

Relative Turbidity Meter ITM-2

Application / Specified Usage

- Media with a turbidity > 2000 NTU / 500 EBC (equal to about 5,5 % of display ITM-2)

Application Examples

- Phase separation of products (for example whey – cream – milk)
- CIP-return line (monitoring of pre-rinse water to product leftovers)
- Yeast harvest in breweries
- Quality control
- Leakage control of filter and gaskets

Hygienic Design / Process Connection

- By using Negele weld-in sleeves / adapters of the **CLEANadapt** system or the build-in system EHG-.../ 1/2" a flow optimized, hygienic and easy sterilizable installation will be achieved.
- CIP- / SIP-cleaning up to 140 °C / maximum 30 minutes
- Product contacting materials compliant to FDA
- Sensor made of stainless steel, immersion piece made of PEEK
- Optics made of quartz glass, optional: sapphire glass
- Additional Process connections:
TriClamp, dairy flange (DIN 11851), DRD, Varivent, APV u.a.

Features / Advantages

- No color dependency (wave length 860 nm)
- Smallest pipe diameter: DN 25
- Four measurement ranges, two externally switchable
- High reproducibility: $\leq 1\%$ of full scale
- Switching output (switchpoint and hysteresis free adjustable)
- Analog output 4...20 mA (standard)

Options / Accessories

- Electrical connection with M12 plug-in connector
- Preassembled cable for M12 plug-in connector
- Remote version (electronics and sensor separated)

Measuring Principle of the Relative Turbidity Meter

An infrared diode irradiates infrared light into the media. Particles in the media reflecting the irradiated light which is detected by the receiver diode. The electronics calculates the turbidity of the media according to the received signal.

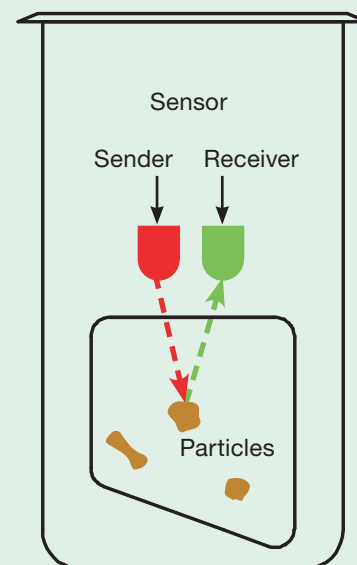
Authorizations



ITM-2 with EMZ-132



Measurement Principle



Specification		
Process connection	thread torque	G1/2" sensor, combined with Negele-weld-in sleeves maximum 10 Nm
Materials	connector head thread connection immersion piece optics window in lid sealing optics-immersion piece	stainless steel 1.4305 (303), Ø 89 mm stainless steel 1.4305 (303) PEEK quartz glass sapphire glass (optional) PMMA EPDM
Temperature ranges	ambient process CIP- / SIP-cleaning	-10...+60 °C 0...100 °C up to 140 °C / maximum 30 minutes
Operating pressure		maximum 10 bar
Protection class		IP 69 K (with M12 plug-in connector)
Measurement range	adjustable	0...10 / 20 / 50 / 100 %
Reproducibility		≤ 1 % of full scale
Electrical connection	cable entry cable connection power supply	2 x M16 x 1,5 (PG) 2 x M12 plug-in 1.4305 (303) 18...36 V DC, maximum 150 mA galvanically isolated
Sensor cable (only ITM-2G)	PUR-cable	4-pin, shielded with M12-connector length max. 10 m (standard cable 5 m)
Inputs	measurement range setting	18...36 V DC, galvanically isolated
Outputs	analog switching output hysteresis adjustable	4...20 mA (scaled to measurement range) supply -0,6 V active maximum 50 mA, short-circuit proof switching threshold free adjustable 0...100 %, factory setting 5 %
Display	LCD with backlight	2 x 8-digit
Measurement principle	infrared backscatter principle	acc. to EN7027 (wave length 860 nm ± 20 nm)
Weight		ca. 1600 g

