Product Information ITM-51 | ITM-51R **FOOD**

Relative Turbidity Meter ITM-51

CLEANadapt

Application / Specified Usage

· Relative turbidity measurement of liquid media for mid to high turbidity range (200...300,000 NTU equivalent)

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
· Leackage control of filter and gaskets

Hygienic Design / Process Connection

· Hygienic process connection with CLEANadapt
· Conforming to 3-A Sanitary Standard for versions with DIRECTadapt
· All wetted materials are FDA-conform
· Sensor completely made of stainless steel
· Complete overview of process connections: see order code
· The Anderson-Negele CLEANadapt system offers a flow-optimized, hygienic and easily sterilizable installation solution for sensors.

Features / Advantages

· CIP-/SIP-cleaning up to 140 °C / maximum 120 minutes
· Front flush or extended sensor stem
· Optics made of high resistant sapphire
· Intergrated leackage detection in the sensor
· Independent to reflexions at small diameters or electro-polished surfaces
· No color dependency (wave length 860 nm)
· Smallest pipe diameter: DN 25
· High reproducibility: ≤ 1% of full scale
· Switching output (switchpoint and hysteresis freely adjustable)
· Analog output 4...20 mA freely adjustable
· External range switching between two measurement ranges

Options / Accessories

· Electrical connection with M12 plug-in connector
· Preassembled cable for M12 plug-in connector
· Display module Simple User Interface (SUI) and Large User Interface (LUI)
· Remote version with cable length up to 30 m

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 (backscatter principle). The electronics calculates the relative turbidity of the media according to the received signal.
The relative turbidity is based on the Negele calibration standard and is displayed in "%TU".

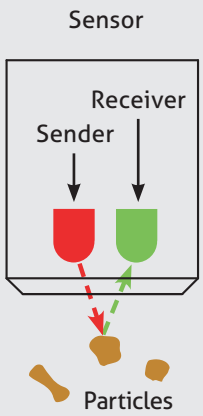
Communication

IO-Link 4...20 mA

ITM-51

ITM-51R

Measurement Principle



Specification			
Measurement category	can be selected	%TU, NTU, EBC, %solids (customized)	
Measurement range	freely adjustable	0...300,000 NTU equivalent 0...200 %TU 0...75,000 EBC	
Process connection		CLEANadapt G1/2" hygienic TriClamp 1.5", 2", 2.5", 3" Varivent DN 25 (type F) DN 40/50 (type N)	
Process pressure		-1...20 bar	
Tightening torque		20 Nm (CLEANadapt system)	
Materials	Connecting head Sensor Lens Plastic cover/sight glass	Stainless steel 1.4308 (AISI CF-8) Stainless steel 1.4404 (AISI 316L) Sapphire Polycarbonate	
Temperature ranges	Ambient Process CIP/SIP	-10...60 °C -10...130 °C Up to 140 °C max. 120 min	
Reproducibility	of turbidity	< 1% of upper range limit	
Resolution/measurement range	the resolution is dependent on the selected measure-ment range	range/NTU	resolution/NTU
		< 1000	15
		1000...10000	30
		10000...100000	100
Accuracy	0...9,999 NTU 10,000...300,000 NTU	±3% from measurement value; ±50 NTU offset ±5% from measurement value	
Long-term stability	±0.2%	from measurement value	
Response time	for turbidity measurement	0.75 s	
Damping	1.5 s, 3 s, 5 s, 10 s, 20 s	adjustable damping	
Measurement principle	Infrared backscatter	wave length 860 nm	
Electrical connection	Cable gland Cable connection Supply voltage Protection class	2x M16x1.5 2x M12 connector 1.4301 (AISI 304) 18...36 V DC max. 190mA IP69K	
Communication	Analog Digital	2x Analog output 4...20 mA, potential-free 1x Digital Input (24 V DC), short circuit proof IO-Link v1.1	
Weight		750 g	

