05063 / 2.5 / 2025-02-12 / CD / NA

Product Information ITM-4 **FOOD**

4-Beam-Turbidity Meter ITM-4

Application / Specified Usage

- Turbidity measurement from 0 up to 5000 NTU resp. 0 up to 1250 EBC
- Filter monitoring
- Phase separation of low turbid media

Communication

4...20 mA 0/1

Application Examples

- Process control of brewing processes
- Fresh water control in the beverage industry
- Water-/waste water control e.g. in dairys
- Quality control
- Separator monitoring

ITM-4 TC 30

Hygienic Design / Process Connection

- CIP-/SIP-cleaning up to 130 °C / 266 °F
- Fitting completely made of stainless steel, optical block made of PEEK, glass panes made of sapphire glass
- All wetted materials are FDA-conform
- Tri-Clamp Process connections

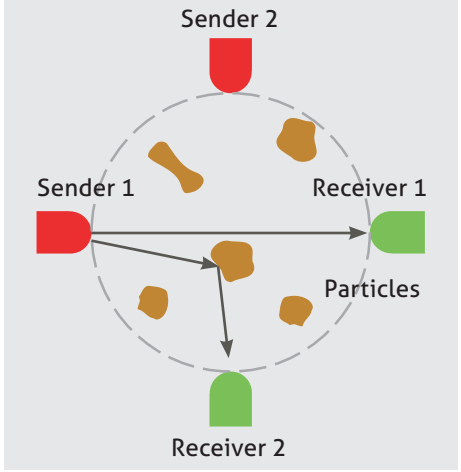
Features / Advantages

- Pollution of the glass panes will be compensated
- Compact device, no separate evaluation unit necessary
- Units NTU and EBC switchable (11 ranges per unit)
- 4 free selectable and externally switchable measurement ranges
- Smallest measurement range 0...5 NTU resp. 0...1 EBC
- Highest measurement range 0...5000 NTU resp. 0...1250 EBC
- Color independent measurement principle (wave length 860 nm)
- Switching and analog output

Options / Accessories

- Electrical connection with M12 plug-in connector
- Preassembled cable for M12 plug-in connector

Measurement Principle



Measuring Principle of the 4-Beam-Turbidity Meter

The ITM-4 measures turbidity using the 4-beam alternating light method. The transmitter contains two infrared senders and two infrared receivers arranged at right angles to each other. To determine the turbidity value, the senders are alternately activated. When sender 1 is active, receiver 1 detects the transmitted light and receiver 2 detects the light scattered at 90°. When sender 2 is active, the situation is reversed. An exact turbidity value is calculated from the four measured values of a measurement cycle. Since a transmitted light measurement is available as a reference for each 90° scattered light measurement, interference factors such as contamination of the optics or component ageing can automatically be compensated. Disturbing influences from the sporadic occurrence of solids and air bubbles are largely cancelled out due to the evaluation of multiple measurement cycles.

Specification		
Process connection	Tri-Clamp	1½"; 2"; 2½"; 3"
Materials	connector head thread connection optic block optics window in lid seal	stainless steel 1.4305 / AISI 303, Ø 89 mm stainless steel 1.4404 / AISI 316L PEEK, FDA 21 CFR 177.2415 sapphire glass PMMA EPDM, FDA 21 CFR 177.2600
Temperature ranges	ambient process CIP-/SIP-cleaning	-10...60 °C / 14...140 °F 0...100 °C / 32...212 °F up to 130 °C / 266 °F, maximum 30 minutes
Operating pressure		maximum 10 bar / 14.5 psi
Environmental protection class		IP 69 K (with M12 plug-in connector) intended for use in wet environments at up to 100 % relative humidity
Measurement range	NTU EBC	0...5; 10; 20; 50; 100; 200; 500; 1000; 2000; 4000; 5000 0...1; 2; 5; 10; 20; 50; 100; 200; 500; 1000; 1250
Damping (in seconds)	adjustable t_{90} response time	0; 1; 2; 4; 8; 16; 32; 64; 128 sec.
Accuracy		see table "Accuracy ITM-4" below
Measurement priciple	acc. EN 7027	4-beam alternating light
4-beam alternating light	acc. EN 7027	860 nm ±60 nm
Display	LCD with backlight	2 x 8-digit
Electrical connection	cable entry cable connection power supply	2 x M16 x 1.5 2 x M12-plug-in 1.4301 / AISI 304 18...36 ⎓, maximum 160 mA
Digital inputs	measurement range switching	E1 and E2 24 ⎓ (18-36 VDC) DC decoupled
Output	current output switching output	4...20 mA, galvanically isolated 24 ⎓, maximum 100 mA, respectively to GND of power supply
Weight	diameter 1½"; 2"; 2½" diameter 3"	4 kg 5 kg
Approvals	ETL Listed Conforms to UL Std 61010-1 3rd Ed (with Display option B only) Certified to CSA Std C22.2 61010-1 3rd Ed (with Display option B only)	