Conventional Usage



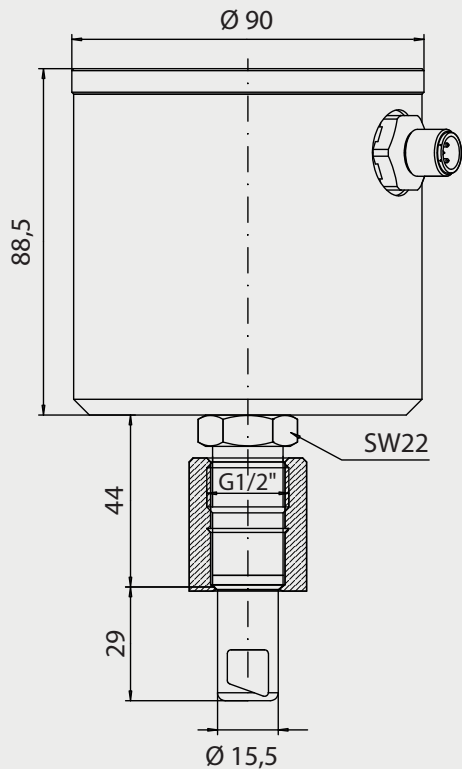
- Not suitable for applications in explosive areas.
- Not suitable for applications in security-relevant equipments (SIL).

Advice to EMV

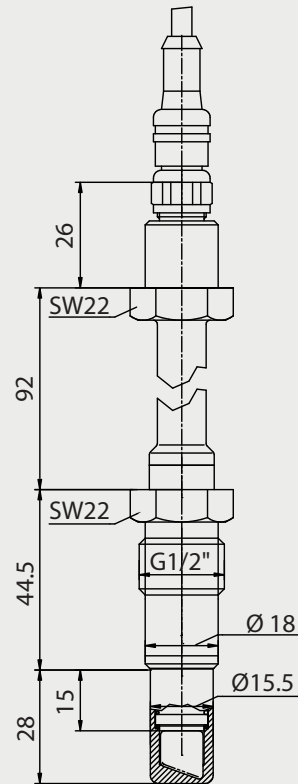


- The device agrees to following standards:
EN 61000-6-2:2007 (transient emissions)
EN 61000-6-2:2005 (interference resistance)
- You have to guarantee the EMC directives for the entire equipment.

Dimensioned Drawing ITM-2



Dimensioned Drawing ITM-2G (Sensor)

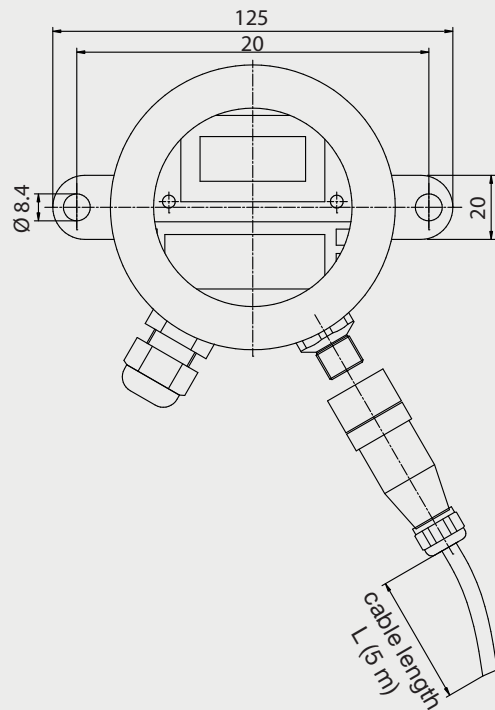


Mechanical Connection / Installation

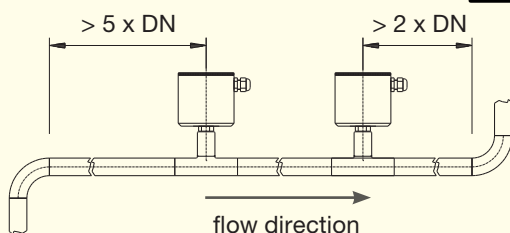


- The sensor has to be installed in that way that the sensor tip is entirely washed around by media and no bubbles can occur. Installation in a rising pipe is recommended.
- The inscription "FLOW" on the bottom side of the sensor has to show in flow direction of the medium.
- Use Negele CLEANadapt system for safe operation of measuring point!
- Use a welding mandril for correct installation of CLEANadapt weld-in fittings. Please pay attention to the weld-in and installation details in the CLEANadapt product information (chapter one).
- Attention: The maximum tightening torque for mounting is 10 Nm!