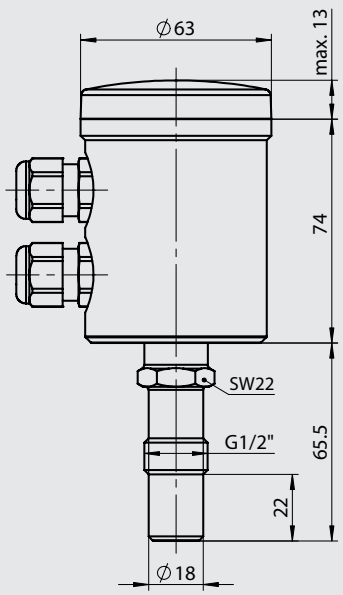
Mechanical Connection / Installation

- The sensor has to be installed in that way that the sensor tip is entirely washed around by media and no bubbles can occure. Installation in a rising pipe is recommended.
- If weld-in sleeve is correctly mounted the axis between the 2 connectors points in flow direction.
- For installation in horizontal pipes from top the use of extended sensor stem is recommended to avoid the influence of bubbles to the measuring signal.
- Attention: The maximum tightening torque for mounting is 20 Nm!

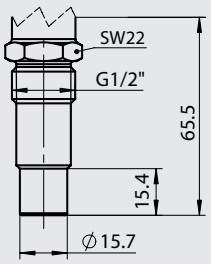
Conditions for a measuring point according to 3-A Sanitary Standard 46-03

- The Sensors ITM-51 / ITM-51R with process connection TCx and TLx are conforming to the 3-A Sanitary Standard.
- Sensors are designed for CIP-/SIP cleaning. Maximum 140 °C / 120 min.
- An internal leackage monitoring is indicating liquid ingression into the sensor body (refer to manual)
- The mounting position, self-draining properties and position of the leackage hole must be in accordance with the current 3-A Sanitary Standard.