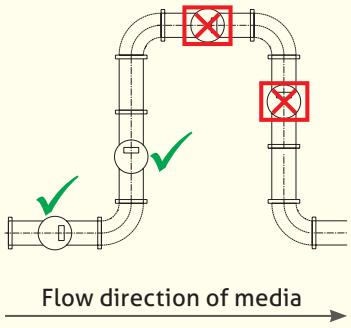
Accuracy ITM-4					
Measurement range	**0...5 NTU 0...1.25 EBC**	**6...100 NTU 1.5...25 EBC**	**101...1000 NTU 26...250 EBC**	**1001...5000 NTU 251...1250 EBC**	**Annotation**
Resolution	0.1 NTU	0.1 NTU	1%	10%	display
Reproducibility (with the same process conditions)	±0.3 NTU	±0.5 NTU	±3%	±4%	of measurement value ±1 resolution step
Absolute accuracy acc. to FNU-formazine-scale	±2 NTU ±0.5 EBC	±4 NTU ±1 EBC	±4%	±6%	of measurement value ±1 resolution step

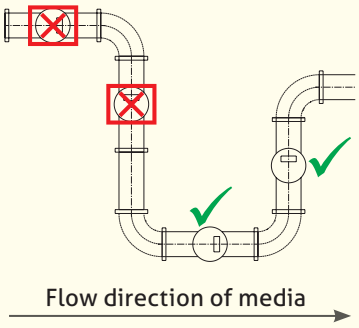
Mechanical Connection / Installation

- **The device has to be installed in that way that the fitting is entirely filled with media.**
  Air or air bubbles are detected as turbidity.

- **Correct installation:**
  - Before or into an ascending pipe.

- **Wrong installation:**
  - Before or into a descending pipe.
  - Into the highest point of a pipe, air bubbles will concentrate there





- Pay attention to the above-mentioned drawings!

- Do not open the screws at the optical PEEK-block!

Conventional Usage

- Not suitable for applications in explosive areas.
- Not suitable for applications in security-relevant equipments (SIL).

Note on CE

- Applicable directives:
  Electromagnetic Compatibility Directive 2014/30/EU
- Compliance with the applicable EU directives is identified by the CE label on the product.
- The operating company is responsible for complying with the guidelines applicable to the entire installation.

Advice to Pressure Equipment Directive

ITM-4 turbidity meters are pressure accessories as defined by the Pressure Equipment Directive PED 97/23/EC and must therefore be subjected to a conformity assessment procedure. The devices are approved for „Fluid Group 2 Media". By definition, Article 3 Paragraph 3 Sound Engineering Practice applies.

Cleaning / Maintenance

- Don't use sharp items or aggressive detergents for cleaning the optics.
- In case of using pressure washers, dont't point nozzle directly to electrical connections!

Reshipment

- Sensors shall be clean and must not be contaminated with dangerous media! Please note the advice for cleaning!
- Use suitable transport packaging only to avoid damage of the equipment!

Transport / Storage

- No outdoor storage
- Dry and dust free
- Not exposed to corrosive media
- Protected against solar radiation
- Avoiding mechanical shock and vibration
- Storage temperature 0...40 °C / 32...104 °F
- Relative humidity max. 80 %

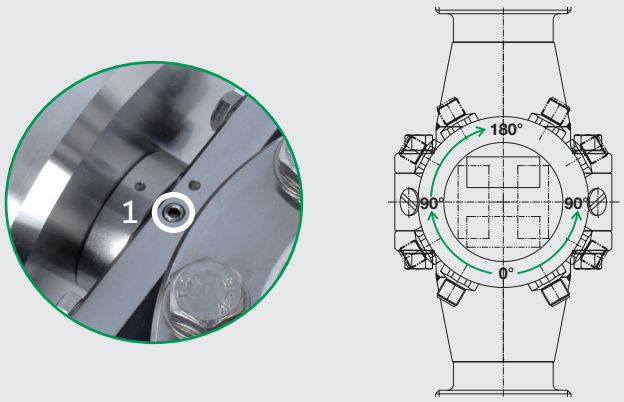
Disposal

- Electrical devices should not be disposed of with household trash. They must be recycled in accordance with national laws and regulations.
- Take the device directly to a specialized recycling company and do not use municipal collection points.

