

## Technical Information

# Liquiphant M FTL50(H), FTL51(H)

## Vibration Limit Switch

Level limit switch for all liquids.

Suitable for use in hazardous areas, food and pharmaceuticals



### Application

The Liquiphant M is a level limit switch for use in all liquids

- for process temperatures of  $-50\text{ °C}$  to  $150\text{ °C}$
- for pressures up to 100 bar
- for viscosity up to  $10000\text{ mm}^2/\text{s}$
- for densities  $0.5\text{ g/cm}^3$  or  $0.7\text{ g/cm}^3$  other settings available on request
- foam detection on request

The function is not affected by flow, turbulence, bubbles, foam, vibration, bulk solids content or build-up.

The Liquiphant is thus the ideal substitute for float switches.

### FTL50:

Compact design, ideal for mounting in pipes and for installation in areas difficult to access

### FTL51:

With extension pipe up to 3 m  
(6 m on request)

### FTL50H, FTL51H:

With polished tuning fork and easy-to-clean process connections and housings for food and pharmaceutical applications.

High corrosion-resistant AlloyC4 (2.4610) is available for the fork and process connections for applications in very aggressive liquids.

EEx ia, EEx de and EEx d protection enable it to be used in hazardous areas.

### Your benefits

- Use in safety systems requiring functional safety to SIL2/SIL3 in accordance with IEC 61508/IEC 61511-1
- Large number of process connections to choose from: universal usage
- Wide variety of electronics, e.g. NAMUR, relay, thyristor, PFM signal output: the right connection for every process control system
- PROFIBUS PA protocol: for commissioning and maintenance
- No calibration: quick, low-cost start-up
- No mechanically moving parts: no maintenance, no wear, long operating life
- Monitoring of fork for damage: guaranteed function
- FDA approved materials (PFA Edlon)

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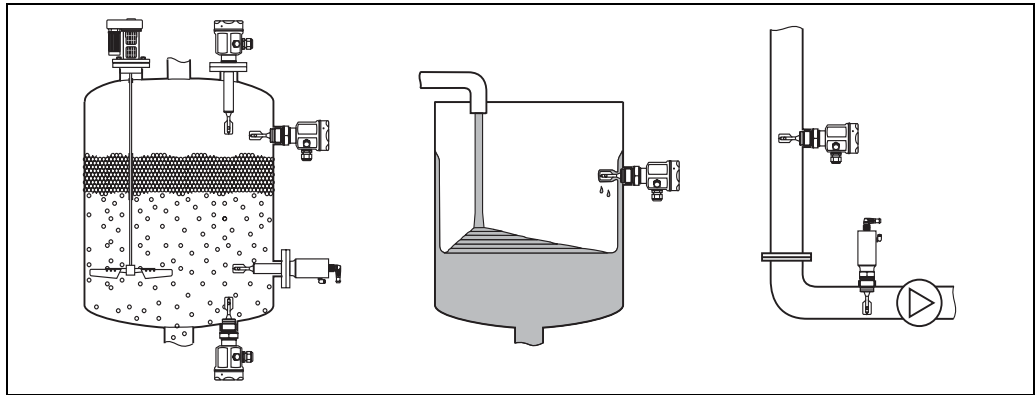
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## Application

### Level limit detection

Maximum or minimum detection in tanks or pipes containing all kinds of liquids, including use in hazardous areas, food and pharmaceuticals



L00-FTL5xxxx-11-05-xx-xx-000

## Function and system design

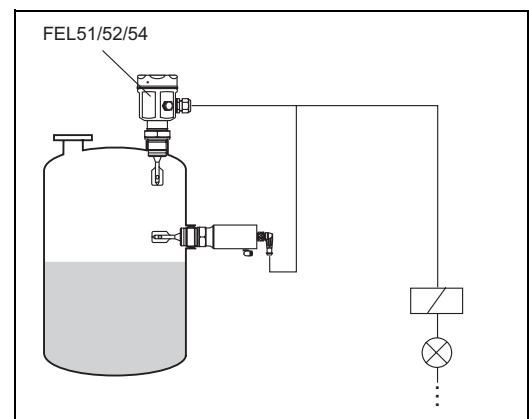
### Measuring principle

The sensor's fork vibrates at its intrinsic frequency. This frequency is reduced when covered with liquid. The change in frequency then activates a limit switch.

### Modularity

#### Level limit switch

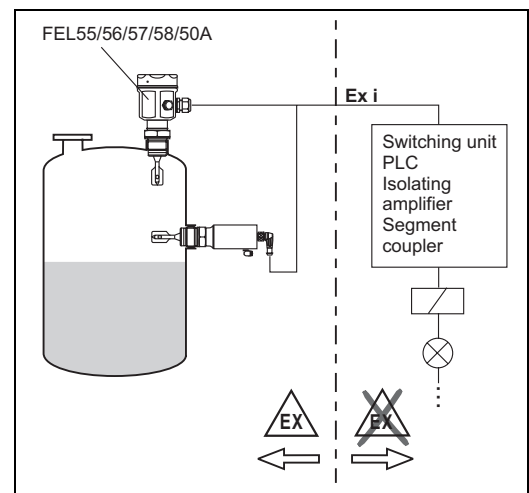
Liquiphant M FTL with electronic versions  
FEL51, FEL52, FEL54



L00-FTL5xxxx-15-05-xx-xx-000

#### Level sensor

Liquiphant M FTL with electronic versions  
FEL55, FEL56, FEL57, FEL58  
for connecting to a separate switching unit or  
or an isolating amplifier FEL50A  
for connecting to PROFIBUS PA segment



L00-FTL5xxxx-15-05-xx-xx-000

**Electronic versions  
for level limit switches**

FEL51:  
Two-wire AC version;  
Switch the load directly into the power supply circuit via the thyristor.

FEL52:  
Three-wire DC version;  
Switch the load via the transistor (PNP) and separate connection.

FEL54:  
Universal current version with relay output;  
Switch the loads via 2 floating change-over contacts.

**Electronic versions  
for level sensor**

FEL55:  
For separate switching unit; signal transmission 16/8 mA along two-wire cabling.

FEL56:  
For separate switching unit; signal transmission L-H edge 0.6...1.0 / 2.2...2.8 mA  
to EN 50227 (NAMUR) along two-wire cabling.

FEL58:  
For separate switching unit; signal transmission H-L edge 2.2...3.5 / 0.6...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.

FEL57:  
For separate switching unit; PFM signal transmission;  
Current pulses superposed on the power supply along the two-wire cabling.  
Cyclical checking from the switching unit without changing levels.

FEL50A:  
For connecting to PROFIBUS PA;  
Cyclic and acyclic data exchange acc. to PROFIBUS PA Profile 3.0 Discrete Input

**Galvanic isolation**

FEL51, FEL52, FEL50A:  
Between sensor and power supply

FEL54:  
Between sensor and power supply and load

FEL55, FEL56, FEL57, FEL58:  
See Switching unit connected

**Design**

FTL50:  
Compact

FTL51:  
With extension pipe

FTL50H:  
Compact, with polished tuning fork and hygienic process connections

FTL51H:  
With extension pipe, polished tuning fork and hygienic process connections

## Input

**Measured variable**

Level (limit value)

**Measuring range  
(detection range)**

FTL50:  
Depends on mounting point.

FTL51:  
Depends on mounting point and the pipe extension. Standard 3000 mm (up to 6000 mm on request)

**Product density**

Adjustment on the electronic insert > 0.5 g/cm<sup>3</sup> or > 0.7 g/cm<sup>3</sup> (other on request)

## Electronic insert FEL51 (AC 2-wire)

### Power supply

Supply voltage: 19...253 V AC  
 Power consumption: < 0.83 W  
 Residual current consumption: < 3.8 mA  
 Short-circuit protection  
 FEM51 overvoltage protection: overvoltage category III

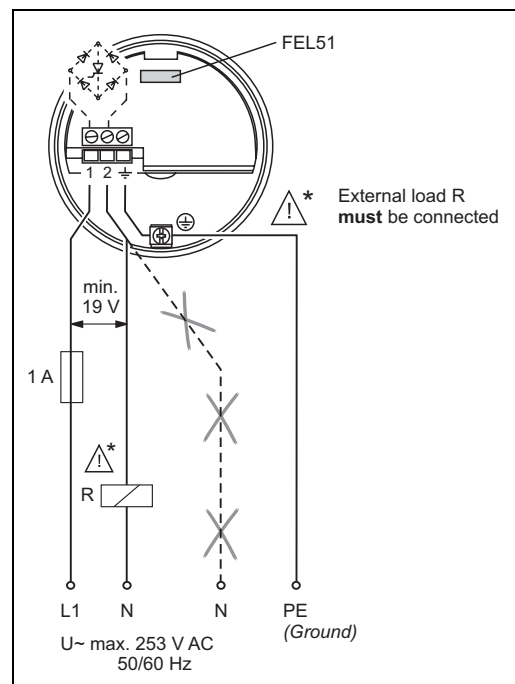
### Electrical connection

#### Two-wire AC connection

Always connect in series with a 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 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)
- that a relay cannot de-energise with holding power below 3.8 mA.  
 If this is the case, a resistor should be connected parallel to the relay. (RC module available on request).
- When selecting the relay, pay attention to the holding power/rated power (See "Connectable load")



L00-FTL5xxxx-04-05-xx-xx-007

### Output signal

$I_L$  = load current (switched through)

< 3.8 mA = residual current (blocked)



= lit



= unlit

L00-FTL2xxxx-07-05-xx-xx-000

| Safety mode | Level | Output signal  | LEDs<br>green | red |
|-------------|-------|----------------|---------------|-----|
| Max.        |       | 1 $I_L$ → 2    |               |     |
|             |       | 1 < 3.8 mA → 2 |               |     |
| Min.        |       | 1 $I_L$ → 2    |               |     |
|             |       | 1 < 3.8 mA → 2 |               |     |

L00-FTL5xxxx-04-05-xx-xx-001

### Signal on alarm

Output signal on power failure or in the event of damaged sensor: < 3.8 mA

### Connectable load

- For relays with a minimum holding power/rated power > 2.5 VA at 253 V AC (10 mA) or > 0.5 VA at 24 V AC (20 mA)
- Relays with a lower holding power/rated power can be operated by means of an RC module connected in parallel
- For relays with a maximum holding power/rated power < 89 VA at 253 V AC or < 8.4 VA at 24 V AC
- Voltage drop across FEL51 max. 12 V
- Residual current with blocked thyristor max. 3.8 mA
- Load switched directly into the power supply circuit via the thyristor.  
 Transient (40 ms) max. 1.5 A, max. 375 VA at 253 V or max. 36 VA at 24 V (not short-circuit proof)

## Electronics FEL51 (AC, in compact housing)

### Power supply

Supply voltage: 19...253 V AC  
 Power consumption: < 0.83 W  
 Residual current consumption: < 3.8 mA  
 Short-circuit protection  
 FEM51 overvoltage protection: overvoltage category III

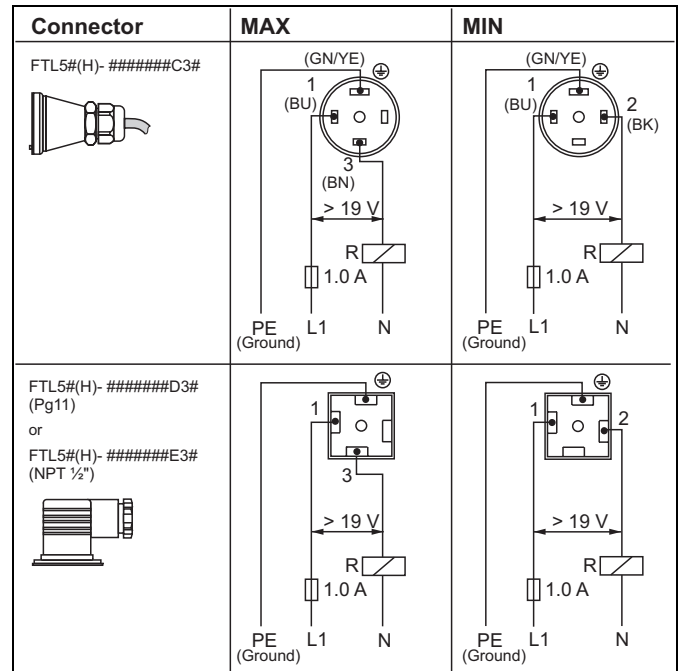
### Electrical connection

#### Two-wire AC connection

Always connect in series with a 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 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).
- That a relay cannot de-energise with holding power below 3.8 mA. If this is the case, a resistor should be connected parallel to the relay. (RC module available on request).



