

Technical information

Soliphant M

FTM50, FTM51, FTM52

Vibronic

Universal point level switch for fine-grained bulk solids



Application

Soliphant M is a robust point level switch for silos with fine-grained or dusty bulk solids even with a low bulk weight.

The various designs mean the device has a wide range of applications.

Many certificates are available for use in dust or gas incensive hazard areas.

FTM50:

Compact design for installation in any position. A wide range of applications thanks to various variations e.g.

- Polished short fork with stainless steel housing (F15) and Tri-Clamp
- Coated standard fork with aluminum housing (F17) and flange
- Standard fork with 280 °C (536 °F) rating and aluminum housing (F13)

FTM51:

With extension pipe up to 4 m (13 ft) for installation in any position

FTM52:

With rope up to 20 m (66 ft) for installation from above

Typical applications:

Cereals, flour, cocoa, sugar, animal feed, detergents, dye powder, chalk, gypsum, cement, plastic granules, fly ash

Your benefits

- Market leader in the area of level detection of bulk solids
- Functional safety up to SIL 2 as per IEC 61508
- No mechanically moving parts: no wear, long operating life
- Insensitive to external vibrations and build-up
- Various electronic inserts: e.g. NAMUR, relay, thyristor and PFM-signal outputs for optimum alignment with the plant control system
- Configurable density setting (bulk weight setting) and switching delay
- Process temperature up to 280 °C (536 °F)
- Choice of coated or polished sensor
- Diagnostic function: warning in the event of impending device failure due to buildup or abrasion

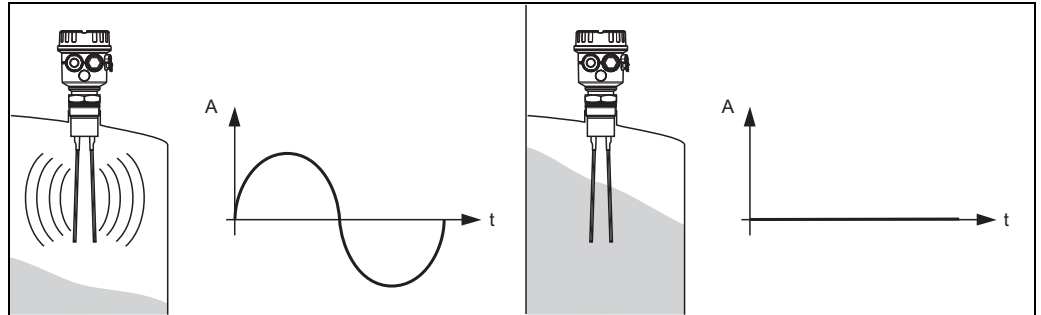
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Function and system design

Measuring principle

A piezoelectric drive excites the tuning fork of Soliphant M to its resonance frequency. If medium covers the tuning fork, the fork's vibrating amplitude changes (the vibration is damped). Soliphant M's electronics compare the actual amplitude with a target value and indicate whether the tuning fork is vibrating freely or whether it is covered by medium.



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A: Amplitude
t: Time

Measuring system

The measuring system is available either with compact instrumentation or separate instrumentation with a switching unit. The following electronic versions are available:

Compact instrumentation

FEM51:

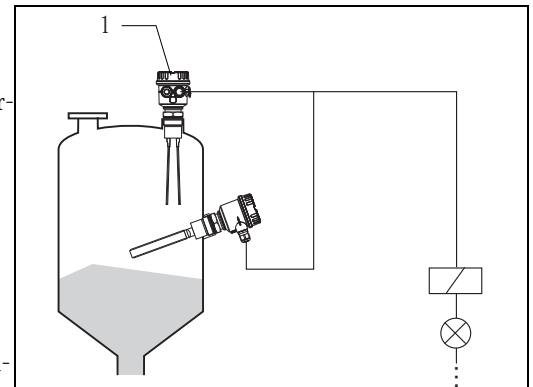
- Two-wire AC version
- Switch the load directly into the power supply circuit via the thyristor

FEM52:

- Three-wire DC version
- Switch the load via the transistor (PNP) and separate connection

FEM54:

- Universal current version with relay output
- Switch the loads via 2 floating change-over contacts (DPDT)



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1 Electronic version

Separate instrumentation with switching unit

For connecting to a separate switching unit or isolating amplifier such as Nivotester:

- FTL325N, FTL375N (NAMUR) or
- FTL325P, FTL375P (PFM)

FEM55:

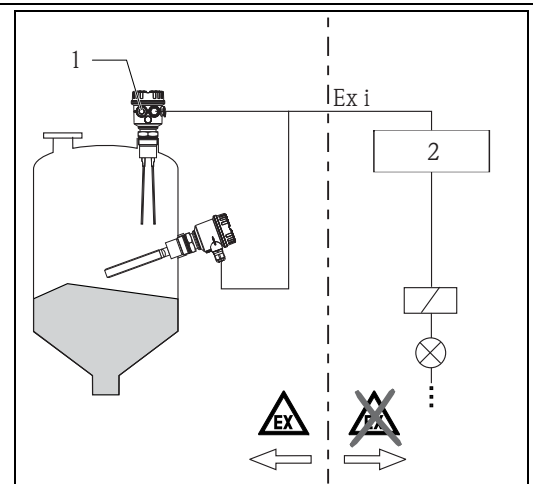
Signal transmission 8/16 mA along two-wire cabling:

FEM57:

- PFM signal transmission
- Current pulses superposed on the power supply along the two-wire cabling
- Self-test from the switching unit without changing levels

FEM58:

- Signal transmission H-L edge 2.2 to 4.8 / 0.4 to 1.0 mA to EN 50227 (NAMUR) along two-wire cabling
- Checking of connecting cabling and other devices by pressing a key on the electronic insert



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1 Electronic version

2 Switching unit, PLC, isolating amplifier, segment coupler

Cable specifications

Within the indicated standards and guidelines to interference immunity (see also "Electromagnetic compatibility", →  12) a normal instrument cable is sufficient. If higher interference levels are present, a shielded cable must be used.

Immunity to temperature change of connecting cable

The connecting cables must withstand the ambient temperature +5 K.

Connecting cables

- Electronic inserts: cross-section max. 2.5 mm² (13 AWG); strand in ferrule to DIN 46228
- Protective ground in housing: cross-section max. 2.5 mm² (13 AWG)
- Equipotential bonding connection on housing: cross-section max. 4 mm² (11 AWG)

Cable entry

Housing-specific: screw terminal on electronic insert.

Input

Measured variable

Level (according to the mounting location and the overall length)

Measuring range (detection range)

- FTM50: overall length see, →  17
- FTM51: overall length 300 to 4000 mm (11.8 to 157 in)
- FTM52: overall length 750 to 20000 mm (29.5 to 787 in)

The measuring range of Soliphant M depends on the medium, mounting location and fork length. The detection range is located within the length of the fork.

Distinction between the forks:

- For light media:
Standard fork with a fork length of 155 mm (6.1 in) (bulk weight of the medium ≥ 10 g/l)
- For confined installation conditions, high lateral load or increased buildup:
Short fork with a fork length of 100 mm (3.94 in) (bulk weight of the medium ≥ 50 g/l)

Input signal

- Probes covered => little to no vibrating amplitude
- Probes not covered => large vibrating amplitude

Selectable frequency monitoring (diagnosis) for detection of abrasion and build-up.

Measuring frequency

- Standard fork: approx. 140 Hz (in air)
- Short fork: approx. 350 Hz (in air)

Output

Galvanic isolation

- FEM51, FEM52, FEM55: Between sensor and power supply
- FEM54: Between sensor, power supply and load
- FEM57, FEM58: See switching unit connected

Switch-on behavior

When the power supply is switched on the switching status of the outputs corresponds to "signal on alarm". The correct switching status is assumed after a maximum of 3 s.

Fail-safe mode

Minimum/maximum residual current safety selectable on electronic insert.
(with FEM57 only at Nivotester).

MAX = maximum safety:

The output switches safety-oriented when the fork is covered (signal on alarm)

For use with overfill prevention for example.

MIN = minimum safety:

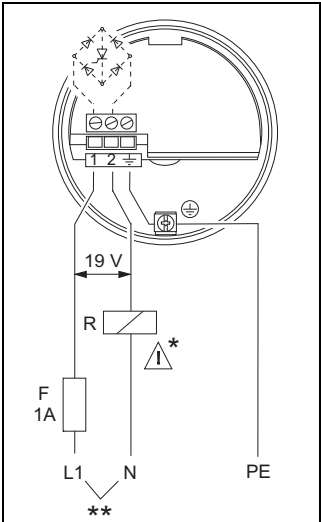
The output switches safety-oriented when the fork is uncovered (signal on alarm)

For use with dry running protection for example.

Switching delay	0.5 s when the sensor is covered. Version 150 °C (302 °F): 1.5 s when the sensor is uncovered (1.0 s for short fork) Version 230/280 °C (446/536 °F): 2 s when the sensor is uncovered (1.0 s for short fork) Can be changed to 5 s for covering and uncovering.
Switch behavior	Binary

Electronic insert

FEM51 electronic insert (AC 2-wire)	Power supply - Supply voltage AC: 19 to 253 V - Power consumption: < 1.0 W - Residual current consumption (I_R): < 4 mA; 5.5 mA for short fork (in switch-off moment < 1 mA for 100 ms) - Short-circuit protection - Separation voltage: 3.6 kV - FEM51 overvoltage protection: overvoltage category II Two-wire AC connection Always connect in series with a load! Check the following: - the residual current consumption in blocked state. - that for low voltage - the voltage drop across the load is such that the minimum terminal voltage at the electronic insert (19 V) when blocked is not undershot. - the voltage drop across the electronics when switched through is observed (up to 12 V). - when selecting the relay, pay attention to the holding power/rated power (see "Connectable load"). * External load "R" must be connected ** AC: U~max. 253 V, 50/60 Hz
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Output signal

I_L = load current (switched through)

I_R = residual current (blocked)

☀ = lit

⚡ = flashes

● = unlit

* See also "Operating elements",
→ 23

Safety mode	Level	Output signal	LEDs green yellow red		
MAX		1 I_L → 2	☀	☀	●
		1 I_R → 2	☀	●	●
MIN		1 I_L → 2	☀	☀	●
		1 I_R → 2	☀	●	●
Maintenance required *		1 I_L / I_R → 2	⚡	●	⚡
Instrument failure		1 I_R → 2	●	●	☀

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Signal on alarm

Output signal on power failure or in the event of device failure: I_R

Connectable load

- For relays with a minimum holding power/rated power > 2.5 VA at 253 V (10 mA) or > 0.5 VA at 24 V (20 mA)
- For relays with a maximum holding power/rated power < 89 VA at 253 V or 8.4 VA at 24 V
- Voltage drop across FEM51 max. 12 V
- Residual current with blocked thyristor max. 4 mA (5.5 mA for short fork)
- Load current max. 350 mA (short-circuit proof)

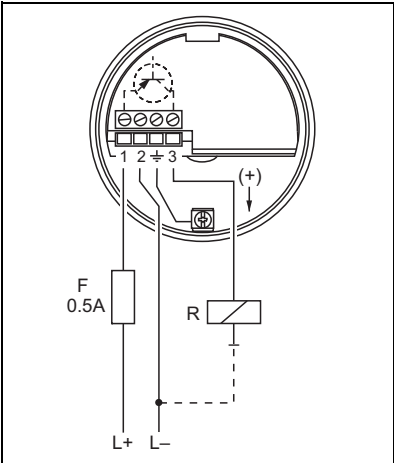
FEM52 electronic insert
(DC PNP)

Power supply

- DC voltage: 10 to 55 V
- Ripple: max. 1.7 V, 0 to 400 Hz
- Current consumption: max. 16 mA
- Power consumption: max. 0.86 W
- Reverse polarity protection/short-circuit protection
- Separation voltage: 3.6 kV
- FEM52 overvoltage protection: overvoltage category III

Three-wire DC connection

Preferably used with programmable logic controllers (PLC), DI modules as per EN 61131-2.
Positive signal at switching output of the electronics (PNP).