Turning the display

1. Loosen the set screws (1) on top and bottom resp.on the left and right.
2. Turn the head to the desired position.
   Turnig is possible only in steps of 90°!
3. Tighten the two set screws (1).

Fig.: Turning the display



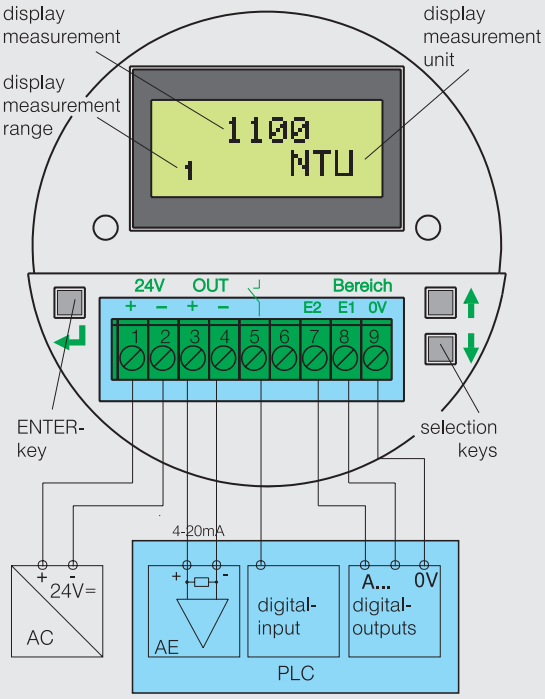
External measurement range selection

- The turbidity meter is delivered with measurement range 1 (0...1000 NTU / 0-1000 EBC = 4...20 mA)
- Range 2 (E1=24 V DC), range 3 (E2=24 V DC) and range 4 (E1=24 V DC and E2=24 V DC) can be chosen by means of the ratedsignal +24 V DC (18...36 V DC) at the inputs on pin 7, 8 and 9. Please take note of the connection plan and the table below.
- If these inputs are not connected, measurement range 1 always will be active!

E1*	E2*	Measurement range
0	0	1
1	0	2
0	1	3
1	1	4

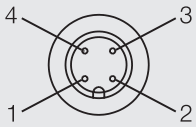
*0 = 0 V DC / 1 = 24 V DC
The digital inputs E1and E2 are DC decoupled to the power supply.
Reference ground: pin 9

Electrical connection ITM-4



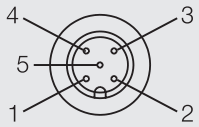
Connecting diagramm M12 plug-in ITM-4/.../M12

M12 plug-in left (4-pin)
power supply /
outputs 4...20 mA



1. + 24 V power supply
2. + output turbidity
3. - output turbidity
4. - power supply

