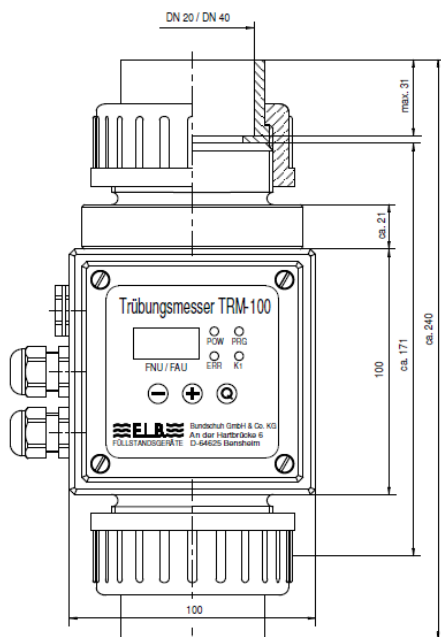
Correct installation: Upstream of a rising line or in a rising line.

Wrong installation: In a falling line or upstream of a falling line.
Air bubbles collect at the highest point of a pipe in the fitting.

The entire electronics including the operating controls are integrated in the fitting.

The TRM 100 turbidity measuring unit can be installed in the main line or bypass (siphon).

Reliable measurement requires that the fitting is always completely filled and the medium does not contain any bubbles. The turbidity measuring unit should always be installed in an ascending pipeline to ensure complete filling of the measuring chamber.



For pipelines > nominal diameter of the TRM-100 or flow velocities > 2 m / sec, the TRM-100 must be installed in the bypass / siphon as shown above. For maintenance tasks ball valves should be installed on the TRM-100 for before and after the TRM-100 to shut off the line.

2 Installation

Please note!

Installation preferably in vertical pipelines.

Best installed in an ascending pipeline with a damping section approx. 600 mm before and approx. 400 mm after the fitting.

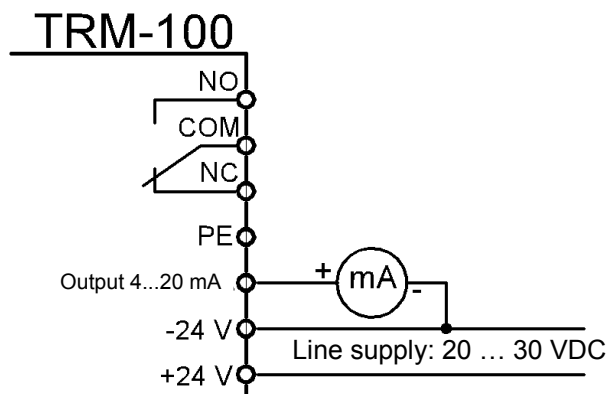
The fitting must be completely filled during measurement. With horizontal lines, the fitting must be installed in the vertical part of a siphon.

The measuring pipe must be clean. It must be cleaned with a brush if the deviation from the calibration rod is > 10%.

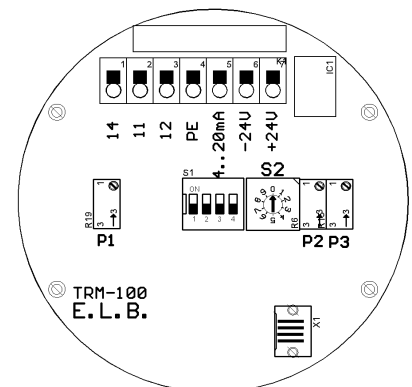
Not used cable glands must be sealed to avoid condensate formation in the TRM-100 !!

3 Electrical connection

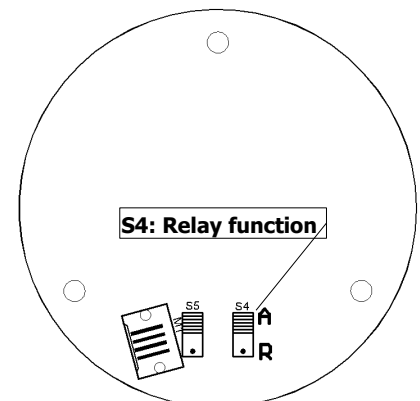
Terminal	Description
14	NO / Normally open
11	COM / Shared
12	NC / Normally closed
PE	Protective earth
4...20 mA	4..20 mA current output, Burde 250..500 Ohm
-24 V	Power supply -
+24 V	Power supply +



Terminal compartment



Back of front plate



4 Setting relay switching point

To initiate the programming sequence the buttons "Q" and "+" must be pushed until the "PRG" LED lights up. The device is now in the programming mode; the switching point (K1 = permanent light) of the relay is shown on the display.

The switching point can be changed with the "+" or "-" buttons. The switching point is stored with the "Q" button; the disconnect point (K1 = flashing light) of the relay is now shown on the display.

The disconnect point can be changed with the "+" or "-" buttons.

The disconnect point is stored with the "Q" button and the programming mode is closed.

