

Operating instruction

Turbidity measuring TRUBOMAT GAB ... 1000 V4

measuring range: 0,1 ... 1000 NTU
with stainless steel fixture GAB...



stainless steel fixture GAB ...

Safety Precautions

- The device may only be connected to supply power which complies with the specifications included in the technical data and on the serial plate!
- The device must be disconnected from all sources of power during installation and maintenance work!
- The device may only be operated under the conditions specified in the operating instructions!

Functions Description

The TRUBOMAT turbidity measuring device determines the turbidity of liquids using the light absorption and scattered light measuring method. The inline measuring cell at the **sensor set** makes use of two IR transmitters and one IR receiver in pulsating light mode (IR measuring method according ISO 7027).

Installing the Sensor Fixture

Observe:

The fixture must be installed vertically!
Best installation is the mounting in a ascending tube with slow down section 600 mm in front and 400 mm behind the turbidity measuring device

- The sensor fixture must be completely filled with liquid medium during the performance of measurements. Install to the vertical portion of a siphon trap if necessary.
- Air bubbles distort measurement results.
- Lenses must be clean – clean at regular intervals as required.

Technical Data

Supply power

10 to 30 V DC

Connected load

0.6 W

Measuring signal

4 ... 20 mA

For connection to the TRUBOMAT TMM 119 measuring amplifier

Attention!

If a different measuring amplifier is used, an external 10 to 30 V DC voltage source is required.

→ The measuring signal output is a current sink (see wiring diagram at the end of these instructions).

Terminal housing: PBT, IP 65

Ambient temperature

+5 ... +45° C

Medium temperature

+5 ... + 60° C

Max. allowable operating pressure

10 bar max. 60°C

Measuring range

0,1 ... 1000 NTU (5 selectable resolutions)
NTU - "Nephelometric Turbidity Unit".

Measuring accuracy

±5 % of actual measuring value,
±1 % of upper limit of effective range

Control elements

4-fold DIP switch array for measuring range selection, calibration potentiometer P3

Indicators

Status LED (green)

Fault LED (red)

CE mark

In accordance with low-voltage directive (73/23/EWG) and EMC directive (89/336/EWG)



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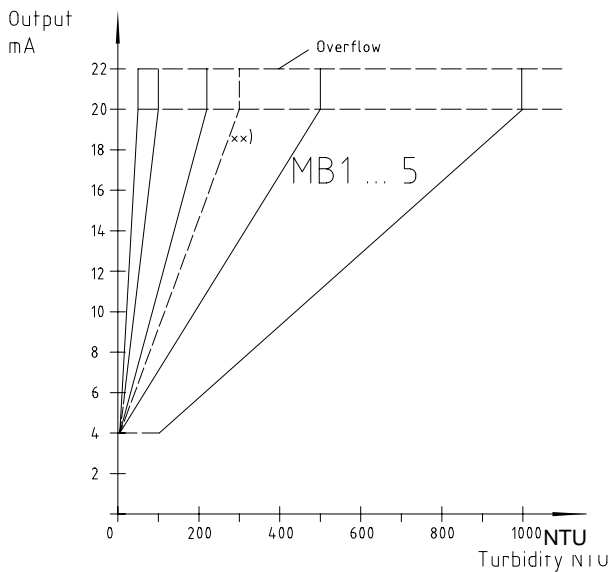
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Operation instruction TRUBOMAT GAB ... 20 V4

The sensor set consists of a receiver module with microprocessor-controlled analysis electronics and two transmitter modules.

The sensor set generates a 4 to 20 mA output signal in accordance with the following diagram.

Measuring ranges are selected with the help of the DIP switches on the receiver module.