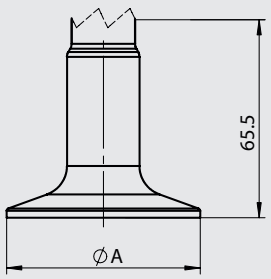
ITM-51 with vertical head orientation



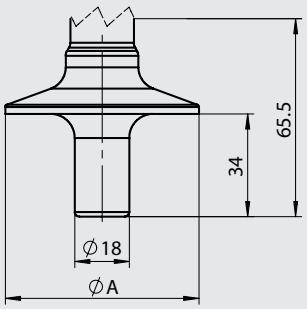
ITM-51-S0L-V-D-P



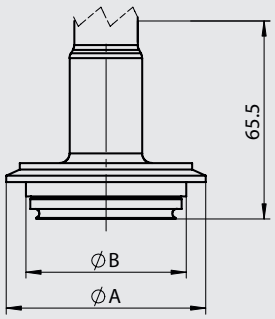
ITM-51-TCx-V-D-P



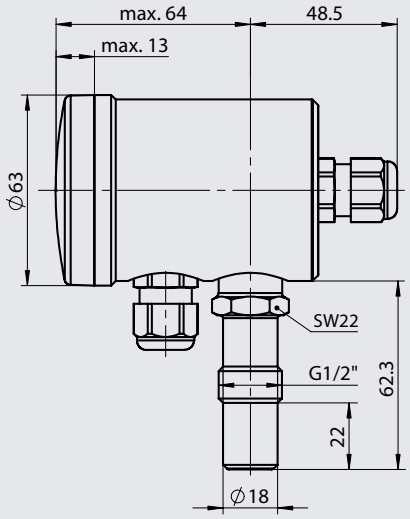
ITM-51-TLx-V-D-P



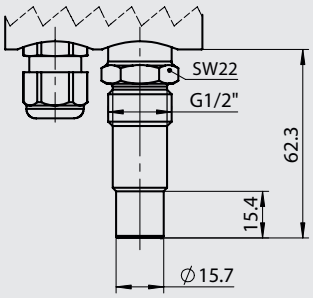
ITM-51-Vxx-V-D-P



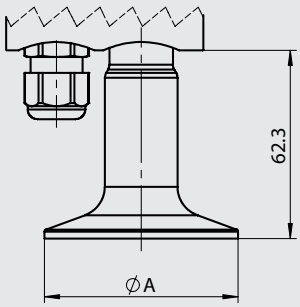
ITM-51 with horizontal head orientation



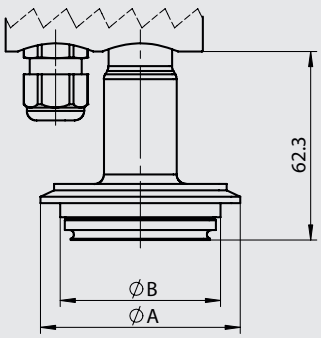
ITM-51-S0L-H-D-P



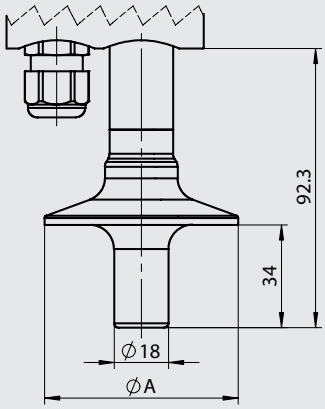
ITM-51-TCx-H-D-P



ITM-51-Vxx-H-D-P



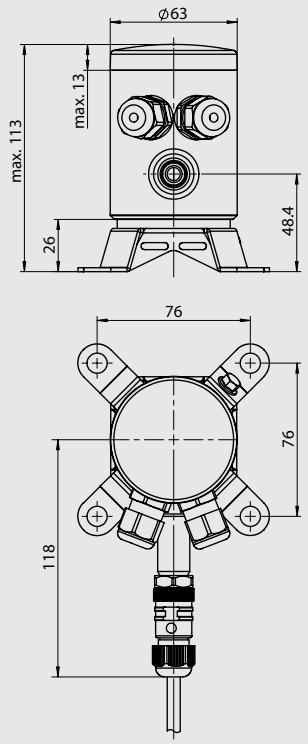
ITM-51-TLx-H-D-P



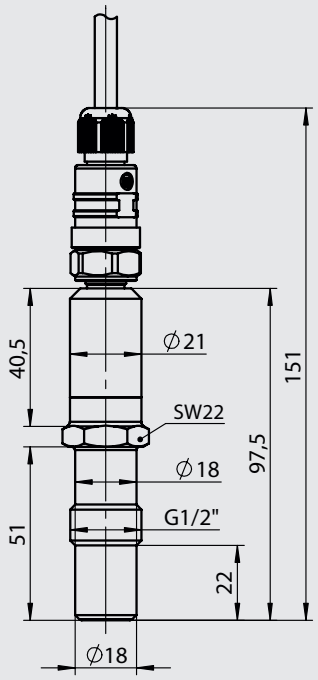
Varivent size		
Type	**Ø A**	**Ø B**
V25	66.0 mm	57.0 mm
V40	84.0 mm	75.0 mm

Tri-Clamp size	
Type	**Ø A**
TC1/TL1	50.5 mm
TC2/TL2	64.0 mm
T25/TL5	77.5 mm
TC3/TL3	91.0 mm