L00-FTL5xxxx-04-05-xx-xx-en-008

### Output signal

$I_L$  = load current (switched through)

< 3.8 mA = residual current (blocked)



= lit



= unlit

L00-FTL2xxxx-07-05-xx-xx-000

| Safety mode | Level | Output signal                        | LEDs  |     |
|-------------|-------|--------------------------------------|-------|-----|
|             |       |                                      | green | red |
| Max.        |       | 1 $\xrightarrow{I_L}$ 3              |       |     |
|             |       | 1 $\xrightarrow{< 3.8 \text{ mA}}$ 3 |       |     |
| Min.        |       | 1 $\xrightarrow{I_L}$ 2              |       |     |
|             |       | 1 $\xrightarrow{< 3.8 \text{ mA}}$ 2 |       |     |

L00-FTL5xxxx-04-05-xx-xx-en-001a

### Signal on alarm

Output signal on power failure or in the event of damaged sensor: < 3.8 mA

### Connectable load

- For relays with a minimum holding power/rated power > 2.5 VA at 253 V AC (10 mA) or > 0.5 VA at 24 V AC (20 mA)
- Relays with a lower holding power/rated power can be operated by means of an RC module connected in parallel
- For relays with a maximum holding power/rated power < 89 VA at 253 V AC or < 8.4 VA at 24 V AC
- Voltage drop across FEL51 max. 12 V
- Residual current with blocked thyristor max. 3.8 mA
- Load switched directly into the power supply circuit via the thyristor.  
 Transient (40 ms) max. 1.5 A, max. 375 VA at 253 V or max. 36 VA at 24 V (not short-circuit proof)

## Electronic insert FEL52 (DC PNP)

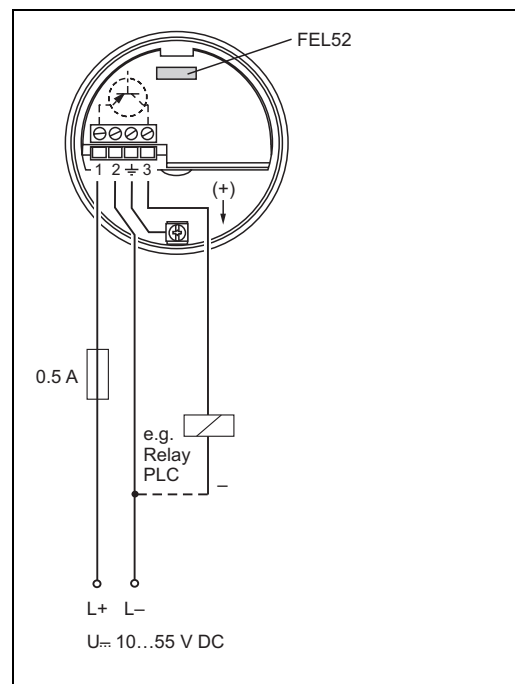
### Power supply

Supply voltage: 10...55 V DC  
 Ripple: max. 1.7 V, 0...400 Hz  
 Current consumption: max. 15 mA  
 Power consumption: max. 0.83 W  
 Reverse polarity protection  
 Overvoltage protection FEL52: overvoltage category III

### Electrical connection

#### Three-wire DC connection

Preferably used with programmable logic controllers (PLC).  
 DI module as per EN 61131-2.  
 Positive signal at switching output of the electronics (PNP);  
 Output blocked on reaching limit.



L00-FTL5xxxx-04-05-xx-en-001

### Output signal

$I_L$  = load current  
(switched through)

$< 100 \mu A$  = residual current  
(blocked)



= lit



= unlit

L00-FTL2xxxx-07-05-xx-xx-000

| Safety mode | Level | Output signal                   | LEDs<br>green | red |
|-------------|-------|---------------------------------|---------------|-----|
| Max.        |       | $L+ \xrightarrow{I_L} +$<br>1 3 |               |     |
|             |       | $1 \xrightarrow{< 100 \mu A} 3$ |               |     |
| Min.        |       | $L+ \xrightarrow{I_L} +$<br>1 3 |               |     |
|             |       | $1 \xrightarrow{< 100 \mu A} 3$ |               |     |

L00-FTL5xxxx-04-05-xx-xx-004

### Signal on alarm

Output signal on power failure or in the event of damaged sensor:  $< 100 \mu A$

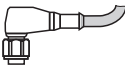
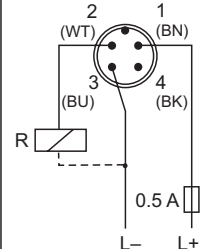
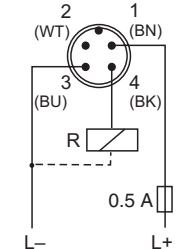
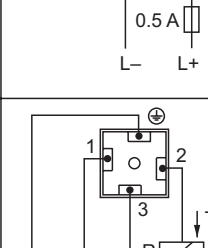
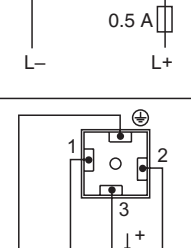
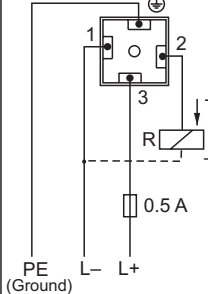
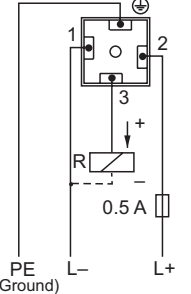
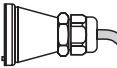
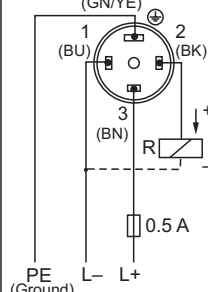
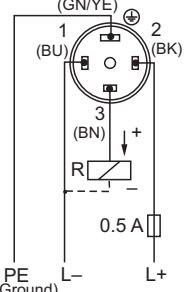
### Connectable load

- Load switched via the transistor and separate PNP connection, max. 55 V DC
- Load current max. 350 mA (pulsed overload and short-circuit protection)
- Residual current  $< 100 \mu A$  (with transistor blocked)
- Capacitive load max. 0.5  $\mu F$  at 55 V, max. 1.0  $\mu F$  at 24 V
- Residual voltage  $< 3 V$  (with transistor switched through)

# Electronics FEL52 (DC PNP, in compact housing)

|              |                                                                                                                                                                                                                              |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power supply | Supply voltage: 10...55 V DC<br>Ripple: max. 1.7 V, 0...400 Hz<br>Current consumption: max. 15 mA<br>Power consumption: max. 0.83 W<br>Reverse polarity protection<br>Overvoltage protection FEL52: overvoltage category III |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                       |                                                                                                                                                                                                                                         |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Electrical connection | <b>Three-wire DC connection</b><br><br>Preferably used with programmable logic controllers (PLC).<br>DI module as per EN 61131-2.<br>Positive signal at switching output of the electronics (PNP);<br>Output blocked on reaching limit. |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

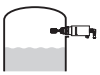
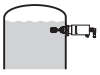
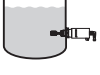
| Connector                                                                                                                                                    | MAX                                                                                   | MIN                                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| FTL5#(H)- #####N3#<br>(M12x1)<br>52018763<br>                              |    |    |
| FTL5#(H)- #####N3#<br>(M12x1)<br>52010285 / 52024216<br>                    |   |   |
| FTL5#(H)- #####D3#<br>(Pg11)<br>or<br>FTL5#(H)- #####E3#<br>(NPT 1/2")<br> |   |   |
| FTL5#(H)- #####C3#<br>                                                    |  |  |

L00-FTL5xxxx-04-05-xx-en-010

|               |                                    |
|---------------|------------------------------------|
| Output signal | With valve connector or cable tail |
|---------------|------------------------------------|

$I_L$  = load current  
(switched through)  
  
 $< 100 \mu A$  = residual current  
(blocked)  
  
 = lit  
  
 = unlit

L00-FTL2xxxx-07-05-  
xx-xx-000

| Safety mode | Level                                                                                 | Output signal                                | LEDs<br>green      red                                                                                                                                                      |
|-------------|---------------------------------------------------------------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Max.        |  | $L+ \xrightarrow{I_L} +$<br>3      2         |   |
|             |  | $L+ < 100 \mu A \xrightarrow{+}$<br>3      2 |   |
| Min.        |  | $L+ \xrightarrow{I_L} +$<br>2      3         |   |
|             |  | $L+ < 100 \mu A \xrightarrow{+}$<br>2      3 |   |

L00-FTL5xxxx-04-05-xx-xx-004

**With M12x1 connector 52010285 / 52024216 (without LEDs)**

$I_L$  = load current  
(switched through)

$< 100 \mu A$  = residual current  
(blocked)



= lit



= unlit

L00-FTL2xxxx-07-05-xx-xx-000

| Safety mode | Level | Output signal                                                   | LEDs |
|-------------|-------|-----------------------------------------------------------------|------|
| Max.        |       | $L^+ \xrightarrow{I_L} -$<br>1                      2           |      |
|             |       | $L^+ < 100 \mu A \xrightarrow{-} -$<br>1                      2 |      |
| Min.        |       | $L^+ \xrightarrow{I_L} -$<br>1                      4           |      |
|             |       | $L^+ < 100 \mu A \xrightarrow{-} -$<br>1                      4 |      |

L00-FTL5xxxx-04-05-xx-xx-010

**With M12x1 connector 52018763 (with LEDs)**

$I_L$  = load current  
(switched through)

