# Датчики уровня Soliphant T FTM260

## Техническая информация

# Technical Information

# Soliphant T  FTM260

## Level limit switch
## Cost–effective vibration limit switch for fine–grained solids



**Application**

Soliphant is a rugged level limit switch for use
in silos containing fine–grained and powdery solids
(up to 10 mm).
Its design and constructional materials also make it
suitable for foodstuff applications.

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

**Your benefits**

- No calibration:
  quick and low–cost start–up
- Insensitive to build–up:
  maintenance–free
- No mechanical moving parts:
  no wear, long operating life
- Various electronic inserts:
  optimum adaptability to the plant process
- External switching status:
  simple control

# Table of contest

# Function and system design

**Measuring principle**

The symmetrical vibrating fork is excited to its resonant frequency. Vibration characteristics change when the fork is submerged in solid material. The change is registered by the electronics which actuate an electronic switch or relay.
The tip of the Soliphant fork is particularly sensitive, while the base of the fork is completely insensitive. This enables solids of very low density to be detected even with material build-up on the vessel walls.

The function of the electronic switch or relay and the LED is dependent on both the level and fail-safe mode selected



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Soliphant FTM260 can be operated in both minimum or maximum fail-safe mode, i.e. the electronic switch opens or the relay de-energises on reaching the limit value, on a fault or on a loss of power.

**Measuring system**

Soliphant FTM260 is a compact limit switch to which miniature contactors, solenoid valves and programmable logic controllers (PLC) can be directly connected.
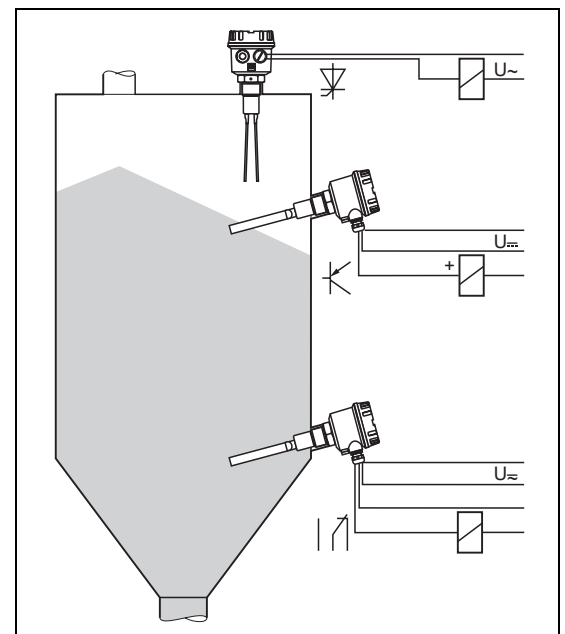


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# Output

| | |
|---|---|
| **Signal on alarm** | Output open or relay de–energised |
| **Connectable load** | ■ with FEM31<br>*(The load is switched directly via a thyristor in the power circuit)*<br>Short-term (40 ms) max. 1.5 A, max. 375 VA at 250 V or max. 36 VA at 24 V<br>(no short circuit protection),<br>continuous max. 87 VA at 253 V, max. 8.4 VA at 24 V,<br>min. 2.5 VA at 253 V (10 mA), min. 0.5 VA at 24 V (20 mA);<br>Voltage drop across FEM 31 max. 12 V at load current >10 mA<br>(max. 10 V at load current >20 mA);<br>Quiescent current max. 3.8 mA with open thyristor<br><br>■ with FEM32<br>*(The load is switched via a transistor and separate PNP connection)*<br>Short-term (1 s) max. 1 A, max. 55 V<br>(cyclic overload and short–circuit protection),<br>continuous max. 350 mA,<br>max. 0.5 µF at 55 V, max. 1.0 µF at 24 V;<br>Residual voltage <3 V (with closed transistor);<br>Residual current <100 µA (with open transistor)<br><br>■ with FEM34<br>*(The load switched via a potential-free changeover contact)*<br>I~ max. 6 A, U~ max. 253 V,<br>P~ max. 1500 VA, cos φ = 1, P~ max. 750 VA, cos φ > 0.7;<br>I– max. 6 A bis 30 V, I– max. 0.2 A to 125 V;<br>Additional switching delay 0.3 s |
| **Switch behaviour** | approx. 0.6 s when covered,<br>approx. 1.4 s when free |
| **Fail-safe mode** | Minimum or maximum fail-safe mode, switchable |