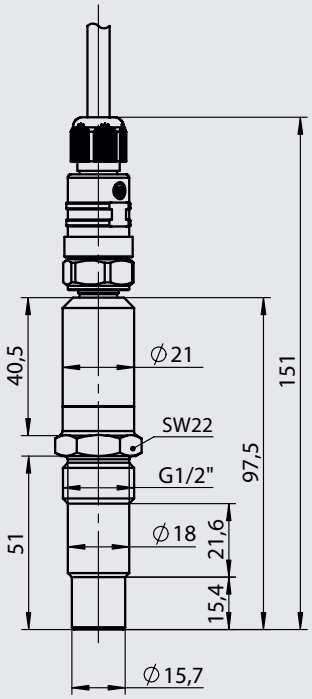
HUR / Head Unit Remote Version



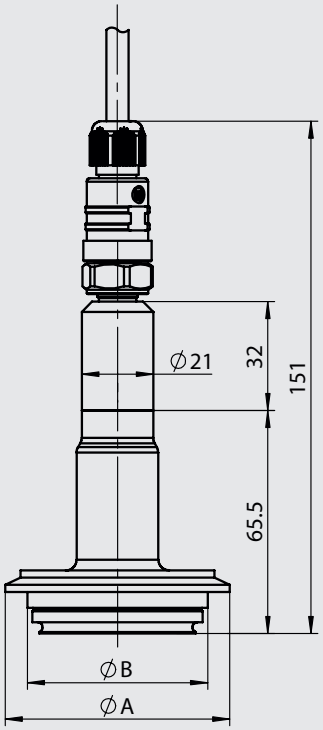
ITM-51R-S01-D-P



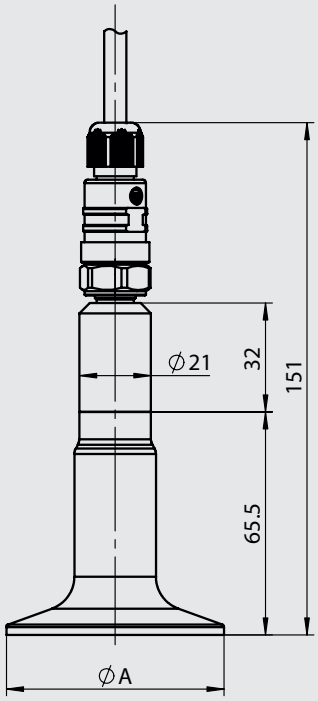
ITM-51R-S0L-D-P



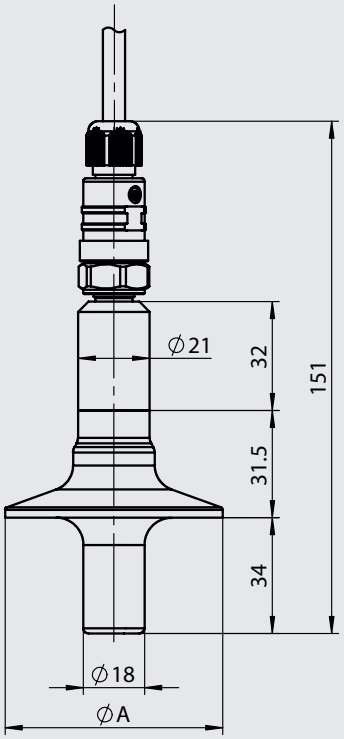
ITM-51R-Vxx-D-P



ITM-51R-TCx-D-P



ITM-51R-TLx-D-P



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.

Reshipment

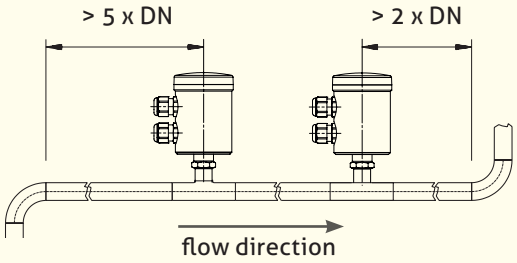
- Sensors shall be clean and must not be contaminated with dangerous media! Note the cleaning information!
- Use suitable transport packaging only to avoid damage of the equipment!

Measurement Range Switching

- The sensor is delivered from the factory for 4...20 mA with measuring range 1 (0...100 %TU) and measuring range 2 (0...10 %TU).
- By means of an external control voltage (24 V DC) it is possible to switch between measuring range 1 and 2 at digital input X3 (see "Electrical connection").
- Digital input X3 is short circuit proof.

