

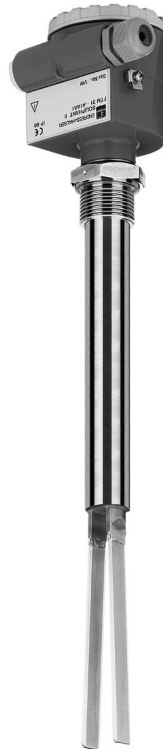
Level Limit Switch *soliphant II* FTM 30 (D/S), FTM 31 (D/S), FTM 32 (D/S)

Universal vibration limit switch
for fine-grained bulk solids
Suitable for dust explosion hazardous areas



A

A FTM 30
compact version
for mounting at any
orientation;
Aluminium housing T3
with separate connection
compartment



B

B FTM 31
with extension tube
max. 4 m
for mounting from above;
Aluminium housing F6



C

C FTM 32
with rope max. 20 m
for mounting from above;
Aluminium housing F6

Application

Soliphant is a rugged limit switch for silos containing powdered or fine-grained solids, including those with very low bulk densities.

The various versions ensure it can be used in a wide range of applications, including dust explosion areas and foodstuffs.

Typical applications:

grain, flour, milk powder, cocoa, sugar, animal feed, washing powders, dyes, chalk, plaster, cement, plastic granules

Features and Benefits

- No calibration:
simple commissioning
- Insensitive to build-up:
maintenance-free operation
- No moving parts:
no wear, long operating life
- Various electronic inserts:
optimum adaptation to the plant control system
- Plastic housing F10
with transparent cover:
switching status seen externally,
simple control
- Aluminium housing T3
with separate connection
compartment:
also available with explosion
protection to EEx de

Endress + Hauser

The Power of Know How

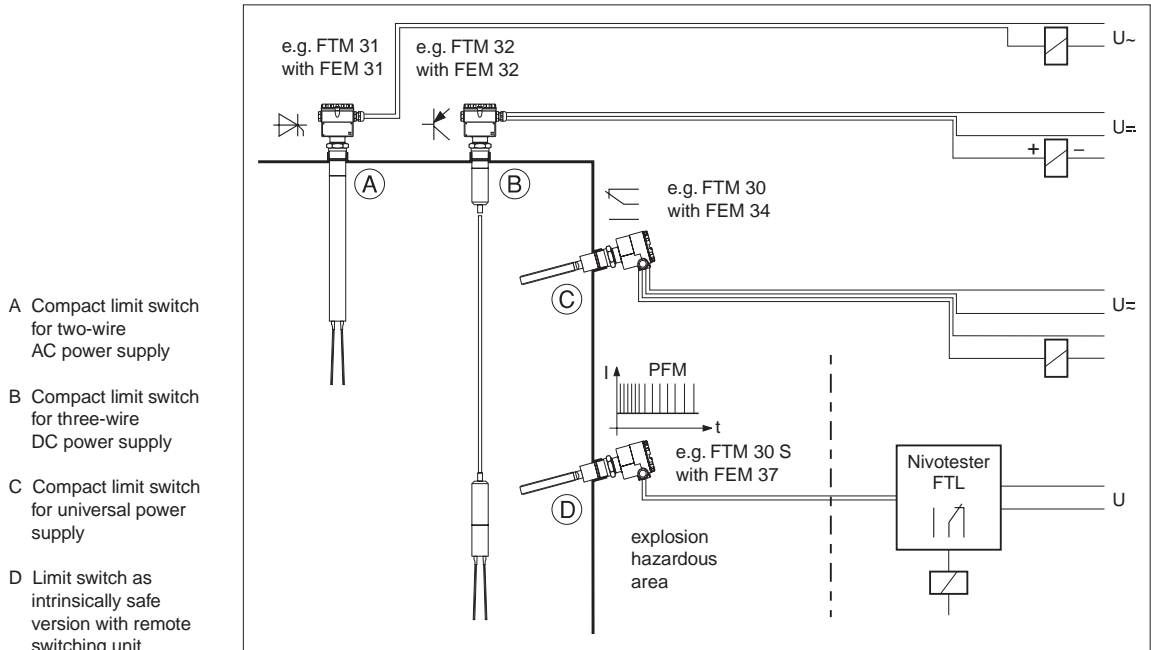


Measuring System

Soliphant FTM 30, 31 or 32 with the integrated electronic insert FEM is a compact limit switch to which miniature contactors, magnetic valves and programmable logic controllers (PLCs) can be directly connected. It can be used in safe or in dust explosion hazardous areas. (Dust ignition proof.)

Soliphant FTM 30 **D**, 31 **D**, 32 **D** has in addition explosion protection to EEx de.

Soliphant FTM 30 **S**, 31 **S**, 32 **S** has explosion protection to EEx i and requires a separate switching unit Nivotester FTL mounted outside the explosion hazardous area. (Dust ignition proof and explosion proof.)



Function

The symmetrical vibrating fork is excited to its resonant frequency. When the fork is covered by material, the vibrations are damped. The change in amplitude is registered by the electronics which activate either an electronic switch or a relay.

low bulk density. In contrast, the base of the fork is very insensitive and is therefore unaffected by material build-up on the vessel walls.

Soliphant is especially sensitive at the tip of the fork, making it ideal for the limit detection of materials which have a very

Soliphant can be operated in both minimum or maximum fail-safe mode, i.e. the electronic switch opens or the relay de-energises when the minimum or maximum level is reached, on fault or on power failure.

The function of the electronic switch or relay depends on the level and fail-safe mode.

The electronic insert FEM 37 changes the frequency of the PFM signal causing the Nivotester FTL to switch accordingly.

Level	Fail-safe mode	Electronic inserts				
		FEM 31 FEM 41	FEM 32	FEM 34 FEM 44	FEM 35 FEM 45	FEM 37
Max.	Normal					
	Fail-safe					
Min.	Normal					
	Fail-safe					
Relay						

Summary of Mechanical and Electrical Versions

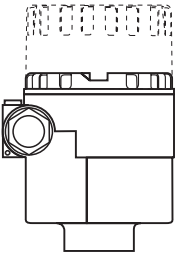
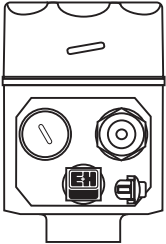
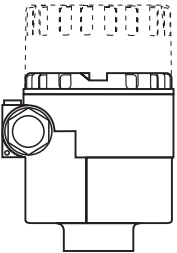
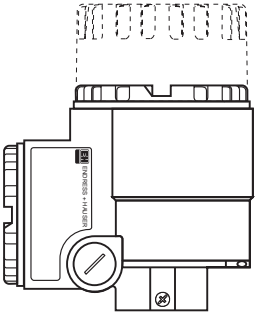
Applications
according to certificate