DC: $U = 10\text{ V to }55\text{ V}$

Output signal

I_L = load current (switched through)

I_R = residual current (blocked)

☀ = lit

☀ = flashes

● = unlit

* See also "Operating elements", → 23

Safety mode	Level	Output signal	LEDs green yellow red
MAX		$L+ \xrightarrow{I_L} +$ $1 \xrightarrow{I_L} 3$	☀ ☀ ●
		$1 \xrightarrow{I_R} 3$	☀ ● ●
MIN		$L+ \xrightarrow{I_L} +$ $1 \xrightarrow{I_L} 3$	☀ ☀ ●
		$1 \xrightarrow{I_R} 3$	☀ ● ●
Maintenance required *		$1 \xrightarrow{I_L / I_R} 3$	☀ ● ☀
Instrument failure		$1 \xrightarrow{I_R} 3$	☀ ● ☀

L00-FTM5xxxx-04-05-xx-en-007

Signal on alarm

Output signal on power failure or in the event of device failure: < 100 μ A

Connectable load

- Load switched via transistor and separate PNP connection, max. 55 V
- Load current max. 350 mA (pulsed overload and short-circuit protection)
- Residual current < 100 µA (with transistor blocked)
- Capacitance load max. 0.5 µF at 55 V, max. 1.0 µF at 24 V
- Residual voltage < 3 V (with transistor switched through);

FEM54 electronic insert (AC/DC with relay output)

Power supply

- Alternating voltage AC: 19 to 253 V, 50/60 Hz
- DC voltage: 19 to 55 V
- Power consumption: max. 1.5 W
- Reverse polarity protection/short-circuit protection
- Separation voltage: 3.6 kV
- FEM54 overvoltage protection: overvoltage category II

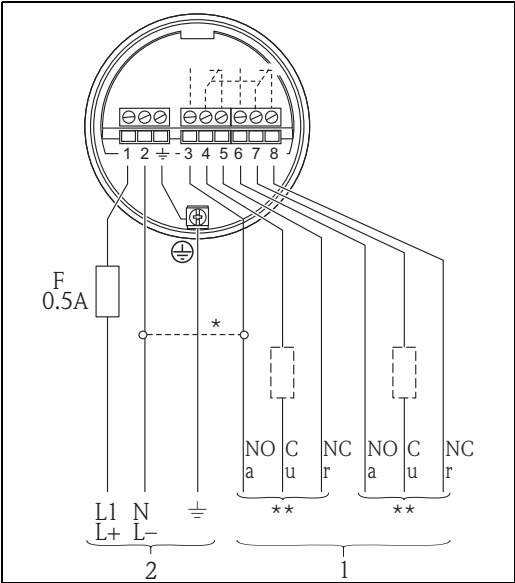
Universal current connection with relay output (DPDT)

Note!
Please note the different voltage ranges for AC and DC.

Output:
When connecting a device with high inductance, provide a spark arrester to protect the relay contact. A fine-wire fuse (depending on the load connected) protects the relay contact on short-circuiting. The relay contacts switch simultaneously.

- * When jumpered, the relay output works with NPN logic.
- ** See "Connectable load"

- 1 Relay outputs: normally open/closed (NO, NC)
- 2 AC: U~19 to 253 V, DC: U=19 to 55 V



Output signal

- ⏏ = relay energized
- ⏏ = relay de-energized
- ☀ = lit
- ⚡ = flashes
- = unlit

* See also "Operating elements",
→ 23

Safety mode	Level	Output signal	LEDs green yellow red
MAX			
MIN			
Maintenance required *			
Instrument failure			

L00-FTM5xxxx-04-05-xx-en-008

Signal on alarm

Output signal on power failure or in the event of device failure: relay de-energized

Connectable load

- Loads switched via 2 floating change-over contacts (DPDT)
- AC: I~ max. 6 A (Ex de 4 A), U~ max. 253 V; P~ max. 1500 VA, cos ϕ = 1, P~ max. 750 VA, cos ϕ > 0.7
- DC: I= max. 6 A (Ex de 4 A) to 30 V, I= max. 0.2 A to 125 V
- The following applies when connecting a functional low-voltage circuit with double isolation as per IEC 1010: Sum of voltages of relay output and power supply max. 300 V

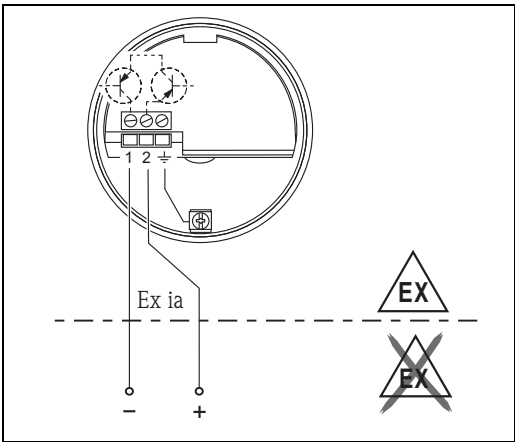
FEM55 electronic insert
(8/16 mA)

Power supply

- DC supply voltage: 11 to 36 V
- Power consumption: < 600 mW
- Reverse polarity protection/short-circuit protection
- Separation voltage: 3.6 kV
- FEM55 overvoltage protection: overvoltage category III

Two-wire connection
for separate switching unit

For connecting to programmable logic controllers (PLC), AI modules 4-20 mA to EN 61131-2.
Output signal jump from high to low current on point level.



U= 11 to 36 e.g. PLC

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Output signal

~ 16 mA = 16 mA ± 5 %

~ 8 mA = 8 mA ± 6 %

☀ = lit

☀ = flashes

● = unlit

* See also "Operating elements", → 23

Safety mode	Level	Output signal	LEDs		
			green	yellow	red
MAX		+ 2 ~16 mA → 1	☀	☀	●
		+ 2 ~8 mA → 1	☀	●	●
MIN		+ 2 ~16 mA → 1	☀	☀	●
		+ 2 ~8 mA → 1	☀	●	●
Maintenance required *		+ 2 8/16 mA → 1	☀	☀	●
		 3.6 mA	☀	●	☀
Instrument failure		+ 2 3.6 mA → 1	●	●	☀

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Signal on alarm

Output signal on power failure or in the event of device failure: < 3.6 mA

Connectable load

- $R = (U - 11\text{ V}) / 16.8\text{ mA}$
- U = connection DC voltage 11 V to 36 V

FEM58 electronic insert
(NAMUR H-L edge)

Note!
Only in combination with standard fork (fork length 155 mm (6.1 in)).

Power supply

- DC supply voltage: 8.2 V $\pm$ 20 %
- Power consumption: < 8 mW at $I < 1\text{ mA}$; < 36 mW at $I = 2.2$ to 4.8 mA
- Separation voltage: 1.9 kV
- Connection data interface: IEC 60947-5-6

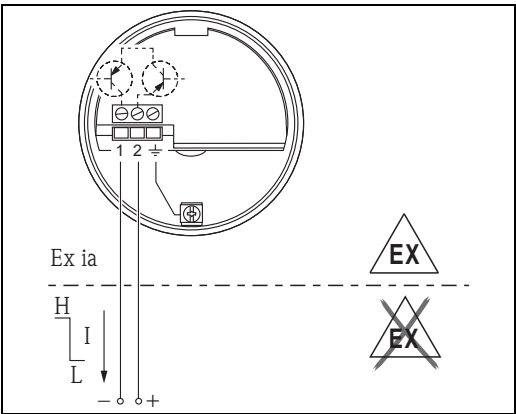
Two-wire connection
for separate switching unit

For connecting to isolating amplifiers
acc. to NAMUR (IEC 60947-5-6), z.B. FTL325N or
FTL375N from Endress+Hauser.

H-L edge:
Output signal jump from high to low current on
point level.

Additional function:
Test key on the electronic insert.
Pressing the key breaks the connection to the
isolating amplifier.

- Note!
- For Ex d applications, the additional function can
only be used if the housing is not exposed
to an explosive atmosphere.
 - Connecting to multiplexer:
Set clock time to min. 5 s.



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Isolating amplifier to IEC 60947-5-6 (NAMUR)

Output signal

- ☀ = lit
- ⚡ = flashes
- = unlit

* See also "Operating elements", → 23

Safety mode	Level	Output signal	LEDs		
			green	yellow	red
MAX		$\begin{matrix} + & 2.2 \dots & 4.8\text{ mA} \\ & \xrightarrow{\hspace{1cm}} & 1 \end{matrix}$	☀	☀	●
		$\begin{matrix} + & 0.4 \dots & 1.0\text{ mA} \\ & \xrightarrow{\hspace{1cm}} & 1 \end{matrix}$	⚡	●	●
MIN		$\begin{matrix} + & 2.2 \dots & 4.8\text{ mA} \\ & \xrightarrow{\hspace{1cm}} & 1 \end{matrix}$	⚡	☀	●
		$\begin{matrix} + & 0.4 \dots & 1.0\text{ mA} \\ & \xrightarrow{\hspace{1cm}} & 1 \end{matrix}$	⚡	●	●
Maintenance required *		$\begin{matrix} + & 0.4 \dots & 4.8\text{ mA} \\ & \xrightarrow{\hspace{1cm}} & 1 \end{matrix}$	⚡	●	⚡
Instrument failure		$\begin{matrix} + & 0.4 \dots & 1.0\text{ mA} \\ & \xrightarrow{\hspace{1cm}} & 1 \end{matrix}$	●	●	⚡

L00-FTM5xxxx-04-05-xx-en-012

Signal on alarm

Output signal
in event of device failure: < 1.0 mA

Connectable load

- See "Technical Data" of the isolating amplifier connected according to IEC 60947-5-6 (NAMUR)
- Connection also to safety isolating amplifiers (I = 3 to 4.8 mA)

FEM57 electronic insert (PFM)

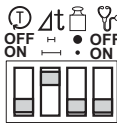
Power supply

- DC supply voltage: 9.5 to 12.5 V
- Power consumption: < 150 mW
- Reverse polarity protection/short-circuit protection
- Current consumption: 10 to 13 mA
- Separation voltage: 2.6 kV

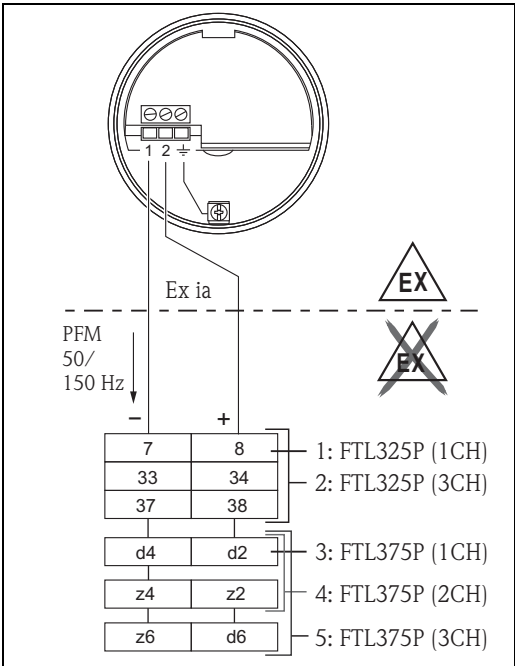
Two-wire connection for separate switching unit

For connecting to Nivotester (see graphic) from Endress+Hauser.
Output signal jump of PFM from high to low frequency when sensor is covered. Switching between minimum/maximum safety on the Nivotester.

Additional function "self test":
After interruption of the power supply, a test cycle is activated which checks the sensor and electronics without any change in level.
For this purpose, the operating elements must be configured as follows:



The test is activated at the switching unit.
LEDs indicate the progress of the test.