Digital Input X3	Measurement Range
0 V	1 (factory setting: 0...100 %TU)
24 V DC	2 (factory setting: 0...10 %TU)

In- and Output Length



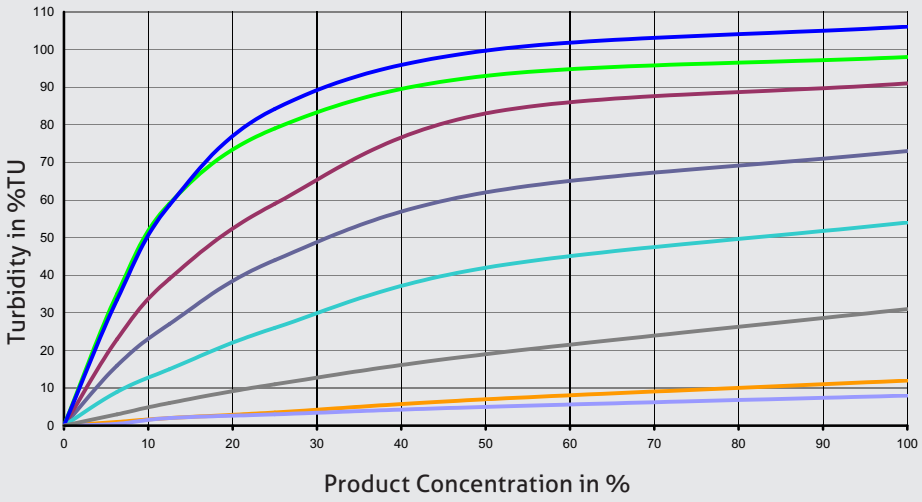
Note

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

Calibration

Device is calibrated ex works. A periodical calibration is not neccessary. A calibration check can be performed on site by using the calibration check tool. For detailed description please refer to the manual.

Showcase Diagram of different Media



Cream (40 % fat)*
Cream (32 % fat)*
Cream (10 % fat)*

Full Cream Milk (3.5 % fat)*

UHT-Milk (1.5 % fat)*

Whey*

Tomato Juice
Orange Juice

* Average turbidity of customary milk products at different dilutions.

Turbidity Diagram

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.

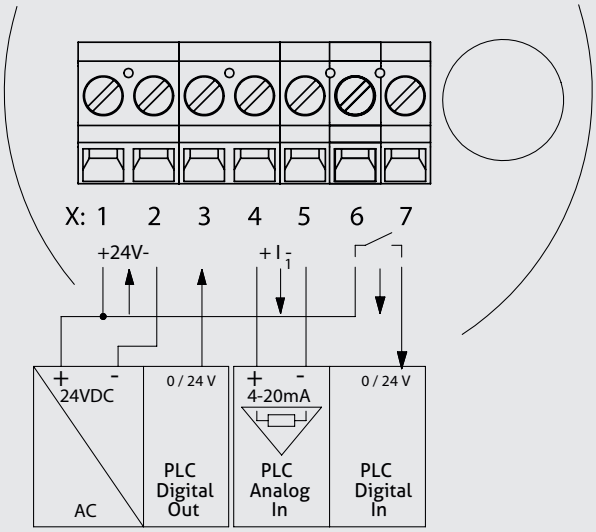
Cleaning / Maintenance

- 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!

Conventional Usage

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

Electrical connection (Signal module A53)

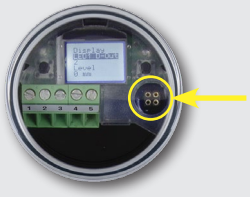


1: Power supply +24 V DC
2: Power supply -
3: Digital input X3
4: Analog output X45 +
5: Analog output X45 -
6: Relay output X67
7: Relay output X67

Sensor configuration

Monitoring or configuration of the sensor could be performed using IO-Link or the MPI-200 programming adapter with MPI-200-F. It must be ensured that the sensor is permanently connected to the supply voltage while the paramters are being set.

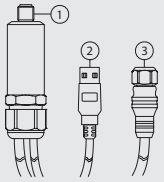
Programming adapter MPI-200-F connection



Connection plug for MPI-200-F adapter as an intermediate plug between the ITM-51 electronics and the MPI-200 connection 3 (see next figure).