$< 100 \mu A$  = residual current  
(blocked)



= lit



= unlit

L00-FTL2xxxx-07-05-xx-xx-000

| Safety mode | Level | Output signal                                                   | LEDs |
|-------------|-------|-----------------------------------------------------------------|------|
| Max.        |       | $L^+ \xrightarrow{I_L} -$<br>1                      2           |      |
|             |       | $L^+ < 100 \mu A \xrightarrow{-} -$<br>1                      2 |      |
| Min.        |       | $L^+ \xrightarrow{I_L} -$<br>1                      4           |      |
|             |       | $L^+ < 100 \mu A \xrightarrow{-} -$<br>1                      4 |      |

L00-FTL5xxxx-04-05-xx-xx-010

**Signal on alarm**

Output signal on power failure or in the event of damaged sensor:  $< 100 \mu A$

**Connectable load**

- Load switched via the transistor and separate PNP connection, max. 55 V DC
- Load current max. 350 mA (pulsed overload and short-circuit protection)
- Residual current  $< 100 \mu A$  (with transistor blocked)
- Capacitive load max. 0.5  $\mu F$  at 55 V, max. 1.0  $\mu F$  at 24 V
- Residual voltage  $< 3 V$  (with transistor switched through)

### Electronic insert FEL54 (AC/DC with relay output)

## Power supply

Supply voltage: 19...253 V AC, 50/60 Hz or 19...55 V DC  
Power consumption: max. 1.3 W  
Reverse polarity protection  
Overvoltage protection FEL54: overvoltage category III

## Electrical connection

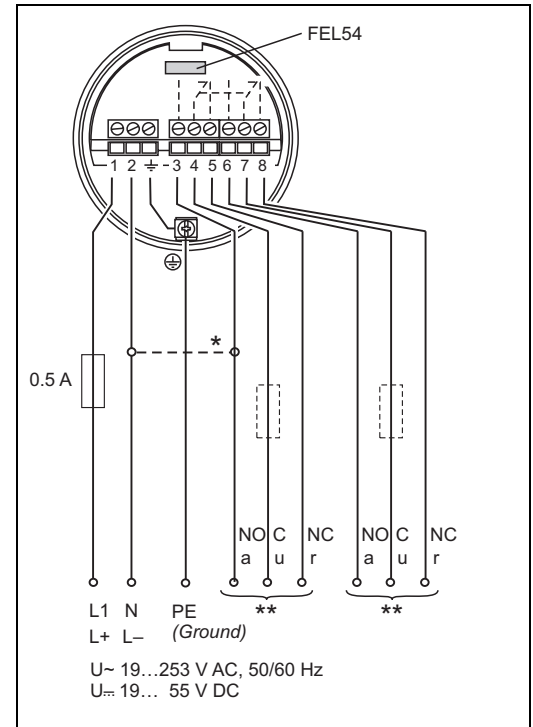
### Universal current connection with relay output

Power supply:  
Please note the different voltage ranges  
for AC and DC.

Output:  
When connecting an instrument 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.  
Both relay contacts switch simultaneously.

\* When jumpered, the relay output works with NPN logic.

\*\* See below "Connectable load"



L00-FTL5xxxx-04-05-xx-xx-002

### Output signal

| Safety mode | Level                                                                                 | Output signal                                                                                  | LEDs<br>green                                                                                  | red                                                                                   |
|-------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Max.        |  | <br>3 4 5 | <br>6 7 8 |  |
|             |  | <br>3 4 5 | <br>6 7 8 |  |
| Min.        |  | <br>3 4 5 | <br>6 7 8 |  |
|             |  | <br>3 4 5 | <br>6 7 8 |  |

### Signal on alarm

Output signal on power failure or in the event of damaged sensor: relay de-energised

### Connectable load

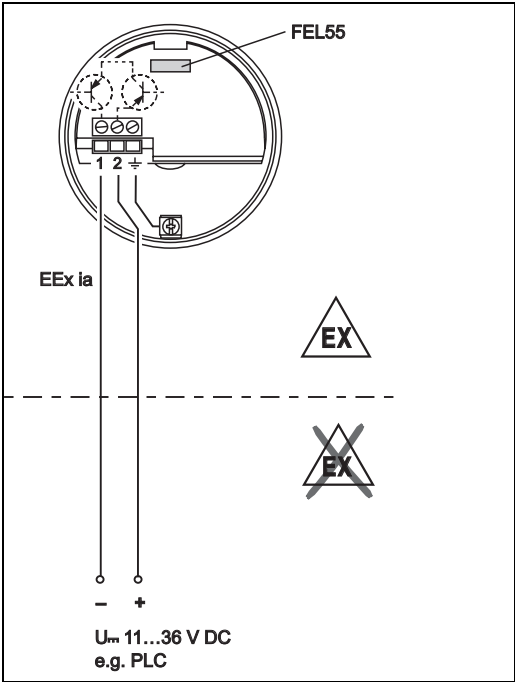
- Loads switched via 2 floating change-over contacts (DPDT)
- $I_{\sim}$  max. 6 A (EE d 4 A),  $U_{\sim}$  max. 253 V AC;  $P_{\sim}$  max. 1500 VA,  $\cos \varphi = 1$ ,  $P_{\sim}$  max. 750 VA,  $\cos \varphi > 0.7$
- $I_{\text{res}}$  max. 6 A (EE d 4 A) to 30 V,  $I_{\text{res}}$  max. 0.2 A to 125 V
- When connecting a low-voltage circuit with double isolation according to IEC 1010 the following applies:  
total of voltages of relay output and power supply max. 300 V

## Electronic insert FEL55 (8/16 mA)

|              |                                                                                                                                                      |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power supply | Supply voltage: 11...36 V DC<br>Power consumption: < 600 mW<br>Reverse polarity protection<br>Overvoltage protection FEL55: overvoltage category III |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------|

|                       |                                                 |
|-----------------------|-------------------------------------------------|
| Electrical connection | Two-wire connection for separate switching unit |
|-----------------------|-------------------------------------------------|

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



L00-FTL5xxxx-04-05-xx-en-000

Output signal

~ 16 mA = 16 mA ± 5 %  
~ 8 mA = 8 mA ± 6 %  
☀ = lit  
● = unlit

L00-FTL2xxxx-07-05-xx-xx-000

| Safety mode | Level | Output signal  | LEDs<br>green | red |
|-------------|-------|----------------|---------------|-----|
| Max.        |       | + 2 ~16 mA → 1 | ☀             | ●   |
|             |       | + 2 ~8 mA → 1  | ☀             | ☀   |
| Min.        |       | + 2 ~16 mA → 1 | ☀             | ●   |
|             |       | + 2 ~8 mA → 1  | ☀             | ☀   |

L00-FTL5xxxx-04-05-xx-xx-000

|                 |                                                                            |
|-----------------|----------------------------------------------------------------------------|
| Signal on alarm | Output signal on power failure or in the event of damaged sensor: < 3.6 mA |
|-----------------|----------------------------------------------------------------------------|

Connectable load

- R = (U - 11 V) : 16.8 mA
- U = connection voltage: 11...36 V DC

Example:  
PLC with 250 Ω loop powered input

250 Ω = (U - 11V) / 16, 8 mA  
4,2 [Ω/A] = U - 11 V  
U = 15,2 V

Electronic insert FEL56 (NAMUR L-H edge)

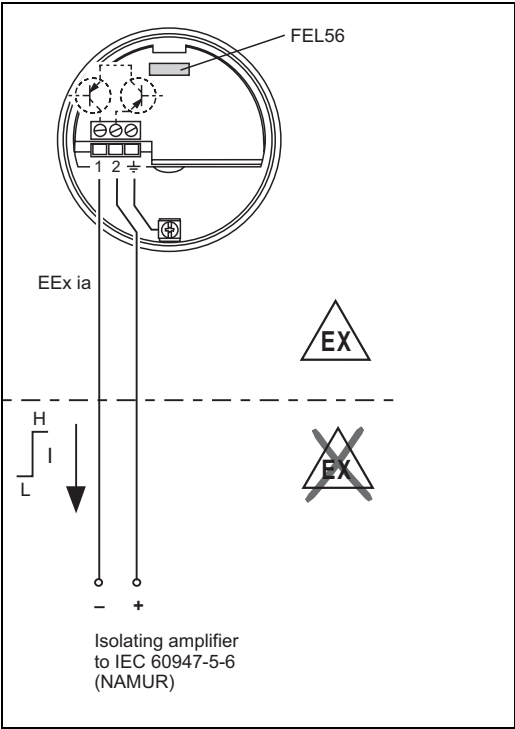
**Power supply** Power consumption: < 6 mW bei I < 1 mA; < 38 mW bei I = 2,2...4 mA  
Connection data interface: IEC 60947-5-6

**Electrical connection** **Two-wire connection for separate switching unit**

For connecting to isolating amplifiers acc. to NAMUR (IEC 60947-5-6), e.g. FXN421, FXN422, FTL325N, FTL375N or Commutec SIN100, SIN110 from Endress+Hauser. Output signal jump from low to *high current on limit*.

**(L-H edge)**

Connecting to multiplexer:  
Set clock time to min. 2 s.



L00-FTL5xxxx-04-05-xx-en-004

**Output signal**

= lit  
 = flashes  
 = unlit

L00-FTL5xxxx-07-05-xx-xx-002

| Safety mode | Level | Output signal             | LEDs  |     |
|-------------|-------|---------------------------|-------|-----|
|             |       |                           | green | red |
| Max.        |       | + 0.6 ... 1.0 mA<br>2 → 1 |       |     |
|             |       | + 2.2 ... 2.8 mA<br>2 → 1 |       |     |
| Min.        |       | + 0.6 ... 1.0 mA<br>2 → 1 |       |     |
|             |       | + 2.2 ... 2.8 mA<br>2 → 1 |       |     |

L00-FTL5xxxx-04-05-xx-xx-003

**Signal on alarm** Output signal in the event of damaged sensor: > 2.2 mA

**Connectable load** ■ See Technical Data of isolating amplifier connected according to IEC 60947-5-6 (NAMUR)

## Electronic insert FEL58 (NAMUR H-L edge)

### Power supply

Power consumption: < 6 mW bei I < 1 mA; < 38 mW bei I = 2,2...4 mA  
Connection data interface: IEC 60947-5-6

### Electrical connection

#### Two-wire connection for separate switching unit

For connecting to isolating amplifiers acc. to NAMUR (IEC 60947-5-6), e.g. FXN421, FXN422, FTL325N, FTL375N or Commutec SIN100, SIN110 from Endress+Hauser. Output signal jump from high to *low current on limit*.