FTM ..	FTM .. D	FTM .. S
- Standard application - Dust-Ex area	- Standard application - Dust-Ex area - Ignition protection EEx de - CSA, FM: XP	- Standard application - Dust-Ex area - Ignition protection EEx i - CSA, FM: IS

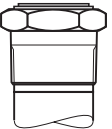
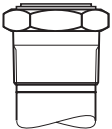
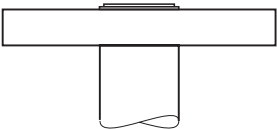
Plug-in electronic inserts
simple to replace with another electronic insert – without recalibrating –

Two-wire AC power supply (thyristor)	Three-wire DC power supply (transistor, PNP)	Universal power supply (relay, potential-free changeover contact)	Universal power supply (relay, 2 potential-free changeover contacts)	Intrinsically safe signal transmission along two-wire cabling to remote switching unit Nivotester
FEM 31 for FTM 30, 30 D, 31, 32; FEM 41 for FTM 31 D, 32 D, 32 dust-Ex	FEM 32 for FTM 30, 30 D, 31, 32 (not for FTM 32 dust-Ex)	FEM 34 for FTM 30, 30 D, 31, 32; FEM 44 for FTM 31 D, 32 D, 32 dust-Ex	FEM 35 for FTM 30, 30 D, 31, 32 FEM 45 für FTM 31 D, 32 D, 32 St Ex (not for EEx de)	FEM 37 for FTM 30 S, 31 S, 32 S



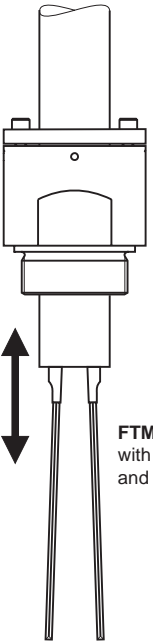
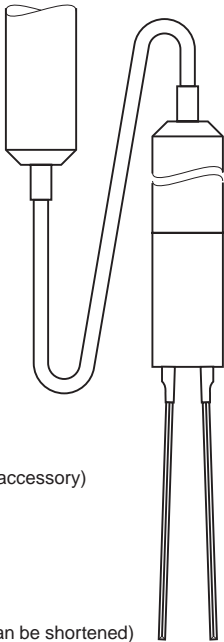
Housing
all with IP 66 protection and a wide range of cable entries; with high cover for FEM 35, 45

			
Aluminium housing F6 for FTM .. and FTM .. S	Steel housing F8 for FTM .. and FTM .. S	Plastic housing F10 with transparent cover for FTM .. and FTM .. S	Aluminium housing T3 with separate connection compartment for FTM .. D and FTM .. S

Process Connections

		
Tapered thread R 1 1/2, DIN 2999	Tapered thread 1 1/2 NPT	Various flanges to DIN, ANSI, JIS

Sensor versions
Vibrating fork in solid stainless steel; resistant to high lateral loads

			
FTM 30 compact unit	FTM 31 with extension tube	FTM 31 with extension tube and sliding sleeve (accessory)	FTM 32 with rope (can be shortened)

Dimensions

All dimensions in mm
100 mm = 3.94 in

A FTM 30
compact version,
with thread
R 1½ (DIN 2999)
or 1½ NPT,
shown with
housing F6 / F10

B FTM 30
compact version,
with flange to
DIN 2527 Form B,
ANSI B 16.5
or JIS 2210,
shown with
housing F6 / F10

C FTM 31
with extension tube,
with thread
R 1½ (DIN 2999)
or 1½ NPT,
shown with
housing T3

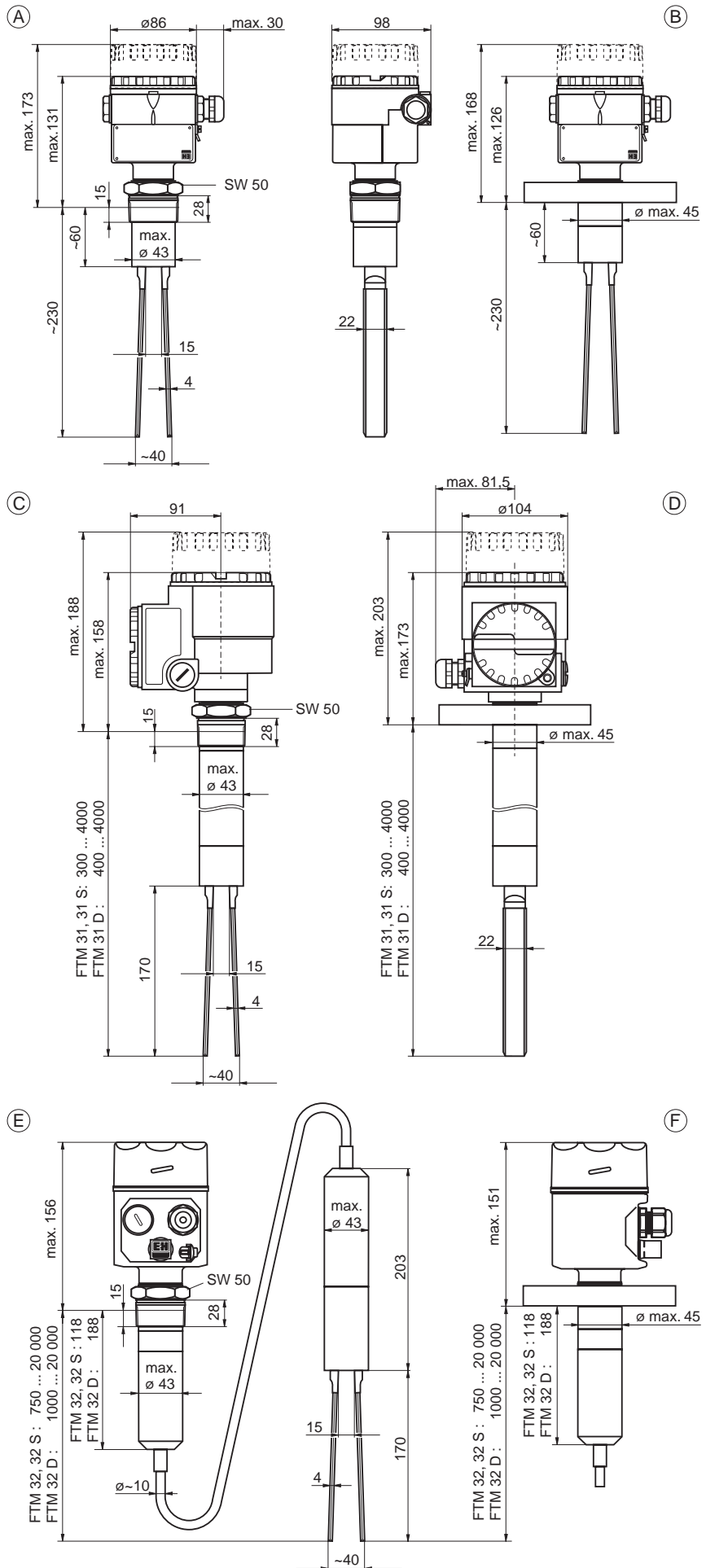
D FTM 31
with extension tube,
with flange to
DIN 2527 Form B,
ANSI B 16.5
or JIS 2210,
shown with
housing T3

E FTM 32
with rope,
with thread
R 1½ (DIN 2999)
or 1½ NPT,
shown with
housing F8

F FTM 32
with rope,
with flange to
DIN 2527 Form B,
ANSI B 16.5
or JIS 2210,
shown with
housing F8

Flanges
See Page 11, Product
Structure, Process
Connection, Material.