Connection of programming adapter MPI-200

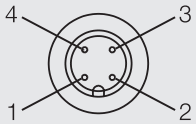
1: Connection for M12 connector
2: USB port for connecting to a PC
3: Connection cable to adapter for ITM-51



Electrical connection "N" (Signal module A53)

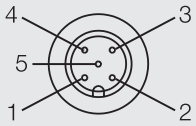
M12 connector (4 pin)

1: Analog output X45 +
2: Relay output X67
3: Relay output X67
4: Analog output X45 -



M12 connector (5 pin)

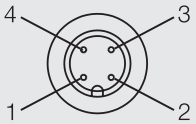
1: Power supply +24 V DC
2: Not assigned
3: Not assigned
4: Power supply -
5: Digital input X3



Electrical connection "A" (Signal module A53)

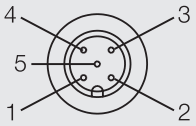
M12 connector (4 pin)

1: Analog output X45 -
2: Analog output X45 +
3: Power supply +24 V DC
4: Power supply -



M12 connector (5 pin)

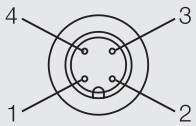
1: Relay output X67
2: Not assigned
3: Not assigned
4: Relay output X67
5: Digital input X3



Electrical connection "M" (Signal module A42)

M12 connector (4 pin)

1: Power supply +24 V DC
2: Analog output X45 +
3: Analog output X45 -
4: Power supply -

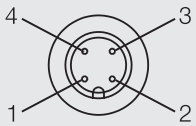


Electrical connection "C" (Signal module I42)

M12 connector (5 pin)

IO-Link

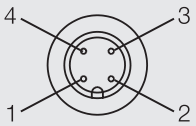
1: Power supply +24 V DC
2: Analog output X45 -
3: Power supply -
4: IO-Link
5: Analog output X45 +



Electrical connection "R" (Signal module I53)

M12 connector (4-pin)

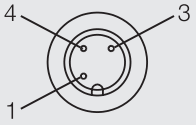
1: Analog output X45 +
2: Relay output X67
3: Relay output X67
4: Analog output X45 -



M12 connector (3-pin)

IO-Link

1: Power supply +24 V DC
3: Power supply -
4: IO-Link / Digital input X3



Order code

ITM-51R (relative turbidity meter, remote version, remote cable must be ordered seperately)

Process connection (Ⓐ: 3-A approval, Ⓔ: EHEDG approval)

S0L	(CLEANadapt G1/2", extended sensor stem)
S01	(CLEANadapt G1/2")
TC1	(Tri-Clamp 1½") Ⓐ Ⓔ
TC2	(Tri-Clamp 2") Ⓐ Ⓔ
T25	(Tri-Clamp 2½") Ⓐ Ⓔ
TC3	(Tri-Clamp 3") Ⓐ Ⓔ
TL1	(Tri-Clamp 1½", extended sensor stem) Ⓐ Ⓔ
TL2	(Tri-Clamp 2", extended sensor stem) Ⓐ Ⓔ
TL5	(Tri-Clamp 2½", extended sensor stem) Ⓐ Ⓔ
TL3	(Tri-Clamp 3", extended sensor stem) Ⓐ Ⓔ
V25	(Varivent type F, DN 25) Ⓔ
V40	(Varivent type N, DN 40/50) Ⓔ

Signal module

A42	(1x 4...20 mA turbidity)
A52	(1x 4...20 mA turbidity, 1x switching out)
A53	(1x 4...20 mA turbidity, 1x switching out, external range switching)
I42	(IO-Link and 1x 4...20 mA turbidity)
I52	(IO-Link and 1x 4...20 mA turbidity, 1x switching out)
I53	(IO-Link and 1x 4...20 mA turbidity, 1x switching out, external range switching)