# Power supply

**Electrical connection**

Screw terminals on electronic insert for max. 2.5 mm$^2$ wire in end sleeve A 2.5 – 7 to DIN 46 228
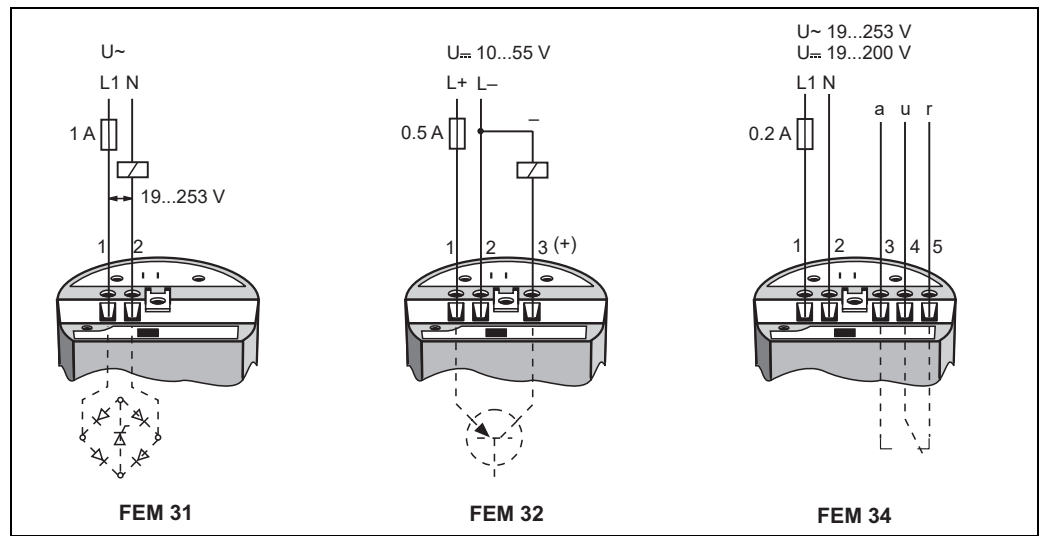


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**Electronic insert FEM31**

*Two-wire AC connection (thyristor)*

✎ Note!
Always connect in series with the load!

Check the following:

- the residual current in blocked state (up to 3.8 mA)
- that for low voltage
  – the voltage drop across the load such so that the minimum terminal voltage at the electronic insert (19 V) when blocked is not too low.
  – the voltage drop across the electronic insert when open is observed (up to 12 V).
- that a relay cannot de-energise with a retaining current below 3.8 mA.
  If this is the case, a resistor should be connected parallel to the relay.

**Electronic insert FEM32**

*Three-wire DC connection (transistor, PNP)*

Designed to be connected to programmable logic controllers (PLC).
Positive signal at switching output of the electronic insert (PNP).

**Electronic insert FEM34**

*Universal connection (relay, potential-free changeover contact)*

Potential-free changeover contact.

**Supply voltage**

- Output with FEM31
  Voltage at Terminals 1 and 2: 19...253 V, 50/60 Hz,
  Current consumption (stand-by) max. 3.8 mA

- Output with FEM32
  10...55 V, ripple max. 1.7 V, 0...400 Hz,
  Current consumption max. 15 mA, protection against reverse polarity

- Output with FEM34
  AC 19...253 V, 16...60 Hz or DC 19...200 V,
  Current consumption max. 7 mA