See data sheets for
flange dimensions



Length tolerances for FTM 31

Sensor length	Tolerance
up to 1 m	+0 mm -5 mm
up to 3 m	+0 mm -10 mm
up to 4 m	+0 mm -20 mm

Length tolerances for FTM 32

Sensor length	Tolerance
up to 3 m	+2.5 mm -15 mm
up to 20 m	+2.5 mm -20 mm

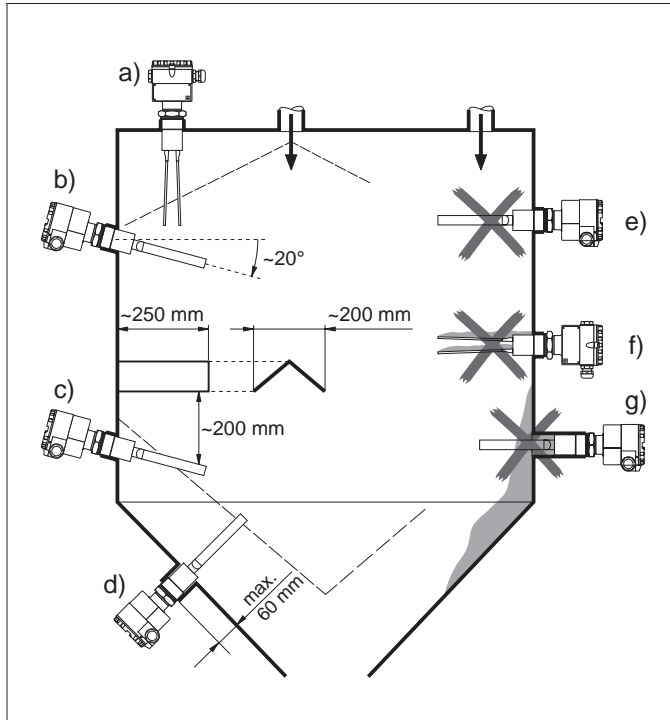
Installation

Soliphant FTM 30

The compact Soliphant version can be mounted at any position in a bulk solids vessel.

Left: correct mounting

- a) top-mounted, tines vertical but at any orientation
- b) laterally mounted: fork angled slightly downwards so that material can slide off more easily
- c) with shield: to protect against collapsing mounds (length approx. 250 mm, width approx. 200 mm)
- d) In discharge hopper. Max. nozzle length 60 mm (2.4 in)



Right: incorrect mounting

- e) in filling curtain
- f) fork orientation incorrect (broad tine surface is subjected to high load caused by discharging material; malfunction due to residual material)
- g) mounting nozzle too long

Take into account the angle of the mound or discharge hopper when determining the height of the installation point.

Soliphant FTM 31

- With extension tube: to be used, e.g.
- if mounting is only possible from above
 - with heavy build-up on the silo wall
 - with sliding sleeve (accessory), if the switch point is to be altered.

Mount in the centre of the discharge hopper in order to keep the lateral load caused by discharging material to a minimum, or close to the vessel wall with an extra fastening near to the fork.

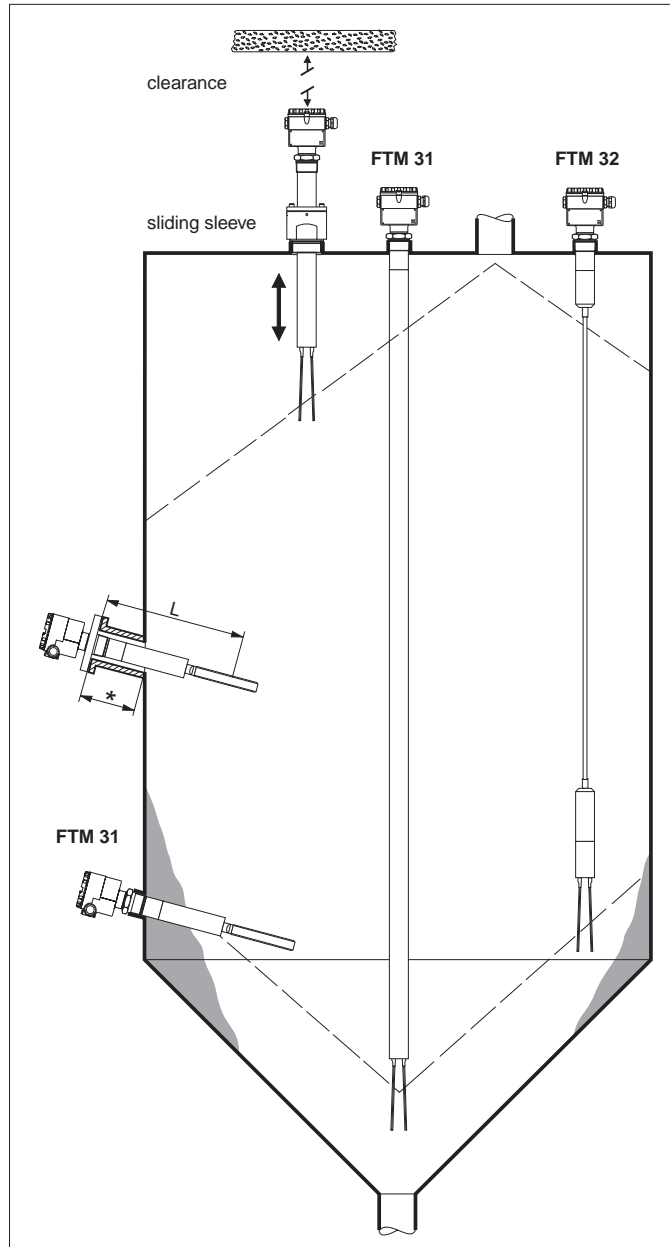
Check that there is enough space outside the silo for mounting.