#### (H-L edge)

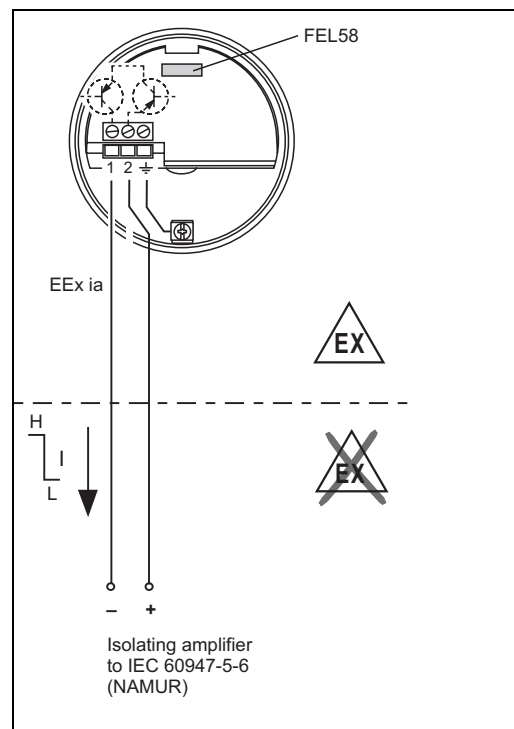
Additional function:  
Test key on the electronic insert.  
Pressing the key breaks the connection to the isolating amplifier.



#### 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. 2 s.



L00-FTL5xxxx-04-05-xx-xx-002

### Output signal

= lit  
 = flashes  
 = unlit

L00-FTL5xxxx-07-05-xx-xx-002

| Safety mode | Level | Output signal           | LEDs<br>green    yellow |
|-------------|-------|-------------------------|-------------------------|
| Max.        |       | + 2.2 ... 3.5 mA<br>→ 1 |                         |
|             |       | + 0.6 ... 1.0 mA<br>→ 1 |                         |
| Min.        |       | + 2.2 ... 3.5 mA<br>→ 1 |                         |
|             |       | + 0.6 ... 1.0 mA<br>→ 1 |                         |

L00-FTL5xxxx-04-05-xx-xx-007

### Signal on alarm

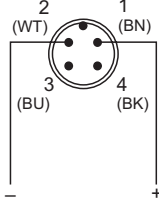
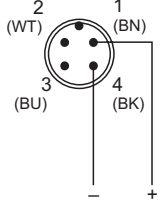
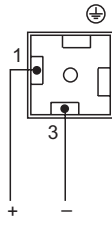
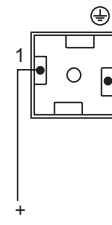
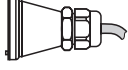
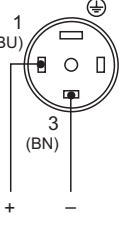
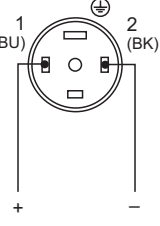
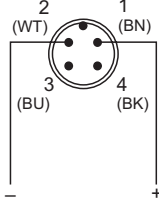
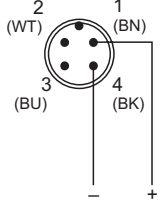
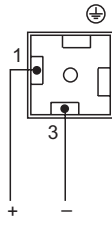
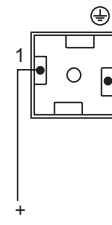
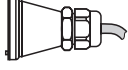
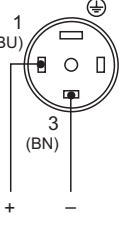
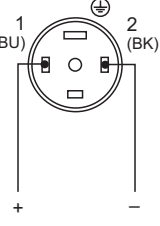
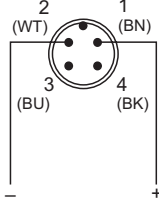
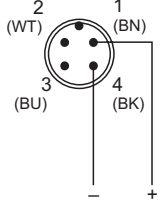
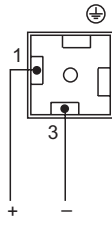
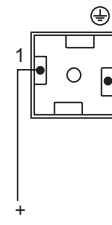
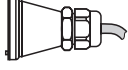
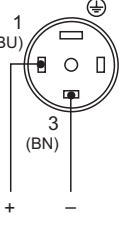
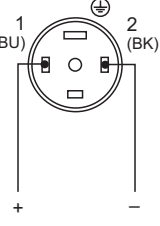
Output signal in the event of damaged sensor: < 1.0 mA

### Connectable load

- See Technical Data of isolating amplifier connected according to IEC 60947-5-6 (NAMUR)
- Connection also to isolating amplifiers which have special safety circuits (I > 3.0 mA)

Electronics FEL58 (NAMUR H-L edge, in compact housing)

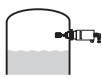
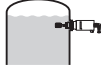
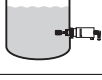
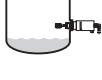
|              |                                                                                                                |
|--------------|----------------------------------------------------------------------------------------------------------------|
| Power supply | Power consumption: < 6 mW bei I < 1 mA; < 38 mW bei I = 2,2...4 mA<br>Connection data interface: IEC 60947-5-6 |
|--------------|----------------------------------------------------------------------------------------------------------------|

| Electrical connection                                                                                                                                                                                                                                                                                               | <p><b>Two-wire connection for separate switching unit</b></p> <p>For connecting to isolating amplifiers acc. to NAMUR (IEC 60947-5-6), e.g. FXN421, FXN422, FTL325N, FTL375N or Commutec SIN100, SIN110 from Endress+Hauser. Output signal jump from high to <i>low current on limit</i>.</p> <p><b>(H-L edge)</b></p> <p>Additional function:<br/>If the test magnet is held against the marking on the nameplate, the output signal is inverted.</p> <p>Connecting to multiplexer:<br/>Set clock time to min. 3 s.</p> <p>The NAMUR interface has a defined power consumption. Thus, it is not possible to use the M12 connector with integrated LED (52018763).</p> | <table><tr><th>Connector</th><th>MAX</th><th>MIN</th></tr><tr><td><div>FTL5#(H)- #####N3#<br/>(M12x1)<br/>52018763</div><div></div><div>FTL5#(H)- #####N3#<br/>(M12x1)<br/>52010285 / 52024216</div><div></div></td><td></td><td></td></tr><tr><td><div>FTL5#(H)- #####D3#<br/>(Pg11)<br/>or<br/>FTL5#(H)- #####E3#<br/>(NPT 1/2")</div><div></div></td><td></td><td></td></tr><tr><td><div>FTL5#(H)- #####C3#</div><div></div></td><td></td><td></td></tr></table> | Connector | MAX | MIN | <div>FTL5#(H)- #####N3#<br/>(M12x1)<br/>52018763</div> <div></div> <div>FTL5#(H)- #####N3#<br/>(M12x1)<br/>52010285 / 52024216</div> <div></div> |  |  | <div>FTL5#(H)- #####D3#<br/>(Pg11)<br/>or<br/>FTL5#(H)- #####E3#<br/>(NPT 1/2")</div> <div></div> |  |  | <div>FTL5#(H)- #####C3#</div> <div></div> |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Connector                                                                                                                                                                                                                                                                                                           | MAX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | MIN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |     |     |                                                                                                                                                                                                                                                                                                                     |                                                                                     |                                                                                     |                                                                                                                                                                                    |                                                                                      |                                                                                      |                                                                                                                               |                                                                                       |                                                                                       |
| <div>FTL5#(H)- #####N3#<br/>(M12x1)<br/>52018763</div> <div></div> <div>FTL5#(H)- #####N3#<br/>(M12x1)<br/>52010285 / 52024216</div> <div></div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |           |     |     |                                                                                                                                                                                                                                                                                                                     |                                                                                     |                                                                                     |                                                                                                                                                                                    |                                                                                      |                                                                                      |                                                                                                                               |                                                                                       |                                                                                       |
| <div>FTL5#(H)- #####D3#<br/>(Pg11)<br/>or<br/>FTL5#(H)- #####E3#<br/>(NPT 1/2")</div> <div></div>                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |     |     |                                                                                                                                                                                                                                                                                                                     |                                                                                     |                                                                                     |                                                                                                                                                                                    |                                                                                      |                                                                                      |                                                                                                                               |                                                                                       |                                                                                       |
| <div>FTL5#(H)- #####C3#</div> <div></div>                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |     |     |                                                                                                                                                                                                                                                                                                                     |                                                                                     |                                                                                     |                                                                                                                                                                                    |                                                                                      |                                                                                      |                                                                                                                               |                                                                                       |                                                                                       |

Output signal

 = lit
   
 = flashes
   
 = unlit

L00-FTL5xxxx-07-05-xx-xx-002

| Safety mode | Level                                                                                 | Output signal                                                                                                           | LEDs<br>green    yellow                                                                                                                                                                  |
|-------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Max.        |  | <div> <div>2.2...<br/>3.5 mA</div> <div> <div>+</div> <div>1</div> <div>→</div> <div>3</div> <div>-</div> </div> </div> | <div>   </div> |
|             |  | <div> <div>0.6...<br/>1.0 mA</div> <div> <div>+</div> <div>1</div> <div>→</div> <div>3</div> <div>-</div> </div> </div> | <div>   </div> |
| Min.        |  | <div> <div>2.2...<br/>3.5 mA</div> <div> <div>+</div> <div>1</div> <div>→</div> <div>2</div> <div>-</div> </div> </div> | <div>   </div> |
|             |  | <div> <div>0.6...<br/>1.0 mA</div> <div> <div>+</div> <div>1</div> <div>→</div> <div>2</div> <div>-</div> </div> </div> | <div>   </div> |

L00-FTL5xxxx-04-05-xx-xx-007

|                 |                                                        |
|-----------------|--------------------------------------------------------|
| Signal on alarm | Output signal in the event of damaged sensor: < 1.0 mA |
|-----------------|--------------------------------------------------------|

|                  |                                                                                                                                                                                                                                               |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Connectable load | <ul style="list-style-type: none"><li>■ See Technical Data of isolating amplifier connected according to IEC 60947-5-6 (NAMUR)</li><li>■ Connection also to isolating amplifiers which have special safety circuits (I &gt; 3.0 mA)</li></ul> |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Electronic insert FEL57 (PFM)

### Power supply

Supply voltage: 9,5...12,5 V DC  
 Current consumption: 10...13 mA  
 Power consumption: < 150 mW  
 Reverse polarity protection

### Electrical connection

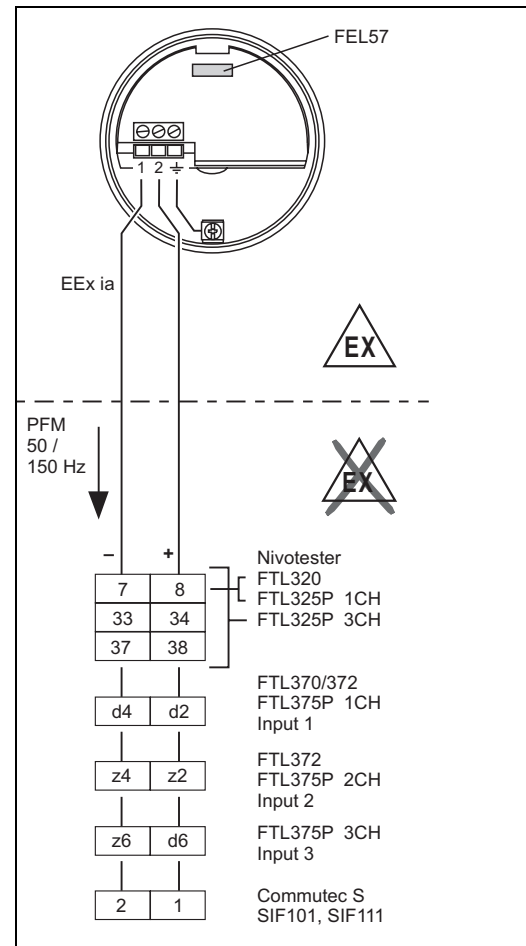
#### Two-wire connection for separate switching unit

For connecting to switching units  
 Nivotester FTL320, FTL325P,  
 FTL370, FTL372, FTL375P  
 (also with cyclical checking)  
 Commutec SIF101, SIN111  
 from Endress+Hauser.  
 Output signal jump of PFM signal  
 from high to low frequency  
 when sensor is covered.  
 Switching between minimum/maximum  
 safety in the Nivotester.