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Output signal

- ☀ = lit
- ☀ = flashes
- = unlit

* See also "Operating elements", → 23

Safety mode	Level	Output signal (PFM)	LEDs		
			green	yellow	red
		150 Hz	☀	☀	●
		50 Hz	☀	●	●
Maintenance required *		150 Hz	☀	☀	☀
		0 Hz	☀	●	☀
Instrument failure		0 Hz	☀	●	☀

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Signal on alarm

Output signal on power failure or in the event of device failure: 0 Hz

Connectable load

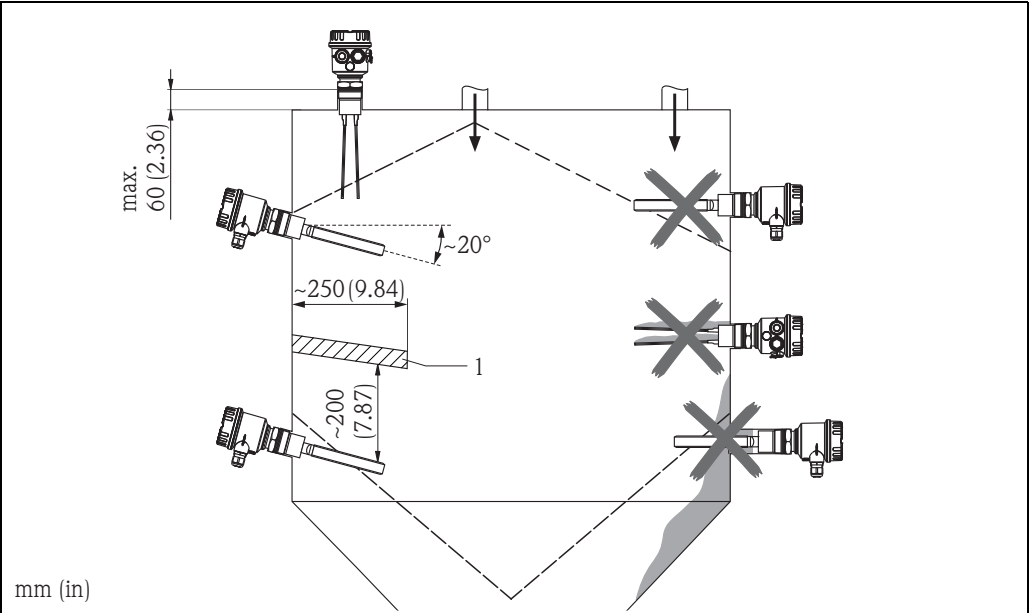
- Floating relay contacts in connected switching unit Nivotester (see drawing above)

- For contact load, see the Technical Data of the switching unit

Installation

Installation instructions

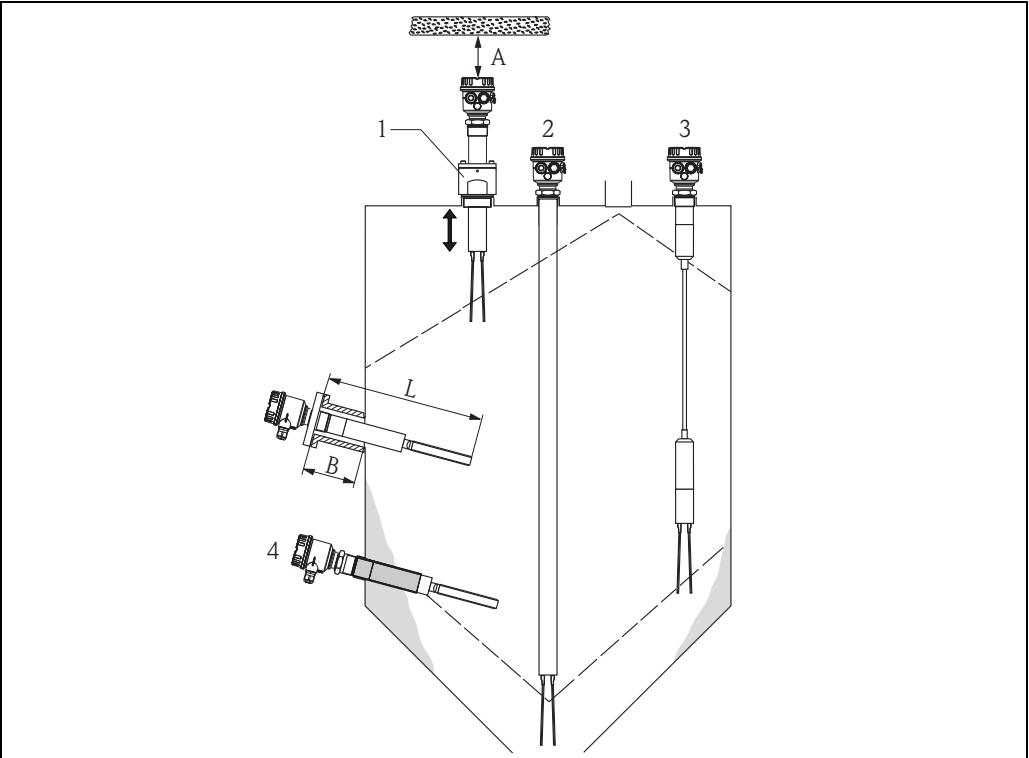
Orientation FTM50



1 Protective cover (provided by the customer)

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Orientation FTM51, FTM52



1 Sliding sleeve; 2 FTM51; 3 FTM52; 4 FTM51 with supporting tube (not included in the delivery)
A Clearance
B Maximum nozzle length: L – 145 mm (5.71 in) for short fork or L – 200 mm (7.87 in) for standard fork

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Environment

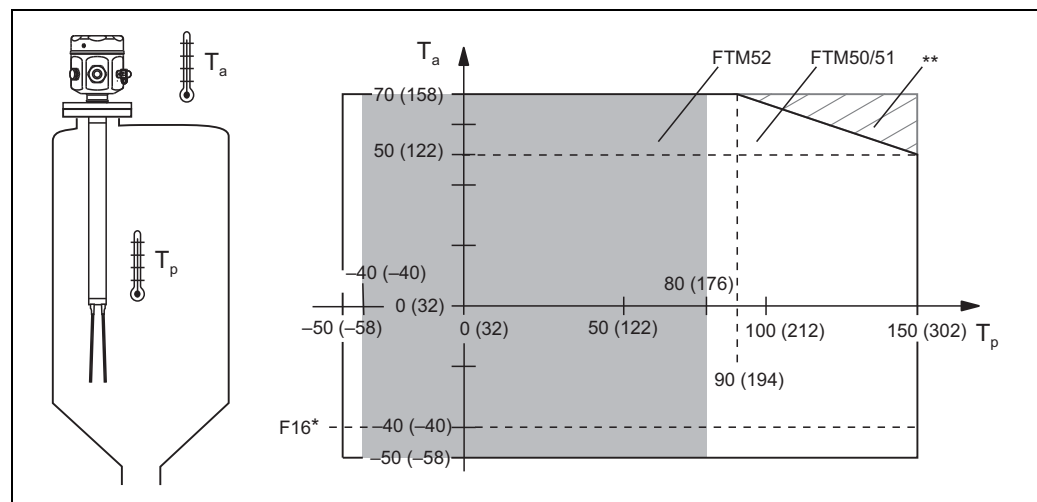
Ambient temperature range	-50 °C to +70 °C (-58 °F to +158 °F); With F16 housing: -40 °C to +70 °C (-40 °F to +158 °F)
Storage temperature	-50 °C to +85 °C (-58 °F to +185 °F)
Climate class	Climate protection as per DIN IEC 68, Part 2-38, Fig. 2a
Degree of protection	■ Housing F15, F16, F17, separate housing: IP66/IP67, NEMA4X ■ Housing F13, T13, F27: IP66/IP68, NEMA4X/6P
Vibration resistance	To EN 60068-2-64: 0.01 g ² /Hz
Shock resistance	To EN 60068-2-27: 30 g
Electrical safety	IEC 61010, CAN/CSA-C22.2 No. 61010-1-04 US standard UL 61010-1, 2 nd Edition
Electromagnetic compatibility	■ Interference emission to EN 61326, Equipment Class B, ■ Interference immunity to EN 61326; Annex A (Industrial) and NAMUR Recommendation NE21 (EMC).

Process

Medium temperature limits	Non-hazardous area and Ex d + DIP certificates (Ex ia certificates see Seite 35, "Certificates")
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NOTICE

Permitted ambient temperature T_a at housing depending on the process temperature T_p in the container.

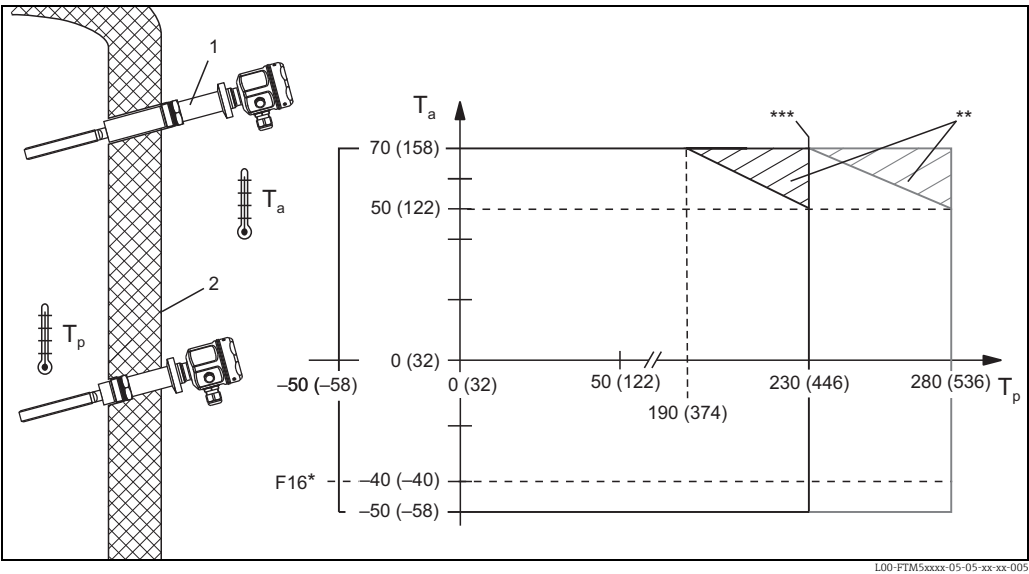


* Restriction to -40 °C with F16 housing

** Additional temperature range for sensors (FTM50, FTM51) with temperature spacer

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High temperature (only FTM50, FTM51)

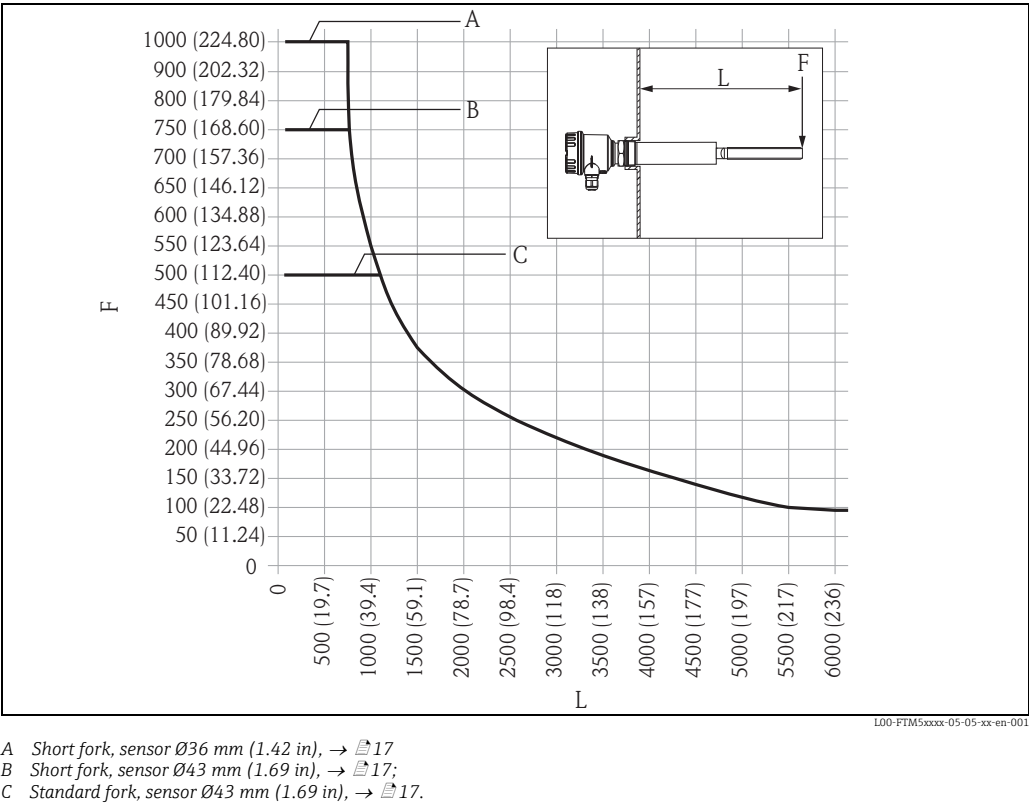


- * Restriction to -40 °C with F16 housing
- ** Additionally utilizable temperature range when using the temperature spacer outside the insulation "1"
- *** Antistick coating possible up to max. 230 °C
- 2 Insulation