The relay mode can be set on the switch **S4** (rear of front plate): **A** (working current); **S4: R** (static current).

5 Adjusting current output 4...20 mA

A multimeter, measuring range 0...100 (200) mA, must be integrated in the 20 mA circuit.

To initiate the programming sequence the buttons "+" and "-" must be pushed at same time until the "PRG" LED lights up. The device is now in the programming mode, "4n" is shown on the display as notice for setting the 4 mA value.

The output current can be changed with the "+" or "-" buttons.

The value is saved with the "Q" button, "20n" is shown on the display as notice for setting the 20 mA value.

The value can be changed with the "+" or "-" buttons.

The value is stored with the "Q" button and the programming mode is closed.

6 Measuring ranges

Measuring ranges "FNU": to 1.000 FNU, scattered light; measuring ranges "FAU": 2.000 + 4.000 FAU, transmitted light.

Resolution, this is the display area of the display output as 4...20 mA on the analogue output. The display flashes when this set measuring range is exceeded.

Example: Measuring range 6 is set (display area 0...500 FNU) == 4...20 mA. The display shows the value 550 and flashes. Flashing means that the 20 mA interface has exceeded the measuring range. Switching to the next larger range must then be done.

Possible settings on switch S2 for adjusting the current output:

1 ==	0,1..... 10,0FNU/FAU
2 ==	0,1..... 20,0FNU/FAU
3 ==	0,1..... 50,0FNU/FAU
4 ==	0,1..... 100,0FNU/FAU
5 ==	0,1..... 200,0FNU/FAU

6 ==	0,1..... 500,0FNU/FAU
7 ==	0,1..... 1.000,0FNU/FAU
8 ==	500..... 2.000,0FNU/FAU
9 ==	500..... 4.000,0FNU/FAU

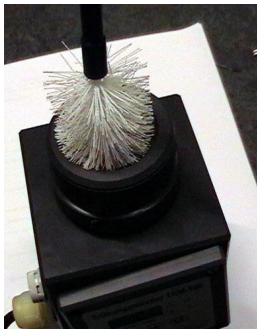
The integration time of the measurement can be set in seconds on DIP switch "S1":

S1.1	S1.2	Integration time
OFF	OFF	approx. 2 seconds
ON	OFF	approx. 5 seconds
OFF	ON	approx. 10 seconds
ON	ON	approx. 20 seconds

7 Technical Data

See data sheet 12-01-02E. Measuring range according to type plate, S1.2 = ON (integration time 10 sec.)

8 Maintenance



To clean the TRM-100, the screws (union nut) may be loosened only when the device is without power and the measuring pipe completely empty. Remove the TRM-100, remove the sealing rings of the screw unions (union nut) and clean, replace if damaged. Remove all residues and adhesions in the measuring pipe using a mild cleaning agent and a soft brush or sponge.

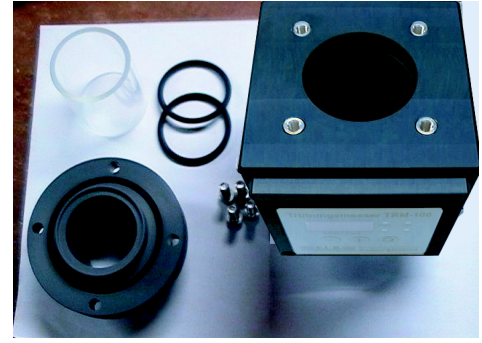
The measuring pipe must be replaced when the adhesions cannot be removed.

Required spare parts:	1 unit measuring pipe (nano-coated)	Item No.: „glasrohr2“ (DN 40)
		Item No.: „glasrohr3“ (DN 20)
	2 units sealing rings, EPDM	Item No.: „ori0108“ (DN 40)
		Item No.: „ori0120“ (DN 20)
	or	
	2 units sealing rings, FKM	Item No.: „ori0109“ (DN 40)
		Item No.: „ori0121“ (DN 20)

8.1 Remove measuring tube

Loosen the union nut

The four M6 screws of the measuring pipe screw connection must loosen with an Allen key size 6 then remove the seals and glass pipe.



8.2 Install measuring pipe

Installation is performed in the opposite sequence as the removal.

Evenly tighten the four screws M 6, so that the screw of the measuring pipe is fully seated against the housing. Pay attention to the correct fitting of the sealing rings !

It should only new spare parts be used (See point 8 for new spare parts).

8.3 Check the TRM-100 with calibration rod.



Insert the calibration rod so that the red markings are parallel. Set the S2 switch to the measuring range which is printed on the calibration rod.

If the display value deviates by more than ± 50 FNU from the value printed on the calibration rod then correct the display value with the potentiometer 'P1'. Reset the S2 switch.



8.4 Installing TRM-100 in the pipeline

Insert clean or new sealing rings into the screw union and install the TRM-100 again into the pipeline. Tighten the screw union and establish the electrical connections.