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Turbidity

Characteristics

System	Optical Turbidimeter
Processing	Indication, switching, measuring
Process connection	Welded nozzle, Milk-pipe connection
Media	Liquids, viscous media
Pressure range	-1..+10 bar
Media temperature	0..+90°C CIP-/SIP-capable, 120°C < 30 min

Application

- **Continuous turbidity measurement**
- **Brewery**
- **Diary**
- **Food- and beverage industry**
- **Machine building**
- **Pharmacy industry**
- **Cosmetic industry**
- **Biotechnology**

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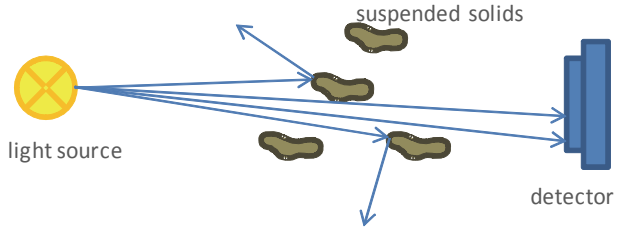
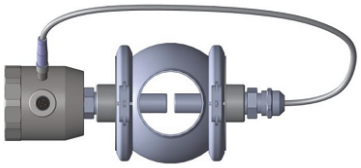
Product information

Hygienic Design

Function

The turbidity measurement method is based on the optical principle of light scattering . The device emits a light beam . This applies to particles in the fluid and parts of the light will be reflected (scattered) . In the opposite to the light source is a light sensor, receiving with increasing scattering (higher proportion of particles → greater turbidity) less and less light . The following images show the effect :

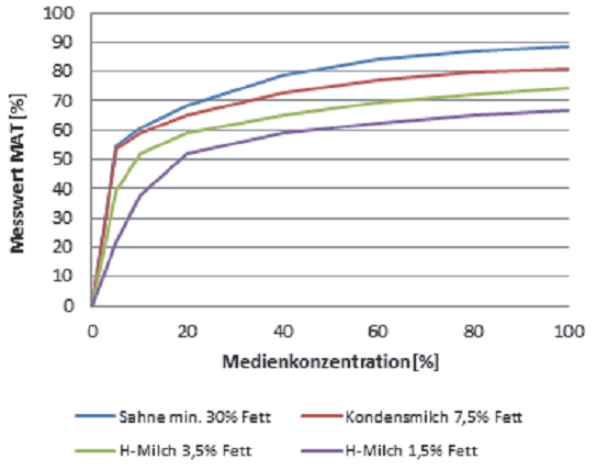




From knowledge of the emitted and the received light, the integrated microcontroller computes the turbidity as a percentage of the maximum measurement value. This value can be converted with an integrated conversion table into a material-specific concentration values, or in the formazine based unit FAU. The values for the current output, the two switching outputs and the optional connected LC display derived from this result.

There are a variety of parameters in the operating menu to fit the turbidimeter for the best result in the application. For instance : because of the programmable time behavior, short-term disturbances in the medium courses no uncontrolled switching operations or troubled measured values at the current output.

As an example, measurement diagrams for various dairy products



Advantage

The parts coming into contact with the media complies with FDA requirements and are CIP-/SIP capable. Steam sterilization for a short time – up to 120°C.

- No mechanical moving parts
- Compact construction design for food and hygiene compliance
- Independent of pressure, temperature and density changes
- Maintenance-free
- Installation without gaps and cavity-free
- Detection of liquids such as milk or beer