* Nozzle length
max. L – 170 mm
(max. L – 7 in)

Soliphant FTM 32

- With rope (can be shortened);
To be used if e.g.
- only top-mounting in a high silo is possible
 - there is not enough clearance outside the silo for the long version of the Soliphant FTM 31.

The instrument should be installed near to the vessel wall in order to keep the tension caused by discharging material to a minimum. It should not, however, be so near that it touches the wall when it swings.



Take into account the angle of the mound or discharge hopper when calculating the length of the sensor required.

Electrical Connection

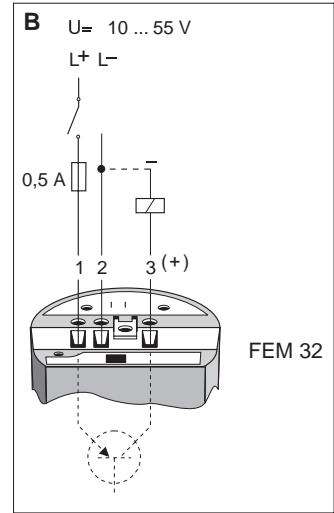
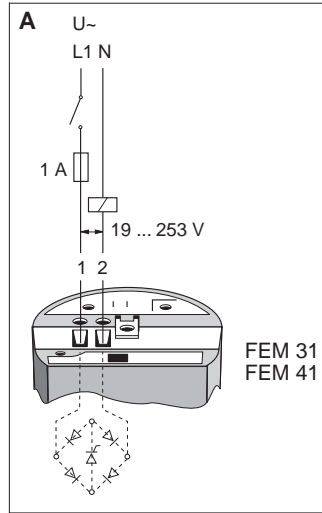
Note

The diagrams show the direct connection of the electronic insert in the housing F6, F8 or F10.

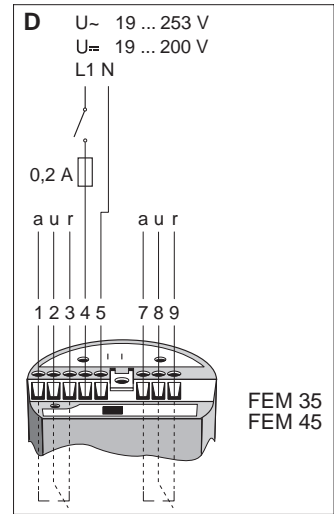
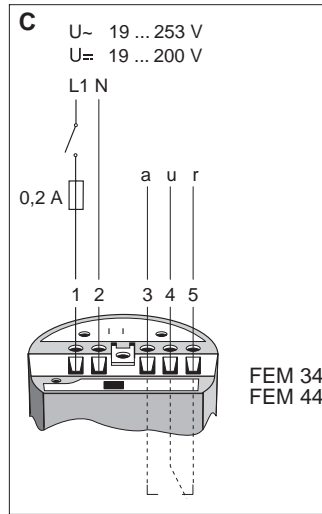
The terminals in the separate connection compartment of the housing T3 have the same designations as those of the built-in electronic insert.

* When connecting a low-voltage circuit with double isolation according to IEC 1010 the following applies:
Voltage sum of power supply and relay output max. 300 V.

A
Electronic insert
FEM 31, FEM 41
Two-wire
AC power supply
Always connect in series with a load!
Note the voltage drop across the electronic insert in the conducting state (max. 12 V), the residual current in the blocked state (max. 4 mA) and, when using low voltages, the voltage drop across the load.
The terminal voltage at the electronic insert must never be less than 19 V!



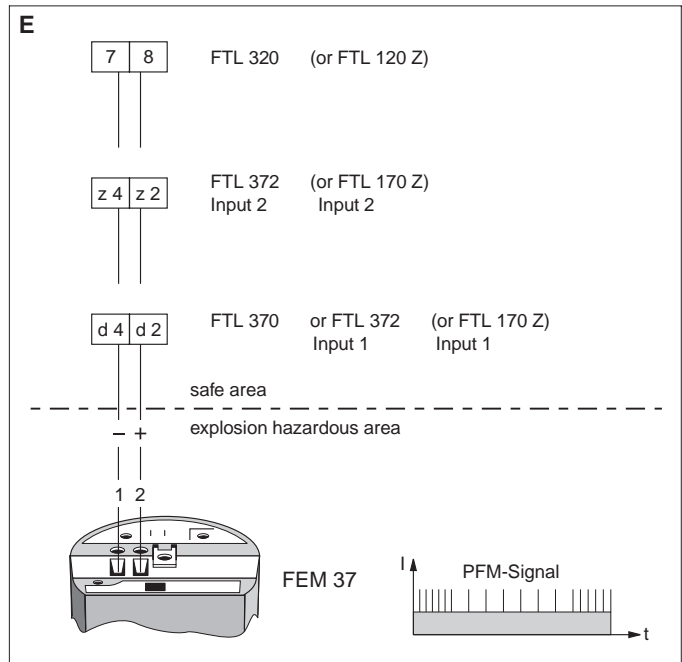
B
Electronic insert
FEM 32
Three-wire
DC power supply
Recommended for use with programmable logic controllers (PLC). Positive signal at the switching output of the electronic insert (PNP).



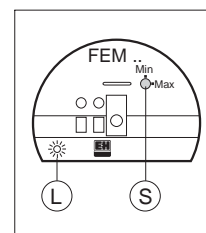
C
Electronic insert
FEM 34, FEM 44
Universal power supply with relay output
1 potential-free changeover contact. * (SPDT)

D
Electronic insert
FEM 35, FEM 45
Universal power supply with relay output
2 potential-free changeover contacts * (DPDT)

E
Electronic insert
FEM 37
Intrinsically-safe PFM signal transmission along two-wire cabling to the remote switching unit Nivotester FTL 320, FTL 370 or FTL 372. (Can also be connected to the earlier types FTL 120 Z, FTL 170 Z).



The plug-in electronic inserts can be exchanged without recalibration. A high housing cover is required for the FEM 35, 45.



L LED shows switching status
S Fail-safe mode is selected using a switch (with FEM 37, on the Nivotester).