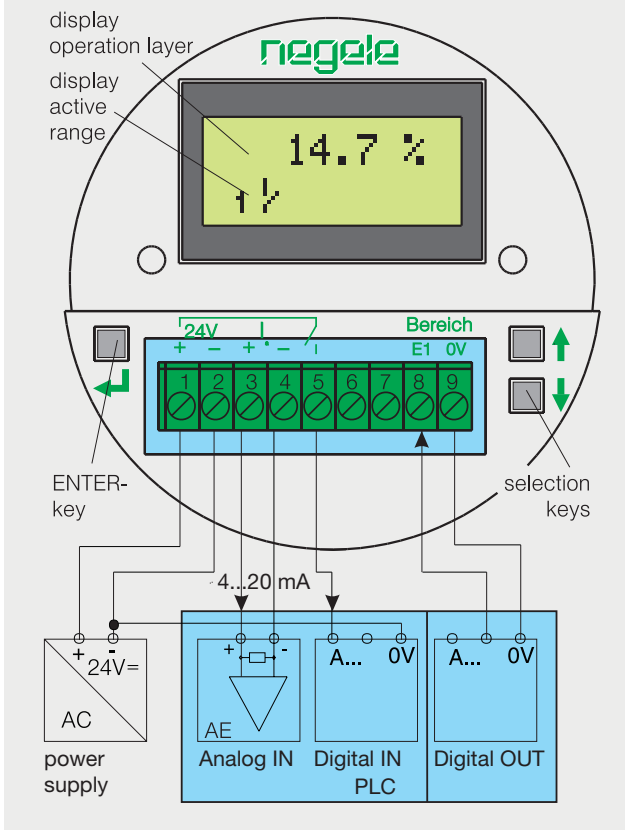
Dimensioned Drawing ITM-2G (Electronics)



In- and Output Length

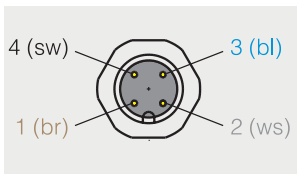


Electrical Connection ITM-2 | ITM-2G



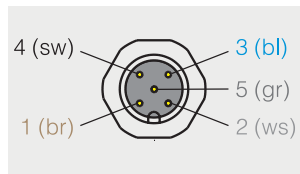
M12 Plug-In Configuration ITM-2/.../M12

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



- 1. + output turbidity
- 2. switching output +
- 3. not connected
- 4. - output turbidity

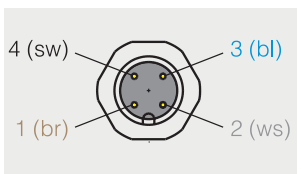
M12 plug-in right (5-pin) supply- / control voltage



- 1. + 24 V power supply
- 2. not connected
- 3. 0 V
- 4. - power supply
- 5. E1 range setting

M12 Plug-In Configuration ITM-2G/.../M12

M12 plug-in left (4-pin) power supply and output



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

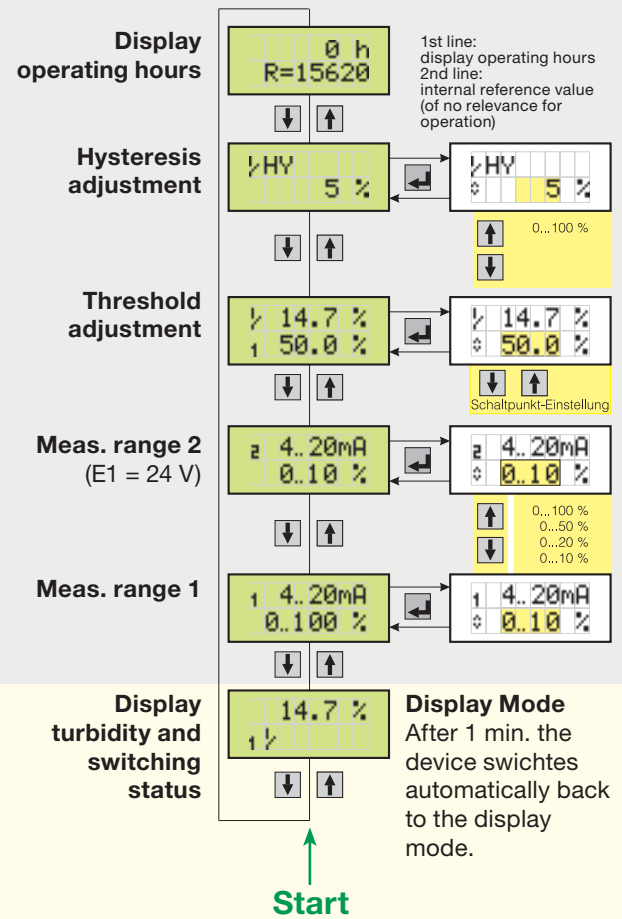
Specialities of ITM-2G with M12 Plug-In



- Attention: The external range setting / switching output functions of the remote version (ITM-2G/.../M12) are not connected by default!
In case the analog output is unused, the switching output can be connected to the M12 plug by rewiring the internal screw-connector as follows:

clamp 4 (blue cable) disconnect and isolate
clamp 3 (white cable) change to clamp 5
- The switching output is now connected to pin 2 of the M12 plug-in.
(reference: ground of power supply)

Installation ITM-2



Adjustment

- The factory setting of the device is measuring range 1 (0...100 % = 4...20 mA).
- With an external control voltage (24 V DC) range 2 can be selected (E1 = 24 V DC). (See "Electrical Connection")

Switching the Measurement Range

- The digital control input E1 is galvanically isolated from the power supply. Ground: clamp 9 (0 V)

E1*	Measurement Range
0	1 (factory setting: 0...100 %)
1	2 (factory setting: 0...10 %)

*0 = 0 V DC / 1 = 24 V DC

Note

- Select suitable measurement range in applications with high turbidity variances (e.g. milk / milk water mixture) for precise measurement.

Cleaning / Maintenance

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

Calibration

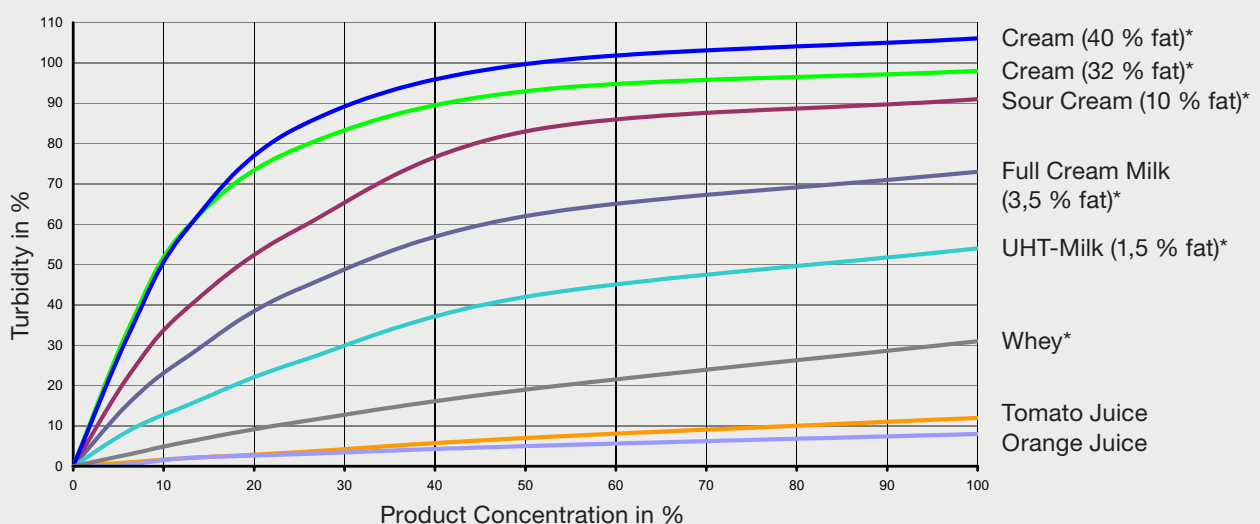
Device is calibrated ex works. A periodical calibration is not necessary. To check the sensor drift perform the following steps:

- Clean the optics and immerse the sensor into a basin with distilled water.
- Ensure that no air bubbles or dirt particles falsify the measurement and agitate the sensor slightly.
- The ITM-2 shows a value between 0,4...0,7 % for distilled water.
- If displayed value is outside the specified range, send the unit in for recalibration.

Note ITM-2G (remote version)

- Evaluation unit and turbidity sensor are calibrated on each other by factory and can not be changed by another.



Showcase Diagram of different Media




* Average turbidity of customary milk products at different dilutions.