Mounting

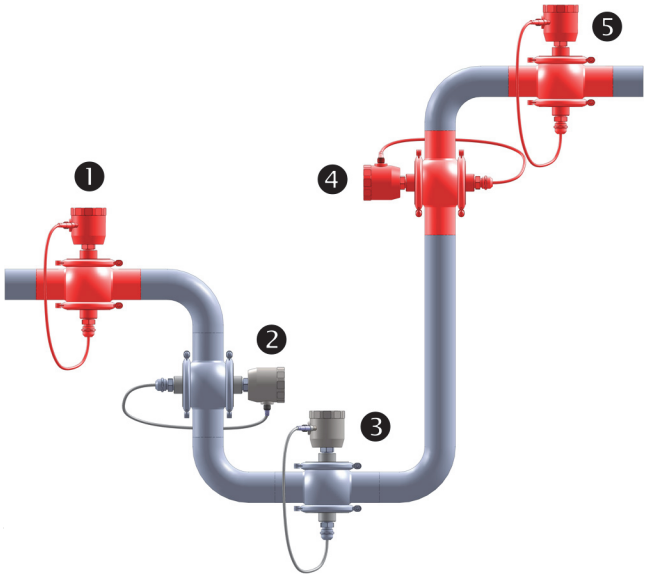
The following notes must be observed :

- The measuring tube must be completely filled
- Air bubbles and foam formation should be avoided
- The installation near inspection glasses should be avoided
- No sedimentation in the near of the optic itself

Installation

The following instructions must be observed:

- The measuring tube must be completely filled
- Air bubbles and foaming must be prevented.
- Installation near viewing glasses must be avoided.
- Sediments may not deposit near the lens.



Position	Characteristic
❶	**Danger – bubbles or partly filled pipe**
❷	Ideal – good measurement result
❸	Ideal – good measurement result
❹	**Danger – open line section**
❺	**Danger – bubbles or partly filled pipe**

Mistakes reserved, technical specifications subject to change without notice.

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Turbidimeter MAT433 / 437

- **Wide measuring range for scanning high turbidity level**
- **Absorption turbidity measurement according to EN ISO 27027**
- **2 switch outputs, function programmable**
- **Analog output 0/4..20mA**
- **Parametrization via GHM*ware* and internal mini USB interface**
- **Wide view LED status display (MAT433)**
- **Graphic LC-Display with capacitive buttons (MAT437)**

Characteristics

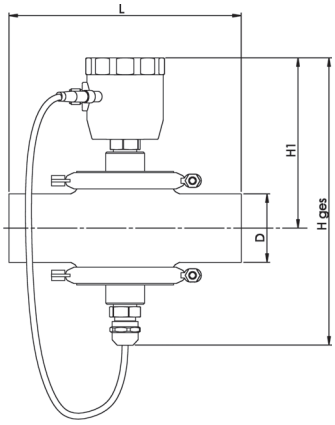
The turbidimeter MAT433/437 is used for phase detection in food and beverage industry. The absorption measurement principle according to EN ISO 27027 is designed to measure very high turbidity. The turbidity is output as a percentage of the maximum measurement value. This value can be converted with an integrated conversion table into material-specific concentrations or into the formazine based unit FAU.

Technical data

Power supply
Supply voltage : 18..30 V DC, max. 3 W
Electrical connection : M12 plug or cable gland M16x1.5 polyamide (PA) or SS-type 1.4305
CE-conformity : EN 61326:2013-07
Ambient conditions
Ambient temperature : -10..+60°C
Climatic class : EN60068-2-38:2010-06
Vibration class : EN60068-2-6, GL Test2
Sensor
Measuring range : 0…100% Absorption, scalable in material specific concentration units, 0…4000FAU
Accuracy : 2%
Process temperature : 0..+90 °C, 120 °C < 30 min
Process pressure : 0..10 bar
Process material : 1.4404, sapphire glass
Process connection : welded connection acc. DIN EN 10357, series A (former DIN11850, Reihe2), Milk pipe connection acc. DIN11851

Outputs
Analog output : active 0/4..20 mA, burden < 600 Ω
Switching outputs : 2 x transistor PNP / NPN programmable max.30 V DC, 100 mA
Response time : programmable 0,01 .. 10 s
Display MAT433 : LED's, 3 colors, programmable
Display MAT437 : Graphic LC-Display, lighted white/red 4 capacitive buttons
Case : round stainless steel housing Ø 59 mm
Material : 1.4305
LED / LCD window : acrylic glass (PMMA)
protection class : IP67 / IP69K