Technical Data

General Specifications

Manufacturer	Endress+Hauser GmbH+Co, D-79689 Maulburg
Instrument family	Soliphant II
Instrument types	FTM 30, FTM 31, FTM 32 FTM 30 D, FTM 31 D, FTM 32 D FTM 30 S, FTM 31 S, FTM 32 S
Instrument function	Level limit switch

Application

Limit detection	Maximum or minimum detection in silos with powdery and fine-grained solids, max. grain size 10 mm
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Operation and System Design

Measuring principle	Damping of the oscillation of a fork vibrating at its resonant frequency
Modularity	FTM . . and FTM . . D: complete limit switch, consisting of the sensor with the integrated electronic insert FEM . . (switching unit); FTM . . S: sensor with integrated electronic insert FEM 37 (transmitter) for connection to remote switching unit Nivotester FTL ...
Signal processing	- Two-wire AC version (with FEM 31, 41): load switched directly via a thyristor in the power supply; - Three-wire version (with FEM 32): load switched via a transistor and separate connection; - Universal version with relay output (with FEM 34, 44, 35, 45): load switched via a potential-free changeover contact; - Version for remote switching unit (with FEM 37): PFM signal transmission; current pulses superimposed on the current flowing in the two-wire power cabling
Electrical isolation	FEM 31, 32, 41: between sensor and power supply; FEM 34, 44, 35, 45: between sensor and power supply and load; FEM 37: between sensor and power supply, in remote switching unit Nivotester between power supply and load

Input

Measured variable	Height (limit value, binary)
Measuring range (detection range)	FTM 30: determined by installation point FTM 31: determined by sensor length (pipe) (approx. 300 ... 4000 mm from above, FTM 31D: approx. 400 ... 4000 mm) FTM 31 with sliding sleeve: adjustable approx. 200 ... 3900 mm from above FTM 32: determined by sensor length (rope) (approx. 800 ... 20000 mm from above, FTM 32D: approx. 1000 ... 20000 mm)

Output

Output signal	Binary; output blocked on reaching limit
Signal failure	Output blocked
Load (connectable) to FEM 31, 41 (AC, load switched via thyristor directly in the power supply)	Transient (40 ms) max. 1.5 A, max. 375 VA at 253 V or max. 36 VA at 24 V (no short circuit-protection) continuous max. 87 VA at 253 V, max. 8.4 VA at 24 V min. 2.5 VA at 253 V (10 mA), min. 0.5 VA at 24 V (20 mA) Voltage drop across FEM . . max. 12 V Residual current max. 4 mA with blocked thyristor
Load (connectable) with FEM 32 (DC, load switched via transistor and separate PNP connection)	Transient (1 s) max. 1 A, max. 55 V (cyclic protection against overload and short circuiting); continuous max. 350 mA, max. 55 V; max. 0.5 µF at 55 V, max. 1.0 µF at 24 V; Residual voltage < 3 V (with conducting transistor); Residual current < 100 µA (with blocked transistor)
Load (connectable) with FEM 34, 44, 35, 45 (Universal current, load switched via potential-free changeover contact)	FEM 34, 44: 1 potential-free changeover contact (SPDT) FEM 35, 45: 2 potential-free changeover contacts (DPDT) I _~ max. 6 A, U _~ max. 253 V; P _~ max. 1500 VA, cos φ = 1, P _~ max. 750 VA, cos φ > 0.7; I _≡ max. 6 A to 30 V, I _≡ max. 0.2 A to 125 V;
Load (connectable) with FEM 37 (potential-free relay contact in switching unit Nivotester FTL)	See Technical Data of the switching unit Nivotester FTL 320, FTL 370, FTL 372, (FTL 120 Z, FTL 170 Z) FTL 325 P, FTL 375 P
Fail-safe switching	Minimum or maximum fail-safe mode, switchable
Switching time	FEM 31, 32, 34, 41, 44: Approx. 0.5 s when covered, approx. 1.5 s when free FEM 35, 45: Approx. 0.5 s when covered, approx. 1.5 s when free, switchable to approx. 2.5 s when covered, approx. 7.5 s when free

Output, General Information

Measuring Accuracy

Reference conditions	Temperature T = 20 °C, operating pressure p _e = 1 bar, Density of material >1 kg/l, grain size <2 mm
Measured error	Approx. 10 mm for vertical mounting, 5 mm for lateral mounting of the sensor
Settling time	The output remains open approx. 2.5 s after switching on the power supply
Switching time error	+/- 25 % when covered or uncovered
Effects of temperature and operating pressure	Negligible

Continued overleaf

Technical Data (Continued)

Operating Conditions

- Mounting

Orientation	Any position for FTM 30 and FTM 31 with short tube Vertical for FTM 31 with long tube and FTM 32
Lateral load on fork for FTM 30	600 N (on narrow edge of tines), static
Lateral load on tube for FTM 31	300 Nm (max. 1 m)
Tensile strength of rope for FTM 32	2500 N
- Environment	
Operating temperature range	-40 °C ... +70 °C
Storage temperature range	-40 °C ... +85 °C
Climatic class	Climatic protection to IEC 68, Part 2-38, Fig. 2a
Ingress protection (housing)	IP 66 to DIN 40 050
Electromagnetic compatibility	FEM 31/32/34/41/44: Interference Emission to EN 61326, Electrical Equipment Class B FEM 35/45: Interference Emission to EN 61326, Electrical Equipment Class A Interference Immunity to EN 61326, Annex A (Industrial) and NAMUR Recommendation NE 21 (EMC)
- Product	
Temperature of product	-40 °C ... +150 °C, see also graphs on next page
Pressure (operating pressure) p_e	-1 bar ... max. 16 bar (FTM 30, 31), 6 bar (FTM 32 D), 2 bar (FTM 32)
Pressure limit	Burst pressure min. 100 bar (FTM 30, 31), 40 bar (FTM 32 D), 3 bar (FTM 32)
Density of product	min. 20 g/l
Grain size of product	max. 10 mm

Construction

Design	FTM 30: compact unit FTM 31: with extension tube max. 4 m FTM 32: with rope max. 20 m
Dimensions	See dimensioned drawings on Page 4
Weight	See Product Structure on Pages 10 and 11
Materials	Process connection (thread): stainless steel 1.4301 (AISI 304); Flanges: 1.4571 (~ AISI 316 Ti), tube: 1.4301, rope insulation: PUR Vibrating fork: stainless steel 1.4301 (AISI 304); Housing F10: fibre-glass reinforced polyester (blue); Low transparent cover: polyamide; high transparent cover: polycarbonat Housing F6, T3: aluminium GD-AI 10, DIN 1725, with plastic coating; Housing F8: stainless steel 1.4301 (AISI 304); Seal for housing cover F6, T3: EPDM (elastomer), for housing cover F8, F10: silicone; Cable gland Pg 13.5: polyamide with NBR seal Cable gland Pg 16: polyamide with neoprene-CR seal
Process connections	Tapered thread R 1½ to DIN 2999 Part 1; Tapered thread 1½ NPT to ANSI B 1.20.1 Flanges to DIN, ANSI, JIS see Product Structure.