Thermal shock resistance	- Maximum 120 K - At high temperature 260 K
Limiting medium pressure range	-1 to 25 bar (362.5 psi) Maximum Working Pressure (MWP) - FTM50/51: 25 bar (362.5 psi) - FTM52: 2 bar (29 psi) (6 bar (87 psi) for Ex d, Ex de and FM/CSA XP) The specified range may be reduced by the selected process connection. The pressure rating (PN) specified on the flanges refers to a reference temperature of 20 °C (68 °F), for ASME flanges to 100 °F. Observe pressure-temperature dependency. The pressure values permitted at higher temperatures can be found in the following standards: - EN 1092-1: 2001 Tab.18 With regard to their stability-temperature property, the materials 1.4404 and 1.4435 are grouped together under 13E0 in EN 1092-1, Tab. 18. The chemical composition of the two materials can be identical. - ASME B 16.5a - 1998 Tab. 2-2.2 F316 - ASME B 16.5a - 1998 Tab. 2.3.8 N10276 - JIS B 2220 Burst pressure FTM50/51: 100 bar (1450 psi)
State of aggregation	Solids
Grain size	≤ 10 mm (0.39 in)
Bulk weight	Depends on the density setting on the electronic insert: - Standard fork: ≥ 10 or 50 g/l (for light media) - Short fork: ≥ 50 or 200 g/l (for confined installation conditions, high lateral load or increased buildup)

Lateral load (static)

The following graphic shows the maximum permitted lateral load F in N (lbf) in relation to the length L in mm (in).



Tensile strength rope FTM52 3000 N (lbf)

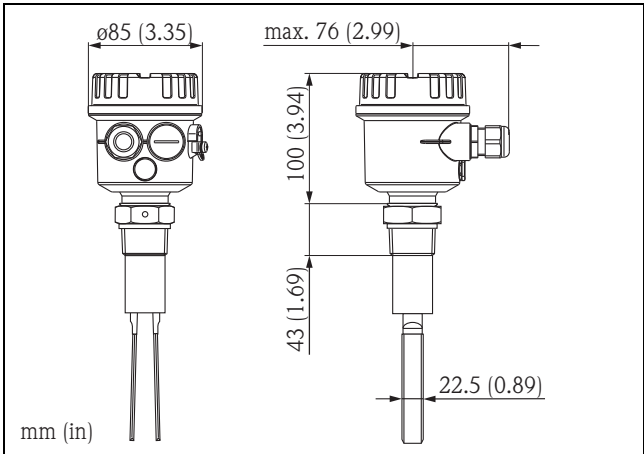
Mechanical construction

Housing and process connection

Polyester housing F16

Process connection:

- R 1½
- 1½ NPT
- 1¼ NPT

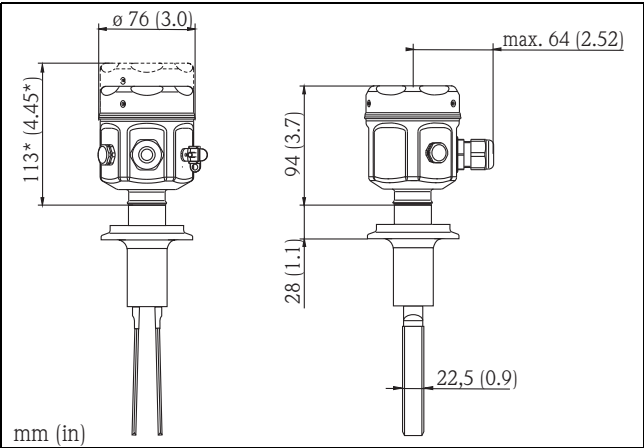


L00-FTM5xxxx-06-05-xx-xx-008

Stainless steel housing F15

Process connection:

Tri-Clamp



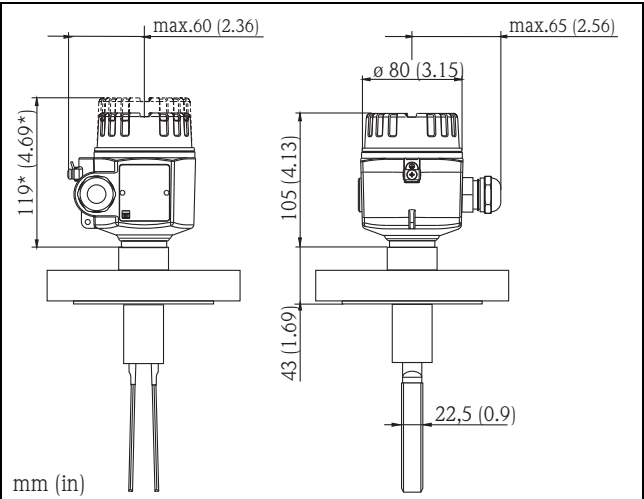
L00-FTM5xxxx-06-05-xx-xx-049

* Cover with glass insert

Aluminum housing F17

Process connection:

Flange



L00-FTM5xxxx-06-05-xx-xx-050

* Cover with glass insert

Aluminum housing F13 (Ex d)

(Adaption to sensor threaded.)

Process connection

- Flange
- R1½
- 1½ NPT
- 1¼ NPT

Stainless steel housing F27 (Ex d)

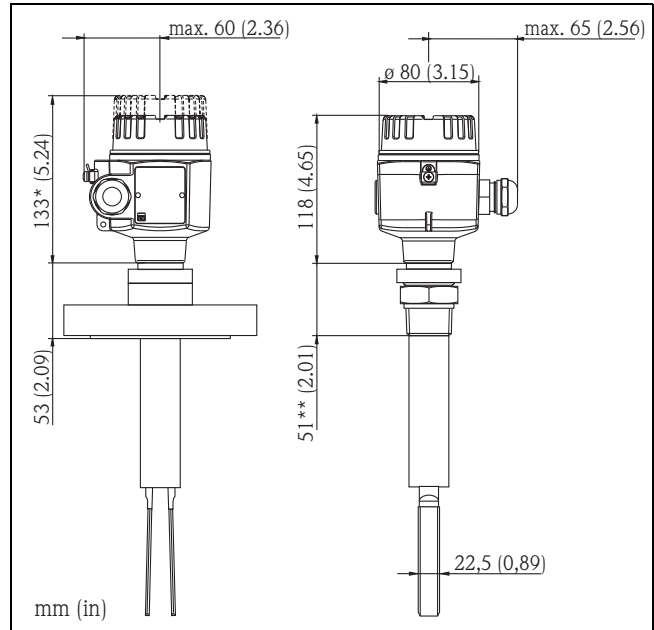
(Adaption to sensor threaded.)

Process connection

- Flange
- R1½
- 1½ NPT
- 1¼ NPT

* Cover with glass insert
(only for aluminum housing F13)

** For Tri-Clamp 36 mm (1.42 in)



L00-FTM5xxxx-06-05-xx-xx-051

Aluminum housing T13 (Ex de)

With separate connection compartment.

Process connection

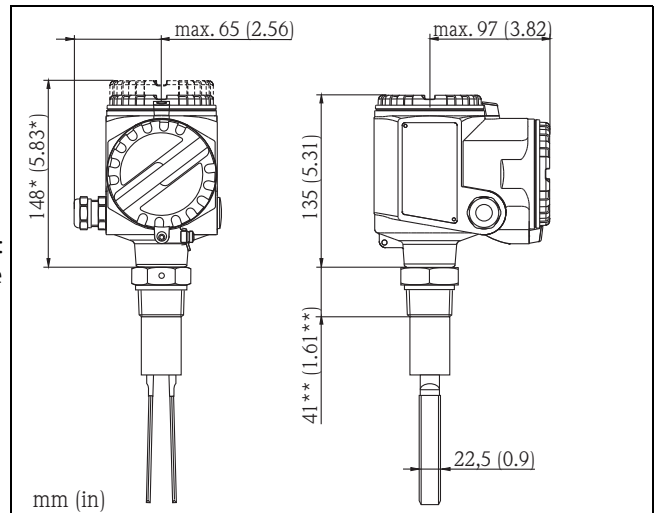
- R1½
- 1½ NPT
- 1¼ NPT

With Ex d(e) for FTM51 and FTM52:
for flange and thread dimensions see
the previous graphic

- R 1½
- 1½ NPT
- 1¼ NPT

* Cover with glass insert

** For Tri-Clamp 16 mm (0.63 in)

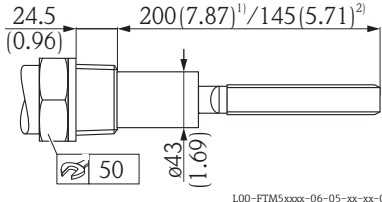
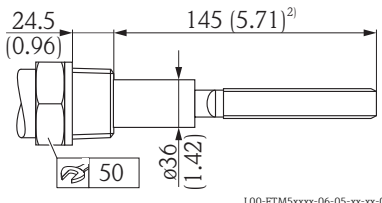
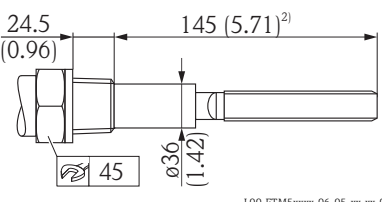
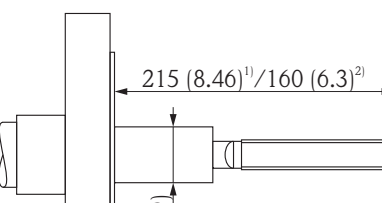
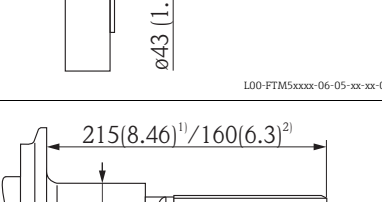
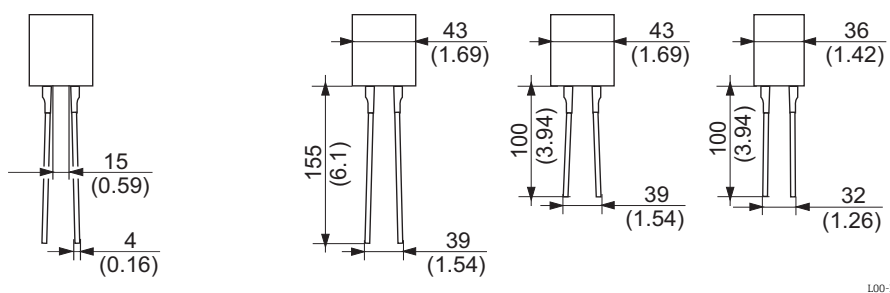