Additional function "cyclical checking":  
 After interruption of the power supply,  
 a test cycle is activated which checks  
 the sensor and electronics without any  
 change in level.  
 Approved for overfill protection acc. to WHG,  
 Germany.  
 The following can be switched at the  
 electronic insert:

- Standard (STD):  
 for low corrosive liquids;  
 simulation approx. 8 s  
 tuning fork exposed – covered – exposed.
- Extended (EXT):  
 for highly corrosive liquids;  
 simulation approx. 41 s  
 tuning fork exposed – covered – corroded –  
 exposed.

The check is activated and monitored at the  
 switching unit.



L00-FTL5xxxx-04-05-xx-en-003

Switching behaviour of the connected device:

| Fail-safe mode<br>set at<br>switching unit | Setting<br>at FEL57 | Fork    | Switching status of relay in switching unit<br>on = energised      off = de-energised |                                             |
|--------------------------------------------|---------------------|---------|---------------------------------------------------------------------------------------|---------------------------------------------|
|                                            |                     |         | ◊ Test start<br>(power off)<br>> 3 s                                                  | ◊ End of test start<br>(power on)           |
| Max.                                       | STD                 | free    | on   off                                                                              | ~ 5 s off   ~ 2 s on   ~ 2 s off   on       |
| Max.                                       | EXT                 | free    | on   off                                                                              | ~ 5 s off   ~ 2 s on   ~ 35 s off   //   on |
| Max.                                       | STD                 | covered | off   off                                                                             | off                                         |
| Max.                                       | EXT                 | covered | off   off                                                                             | off                                         |
| Min.                                       | STD                 | free    | off   ~ 3 s on *                                                                      | ~ 5 s off   ~ 3 s on   off                  |
| Min.                                       | EXT                 | free    | off   ~ 3 s on *                                                                      | ~ 7 s off   ~ 30 s on   //   off            |
| Min.                                       | STD                 | covered | on   ~ 3 s on *                                                                       | ~ 5 s off   on                              |
| Min.                                       | EXT                 | covered | on   ~ 3 s on *                                                                       | ~ 5 s off   ~ 35 s on   //   ~ 3 s off   on |

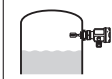
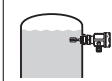
L00-FTL5xxxx-05-05-xx-en-000

\* De-energised on power supply failure

Please note this switching response and function of the plant, especially when replacing a Liquiphant with an EL17Z or FEL37 electronic insert by a Liquiphant M with the FEL57 electronic insert.

Output signal

 = lit  
 = unlit  
L00-FTL2xxxx-07-05-xx-xx-000

| Safety mode | Level                                                                                 | Output signal<br>(PFM)                                                                          | LEDs<br>green    yellow                                                                                                                                                     |
|-------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             |  | 150 Hz<br> |   |
|             |  | 50 Hz<br>  |   |

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Signal on alarm

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

Connectable load

- Floating relay contacts in the connected switching unit Nivotester FTL320, FTL325P, FTL370, FTL372, FTL375P or Commutec SIF101, SIF111
- For contact load see the Technical Data of the switching unit

## Electronic insert FEL50A (PROFIBUS PA)

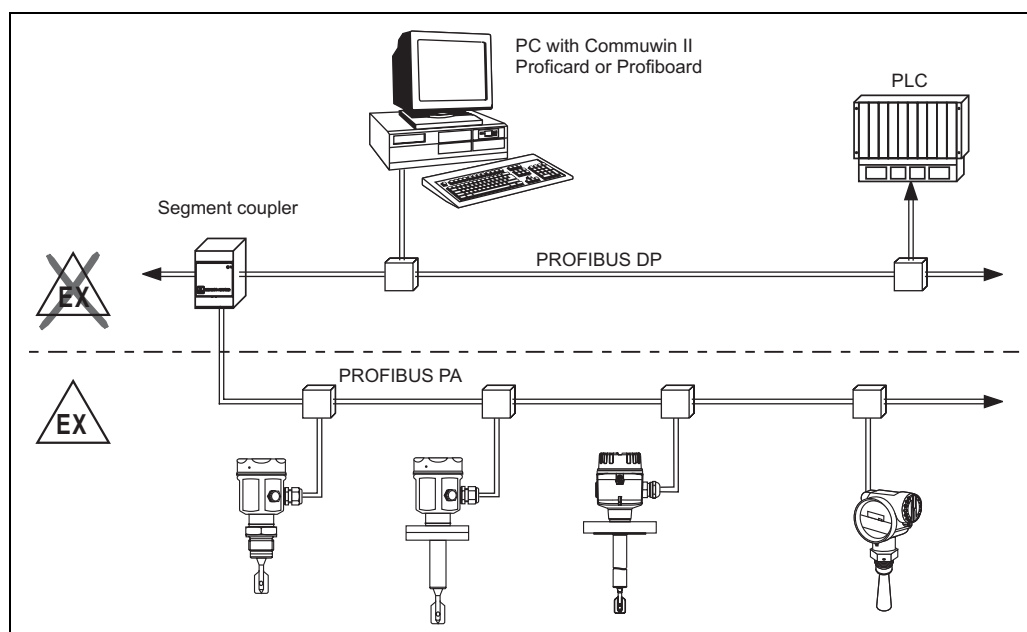
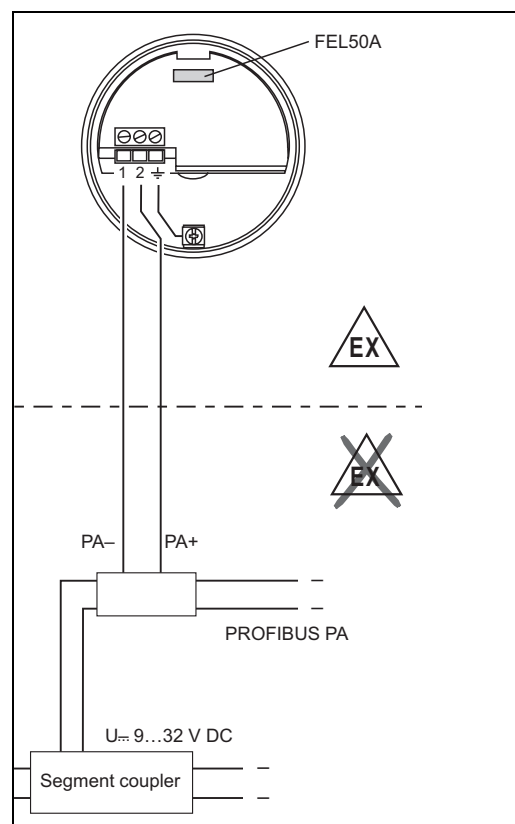
### Electrical connection

#### Two-wire connection for power supply and data transfer

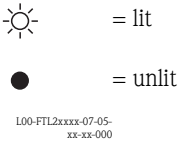
For connecting to PROFIBUS PA

Additional functions:

- Digital communication enables the representation, reading and editing of the following parameters:  
Fork frequency, switch-on frequency, switch-off frequency, switch-on time and switch-off time, status, measured value, density switch.
- Matrix locking possible
- Switch to WHG mode possible (WHG approval).
- For a detailed description see BA198F
- You can also visit [www.profibus.com](http://www.profibus.com) for more information



Output signal



| Setting      | Level | LEDs  |        | FEL50A                     |
|--------------|-------|-------|--------|----------------------------|
|              |       | green | yellow |                            |
| not inverted |       |       |        | OUT_D = 0<br>PA bus signal |
|              |       |       |        | OUT_D = 1<br>PA bus signal |
| inverted     |       |       |        | OUT_D = 1<br>PA bus signal |
|              |       |       |        | OUT_D = 0<br>PA bus signal |

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Signal on alarm

- Failure information can be opened using the following interfaces:  
Yellow LED flashing, status code, diagnostic code; see BA198F

## Connection and function

### Connecting cables

- Electronic inserts: cross-section max. 2.5 mm<sup>2</sup>; strand in ferrule to DIN 46228
- Protective earth in housing: cross-section max. 2.5 mm<sup>2</sup>
- External equipotential bonding connection on housing: cross-section max. 4 mm<sup>2</sup>

### Fail-safe mode

Minimum/maximum residual current safety selectable on electronic insert (with FEL57 on Nivotester only)

Max. = maximum safety:

The output switches to the power fail response when the fork is covered

For use with overfill protection for example

Max. = minimum safety:

The output switches to the power fail response when the fork is exposed

For use with dry running protection for example

### Switching time

When fork is covered: approx. 0.5 s

When fork is exposed: approx. 1.0 s

Other switching times on request

Additionally configurable for PROFIBUS PA: 0.5...60 s

### Switch-on behaviour

When switching on the power supply, the output assumes the alarm signal.