Dimensions



Dimensions MAT433

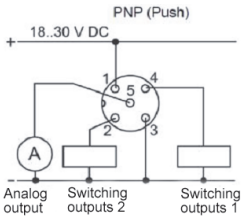
DN	H1 [mm]	H ges [mm]	D [mm] DIN EN 10357 Series A	L [mm] VARINLINE® - housing with welded nozzle	L [mm] milk-pipe thread nozzle DIN11851
DN25	112	191	29x1,5	180	238
DN40	118	203	41x1,5	180	246
DN50	124	215	53x1,5	180	250
DN65	132	231	70x2	250	330
DN80	139,5	246	85x2	250	340
DN100	149	265	104x2	250	358

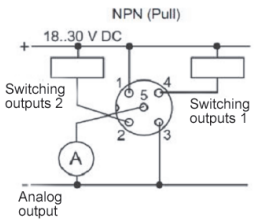
Dimensions MAT437

DN	H1 [mm]	H ges [mm]	D [mm] DIN EN 10357 series A	L [mm] VARINLINE® - housing with welded nozzle	L [mm] milk-pipe thread nozzle DIN11851
DN25	120	199	29x1,5	180	238
DN40	126	211	41x1,5	180	246
DN50	132	223	53x1,5	180	250
DN65	140	239	70x2	250	330
DN80	147,5	254	85x2	250	340
DN100	157	273	104x2	250	358

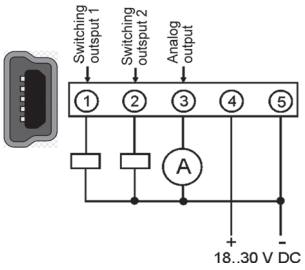
Connection diagrams

M12 device plug





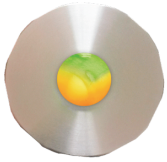
Terminal clamps and USB Mini-B plug



Cable colors (plug):
1 = brown
2 = white
3 = blue
4 = black
5 = gray

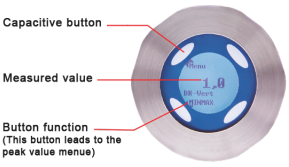
Displays

MAT433



Display : wide view LED status
LED function programable e.g.:
green : on (operation)
red : switch output 1

MAT437



Display: LC display
Programable via capacitive button or **GHMware** configuration software

Ordering Code

MAT433 - 1. - 2. - 3. - 4. - 5.

1.	**Nominal diameter**	
	025	DN25
	040	DN40
	050	DN50
	065	DN65
	080	DN80
	100	DN100
2.	**Optical path length**	
	06	6 mm
3.	**Process connection**	
	1	Welded nozzle (incl. VARINLINE® housing)
4.	**Electrical connection**	
	0	M12-plug (standard)
	1	Cable gland M16x1,5; polyamide (PA)
	2	Cable gland M16x1,5; SS-type (1.4305)
5.	**Optionen**	
	00	without Options

Process adaptions
VARINLINE®-case of the MAT43X

APT 1. 2. 3.

1.	**Process connection**	
	3	Milk pipe DIN11851 two-sided thread nozzle
2.	**Nominal diameter**	
	3	DN25
	4	DN40
	5	DN50
	6	DN65
	7	DN80
	8	DN100
3.	**Optionen**	
	0	without Options
	1	two-sided cone nozzle
	2	Thread- / cone nozzle

Other process adaptions on request

MAT437 - 1. - 2. - 3. - 4. - 5.

1.	**Nominal diameter**	
	025	DN25
	040	DN40
	050	DN50
	065	DN65
	080	DN80
	100	DN100
2.	**Optical path length**	
	06	6 mm
3.	**Process connection**	
	1	Welded nozzle (incl. VARINLINE® housing)
4.	**Electrical connection**	
	0	M12-plug (standard)
	1	Cable gland M16x1,5; polyamide (PA)
	2	Cable gland M16x1,5; stainless steel (1.4305
5.	**Options**	
	00	without Options

Accessory
ACI211 USB connection cable
ACH connection cable