Electrical connection	Terminal screws on electronic insert for max. 2.5 mm ² conductor in A 2.5 - 7 sleeves to DIN 46228; Terminal screws in separate connection compartment of housing T 3: for max. 2.5 mm ² conductor in A 2.5 - 7 sleeves to DIN 46 228
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Display and User Interface

On electronic insert FEM 31, 32, 34, 35, 41, 44, 45	Rotary switch for minimum/maximum fail-safe; red LED showing switching status
On electronic insert FEM 37	Green LED showing status for cover

Power supply

Electronic insert FEM 31, 41	Voltage at Terminal 1 and 2: 19 ... 253 V, 50 / 60 Hz; Current consumption (stand-by) max. 4 mA
Electronic insert FEM 32	10 ... 55 V, ripple max. 1.7 V, 0 ... 400 Hz; current consumption max. 15 mA, reverse polarity protection
Electronic insert FEM 34, 44, 35, 45	AC voltage 19 ... 253 V, 16 ... 60 Hz or DC voltage 19 ... 200 V; current consumption FEM 34, 44: max. 7 mA current consumption FEM 35, 45: max. 10 mA
Electronic insert FEM 37	powered by the switching unit Nivotester FTL

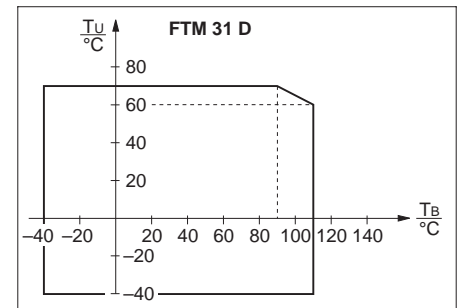
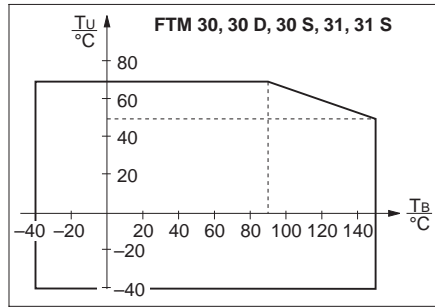
Certificates and Approvals

ATEX, FM, CSA, TIIS	See Product Structure on Page 10 and table on Page 12
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Ordering

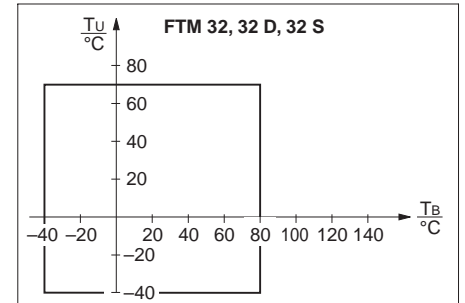
Product designation	See Product Structure on Page 11
Accessories	See page 9
Supplementary documentation	General information on EMC - TI 241F/00/e Technical Information to separate housing HTM 10 E - TI 274F/00/en Safety instructions for FTM 3#-B (ATEX II 1/3 D): XA 023F Safety instructions for FTM 3#S-Z (ATEX II 1/2 GD): XA 001F Safety instructions for FTM 3#S-Z + HTM 10 E (ATEX II 1/2 GD): XA 051F Safety instructions for FTM 30/31 D-H (ATEX II 2 G, II 1/3 D): XA 066F Safety instructions for FTM 32 D-X (ATEX II 2 G, II 1/3 D): XA 066F Safety instructions for FTM 30/31 D-1 (ATEX II 2 G, II 1 D): XA 066F Safety instructions for FTM 32 D-2 (ATEX II 2 G, II 1 D): XA 066F Safety instructions for FTM 30/31 D-3 (ATEX II 1/2 G): XA 066F
Certificates	On request

Technical Data (Continued)



$$x^{\circ}\text{C} = (1.8 \cdot x + 32)^{\circ}\text{F}$$

Permissible ambient temperature values T_U at the housing as a function of the operating temperature T_B in the silo



Accessories

Separate Housing HTM 10 E

for the electronic insert of Soliphant. Easier operation when the Soliphant is mounted in a confined space and wider ambient temperature range for the Soliphant housing. See Technical Information TI 274F/00/en.

Rope Shortening Set

for Soliphant FTM 32. This consists of a number of accessories which enable the rope to be shortened and make a permanent and water-tight connection with the sensor. Instructions for mounting are included. Order-No. 935 622-0001

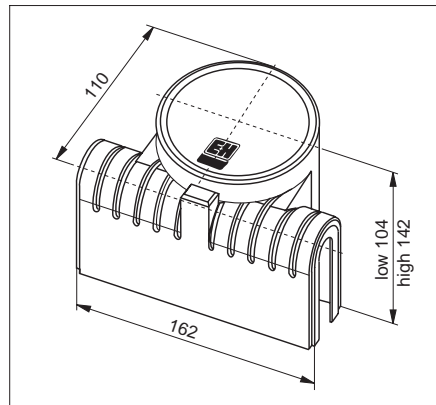
FTM 32 with standard lengths 2500 mm or 6000 mm: The rope shortening set is enclosed.

Protective hood

For housings F6, F10
Material: polyamide

For low housing cover:
Weight: 0.13 kg
Order-No. 942 262-0000

For high housing cover:
Weight: 0.16 kg
Order-No. 942 262-0001



Protective Hood

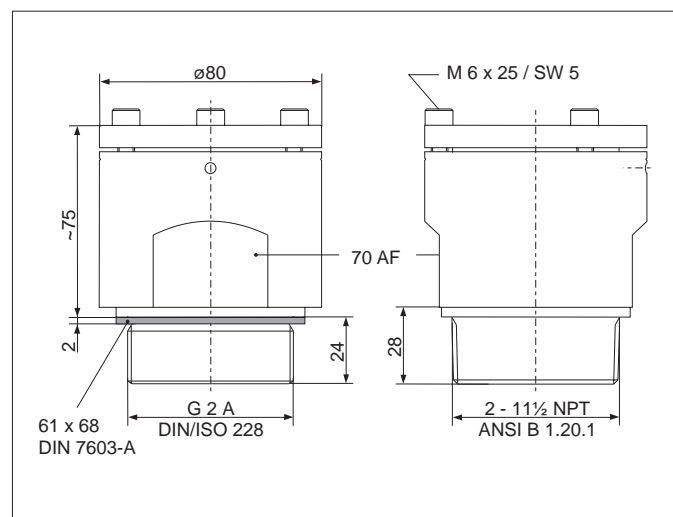
Protects the field-mounted Soliphant from excessive temperatures caused by direct sunlight and prevents condensation from entering the housing due to extreme temperature variations.

Sliding sleeve

Maximum permissible operating pressure: 16 bar;
Max. operating temperature: 150 °C;
Material: stainless steel 1.4301 (AISI 304)
Packing for threaded gland: Graphite;
Weight: 1,79 kg

With thread G 2 A
Order-No. 943 090-1002

With thread 2-11 $\frac{1}{2}$ NPT
Order-No. 943 090-1102



Sliding Sleeve

When mounting the Soliphant FTM 31 in the silo from above, the sliding sleeve allows the switch point to be infinitely adjusted.