# Installation

✎ Note!
All dimensions in mm

100 mm  = 3.94 in

**Installation instructions**

**Mounting location**
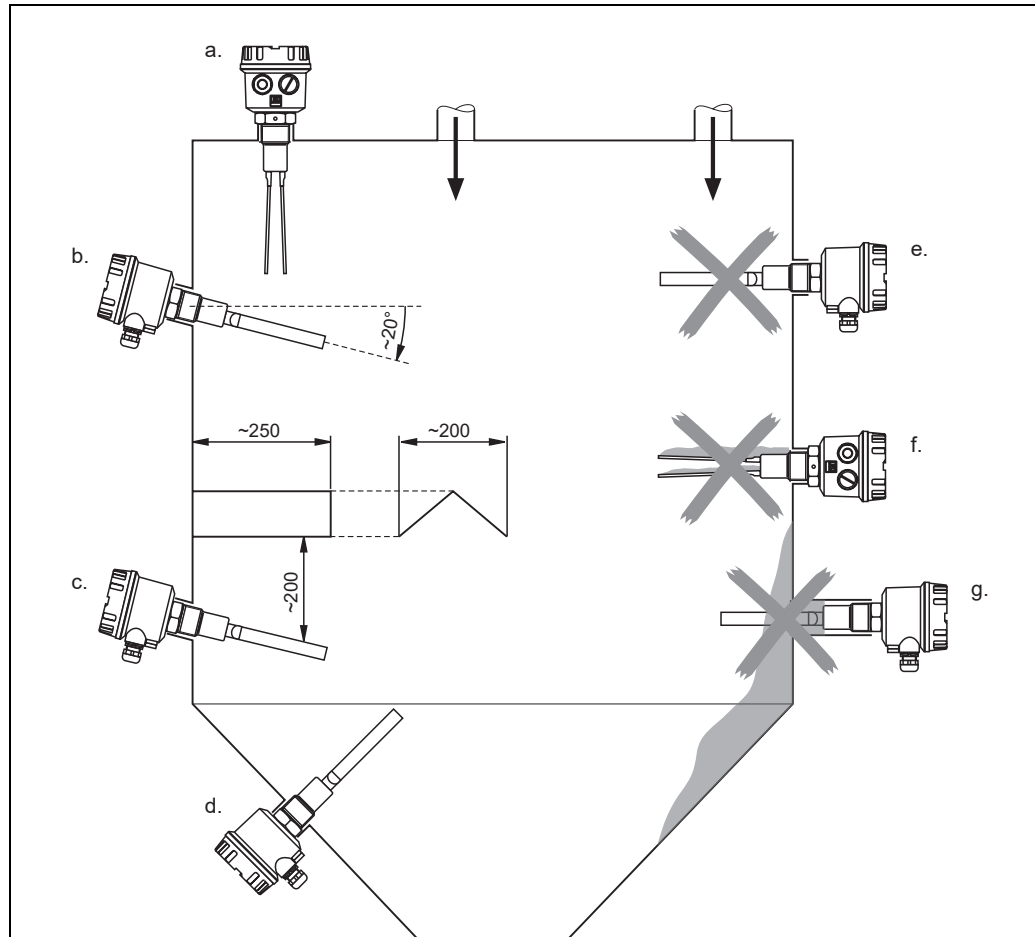


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Left: correct

a.    vertically mounted from above; any fork position

b.    laterally mounted with fork angled slightly downwards, nozzle length max. 60 mm

c.    with roof (length approx. 250 mm, width approx. 200 mm) to protect against collapsing mounds

d.    in discharge hopper

Right: incorrect

e.    in filling curtain

f.    false orientation of the fork (high load on the wide surface of the fork caused by discharging material; malfunction due to residual material)

g.    mounting nozzle too long

**Orientation**

The Soliphant FTM260 may be installed at any orientation in a vessel containing bulk solids.

# Environment

| | |
|---|---|
| **Ambient temperature** | –40 °C...+70 °C (–40°F...+160°F), see also "Temperature diagram" |
| **Storage temperature** | –40 °C...+85 °C (–40°F...+185°F) |
| **Climate class** | Climatic protection according to IEC 68, Part 2-38, Fig. 2a |
| **Degree of protection** | IP66 according to DIN 40050 |
| **Mechanical load on fork** | 600 N,<br>lateral (on fine edges of tines), static |
| **Electromagnetic compatibility** | Interference Emission to EN 61326, Electrical Equipment Class B<br>Interference Immunity to EN 61326, Annex A (Industrial) and NAMUR Recommendation NE 21 (EMC) |

# Process

| | |
|---|---|
| **Medium temperature** | –40 °C...+150 °C (–40°F...+300°F), see also "Temperature diagram" |
| **Temperature diagram** | Permissible values for ambient temperature $T_U$ at housing are dependent on the operating temperature $T_B$ in the silo: |
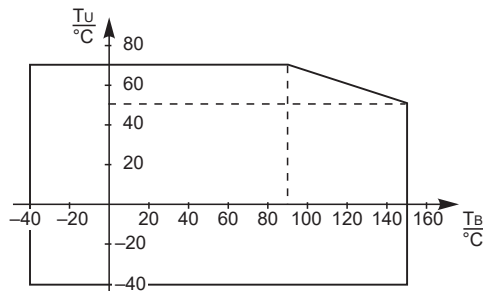


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*x °C = (1.8 x + 32)°F*

| | |
|---|---|
| **Bulk density of material** | min. 100 g/l |
| **Grain size of material** | up to 10 mm (0.4 in) |
| **Operating pressure $p_e$** | –1 bar...+16 bar (–14.5...+230 psi), burst pressure >40 bar |