L00-FTM5xxxx-06-05-xx-xx-052

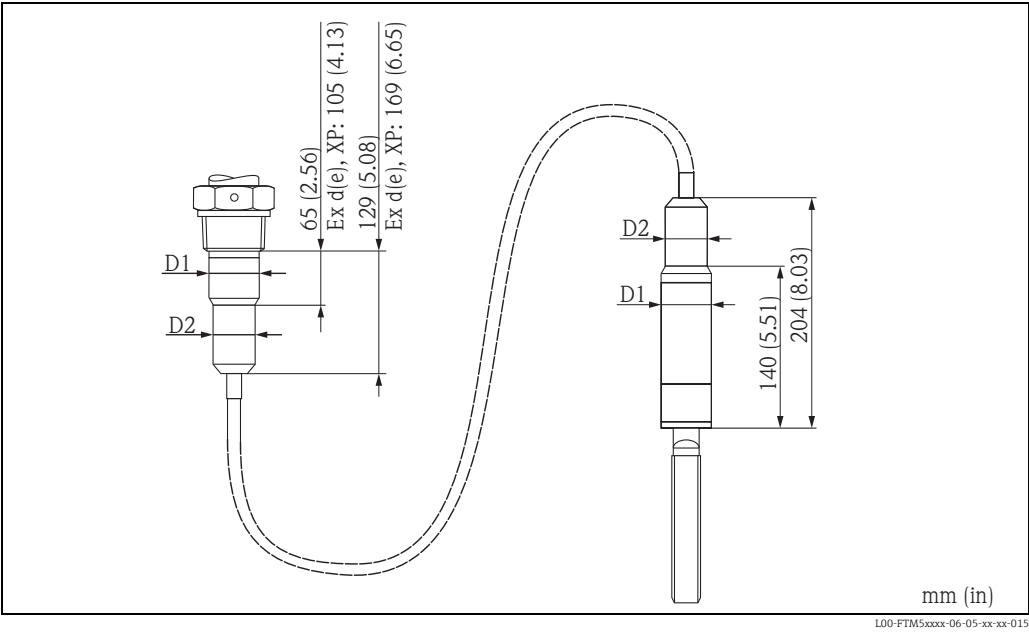
Dimensions

Compact version FTM51

Dimensions: mm (in)

Process connection	Code	Dimensions	Accessories	Pressure Temperature (for FTM50/51)
1½ NPT ANSI B 1.20.1 R 1½ EN 10226	GJ GG	 L00-FTM5xxxx-06-05-xx-xx-004		max. 25 bar (362.5 psi) max. 280 °C (536 °F)
1½ NPT ANSI B 1.20.1	GX	 L00-FTM5xxxx-06-05-xx-xx-006		max. 25 bar (362.5 psi) max. 150 °C (302 °F)
1¼ NPT ANSI B 1.20.1	GK	 L00-FTM5xxxx-06-05-xx-xx-005		max. 25 bar (362.5 psi) max. 150 °C (302 °F)
Flange ANSI B 16.5 EN 1092-1 (DIN 2527 B) JIS B2220	A# B# K#	 L00-FTM5xxxx-06-05-xx-xx-013	Seal according to design installed on site FDA approval available	See nominal pressure of flange, however max. 25 bar (362.5 psi) max. 280 °C (536 °F)
Tri-Clamp 2" ISO 2852	TD	 L00-FTM5xxxx-06-05-xx-xx-014	Clamping ring and front seal installed on site FDA approval available	max. 16 bar (232 psi) max. 120 °C (248 °F) max. 2 bar (29 psi) max. 150 °C (302 °F)
 L00-FTM5xxxx-06-05-xx-xx-030 Dimensions of standard fork and short fork ¹) Length of standard fork ²) Length of short fork				

Rope version FTM52



Process connection:	GJ, GG, A#, B#, K#, TD	GK, GX
ø D1 (mm [in])	43 (1.69)	36 (1.42)
ø D2 (mm [in])	37 (1.46)	37 (1.46)

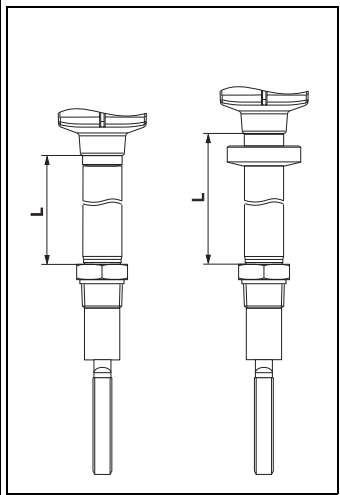
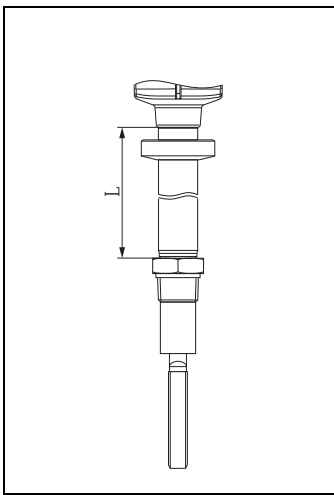
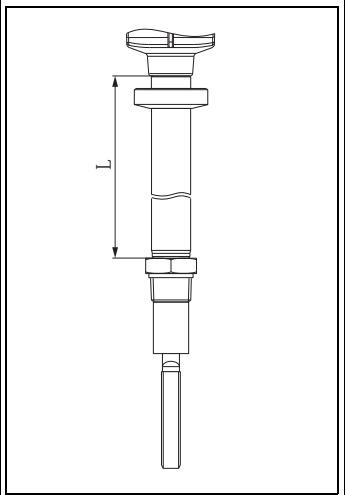
Versions with extensions

FMI51 (pipe): Dimensions depend on process connection and selected pipe extension
FTM52 (rope): Dimensions depend on process connection and selected rope extension

Process connection: ■ 1½ NPT ■ 1¼ NPT ■ R 1½		Flange and Tri-Clamp	
FTM51	FTM52	FTM51	FTM52
L00-FTM5xxxx-06-05-xx-xx-016	L00-FTM5xxxx-06-05-xx-xx-017	L00-FTM5xxxx-06-05-xx-xx-018	L00-FTM5xxxx-06-05-xx-xx-022
L = Length (from lower edge of thread), X = fork length For further information on the overall length and fork length see "Measuring range (detection range)", → 4. Diameter of pipe extension FTM51: see dimensions of FTM50, → 17.			

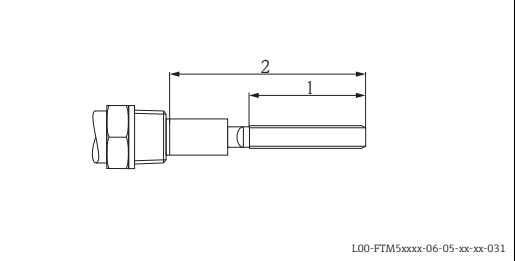
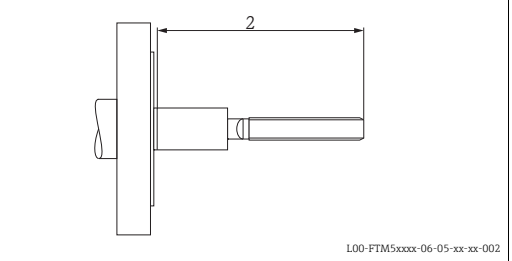
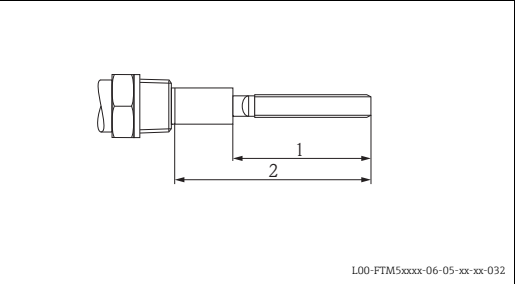
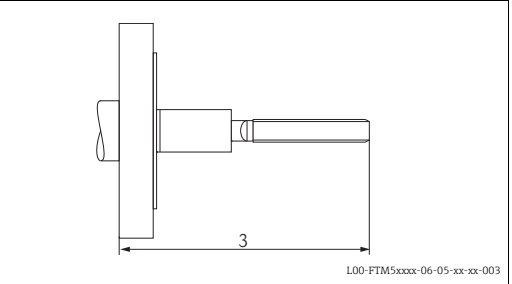
Versions with temperature spacer

Length and version depend on temperature and certificate:

150 °C (302 °F)	230 °C (446 °F)	280 °C (536 °F)
		
L00-FTM5xxxx-06-05-xx-xx-019	L00-FTM5xxxx-06-05-xx-xx-020	L00-FTM5xxxx-06-05-xx-xx-021

mm (in)	150 °C (302 °F)		230 °C (446 °F)	280 °C (536 °F)
L: for housing F15, F16, F17	145 (5.71)	--	175 (6.89)	215 (8.46)
L: for housing F13, F27, T13	145 (5.71)	165 (6.5)	165 (6.5)	205 (8.07)
Certificate	A, 1, 2, 3, 4, 7, 8, C, D, F, X	5, 6, H, Z	Not relevant	Not relevant

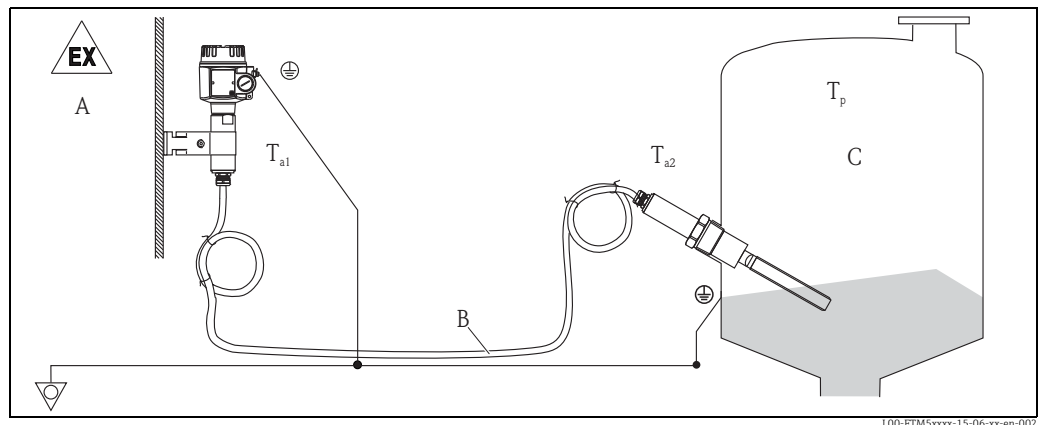
Surface refinement

Electropolishing	Device with thread	Device with flange
		
1: Electropolished fork (0.76 µm) 2: Fork and pipe electropolished as far as welding seam on process connection (0.76 µm) NOTICE In the area of the welding seam, the surface roughness depends on the production technique and is not defined.		
Coating	Device with thread	Device with flange
		
1: Fork coated 2: Fork and pipe coated as far as welding seam on process connection 3: Fully coated		

Version with separate housing

Applications:

For high ambient temperatures and applications with confined installation locations (e.g. filling nozzle applications). The cable between the separate housing and sensor can be shortened at the customer's.

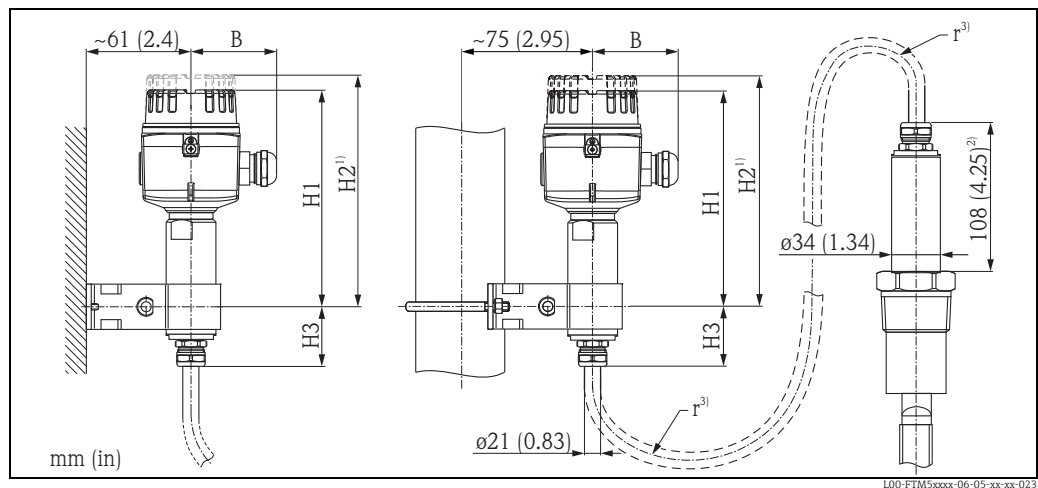


A: Zone 1, Zone 21; B: Length max. 6 m (20 ft); C: Zone 0, Zone 20

	T _{a1}	T _{a2}	T _p
FTM50/51	70 °C (158 °F)	120 °C (248 °F)	Versions: 150 °C (302 °F), 230 °C (446 °F), 280 °C (536 °F)
FTM52	70 °C (158 °F)	80 °C (176 °F)	80 °C (176 °F)

Housing extension heights for wall and pipe mounting

The wall holder unit forms part of the scope of supply for device versions with a separate housing.