Product Structure

Construction		Basic Weight
For standard applications and dust explosion hazardous area		
FTM 30	compact version	1.3 kg
FTM 31	with extension tube	1.2 kg
FTM 32	with rope	2.9 kg
For standard applications and dust explosion hazardous area and Ex area Zone 1; ignition protection EEx de		
FTM 30 D	compact version	2.3 kg
FTM 31 D	with extension tube	2.2 kg
FTM 32 D	with rope	4.0 kg
For standard applications and dust explosion hazardous area and explosion hazardous area Zone 1; ignition protection EEx i		
FTM 30 S	compact version	1.3 kg
FTM 31 S	with extension tube	1.2 kg
FTM 32 S	with rope	2.9 kg
Certificates, Applications (see page 12 too)		
A Without specific certificate		
For FTM 30, 31, 32:		
B ATEX II 1/3 D		
D CSA DIP, Cl. II, Div. 1, Group E-G, Cl. III (FTM 30, 31) ¹⁾		
E CSA DIP, Cl. II, Div. 1, Group G + coal dust, Cl. III (FTM 32) ¹⁾		
F FM DIP, Cl. II, Div. 1, Group E-G, Cl. III ¹⁾		
¹⁾ With aluminium housing F6 and steel housing F8 only		
For FTM 30 D , 31 D , 32 D :		
G FM XP, Cl. I+II, Div. 1, Group A-G, Cl. III (FTM 30/31 D)		
H ATEX II 1/3 D, II 2 G, EEx de IIC T6 (FTM 30/31 D)		
K CSA XP, Cl. I+II, Div. 1, Group A-G, Cl. III (FTM 30 D)		
L CSA XP, Cl. I, Div. 1, Group B+D, Cl. II, Div. 1 Group G + coal dust, Cl. III (FTM 32 D)		
M CSA XP, Cl. I+II, Div. 1, Group B-G, Cl. III (FTM 31 D)		
Q FM XP, Cl. I+II, Div. 1, Group C-G, Cl. III (FTM 32 D)		
X ATEX II 1/3 D, II 2 G, EEx de IIB T6 (FTM 32 D)		
1 ATEX II 1 D, II 2 G, EEx de IIC T6 (FTM 30/31 D)		
2 ATEX II 1 D, EEx de IIB T6 (FTM 32 D)		
3 ATEX II 1/2 G, EEx de IIC T6 (FTM 30/31 D)		
For FTM 30 S , 31 S , 32 S :		
N ATEX II 1/2 D, II 1/2 G, EEx ia IIC T6 (FTM 30/31 S)		
P FM IS, Cl. I+II, Div. 1, Group A-G, Cl. III (FTM 30/31 S) ²⁾		
U FM IS, Cl. I+II, Div. 1, Group C-G, Cl. III (FTM 32 S) ²⁾		
W CSA IS, Cl. I, Div. 1, Group C+D, Cl. II, Div. 1, Group G + coal dust, Cl. III (FTM 32 S)		
Z ATEX II 1/2 D, II 1/2 G, EEx ia IIB T6		
²⁾ With aluminium housing F6, T3 and steel housing F8 only		
Y Special version		
Electronics		Additional Weight
1	Two-wire AC, U.: 19 ... 253 V FEM 31 for FTM 30, 30 D, 31, 32 and for FTM 30 dust-Ex, 31 dust-Ex FEM 41 for FTM 31 D, 32 D, 32 dust-Ex	
2	Three-wire DC PNP, U.: 10 ... 55 V FEM 32 for FTM 30, 30 D, 31, 32 and for FTM 30 dust-Ex, 31 dust-Ex	
4	Universal power supply, 1 potential-free changeover contact FEM 34 for FTM 30, 30 D, 31, 32 and for FTM 30 dust-Ex, 31 dust-Ex FEM 44 for FTM 31 D, 32 D, 32 dust-Ex	
5	Universal power supply, 2 potential-free changeover contacts FEM 35 for FTM 30, 30 D, 31 32 and for FTM 30 dust-Ex, 31 dust-Ex FEM 45 for FTM 31 D, 32 D, 32 dust-Ex (without certificate H, X)	0,1 kg
7	PFM two-wire signal transmission FEM 37 for FTM 30 S, 31 S, 32 S	
8	Without electronic insert (with certificate A and housings F6, F8, F10 only)	-0.2 kg
9	Special version	
<p>Basic Weight:</p> <ul style="list-style-type: none"> - without extension tube - without rope - with threaded boss - with electronic insert - with plastic housing F10 for FTM .. and FTM .. S - with aluminium housing T3 for FTM .. D 		
<p>Product designation, first part</p> <p>Continued on Page 11</p>		

Product Structure (Continued)

Housings and Cable Entries

	Additional Weight
For FTM 30, 31, 32 and FTM 30 S, 31 S, 32 S	0.2 kg
B Aluminium housing F6, IP 66, NPT 1/2"	0.2 kg
C Aluminium housing F6, IP 66, G 1/2 A	0.2 kg
D Aluminium housing F6, IP 66, M 20x1,5	0.2 kg
<i>High cover for housing F6</i>	
F Polyester housing F10, IP 66, NPT 1/2"	
G Polyester housing F10, IP 66, G 1/2 A	
H Polyester housing F10, IP 66, M 20x1.5	
<i>High cover for housing F10</i>	
2 Steel housing F8, IP 66, G 1/2 A	0.1 kg
3 Steel housing F8, IP 66, M 20x1,5	0.4 kg
4 Steel housing F8, IP 66, NPT 1/2"	0.4 kg

For FTM 30 D, 31 D, 32 D and FTM 30 S, 31 S, 32 S:
(housing T3 with built-in electronic insert only)

K Aluminium housing T3, IP 66, NPT 3/4"	1.0 kg
L Aluminium housing T3, IP 66, G 1/2 A	1.0 kg
M Aluminium housing T3, IP 66, M 20x1.5	1.0 kg
<i>High cover for housing T3</i>	

Y Special version

Process Connections and Materials

A Threaded boss R 1 1/2", 1.4301, DIN 2999	
B Threaded boss NPT 1 1/2", 1.4301	
H Flange DN 50, PN 40, DIN 2527, Form B, 1.4571	3.0 kg
J Flange DN 80, PN 16, DIN 2527, Form B, 1.4571	4.5 kg
K Flange DN 100, PN 16, DIN 2527, Form B, 1.4571	5.4 kg
M Flange ANSI 2", 150 psi, RF, 1.4571	1.6 kg
N Flange ANSI 4", 150 psi, RF, 1.4571	5.4 kg
P Flange ANSI 3", 150 psi, RF, 1.4571	3.7 kg
1 Flange 10K 50, JIS, RF, 1.4571	2.0 kg
2 Flange 10K 80, JIS, RF, 1.4571	3.0 kg
3 Flange 10K 100, JIS, RF, 1.4571	4.0 kg
Y Special version	