Electrical connection

P	(cable gland M16x1.5)
D	(2x cable gland M16x1.5)
M	(1x M12 connector, 4 pin output/power supply)
N	(2x M12 connector, 4 pin output, 5 pin input/power supply)
A	(2x M12 connector, 4 pin output/power supply, 5 pin output/input)
C	(1x M12 connector, 5 pin analog output and IO-Link)
R	(2x M12 connector, 4 pin analog and switching output, 3 pin IO-Link and input)

Interface/Display

X	(without Interface)
L	(Large User Interface with display)

Enclosure

X	(opaque plastic cap)
P	(clear plastic cap)
M	(without control window)
W	(with control window)

Configuration

X	(factory setting)
S	(special customer setting)

ITM-51R / S01 / A53 / N / L / P / X

Connection cable for ITM-51R (remote version)

M12-PVC/8-5 m	PVC-cable M12 coupling both-sided, 8-pin, IP69K, 5 m
M12-PVC/8-10 m	PVC-cable M12 coupling both-sided, 8-pin, IP69K, 10 m
M12-PVC/8-25 m	PVC-cable M12 coupling both-sided, 8-pin, IP69K, 25 m
M12-PVC/8-xx m	PVC-cable M12 coupling both-sided, 8-pin, IP69K, special length

PVC-cable with M12-connection

Information

The components ITM-51S/sensor and HUR/Head Unit Remote can be purchased as spare parts separately.
The valid configuration can be seen on the product labels.

Order code

ITM-51 (relative turbidity meter)

Process connection (Ⓐ: 3-A approval, Ⓔ: EHEDG approval)

- **S0L** (CLEANadapt G1/2", extended sensor stem)
- **S01** (CLEANadapt G1/2")
- **TC1** (Tri-Clamp 1½") Ⓐ Ⓔ
- **TC2** (Tri-Clamp 2") Ⓐ Ⓔ
- **T25** (Tri-Clamp 2½") Ⓐ Ⓔ
- **TC3** (Tri-Clamp 3") Ⓐ Ⓔ
- **TL1** (Tri-Clamp 1½", extended sensor stem) Ⓐ Ⓔ
- **TL2** (Tri-Clamp 2", extended sensor stem) Ⓐ Ⓔ
- **TL5** (Tri-Clamp 2½", extended sensor stem) Ⓐ Ⓔ
- **TL3** (Tri-Clamp 3", extended sensor stem) Ⓐ Ⓔ
- **V25** (Varivent type F, DN 25) Ⓔ
- **V40** (Varivent type N, DN 40/50) Ⓔ

Enclosure Orientation

- **H** (horizontal)
- **V** (vertical)

Signal module

- **A42** (1x 4...20 mA turbidity)
- **A52** (1x 4...20 mA turbidity, 1x switching out)
- **A53** (1x 4...20 mA turbidity, 1x switching out, external range switching)
- **I42** (IO-Link and 1x 4...20 mA turbidity)
- **I52** (IO-Link and 1x 4...20 mA turbidity, 1x switching out)
- **I53** (IO-Link and 1x 4...20 mA turbidity, 1x switching out, external range switching)

Electrical connection

- **P** (cable gland M16x1.5)
- **D** (2x cable gland M16x1.5)
- **M** (1x M12 connector, 4 pin output/power supply)
- **N** (2x M12 connector, 4 pin output, 5 pin input/power supply)
- **A** (2x M12 connector, 4 pin output/power supply, 5 pin output/input)
- **C** (1x M12 connector, 5 pin analog output and IO-Link)
- **R** (2x M12 connector, 4 pin analog and switching output, 3 pin IO-Link and input)

Interface/Display

- **X** (without Interface)
- **S** (Simple User Interface with small display)
- **L** (Large User Interface with display)

Enclosure

- **X** (opaque plastic cap)
- **P** (clear plastic cap)
- **M** (without control window)
- **W** (with control window)

Configuration

- **X** (factory setting)
- **S** (special customer setting)

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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 -20...+60 °C
- Relative humidity max. 80 %

Note on CE

- Applicable directives:
  Electromagnetic Compatibility Directive 2014/30/EC
- 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.

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