After max. 3 s it assumes the correct switching mode (Exception: FEL57)

## Performance characteristics

### Reference operating conditions

Ambient temperature: 23 °C

Medium temperature: 23 °C

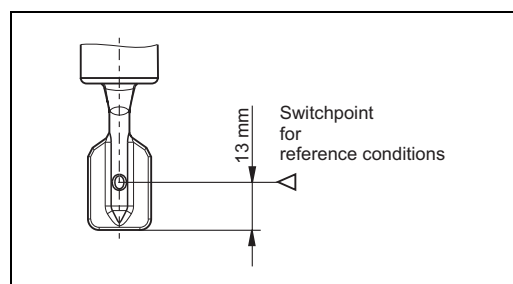
Product density: 1 g/cm<sup>3</sup> (water)

Viscosity: 1 mm<sup>2</sup>/s

Medium pressure  $p_e$ : 0 bar

Sensor mounting: vertical from above

Density switch: to > 0.7



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### Maximum measured error

Specified by mounting position: max. +/-1 mm

### Repeatability

0.1 mm

### Hysteresis

Approx. 2 mm

### Influence of medium temperature

Max. +1.8...-2.8 mm (-50...+150 °C)

### Influence of product density

Max. +4.8...-3.5 mm (0.5...1.5 g/cm<sup>3</sup>)

### Influence of medium pressure

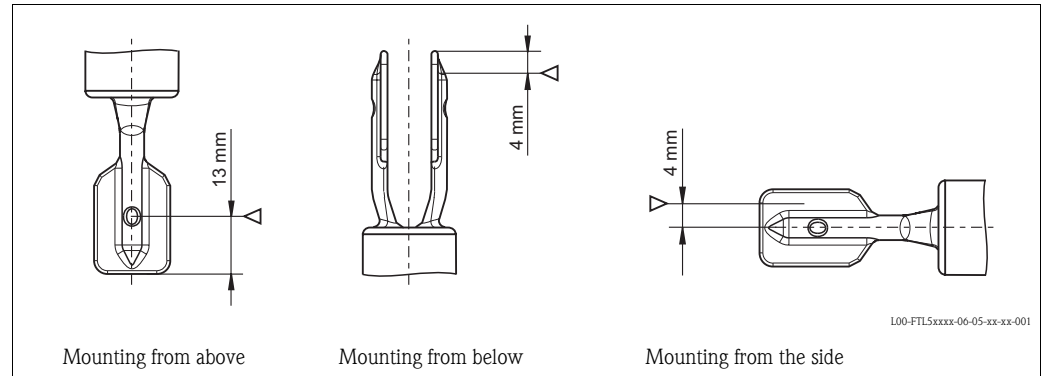
Max. 0...-2.5 mm (-1...64 bar)

## Operating conditions

### Installation

#### Installation instructions

Switch points ▷ on the sensor depend on the mounting position, with reference to water, density 1 g/cm<sup>3</sup>, 23 °C, p<sub>e</sub> 0 bar.



Note!

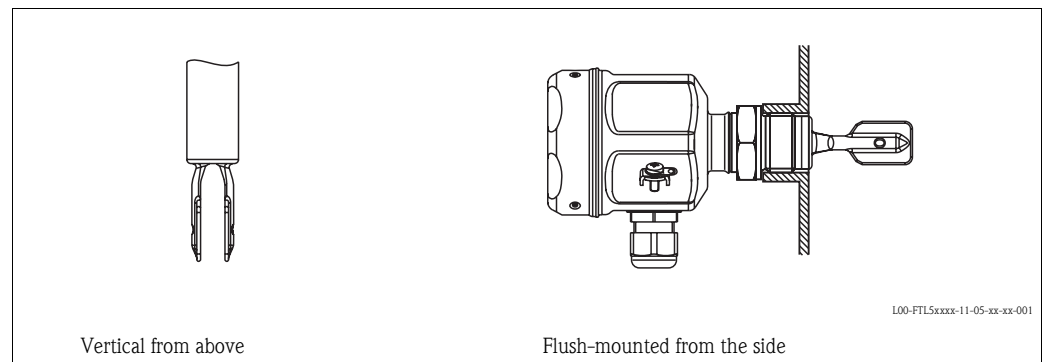
The switchpoints of the Liquiphant **M** are at other positions to those of the previous version Liquiphant **II**.

### Examples of mounting

Examples of mounting with regard to the viscosity  $\nu$  of the liquid and the amount of build-up

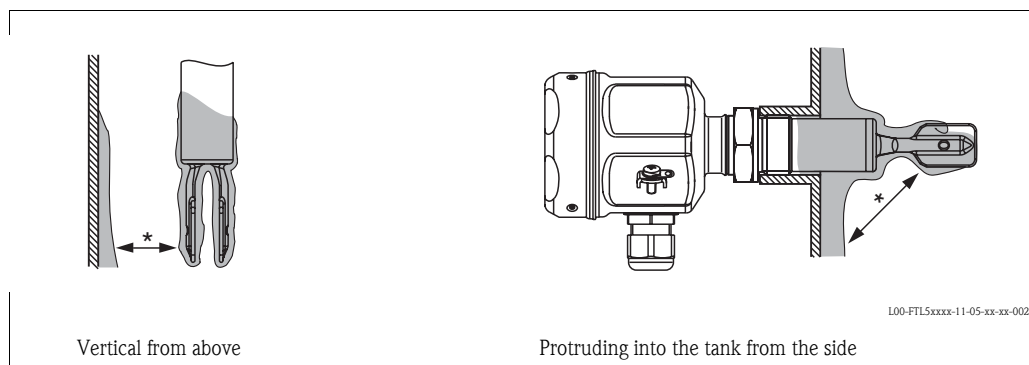
#### Optimum mounting, without problem even with high viscosity:

Position the fork so that the narrow edge of the tines is vertical.  
This ensures that the liquid can run off easily.



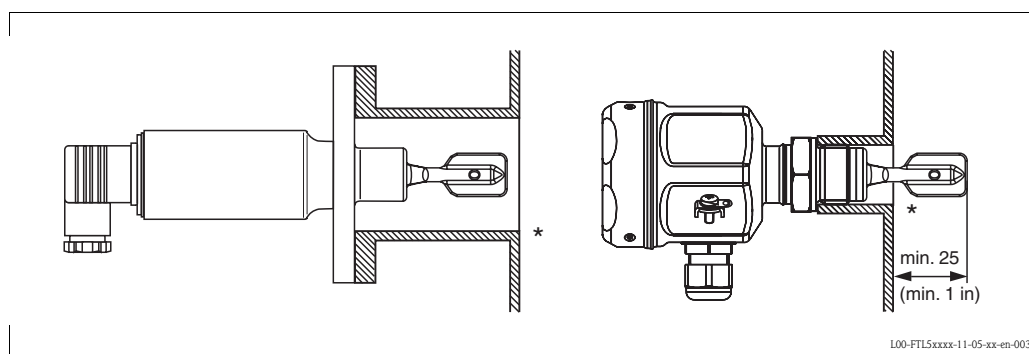
### With build-up on the tank walls:

\* Ensure that there is sufficient distance between the build-up expected on the tank wall and the fork.



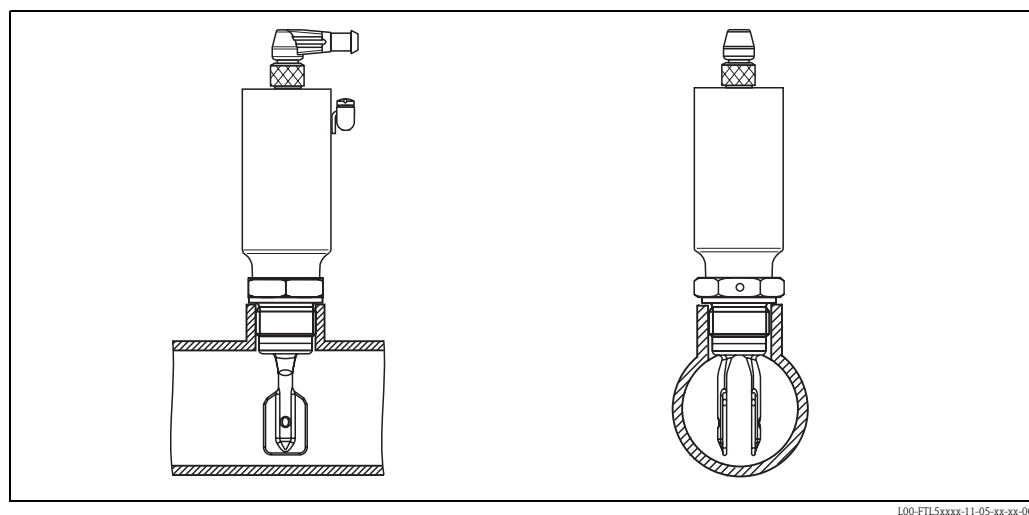
### Mounting positions with low viscosity (up to 2000 mm<sup>2</sup>/s):

\* Deburr the nozzle surfaces

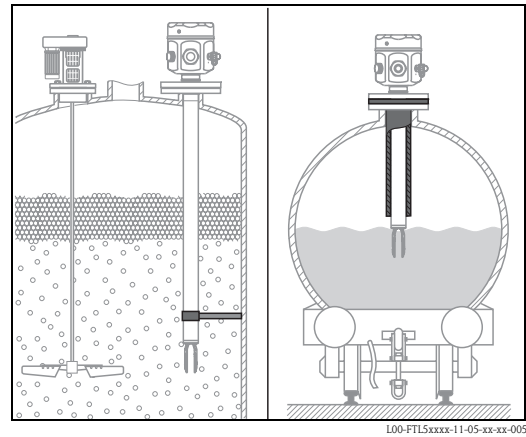


### Mounting in piping from 2"

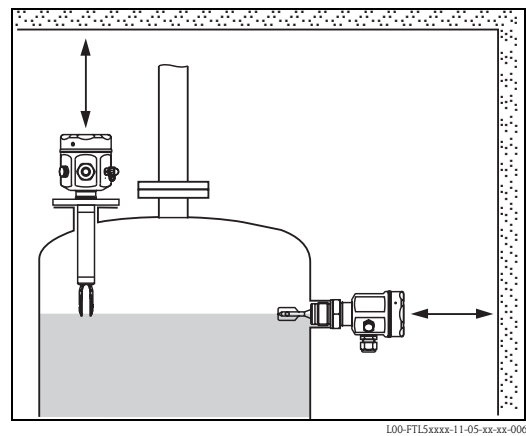
Fluid velocities up to 5 m/s for viscosity 1 mm<sup>2</sup>/s and density 1 g/cm<sup>3</sup>.  
(Check the function for other operating conditions.)



Support the Liquiphant M FTL51(H) in the event of high dynamic loads.



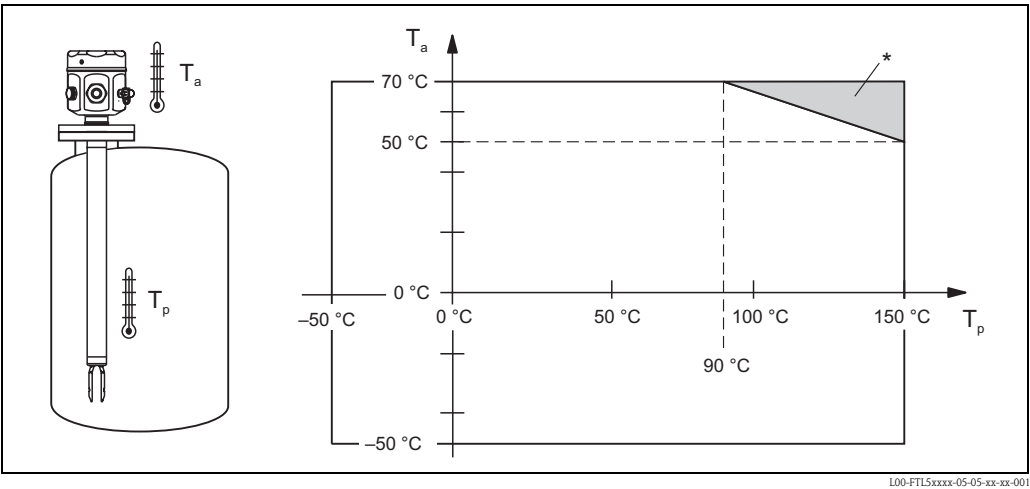
Ensure adequate space outside the tank for mounting, electrical connection and configuration.