- 1) Cover with glass insert;
- 2) - With optional temperature spacer up to 150 °C (302 °F) → 108 + 145 = 253 mm (4.25 + 5.71 = 9.96 in)
 - With high-temperature version 230 °C (446 °F) → 108 + 175 = 283 mm (4.25 + 6.89 = 11.1 in)
 - With high-temperature version 280 °C (536 °F) → 108 + 215 = 323 mm (4.25 + 8.46 = 12.7 in)
- 3) The bending radius is $r \geq 100$ mm (3.94 in); with armored tube $r \geq 75$ mm (2.95 in)

Dimen- sions mm (in)	Housing				
	Polyester (F16)	Stainless steel (F15)	Aluminum (F17)	Aluminum (F13) Stainless steel (F27)	Aluminum (T13) Separate connection com- partment
B	76 (2.99)	64 (2.52)	65 (2.56)	65 (2.56)	97 (3.82)
H1	155 (6.1)	166 (6.54)	160 (6.3)	243 (9.57)	260 (10.2)
H2	--	185 (7.28)	174 (6.85)	258 (10.2)	273 (10.7)
H3	41 (1.61)		62 (2.44)		

Weights	Depends on type; see last column on "Additional weight" in the ordering information
----------------	---

Materials and surfaces	Material specifications as per AISI and DIN-EN.
-------------------------------	---

Surface roughness

NOTICE

In the area of the welding seam, the surface roughness depends on the production technique and is not defined.

Electropolished for simple cleaning and to avoid build-up and corrosion.

Choice of surface roughness (version => type): Ra < 0.76 µm

Parts in contact with process

- Process connection and extension pipe: 316L (1.4404, 1.4435)
- Tuning fork: 316L (1.4404, 1.4435)
- Flanges: 316L (1.4435 or 1.4404)
- PTFE coating: prevents buildup, FDA compliant
- ETFE coating: prevents corrosion
- FTM52: PUR/silicone for rope insulation, PBT

Parts with no process contact

- Seal between process connection/housing: EPDM
- Ground terminals outside on housing: 304 (1.4301), 316L (1.4404)
- Polyester housing F16: PBT-FR with PBT-FR cover or with PA12 transparent cover,
 - Cover seal: EPDM
 - Nameplate glued: polyester film (PET)
 - Pressure compensation filter: PBT-GF20
- Stainless steel housing F15: 316L (1.4404)
 - Cover seal: silicone/PTFE
 - Safety claw: 316L (1.4404)
 - Pressure compensation filter: PA, VMQ/VA
 - Nameplate labeling directly on the device
- Aluminum housing F17/F13: EN-AC-ALSi10Mg, plastic-coated,
 - Cover seal: EPDM
 - Safety claw: nickel-plated brass
 - Pressure compensation filter (only F17): silicone
 - Nameplate: 304 (1.4301)
- Stainless steel housing F27: 316L (1.4435)
 - Cover seal: FVMQ (optional: EPDM seal available as spare part)
 - Safety claw: 316L (1.4435)
 - Nameplate: 316L (1.4404)
- Aluminum housing T13: EN-AC-ALSi10Mg, plastic-coated,
 - Cover seal: EPDM
 - Safety claw: nickel-plated brass
 - Nameplate: 304 (1.4301)
- Cable gland versions:
 - Polyamide (PA)
 - Nickel-plated brass
 - 316L (1.4435)
 - M12 connector (nickel-plated brass)

Operability

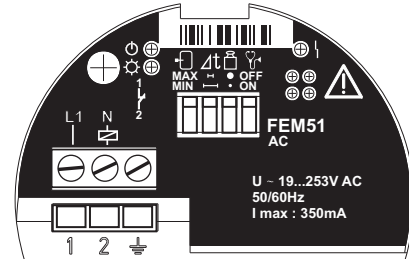
Display elements

NOTICE

The switch settings in the following graphics are in the as-delivered state.

FEM51

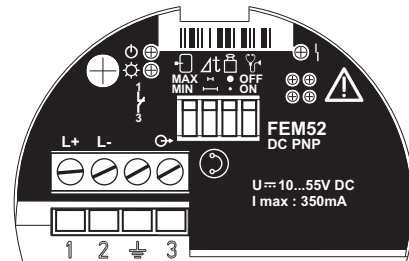
- Green LED lit:
Indicates operational status
- Yellow LED lit:
Indicates switching status
- Red LED
 - flashing: flashes alternately with green LED if maintenance is required
 - lit: indicates device failure



L00-FTM5xxxx-03-05-xx-xx-001

FEM52

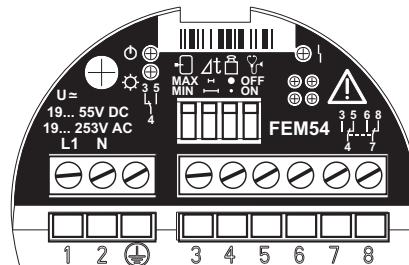
- Green LED lit:
Indicates operational status
- Yellow LED lit:
Indicates switching status
- Red LED
 - flashing: indicates maintenance is required
 - lit: indicates device failure



L00-FTM5xxxx-03-05-xx-xx-002

FEM54

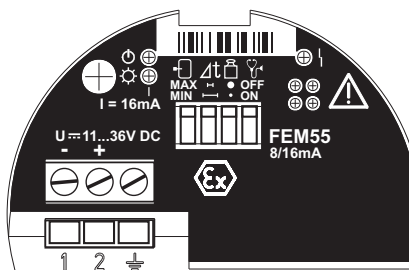
- Green LED lit:
Indicates operational status
- Yellow LED lit:
Indicates switching status
- Red LED
 - flashing: indicates maintenance is required
 - lit: indicates device failure



L00-FTM5xxxx-03-05-xx-xx-004

FEM55

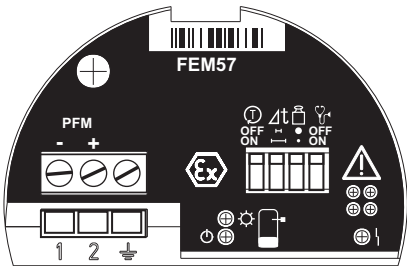
- Green LED lit:
Indicates operational status
- Yellow LED lit:
Indicates switching status
- Red LED
 - flashing: indicates maintenance is required
 - lit: indicates device failure



L00-FTM5xxxx-03-05-xx-xx-005

FEM57

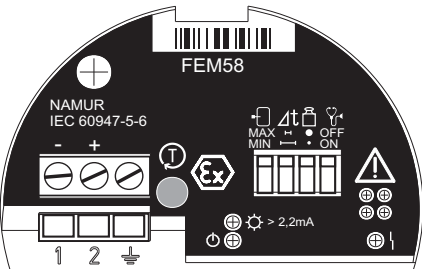
- Green LED lit:
Indicates operational status
- Yellow LED lit:
Indicates covered status
- Red LED
 - flashing: indicates maintenance is required
 - lit: indicates device failure



L00-FTM5xxxx-03-05-xx-xx-007

FEM58

- Green LED flashing:
Indicates operational status
- Yellow LED lit:
Indicates switching status
- Red LED
 - flashing: flashes alternately with green LED if maintenance is required
 - flashing: indicates device failure



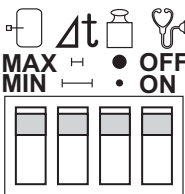
L00-FTM5xxxx-03-05-xx-xx-008

NOTICE

If the test key is pressed this breaks the cable connection.

Operating elements of
FEM51, FEM52, FEM54,
FEM55, FEM58

Factory setting:

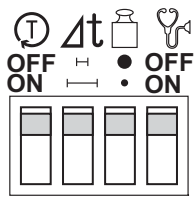


L00-FTM5xxxx-19-05-xx-xx-001

	Switch for safety mode	
	MAX	Overfill prevention
	MIN	Dry running protection
	Switch for switching delay	
		0.5 s when covered 150 °C (302 °F): 1.5 s when uncovered (short fork 1 s) 230/280 °C (446/536 °F): 2 s when uncovered (short fork 1 s)
		5 s when covered, 5 s when uncovered
	Switch for bulk weight/density setting	
	●	50 g/l standard fork, 200 g/l short fork (high bulk weight)
	•	10 g/l standard fork, 50 g/l short fork (low bulk weight)
	Switch for diagnosis	
	OFF	Diagnosis of abrasion and buildup switched OFF
	ON	Diagnosis of abrasion and buildup switched ON ■ For additional density setting to high bulk density: abrasion and build-up are indicated per LED at the electronic insert only ■ For additional density setting to low bulk density: output of "signal on alarm" for abrasion and build-up

Operating elements of FEM57

Factory setting:



L00-FTM5xxxx-19-05-xx-xx-002

	Switch for switching the self-test on or off	
	OFF	Self-test switched off
	ON	At the same time, switching delay 0.5 s when covered, density setting for low bulk weight and diagnostics on (see also Seite 10): Self-test performed when voltage returns.
		0.5 s when covered 150 °C (302 °F): 1.5 s when uncovered (short fork 1 s) 230/280 °C (446/536 °F): 2 s when uncovered (short fork 1 s)
		5 s when covered, 5 s when uncovered
	One switch for bulk weight/density setting	
		Standard fork: 50 g/l Short fork: 200 g/l (high bulk weight)
		Standard fork: 10 g/l (low bulk weight) Short fork: 50 g/l
	One switch for diagnosis	
	OFF	Diagnosis of abrasion and buildup switched OFF
	ON	Diagnosis of abrasion and buildup switched ON - For additional density setting to high bulk density: abrasion and build-up are indicated per LED at the electronic insert only - For additional density setting to low bulk density: output of "signal on alarm" for abrasion and build-up

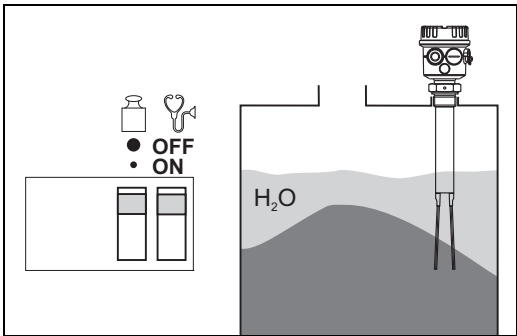
Sediment detection with FTM50 and FTM51

Detection of solids under water

Only sediment is detected.
Water-like liquids or entrained substances are not detected.

The standard version of FTM52 is not suitable for immersion due to the IP67 rope seal!
Version with IP68 available on request.

Hinweis!
Switching sensitivity decreases if a short fork is used.



L00-FTM5xxxx-19-05-xx-xx-014

Certificates and approvals

CE mark, Declaration of Conformity

The device is designed to meet state-of-the-art safety requirements, has been tested and left the factory in a condition in which it is safe to operate.
The device complies with the applicable standards and regulations as listed in the EC Declaration of Conformity and thus complies with the statutory requirements of the EC directives.
Endress+Hauser confirms the successful testing of the device by affixing to it the CE mark.