Other Versions

- 1 Standard features
- 9 Special version

Sensor Length

For FTM 31:

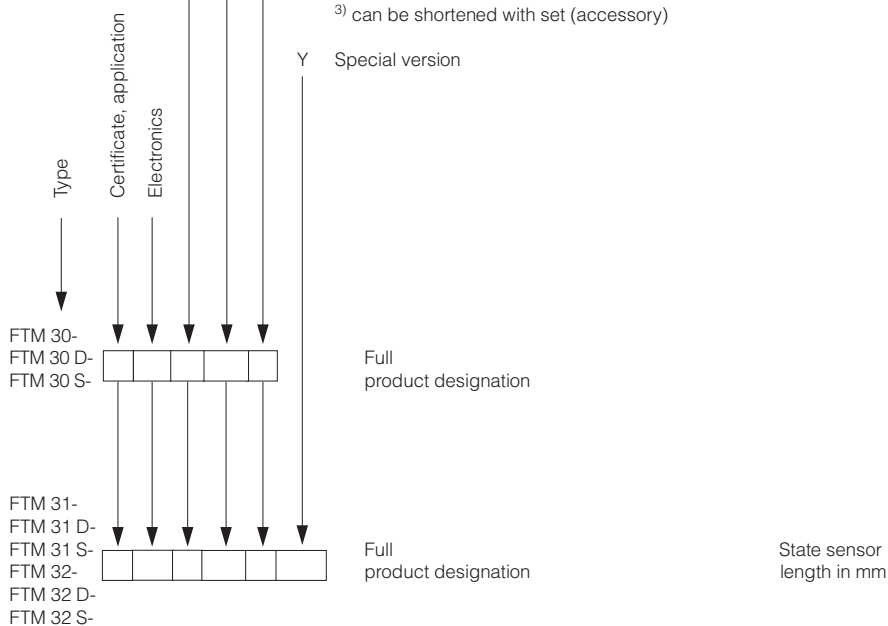
A mm (300 ... 4000 mm for FTM 31, 31 S)	2.0 kg/m
B 500 mm for FTM 31	1.0 kg
C 1000 mm for FTM 31	2.0 kg
D mm (400 ... 4000 mm for FTM 31 D)	2.0 kg/m

For FTM 32:

J mm (750 ... 20 000 mm for FTM 32, 32 S) ³⁾	0.1 kg/m
K 2500 mm for FTM 32 ³⁾	0.3 kg
L 6000 mm for FTM 32 ³⁾	0.7 kg
M mm (1000 ... 20 000 mm for FTM 32 D) ³⁾	0.1 kg/m

³⁾ can be shortened with set (accessory)

Y Special version



Possible combinations of device type, housing and electronic insert depending on certificate

Certificate Application		FTM 30	FTM 31	FTM 32	FTM 30 D	FTM 31 D	FTM 32 D	FTM 30 S	FTM 31 S	FTM 32 S
A without specific certificate	Housing	F6, F8, F10	F6, F8, F10	F6, F8, F10	T3	T3	T3	F6, F8, F10, T3	F6, F8, F10, T3	F6, F8, F10, T3
	electronic insert	FEM 31, 32, 34, 35, without	FEM 31, 32, 34, 35, without	FEM 31, 32, 34, 35, without	FEM 31, 32, 34, 35	FEM 31, 32, 34, 35	FEM 31, 32, 34, 35	FEM 37	FEM 37	FEM 37
B ATEX II 1/3 D	Housing	F6, F8, F10	F6, F8, F10	F6, F8, F10						
	electronic insert	FEM 31, 32, 34, 35	FEM 31, 32, 34, 35	FEM 41, 44, 45						
D CSA – DIP Cl. I/III, Div. 1, Gr. E-G	Housing	F6, F8	F6, F8							
	electronic insert	FEM 31, 32, 34, 35	FEM 31, 32, 34, 35							
E CSA – DIP Cl. II/III, Div. 1, Gr. G + coal dust	Housing			F6, F8						
	electronic insert			FEM 41, 44, 45						
F FM – DIP Cl. I/III, Div. 1, Gr. E-G	Housing	F6, F8	F6, F8	F6, F8						
	electronic insert	FEM 31, 32, 34, 35	FEM 31, 32, 34, 35	FEM 41, 44, 45						
G FM – XP Cl. I/II/III, Div. 1, Gr. A-G	Housing				T3	T3				
	electronic insert				FEM 31, 32, 34, 35	FEM 41, 44, 45				
H ATEX II 1/3 D, II 2 G EEx de IIC T6	Housing				T3	T3				
	electronic insert				FEM 31, 32, 34	FEM 41, 44				
1 ATEX II 1 D, II 2 G EEx de IIC T6										
3 ATEX II 1/2 G EEx de IIC T6										
K CSA – XP Cl. I/II/III, Div. 1, Gr. A-G	Housing				T3					
	electronic insert				FEM 31, 32, 34, 35					
L CSA – XP Cl. I/II/III, Div. 1, Gr. B-D, Gr. G + coal dust	Housing						T3			
	electronic insert						FEM 41, 44, 45			
Q FM – XP Cl. I/II/III, Div. 1, Gr. C-G										
M CSA – XP Cl. I/II/III, Div. 1, Gr. B-G	Housing					T3				
	electronic insert					FEM 41, 44, 45				
N ATEX II 1/2 D, II 1/2 G EEx ia IIC T6	Housing							F6, F8, F10, T3	F6, F8, F10, T3	
	electronic insert							FEM 37	FEM 37	
P FM – IS Cl. I/II/III, Div. 1, Gr. A-G	Housing							F6, F8, T3	F6, F8, T3	
	electronic insert							FEM 37	FEM 37	
U FM – IS Cl. I/II/III, Div. 1, Gr. C-G	Housing									F6, F8, T3
	electronic insert									FEM 37
W CSA – IS Cl. I/II/III, Div. 1, Gr. C+D, Gr. G + coal dust										
X ATEX II 1/3 D, II 2 G EEx de IIB T6	Housing						T3			
	electronic insert						FEM 41, 44			
2 ATEX II 1 D EEx de IIB T6										
Z ATEX II 1/2 D, II 1/2 G EEx ia IIB T6	Housing							F6, F8, F10, T3	F6, F8, F10, T3	F6, F8, F10, T3
	electronic insert							FEM 37	FEM 37	FEM 37

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