**Orientation** FTL50(H) and FTL51(H) with short pipe (up to approx. 500 mm) – any position, FTL51(H) with long pipe – vertical

Environment

**Ambient temperature range** Permitted ambient temperature  $T_a$  at the housing depending on the medium temperature  $T_p$  in the tank:



\* Additional temperature range for devices with a temperature spacer or flameproof bushing

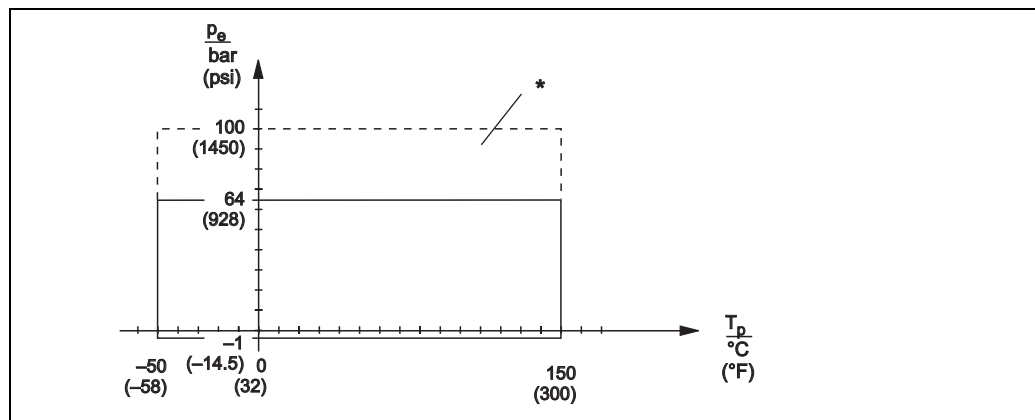
**Ambient temperature limits** -50...+70 °C (function with restricted data)

|                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Storage temperature</b>           | -50...+80 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Climate class</b>                 | Climate protection to IEC 68, Part 2-38, Fig. 2a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Degree of protection</b>          | <ul style="list-style-type: none"> <li>■ Polyester, steel and aluminium housings: IP66/IP67 to EN 60529</li> <li>■ Aluminium housing (EEx d, EEx de): IP66/IP68 to EN 60529 (1 m, 24 h)</li> <li>■ Compact housing: <ul style="list-style-type: none"> <li>– IP65 with valve connector Pg11/NPT ½</li> <li>– IP66/68 with 5m cable tail</li> <li>– IP66/68 with M12x1 connector (52010285) 316L (metal);</li> <li>– IP69k with connector (52024216), elbowed / L= 5 m, without build-in LEDs</li> <li>– IP69k with connector (52018763), elbowed / L= 5 m, with build-in LEDs</li> </ul> </li> </ul> |
| <b>Vibration resistance</b>          | To IEC 68, Part 2-6 (10...55 Hz, 0.15 mm, 100 cycles)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Electromagnetic compatibility</b> | Interference emission to EN 61326, Electrical Equipment Class B<br>Interference immunity to EN 61326; Annex A (Industrial) and NAMUR Recommendation NE 21 (EMC)                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## Medium conditions

|                                 |                                                          |
|---------------------------------|----------------------------------------------------------|
| <b>Medium temperature range</b> | -50...+150 °C; for exceptions, see "Process connections" |
| <b>Thermal shock</b>            | Max. 120 °C/s                                            |

**Medium pressure  $p_e$**



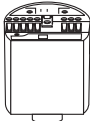
L00-FTL5xxxx-05-05-xx-xx-003

\* Allowed pressure rating by selecting the "100 bar" option (see "Product structure" code 060)  
Exceptions see "Process connections"

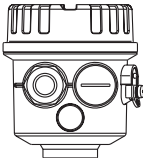
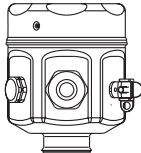
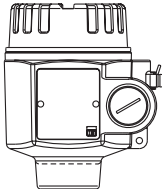
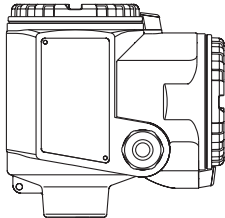
|                             |                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test pressure</b>        | <p><math>p_e = 64</math> bar:<br/> max. 100 bar (1.5 times the medium pressure <math>p_e</math>); no function during test pressure<br/> Burst pressure of diaphragm 200 bar</p> <p><math>p_e = 100</math> bar:<br/> max. 150 bar (1.5 times the medium pressure <math>p_e</math>); no function during test pressure<br/> Burst pressure of diaphragm 400 bar</p> |
| <b>State of aggregation</b> | Liquid                                                                                                                                                                                                                                                                                                                                                           |

|                |                                                                                                                                                          |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Density        | 0.7 g/cm <sup>3</sup> = delivery status<br>0.5 g/cm <sup>3</sup> * adjustable over switches<br><br>* Density settings for the compact housing on request |
| Viscosity      | Max. 10000 mm <sup>2</sup> /s                                                                                                                            |
| Solids content | Max. ø5 mm                                                                                                                                               |

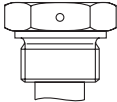
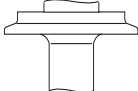
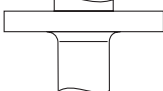
## Mechanical construction

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Design                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Summary of all electrical and mechanical versions<br><br><i>Plug-in electronic inserts to mount in the housing</i> |
| <div><br/>L00-FTL5xxxx-03-05-xx-xx-000</div> <div>FEL51*: Two-wire AC connection<br/>FEL52*: Three-wire DC connection PNP<br/>FEL54: Universal current connection, 2 relay outputs<br/>FEL55: Output 16/8 mA for separate switching unit<br/>FEL56: Output 0.6...1.0 / 2.2...2.8 mA for separate switching unit (NAMUR)<br/>FEL58*: Output 2.2...3.5 / 0.6...1.0 mA for separate switching unit (NAMUR)<br/>FEL57: Output 150/50 Hz, PFM, for separate switching unit (Nivotester)<br/>FEL50A: Digital communication PROFIBUS PA</div> |                                                                                                                    |
| * Electronics also available as compact housing. The electronics cannot be exchanged!                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                    |

### Housing

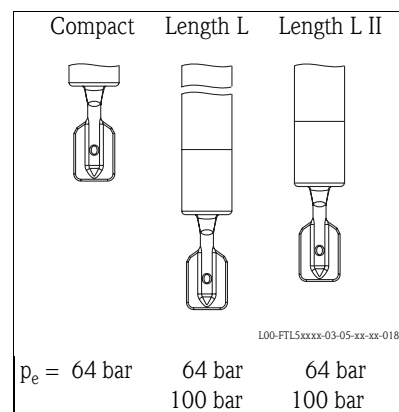
|                                                                                                                     |                                                                                                                     |                                                                                                                      |                                                                                                                       |                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <br>L00-FTL5xxxx-03-05-xx-xx-019 | <br>L00-FTL5xxxx-03-05-xx-xx-001 | <br>L00-FTL5xxxx-03-05-xx-xx-002 | <br>L00-FTL5xxxx-03-05-xx-xx-003 | <br>L00-FTL5xxxx-03-05-xx-xx-004 |
| Pipe housing<br>Compact (316L)                                                                                      | F16<br>Polyester (PBT)                                                                                              | F15<br>Steel (316L)                                                                                                  | F17/F13<br>Aluminium<br>(also for EEx d),<br>coated                                                                   | T13<br>Aluminium with separate<br>connection compartment<br>(also for EEx de and<br>EEx d), coated                    |

### Process connections

|                                                                                                                     |                                                                                                                     |                                                                                                                       |                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <br>L00-FTL5xxxx-03-05-xx-xx-006 | <br>L00-FTL5xxxx-03-05-xx-xx-007 | <br>L00-FTL5xxxx-03-05-xx-xx-008 | <br>L00-FTL5xxxx-03-05-xx-xx-009 |
| G ¾, DIN ISO 228/I<br>R ¾, EN10226<br>NPT ¾, ANSI B 1.20.1<br>(AF 32)                                               | G 1, DIN ISO 228/I<br>R 1, EN10226<br>NPT 1, ANSI B 1.20.1<br>(AF 41)                                               | Diverse<br>hygienic and aseptic<br>connections                                                                        | Flanges to DIN, ANSI, JIS<br>from DN 25 / 1"                                                                          |

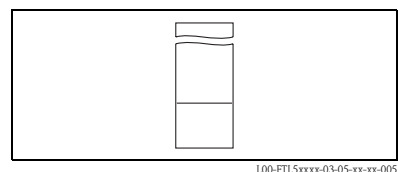
### Sensors

Compact,  
with extension pipe up to 3 m (to 6 m on request)  
or special length "L II" (see also page 30)



### Bushings

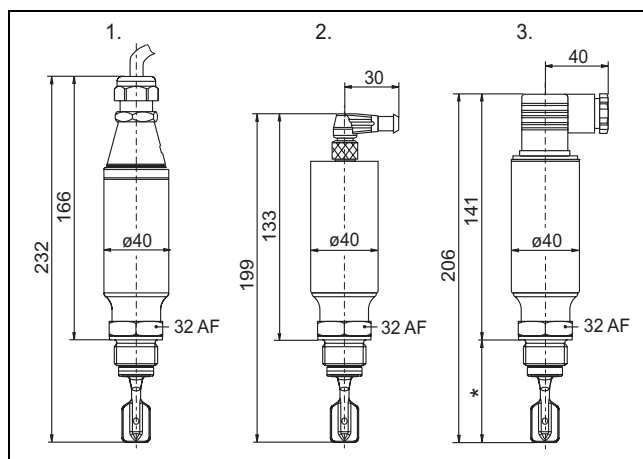
Temperature spacer and flameproof bushing



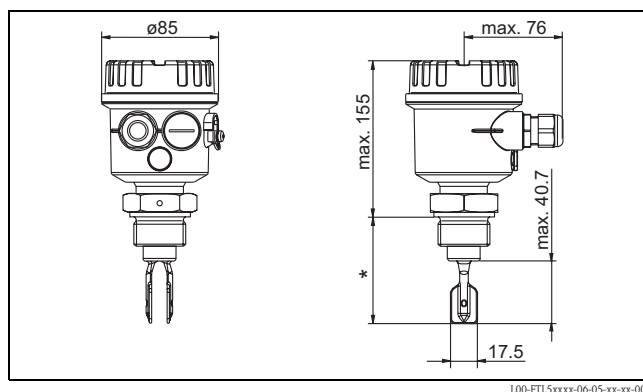
### Dimensions in mm (1 mm = 0,0394 in)