Ex approval

FEM51, FEM52, FEM54, FEM55:

- Explosion protection for potentially explosive gas/air mixtures:
Ex d, Ex de, XP, intrinsically safe sensor circuit Ex ia, IS
- Explosion protection for potentially explosive dust/air mixtures:
Dust ignition-proof as per EN 50281-1-1, DIP as per EN 61241-0

FEM57, FEM58:

- Explosion protection for potentially explosive gas/air mixtures:
Ex ia, IS (intrinsically safe power supply + intrinsically safe sensor circuit)
- Explosion protection for potentially explosive dust/air mixtures:
Ex ia D, IS (intrinsically safe power supply + intrinsically safe sensor circuit)

See "Ordering information", →  27 and "Documentation", →  35.

Your Endress+Hauser distributor will supply you with information about hazardous area versions that are currently available.

All explosion protection data are given in a separate documentation (see "Documentation") which is available upon request.

Copies of certificates available upon request.

	F16 housing	F15 housing	F17 housing	F13 / F27 housing	T13 housing with separate connection compartment	Separate housing
Dust ignition-proof	X (except II 1/2 D)	X	X	X	X	X
Ex ia	X	X	X	X	X	X
Ex nA/nL/nC	X	X	X	X	X	X
Ex d	–	–	–	X	X	X
Ex de	–	–	–	–	X	X
IP66/67	X	X	X	–	–	X
IP66/68	–	–	–	X	X	–
Recommended in event of severe external vibrations	–	–	–	X	X	X
Goretex filter	X	X	X	–	–	–

Other standards and guidelines

Other standards and guidelines that were taken into consideration in designing and developing Soliphant M FTM50, FTM51, FTM52:

- Low Voltage Directive (73/23/EEC)
- DIN EN 61010 Part 1, 2001
Protection Measures for Electrical Equipment for Measurement, Control, Regulation and Laboratory Procedures
Part 1: General requirements
- EN 61326
Electrical Equipment for Measurement, Control and Laboratory Use
EMC requirements

C-tick mark

The measuring system meets the EMC requirements of the "Australian Communications and Media Authority (ACMA)".

CRN approval CRN-approved devices are fitted with a separate plate bearing the registration number No.: 0F10907:5C ADD1.

ASME B 31.3 Design and materials in accordance with ASME B31.3. The welding seams are through-penetration welded and comply with ASME Boiler and Pressure Vessel Code Section IX and EN ISO 15614-1.

Process sealing as per ANSI/ISA 12.27.01 North American practice for the installation of process seals.
Soliphant M instruments are designed by Endress+Hauser according to ANSI/ISA 12.27.01 as single seal devices with annunciation, allowing the user to waive the use and save the cost of installing external secondary process seals in the conduit as required by the process sealing sections of ANSI/NFPA 70 (NEC) and CSA 22.1 (CEC). The instruments comply with the North American installation practice and provide a very safe and cost-saving installation for pressurized applications with hazardous fluids.
Please refer to the Safety Instructions (XA) of the relevant device for further information → 35ff.

Product	Type	Maximum process pressure	Marking	Approval
Soliphant M	FTM50-D/F/H##...	25 bar (362.5 psi)	Single Seal	FM, CSA
	FTM51-D/F/H##...	25 bar (362.5 psi)	Single Seal	FM, CSA
	FTM52-D/F/H##...	2 bar (29 psi)	Single Seal	FM, CSA

Other certificates

- Material certificate as per EN 10204/3.1 for all wetted parts,
- AD2000 on request
- TSE Certificate of Suitability

The following applies to wetted device components:

- They do not contain any materials derived from animals.
- No additives or operating materials derived from animals are used in production or processing.

Functional safety (SIL validation) Use in safety systems requiring functional safety to SIL2 in accordance with IEC 61508. See "Documentation", → 35.

Ordering information

NOTICE

This overview does not mark options which are mutually exclusive.

Soliphant M FTM50

Basic weight: (F16 housing, thread R 1½, fork 100 mm, 50g/l): 1.1 kg (2.43 lbs)

010	Approval		
	A	Non-hazardous area	
	C	CSA General Purpose, CSA C/US	
	D	FM DIP-AIS Cl. II, III, Div. 1, Gr. E-G + CSA DIP Cl. II, III, Div. 1+2, Gr. E-G, Zone 2, 21, 22	
	E	IEC Ex iaD A20, IEC Ex ia IIC T6	
	F	FM IS Cl. I, II, III, Div. 1, Gr. A-G + NI + CSA IS Cl. I, II, III, Div. 1+2, Gr. A-G, FM: Zone 0, 1, 2, 20, 21, 22; CSA: Zone 0, 1, 2	
	G	IEC Ex tD A20/A21	
	H	FM XP-AIS Cl. I, Div. 1, Gr. A-D + CSA XP Cl. I, Div. 1+2, Gr. A-D, FM: Zone 1, 2, 21, 22; CSA: Zone 1, 2	
	S	TIIIS Ex d IIC T3	
	T	TIIIS Ex ia IIC T3	
	X	NEPSI Ex ia IIC T2-T6	
	Z	NEPSI Ex d IIC T2-T6	
	8	NEPSI DIP A20/A21 TA, T* IP66	
	1	ATEX II 1 D, 1/2 GD, 1/3 GD Ex ia IIC T6	
	2	ATEX II 1/2 D Ex tD	
	3	ATEX II 3 D, ATEX II 3 G Ex nA/nL/nC	
	4	ATEX II 1/3 D Ex tD	
	5	ATEX II 1 D, ATEX II 1/2 G Ex de [ia] IIC T6	
	6	ATEX II 1 D, ATEX II 1/2 G Ex d [ia] IIC T6	
	7	ATEX II 1 G/D, Ex ia IIC T6, note Safety Instructions (XA)!	
	Y	Special version, TSP-No. to be spec.	

020		Process connection		Additional weight
	AF	2" 150 lbs, RF, flange ANSI B16.5		2.5 kg
	AG	3" 150 lbs, RF, flange ANSI B16.5		5.0 kg
	AH	4" 150 lbs, RF, flange ANSI B16.5		7.1 kg
	B3	DN50, PN25/40 A, flange EN1092-1 (DIN2527 B)		3.3 kg
	BS	DN80, PN10/16 A, flange EN1092-1 (DIN2527 B)		4.9 kg
	BT	DN100, PN10/16 A, flange EN1092-1 (DIN2527 B)		5.7 kg
	GG	Thread EN10226 R 1½		–
	GJ	Thread ANSI NPT 1½, d = 1.67" sensor		–
	GK	Thread ANSI NPT 1¼, d = 1.38" sensor		–
	GX	Thread ANSI NPT 1½, d = 1.38" sensor to suit ISA nozzle		–
	KF	10K 50A, RF, flange JIS B2220		1.8 kg
	KG	10K 80A, RF, flange JIS B2220		3.3 kg
	KH	10K 100A, RF, flange JIS B2220		4.4 kg
	TD	Tri-Clamp ISO2852, DN40-51 (2")		–
	YY	Special version, TSP-No. to be spec.		

030		Material; surface refinement		
	A	PTFE>316L; fork coated, reduces build-up, no corrosion protection		
	B	PTFE>316L; completely coated, reduces build-up, no corrosion protection		
	C	ETFE>316L; completely coated		
	2	316L; Ra ≤ 3.2 µm/126 µin , without		
	5	316L; Ra ≤ 0.76 µm/30 µin, fork electropolished		
	7	316L; Ra ≤ 0.76 µm/30 µin, fork + tube electropolished		
	9	Special version, TSP-No. to be spec.		

040			Fork; bulk weight	Additional weight
	A	155 mm/6 in; min. 10 g/l		0.1 kg
	K	100 mm/4 in; min. 50 g/l		–
	Y	Special version, TSP-No. to be spec.		

050			Electronics; output
	1	FEM51; 2-wire 19 to 253 VAC	
	2	FEM52; 3-wire PNP 10 to 55 VDC	
	4	FEM54; relay DPDT 19 to 253 VAC/55 VDC	
	5	FEM55; 8/16 mA 11 to 36 VDC	
	7	FEM57; 2-wire PFM	
	8	FEM58; NAMUR + test key (H-L signal)	
	9	Special version, TSP-No. to be spec.	

Soliphant M FTM51

Basic weight: (F16 housing, thread R 1½, length 300 mm, 50 g/l): 1.4 kg (3.09 lbs)

010	Approval	
	A	Non-hazardous area
	C	CSA General Purpose, CSA C/US
	D	FM DIP-AIS Cl. II, III, Div. 1, Gr. E-G + CSA DIP Cl. II, III, Div. 1+2, Gr. E-G, FM: Zone 21, 22
	E	IEC Ex iaD A20, IEC Ex ia IIC T6
	F	FM IS Cl. I, II, III, Div. 1, Gr. A-G + NI + CSA IS Cl. I, II, III, Div. 1+2, Gr. A-G; FM: Zone 0, 1, 2, 20, 21, 22; CSA: Zone 0, 1, 2
	G	IEC Ex tD A20/A21
	H	FM XP-AIS Cl. I, Div. 1, Gr. A-D + CSA XP Cl. I, Div. 1+2, Gr. A-D, FM: Zone 1, 2, 21, 22; CSA: Zone 1, 2
	S	TIIS Ex d [ia] IIC T4
	T	TIIS Ex ia IIC T3
	X	NEPSI Ex ia IIC T2-T6
	Z	NEPSI Ex d [ia] IIC T2-T6
	8	NEPSI DIP A20 Ta, T4
	1	ATEX II 1 D, 1/2 GD, 1/3 GD Ex ia IIC T6
	2	ATEX II 1/2 D Ex tD
	3	ATEX II 3 D, ATEX II 3 G Ex nA/nL/nC
	4	ATEX II 1/3 D Ex tD
	5	ATEX II 1 D, ATEX II 1/2 G Ex de [ia] IIC T6
	6	ATEX II 1 D, ATEX II 1/2 G Ex d [ia] IIC T6
	7	ATEX II 1 G/D, Ex ia IIC T6, note Safety Instructions (XA)!
	Y	Special version, TSP-No. to be spec.

020	Process connection		Additional weight
	AF	2" 150 lbs, RF, flange ANSI B16.5	2.5 kg
	AG	3" 150 lbs, RF, flange ANSI B16.5	5.0 kg
	AH	4" 150 lbs, RF, flange ANSI B16.5	7.1 kg
	B3	DN50, PN25/40 A, flange EN1092-1 (DIN2527 B)	3.3 kg
	BS	DN80, PN10/16 A, flange EN1092-1 (DIN2527 B)	4.9 kg
	BT	DN100, PN10/16 A, flange EN1092-1 (DIN2527 B)	5.7 kg
	GG	Thread EN10226 R 1½	–
	GJ	Thread ANSI NPT 1½, d = 1.67" sensor	–
	GK	Thread ANSI NPT 1¼, d = 1.38" sensor	–
	GX	Thread ANSI NPT 1½, d = 1.38" sensor to suit ISA nozzle	–
	KF	10K 50A, RF, flange JIS B2220	1.8 kg
	KG	10K 80A, RF, flange JIS B2220	3.3 kg
	KH	10K 100A, RF, flange JIS B2220	4.4 kg
	TD	Tri-Clamp ISO2852, DN40-51 (2")	–
	YY	Special version, TSP-No. to be spec.	

030	Material; surface refinement		
	A	PTFE>316L; fork coated, reduces build-up, no corrosion protection	
	B	PTFE>316L; completely coated, reduces build-up, no corrosion protection	
	C	ETFE>316L; completely coated	
	2	316L; Ra ≤ 3.2 µm/126 µin, without	
	5	316L; Ra ≤ 0.76 µm/30 µin, fork electropolished	
	7	316L; Ra ≤ 0.76 µm/30 µin, fork + tube electropolished	
	9	Special version, TSP-No. to be spec.	