M12 plug-in right (5-pin)
switching output /
digital inputs

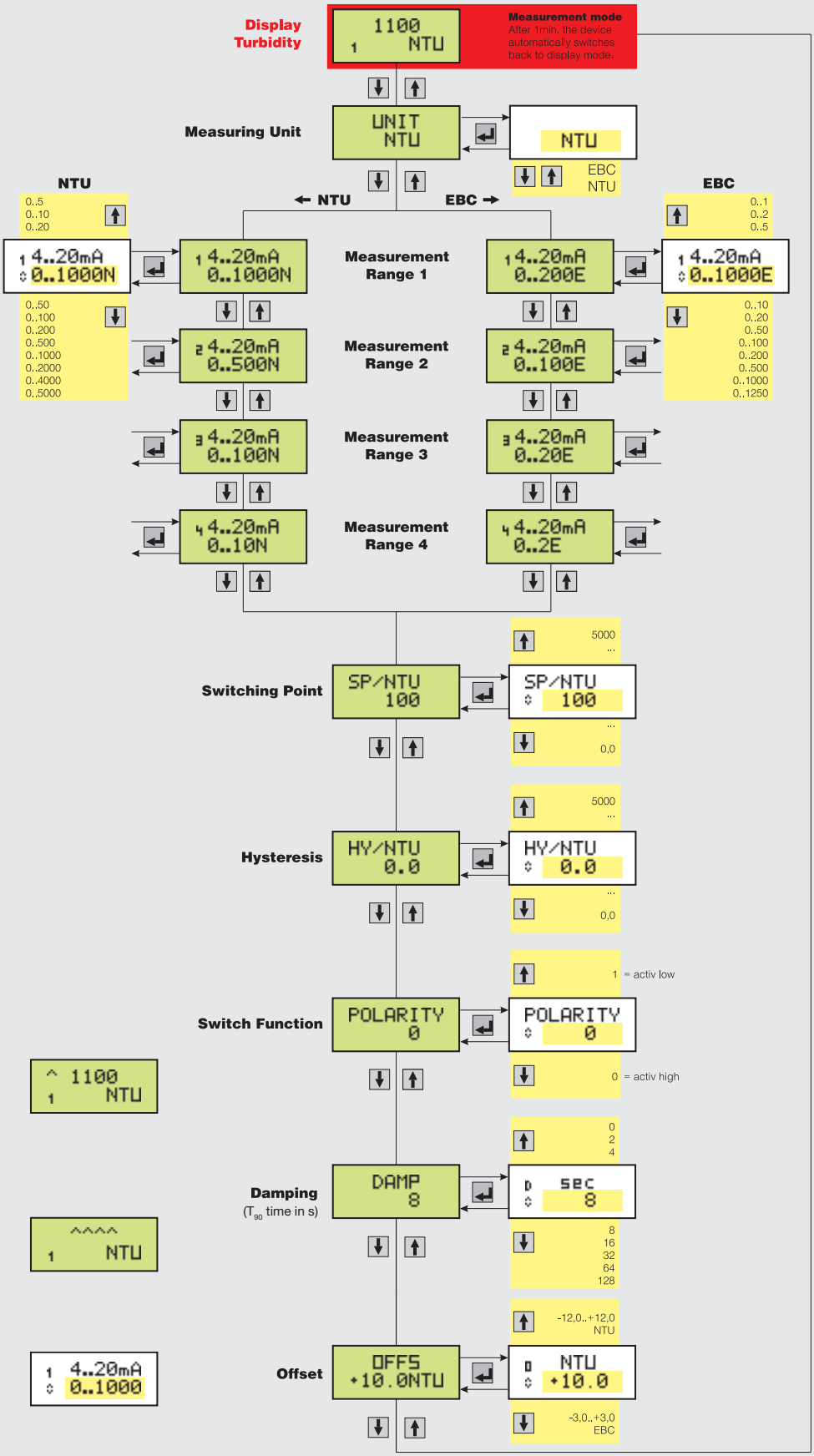


1. E1 input
2. E2 input
3. 0 V input
4. not connected
5. switching output

Note: Switching output

- If the output current is higher than the specified current (80 mA) an electronic fuse switches off the output.
- To reset the switch output disconnect the output (or deactivate and activate the turbidity meter).

Operation diagram ITM-4



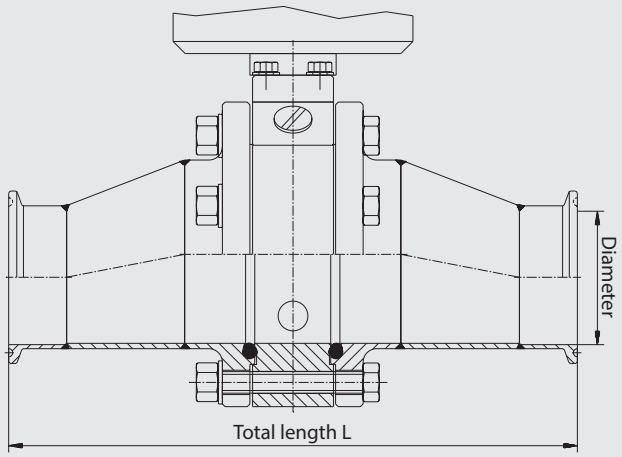
Legend

^-Symbol
"current output overload":
will be displayed if the measured value is higher than the measurement range.
I_{out}: > 20 mA (max. 21.6 mA)

^^^^-Symbol
the current measured value is higher than 5000 NTU resp. 1250 EBC
I_{out}: > 20 mA (max. 21.6 mA)

1 (top left)
current editable measurement
◊-Symbol (bottom left)
the value aside is now editable by using the arrow-buttons

Tri-Clamp ITM-4 TC



Total length of fitting (tol.: ±5/64")

Process connection / nominal width	Tri-Clamp® (-TC) acc. to DIN 32676
1.5"	11.33"
2"	8.86"
2.5"	6.75"
3"	6.61"

Order Information

ITM-4 | TC | ☐ | ☐

Pipe diameter

15	1.5"
20	2.0"
25	2.5"
30	3.0"

Display

D	Display
B	Blind Cap

Accessories

Shielded cordset w/25' cable	42117H0025
Shielded cordset w/50' cable	42117H0050
Shielded cordset w/100' cable	42117H0100
Field Wireable Connector-Straight	42119B0000
Field Wireable Connector-90°	42119A0000

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