# Mechanical construction

✎ Note!
All dimensions in mm

100 mm = 3.94 in

**Design, dimensions**
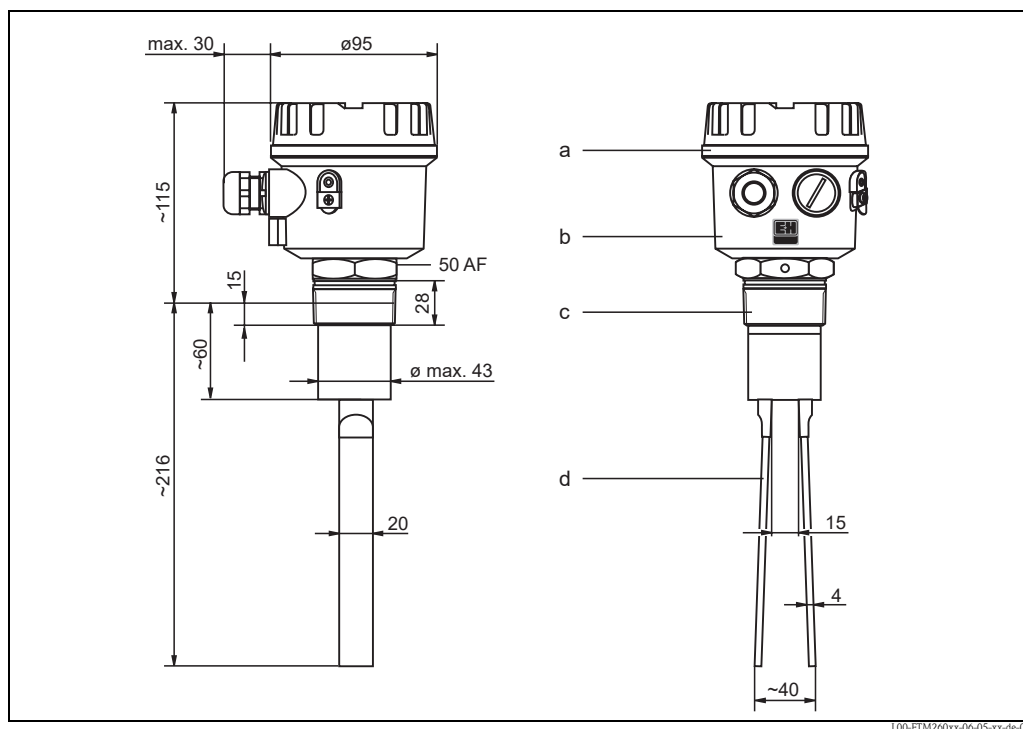


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a. The transparent cover shows the LED which indicates the switching mode

b. Plastic housing,
   Protection IP66, with cable gland versions

c. Process connections:
   – R 1½, DIN 2999, (tapered)
     in stainless steel
   – 1½" NPT, (tapered)

d. Vibrating fork in solid stainless steel with high mechanical resistance to lateral loads

**Weight**  approx. 1.1 kg with electronic insert

**Material**
- Process connection and vibrating fork: stainless steel AISI 304 (1.4301)
  and AISI 316Ti (1.4571)
- Housing (F14): polyester
- Transparent cover: polyamide
- O-ring seal: EPDM
- Cable gland M20x1.5: polyamide with Neoprene–CR seal

**Process connection**  Tapered thread R 1½, DIN 2999;
Tapered thread 1½" NPT

# Human interface

**Display elements,
operating elements**

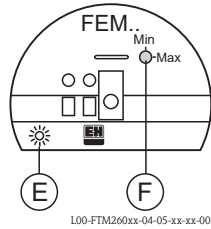The plug-in electronic insert can be easily replaced with another electronic insert – without calibration



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E = LED indicates switching status

F = Fail-safe mode is selected by turning a switch

# Ordering information

**Product structure**

| 20 | | Process Connection | | | |
|---|---|---|---|---|---|
| | G | Thread | DIN2999 | R1½ | 304 |
| | N | Thread | ANSI | NPT1½ | 304 |
| | Y | Special version | | | |

| 30 | | | Electronics; Output | | | |
|---|---|---|---|---|---|---|
| | | Y | Special version | | | |
| | | 1 | FEM31 | 2-wire | | 19...253 V AC |
| | | 2 | FEM32 | 3-wire | PNP | 10...55 V DC |
| | | 4 | FEM34 | relay | | 19...253 V AC/200 V DC |
| | | 8 | not selected | | | |

| 40 | | | | Housing; Cable Entry | | | |
|---|---|---|---|---|---|---|---|
| | | | B | F14 | Polyester | NEMA4X | thread NPT½ |
| | | | C | F14 | Polyester | IP66 | thread G½ |
| | | | D | F14 | Polyester | IP66 | gland M20 |
| | | | R | F14 | Polyester | IP66 | thread NPT½ |
| | | | | CSA GP, non transparent cover | | | |
| | | | S | F14 | Polyester | IP66 | gland M20 |
| | | | | CSA GP, non transparent cover | | | |
| | | | Y | Special version | | | |

| FTM260 | | | | Complete product designation |
|---|---|---|---|---|

По вопросам продаж и поддержки обращайтесь:

Алматы (7273)495-231
Ангарск (3955)60-70-56
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