DIP Switch Settings

| Measuring Range [NTU] | DIP 1 | DIP 2 | DIP 3 | DIP 4 | DIP 5*) | DIP 6*) |
|---------------------------|-------|-------|-------|-------|---------|---------|
| MB1 = 0,1 ... 50 | OFF | OFF | OFF | ON | NC | NC |
| MB2 = 0,1 ... 100 | ON | OFF | OFF | ON | NC | NC |
| MB3 = 0,1 ... 200 | OFF | ON | OFF | ON | NC | NC |
| MB4 = 0,1 ... 500 (**300) | ON | ON | OFF | ON | NC | NC |
| MB5 = 100 ... 1000 | OFF | OFF | OFF | OFF | NC | NC |

*) DIP-switch 5 and 6 = not connected / no function

**) fixtures with process connection greater than DN65

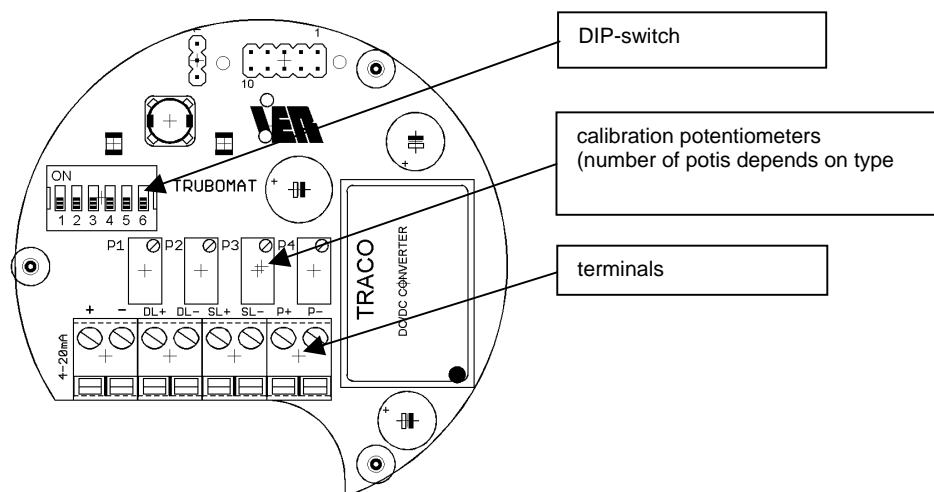
Indication

| | |
|---------------------------|-----------------------------------|
| green LED = 1 Hz blinking | ready, measuring in operation |
| green LED = permanent ON | ready, measuring not in operation |
| green LED = OFF | no power supply or defective |

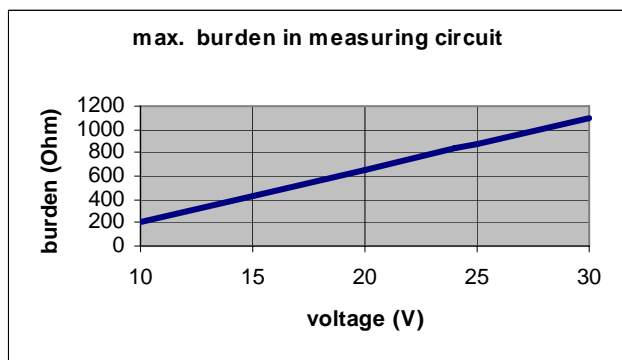
Fault indication

| | |
|--------------|---|
| red LED = ON | = measuring circuit faulty, (short circuit or broken) |
|--------------|---|

Receiver Module PCB



Electrical Connection:



Observe:

The measuring output "4-20 mA" is a current drain, that means, the output channel has the same electrical behavior as a variable resistor. A active power supply for the measuring circuit is always needed.

Connection to BAMOPHOX TUR

see Operation instruction SU0325

Maintenance:

Cleaning intervals depend upon the type of liquid medium and must be determined by the user.

Cleaning the lenses:

- Disconnect the turbidity-measuring instrument from all sources of power.
- Depressurize pipes and empty liquid medium from the device.
- Remove the transmitters and the receiver from the fixture by unscrewing the sleeve nuts.



screw the compression disc with the included tool and remove. Remove the O-ring.

Remove the lens with the included suction cup, and clean the lens – **do not use abrasive cleansers, which may cause scratching!!**

- Reassemble after cleaning by following the above instructions in reverse.

Note: Inspect the O-ring before reassembly and replace if necessary.

- tighten the compression disc with the included tool (use the rod of the suction cup as a lever).
- Before reinstalling the transmitters and the receiver, refill the fixture with liquid medium and inspect for possible leaks.