Depending on particle form and size, the slope of the characteristic curve is decreasing while turbidity is increasing. This is primarily caused by dampening/absorption effects due to multiple reflections inside the media. The turbidity measured in the production process can deviate from the graphs shown above, depending on product, process step and production process.

Overview of further possible process connections (adapter must be ordered separately!)
 The complete overview of all available adapters you will find at product information **CLEANadapt** in chapter 1.

ITM-2					
Process connection	Build-in system EHG (DIN 11850 series 2)	Negele weld-in sleeve	Negele weld-in sleeve	Negele weld-in sleeve	Collar sleeve
DN25	EHG-DIN2-25/ 1/2"	EMZ-132 suitable for installation in vessels	EMS-132 suitable for installation in pulled-out pipes	EMZ-131 suitable for pipes and vessels with leakage hole	EMK-132 suitable for thick-walled vessels
DN40	EHG-DIN2-40/ 1/2"				
DN50	EHG-DIN2-50/ 1/2"				
DN65	EHG-DIN2-65/ 1/2"				
DN80	EHG-DIN2-80/ 1/2"				
DN100	EHG-DIN2-100/ 1/2"				

Overview of further possible process connections (adapter must be ordered separately!)

ITM-2					
Process connection	Weld-in ball	TriClamp	Dairy flange (DIN 11851)	Adapter	Dummy flange
DN25	KEM-132 suitable for installation in bent tubes or vessels	AMC-132/DN25	AMK-132/DN25	-	BST-132 for closing an existing measurement point
DN40		AMC-132/DN25	AMK-132/DN40	AMG-1 (adapter G1" hygienic to G1/2" hygienic)	
DN50		AMC-132/DN50	AMK-132/DN50		
DN65		-	AMK-132/DN65		
DN80		-	-		
DN100		-	-		

Overview of further possible process connections (adapter must be ordered separately!)

ITM-2					
Process connection	DRD (press ring optional)	Varivent-Inline	APV-Inline	SMS	BioControl
DN25	-	AMV-132/25	-	-	-
DN40	AMK-132/50 (only one size)	AMV-132/40	AMA-132	AMK-132/40	AMB-50/ 1/2" and AMB-65/ 1/2" from DN40 up to DN100
DN50		AMV-132/40	AMA-132	AMK-132/50	
DN65		AMV-132/40	AMA-132	-	
DN80		AMV-132/40	AMA-132	-	
DN100		AMV-132/40	AMA-132	-	

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
- Relative humidity max. 80 %

Disposal


- This instrument is not subject to the WEEE directive 2002/96/EG and the respective national laws.
- Pass the instrument directly on to a specialised recycling company and do not use the municipal collecting points.

Reshipment


- Sensors shall be clean and must not be contaminated with dangerous media! Please note the advice for cleaning on page 5!
- Use suitable transport packaging only to avoid damage of the equipment!

Order Code

ITM

Sensor Version

- 2 (compact unit)
- 2G (remote version, including electronics and turbidity sensor)

Optics

- X (of quartz glass)
- S (of sapphire glass)

Electrical Connection

- X (2 x cable gland M16 x 1,5)
- M12 (2 x M12 plug-in; **Attention:** note the advice on page 4 at version ITM-2G!)

ITM - 2 / X / M12

Note: Change of Measurement Characteristic at ITM-2 Rev. B (as of May 2009)



Due to design changes in the optical sensor part the measurement characteristics of the ITM-2 has changed effective from production date as of May 2009.

Current devices are labeled with "Revision B" on the type label (see figure) and differ in measurement characteristic from devices delivered between September 2006 until April 2009.

Turbidity meters which were produced in named-above period are showing a lower turbidity value at high product concentrations (depending on the media) than devices labeled with "Rev. B" (see diagram below).

To replace units which were produced between September 2006 and April 2009 with current devices a recalibration of threshold level and output is required.

Elder devices with production date before September 2006 have the same measurement characteristics like newer ones with "Rev. B" as of May 2009 and can be replaced one by one.

+49 8333 9204 0	
D-87743 Egg a. d. Günz	
Trübungsmessgerät ITM-2	
Anzeige: 0...100 %	
Ausgang: 4...20 mA Schaltausg: 50 mA	
Supply: 18...36 V DC	
(Rev. B)	
P.-Nr: 110000783618-005 16/2009	

Changed Measurement Characteristic at ITM-2 Rev. B (as of May 2009) | Example: Cream (40 % fat)