040	Length; bulk weight		Additional weight
	L	... mm; min. 10 g/l	2.0 kg/m*
	M	... mm; min. 50 g/l	2.0 kg/m*
	P	... in; min. 10 g/l	5.1 kg/100 in*
	Q	... in; min. 50 g/l	5.1 kg/100 in*
	S	... mm; min. 10 g/l, surface refinement	2.0 kg/m*
	T	... mm; min. 50 g/l, surface refinement	2.0 kg/m*
	U	... in; min. 10 g/l, surface refinement	5.1 kg/100 in*
	V	... in; min. 50 g/l, surface refinement	5.1 kg/100 in*
	Y	Special version, TSP-No. to be spec.	
		* With process connection GK and GX: 2.8 kg/m or 7.1 kg/100 in	

050	Electronics; output		
	1	FEM51; 2-wire 19 to 253 VAC	
	2	FEM52; 3-wire PNP 10 to 55 VDC	

Soliphant M FTM52

Basic weight: (F16 housing, thread R 1½, length 1000 mm, 50 g/l): 2.2 kg (4.85 lbs)

010	Approval		
	A	Non-hazardous area	
	C	CSA General Purpose, CSA C/US	
	D	FM DIP-AIS Cl. II, III, Div. 1, Gr. E-G + CSA DIP Cl. II, III, Div. 1+2, Gr. E-G, FM: Zone 21, 22	
	E	IEC Ex iaD A20, IEC Ex ia IIC T6	
	F	FM IS Cl. I, II, III, Div. 1, Gr. A-G + NI + CSA IS Cl. I, II, III, Div. 1+2, Gr. A-G, FM: Zone 0, 1, 2, 20, 21, 22; CSA: Zone 0, 1, 2	
	G	IEC Ex tD A20/A21	
	H	FM XP-AIS Cl. I, Div. 1, Gr. A-D + CSA XP Cl. I, Div. 1+2, Gr. A-D, FM: Zone 1, 2, 21, 22; CSA: Zone 1, 2	
	S	TIIIS Ex d [ia] IIC T6	
	T	TIIIS Ex ia IIC T3 (in preparation)	
	X	NEPSI Ex ia IIC T6	
	Z	NEPSI Ex d [ia] IIC T6	
	8	NEPSI DIP A20/A21 TA, T* IP66	
	1	ATEX II 1D, 1/2 GD, 1/3 GD Ex ia IIC T6	
	2	ATEX II 1/2 D Ex tD [iaD]	
	3	ATEX II 3D, ATEX II 3 G Ex nA/nL/nC	
	4	ATEX II 1/3 D Ex tD [iaD]	
	5	ATEX II 1 D, ATEX II 1/2 G Ex de [ia] IIC T6	
	6	ATEX II 1 D, ATEX II 1/2 G Ex d [ia] IIC T6	
	7	ATEX II 1G/D Ex ia IIC T6, note Safety instructions (XA)!	
	Y	Special version, TSP-No. to be spec.	

020		Process connection		Additional weight
	AF	2", 150 lbs, RF, flange ANSI B16.5		2.5 kg
	AG	3", 150 lbs, RF, flange ANSI B16.5		5.0 kg
	AH	4", 150 lbs, RF, flange ANSI B16.5		7.1 kg
	B3	DN50, PN25/40 A, flange EN1092-1 (DIN2527 B)		3.3 kg
	BS	DN80, PN10/16 A, flange EN1092-1 (DIN2527 B)		4.9 kg
	BT	DN100, PN10/16 A, flange EN1092-1 (DIN2527 B)		5.7 kg
	GG	Thread EN10226 R 1½		–
	GJ	Thread ANSI NPT 1½, d = 1.67" sensor		–
	GK	Thread ANSI NPT 1¼, d = 1.38" sensor		–
	GX	Thread ANSI NPT 1½, d = 1.38" sensor to suit ISA nozzle		–
	KF	10K 50A, RF, flange JIS B2220		1.8 kg
	KG	10K 80A, RF, flange JIS B2220		3.3 kg
	KH	10K 100A, RF, flange JIS B2220		4.4 kg
	TD	Tri-Clamp ISO2852, DN40-51 (2")		–
	YY	Special version, TSP-No. to be spec.		

030		Material; surface refinement		
	A	PTFE>316L; fork coated, reduces build-up, no corrosion protection		
	2	316L; Ra ≤ 3.2 µm/126 µin, without		
	5	316L; Ra ≤ 0.76 µm/30 µin, fork electropolished		
	9	Special version, TSP-No. to be spec.		

040			Length; bulk weight		Additional weight
	B	...			1.3 kg/10 m
		mm; min. 10 g/l			
	C	...			1.3 kg/10 m
		mm; min. 50 g/l			
	F	... in; min. 10 g/l			1.7 kg/500 in
	G	... in; min. 50 g/l			1.7 kg/500 in
	Y	Special version, TSP-No. to be spec.			

050				Electronics; output	
	1	FEM51; 2-wire 19 to 253 VAC			
	2	FEM52; 3-wire PNP 10 to 55 VDC			
	4	FEM54; relay DPDT 19 to 253 VAC/55 VDC			
	5	FEM55; 8/16 mA 11 to 36 VDC			
	7	FEM57; 2-wire PFM			
	8	FEM58; NAMUR + test key (H-L signal)			
	9	Special version, TSP-No. to be spec.			

060					Probe design		Additional weight
	A	Compact					–
	D	6 m cable > separate housing					2.4 kg

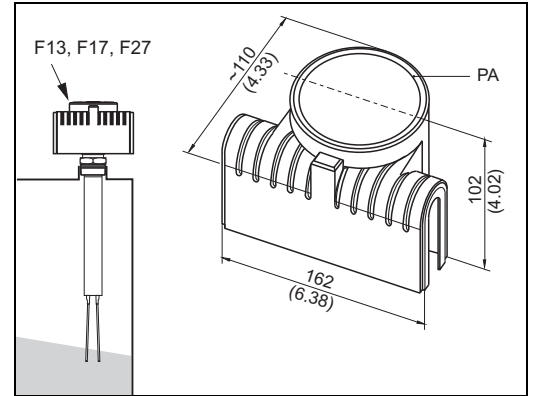
Accessories

Removing tool

For Soliphant M FTM50, FTM51, FTM52.
Order No.: 71026213

Weather protection cover

For Soliphant M FTM50, FTM51, FTM52
with F13, F17 and F27 housing.
Order No.: 71040497



L00-FTM5xxxx-03-05-xx-xx-009

Sliding sleeve

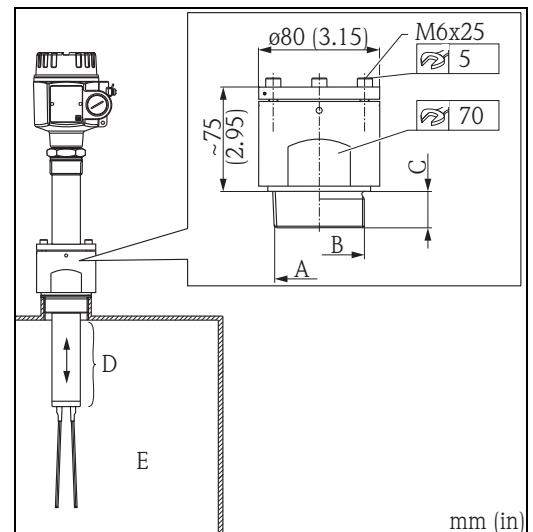
Only for Soliphant M FTM51 with
material version A, 2, 5 (→ 29).
For pressurized containers.

Sliding sleeve version:

- G2
DIN ISO 228/1
Order No.: 52024631
- 2NPT
ANSI B 1.20.1
Order No.: 52024630

NOTICE

Suitable for switch point configuration!



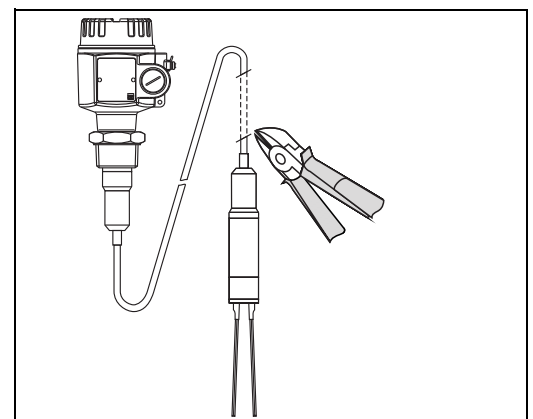
mm (in)

L00-FTM5xxxx-03-05-xx-xx-002

- A G2 (316L)
- B 2NPT (316L)
- C For G2: 24 mm (0.94 in); for 2NPT: 27.5 mm (1.08 in)
- D MWP = 25 bar (362.5 psi)
- E $T_p = \text{max. } 280^\circ\text{C } (536^\circ\text{F})$

Rope shortening kit

Only for Soliphant M FTM52.
Order No.: 52024632

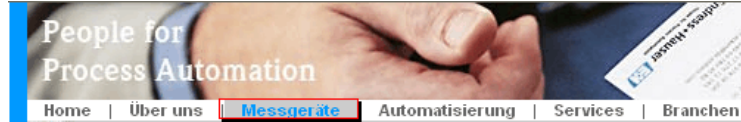


L00-FTM5xxxx-00-00-xx-xx-001

Spare parts

Information on the spare parts that are available for your measuring device is provided on our website "www.endress.com". Proceed as follows here:

1. Select "www.endress.com" and then select the country.
2. Click "Instruments".



3. Enter the product name into the "Product name" field.

Endress+Hauser Produkt Suche

Über den Produktnamen

Geben sie einen Produktnamen ein

4. Select the measuring device.
5. Click the "Accessories/Spare parts" tab.

Allgemeine Informationen	Technische Information	Dokumente/ Software	Service	Zubehör/ Ersatzteile
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► Zubehör

▼ Alle Ersatzteile

- Gehäuse/Gehäuse Zubehör
- Dichtung
- Abdeckung
- Klemmenmodul
- HF-Modul
- Elektronik
- Hilfsenergie
- Antennenmodul



Hinweis

Hier finden Sie eine Liste mit allem verfügbaren Zubehör und Ersatzteilen. Um sich Zubehör und Ersatzteile spezifisch zu Ihrem Produkt(en) anzeigen zu lassen, kontaktieren Sie uns bitte und fragen nach unserem Life Cycle Management Service.

◀ | 1 / 2 | ▶ | 🔍

6. Select the spare parts (also use the overview drawings on the right-hand side of the screen).

When ordering a spare part, always indicate the serial number that is indicated on the nameplate. Where necessary, replacement instructions are provided with the spare parts.

Documentation

NOTICE

You can find the following supplementary documentation on our product pages at www.endress.com.

Operating Instructions

- Soliphant M FTM50, FTM51: KA00229F
- Soliphant M FTM52: KA00230F
- Soliphant M FTM51, sliding sleeve, pressurized: KA00239F
- Soliphant M FTM52, rope shortening: KA00231F
- Soliphant M FTM50, FTM51, FTM52:
 - Separate housing; installation and shortening instructions (housing side): KA00264F
 - Separate housing and armored tube; installation and shortening instructions (housing side): KA00265F
 - Separate housing; removing and installing the sensor: KA00273F

Certificates

- ATEX
- ATEX II 1 D, II 1/2 GD, II 1/3 GD Ex ia IIC T6: XA00305F
 - ATEX II 1 D, II 1 G Ex ia IIC T6 (X): XA00319F
 - ATEX II 1 D, II 1/2 G Ex d/de [ia] IIC T6: XA00306F
 - ATEX II 1/2 D, II 1/3 D Ex tD: XA00307F
 - ATEX II 3 D, II 3 G Ex nA/nL/nC: XA00331F
 - NEPSI DIP: XA00393F
 - NEPSI Ex ia: XA00394F
 - NEPSI Ex d [ia]: XA00395F
 - IEC Ex, Ex ia (in preparation): XA00391F
 - IEC Ex, Ex tD (in preparation): XA00392F
- FM
- ZD00218F
- CSA
- ZD00219F

Functional safety

- Soliphant M + electronic insert FEM51: SD00203F
- Soliphant M + electronic insert FEM52: SD00204F
- Soliphant M + electronic insert FEM54: SD00205F
- Soliphant M + electronic insert FEM55: SD00208F
- Soliphant M + electronic insert FEM57 + Nivotester FTL325P: SD00207F
- Soliphant M + electronic insert FEM58: SD00206F

www.addresses.endress.com