Mounting

| | |
|--------------------------------------|--|
| | <p>This side has a dirt repellent coating. This side must face the medium after the lens has been mounted! Observe the point</p> |
| Observe positioning of hole and pin! | Observe above note if coated lenses are used! |

Observe for cold fluids

The fixture has to be installed to the pipelines **with mounted sensors** only
 For cleaning the glasses **dismount the complete fixture**, after cleaning install as described above

Testing and Readjustment

Factory Calibration

The sensor set is equipped with a calibration constant as a design feature.

As a rule, no recalibration is required.

Calibration point accuracy is better than 2%, and drift is less than 1% per year.

Test Equipment Monitoring

If device calibration testing is required as part of the respective quality assurance system for test equipment monitoring, calibration can be checked with optionally available calibration rods, and the device can be readjusted if necessary.

A suitable calibration standard is available for each turbidity measuring instrument (fixture with sensor set), which consists of one calibration rod.

Each calibration standard is matched to the specific circumstances of the mating turbidity measuring instrument, and cannot be used for other measuring instruments of the same type!



→ **The calibration standard and the turbidity measuring instrument must have the same serial number!**

Procedure :

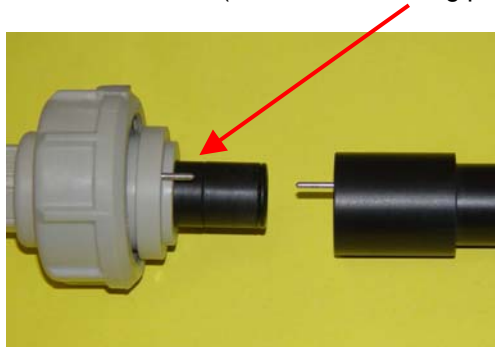
Attention:

It must be assured that all utilised control and switching devices are disconnected from the turbidity measuring device during recalibration!

The following adjustment sequence must be adhered to!!

Step 1

- Clean all lenses and wipe them dry (all visible water droplets and water film must be removed!).
- Then reinstall the lenses for the receiver and the S1 transmitter **only**.
→ **Do not yet install** the lens and the compression disc for the S2 transmitter (180° scattered light)!!
- Reinstall the S1 transmitter and the receiver.
- **Remove the TRUBOMAT KN-D calibration rod (through light)** from the box.
- Insert the calibration rod into the fixture
- Mount the S2 transmitter to the calibration rod (observe the locking pin)



- Insert the calibration rod with attached transmitter completely into the fixture (observe the locking pin), and tighten the sleeve nut.
- Set the DIP switches to the MB5 range = 100 to 1000 (all DIP-switches OFF).
- Switch supply power back on again – the status LED blinks!
- Compare the setpoint value and the actual value.
Setpoint 1 (**SW1**) = setpoint on the plate in the box of the **TRUBOMAT KN-D** calibration rod
Actual value = measured value
- Setpoint / actual value deviation:
Less than $\pm 5\%$ → measuring instrument is OK
Greater than $\pm 5\%$ → adjust actual value with potentiometer P3
- Remove the **TRUBOMAT KN-D calibration rod (through light)**.

Step 2

- **Remove the MAXIMAT KN-S calibration rod (scattered light)** from the box.
- Mount the calibration rod to the S2 transmitter as described above.
- DIP switches stay on the MB5 range = 100 to 1000 (all switches off).
- Compare the setpoint value and the actual value.
Setpoint 2 (**SW2**) = setpoint on the plate in the box of the **TRUBOMAT KN-S** calibration rod
Actual value = measured value
- Setpoint / actual value deviation:
Less than $\pm 5\%$ → measuring instrument is OK
Greater than $\pm 5\%$ → adjust actual value with potentiometer P2

Step 3

- Set the DIP switches to the MB4 range = 0,1 to 300 (all DIP-switches ON/ON/OFF/ON).
- Compare the setpoint value and the actual value.
Setpoint 3 (**SW3**) = setpoint on the plate in the box of the **TRUBOMAT KN-D** calibration rod
Actual value = measured value
- Setpoint / actual value deviation:
Less than $\pm 5\%$ → measuring instrument is OK
Greater than $\pm 5\%$ → adjust actual value with potentiometer P4
- Remove the **TRUBOMAT KN-D calibration rod**.

Step 4

- mount glass with sealing ring and compression disc and transmitter S2
- select the right operation measuring range