#### Housing and sensor FTL50(H)

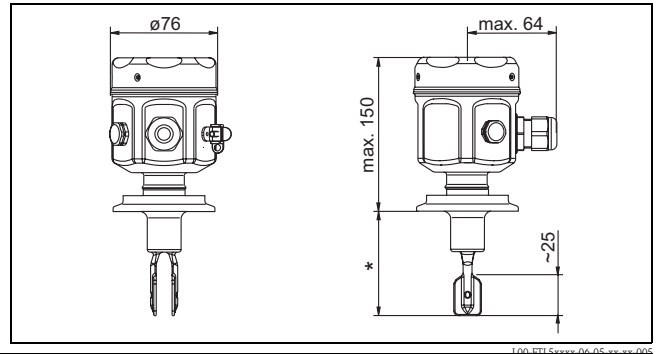
##### Compact housing



##### Polyester housing

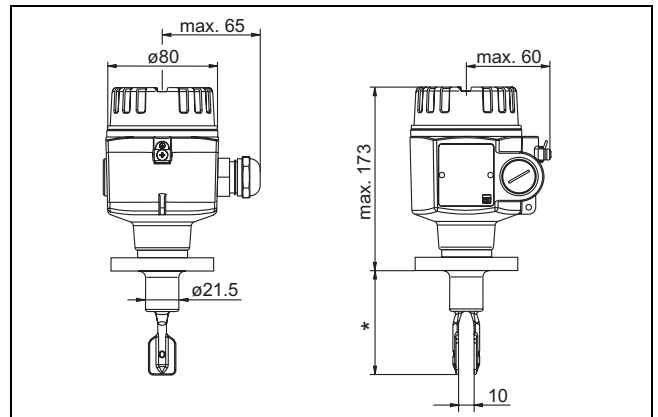


### Steel housing



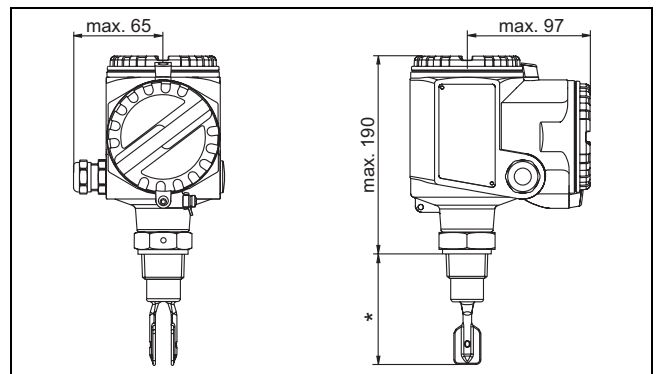
L00-FTL5xxxx-06-05-xx-xx-006

### Aluminium housing



L00-FTL5xxxx-06-05-xx-xx-006

### Aluminium housing with separate connection compartment



L00-FTL5xxxx-06-05-xx-xx-007

\* see "Process connections"



#### Note!

The switchpoints of the Liquiphant **M** are at other positions to those of the previous version Liquiphant **II**.

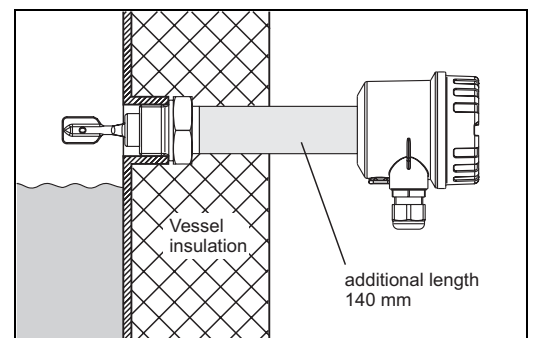
Bushings: temperature spacer, flameproof bushing

#### Temperature spacer

Provides sealed insulation for the vessel and normal ambient temperatures for the housing.

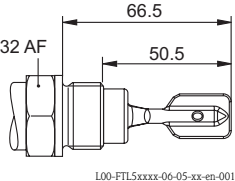
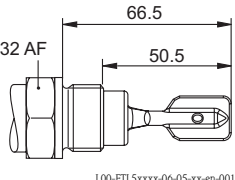
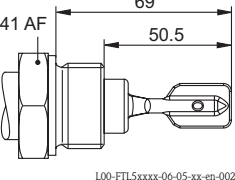
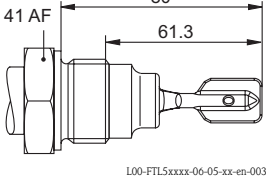
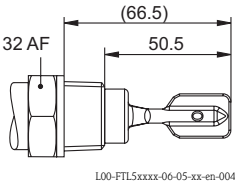
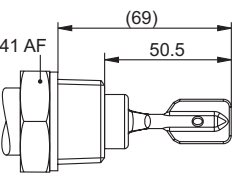
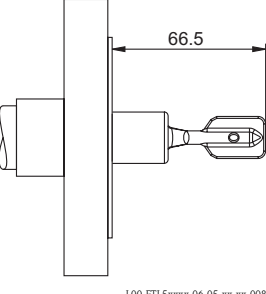
#### Flameproof bushing

Protects the housing from pressures up to 100 bar if the sensor is damaged. Provides sealed insulation for the vessel and normal ambient temperatures for the housing.

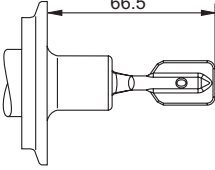
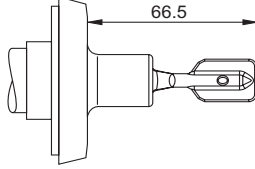
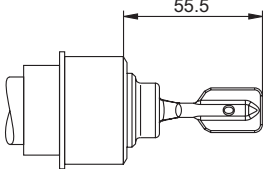
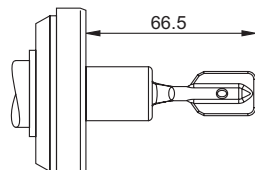
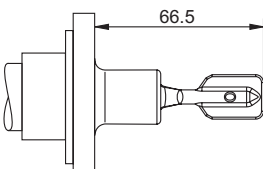
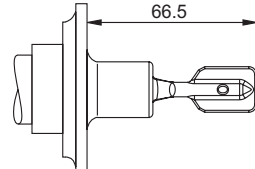
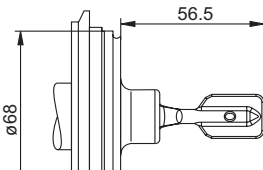


L00-FTL5xxxx-11-05-xx-xx-en-000

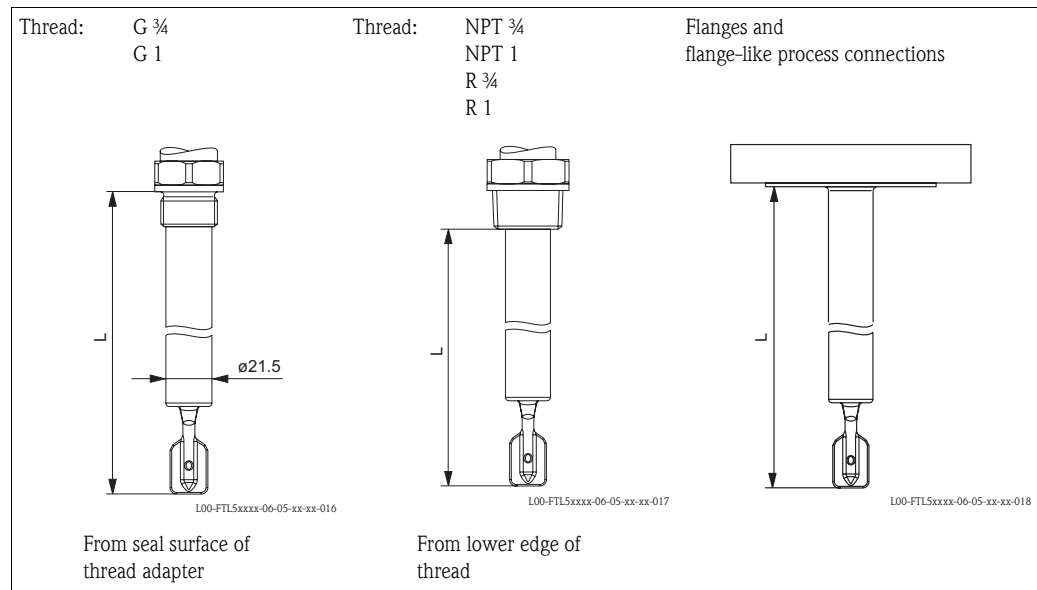
Process connections for FTL50(H) and FTL51(H)

| Process connection                                                                                                                           |                                        | Dimensions                                                                          | Accessories                                                                                                                                                            | Pressure<br>Temperature                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| <b>G ¾</b><br>DIN ISO 228/1<br>with defined<br>thread start<br><br>With elastomer<br>flat seal to DIN 7603:<br>supplied                      | GO2<br>GO5                             |    |                                                                                                                                                                        | max. 100 bar<br>max. 150 °C                                               |
| <b>G ¾</b><br>DIN ISO 228/1<br>with defined<br>thread start<br><br>For flush-mounted<br>installation in<br>welding neck                      | GO2<br>GO5                             |    | <b>Welding neck</b><br>(with defined<br>thread start)<br>with silicone O-ring<br>Endress+Hauser<br>52001052<br><br>In conformity with<br>FDA*<br><br>See "Accessories" | max. 25 bar<br>max. 150 °C<br><br>max. 40 bar<br>max. 100 °C              |
| <b>G 1</b><br>DIN ISO 228/1<br><br>With elastomer<br>flat seal to DIN 7603:<br>supplied                                                      | GR2<br>GR5                             |   |                                                                                                                                                                        | max. 100 bar<br>max. 150 °C                                               |
| <b>G 1</b><br>DIN ISO 228/1<br>with defined<br>thread start<br><br>With seal surface<br>for flush-mounted<br>installation in<br>welding neck | GW2                                    |  | <b>Welding neck</b><br>(with defined<br>thread start)<br>with silicone O-ring<br>Endress+Hauser<br>52001051<br><br>In conformity with<br>FDA*<br><br>See "Accessories" | max. 25 bar<br>max. 150 °C<br><br>max. 40 bar<br>max. 100 °C              |
| <b>NPT ¾</b><br>ANSI B 1.20.1<br><br>or<br><br><b>R ¾</b><br>EN10226                                                                         | GM2<br>GM5<br><br><br>GE2<br>GE5       |  | In conformity with<br>FDA*                                                                                                                                             | max. 100 bar<br>max. 150 °C                                               |
| <b>NPT 1</b><br>ANSI B 1.20.1<br><br>or<br><br><b>R 1</b><br>EN10226                                                                         | GN2<br>GN5<br><br><br>GF2<br>GF5       |  | In conformity with<br>FDA*                                                                                                                                             | max. 100 bar<br>max. 150 °C                                               |
| <b>Flanges</b><br>ANSI B 16.5<br>EN 1092-1<br>(DIN 2527 B)<br>JIS B2220                                                                      | A##<br>B##<br>C##<br>F##<br>N##<br>K## |  | Seal<br>according to design<br>installed on site<br><br>In conformity with<br>FDA*                                                                                     | See nominal pressure<br>of flange, however<br>max. 100 bar<br>max. 150 °C |

\* FDA approved materials according to 21 CFR Part 177.1550/2600

| Process connection                                                                                                        |                   | Dimensions                                                                                                           | Accessories                                                                                                                                                           | Pressure<br>Temperature                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>Tri-Clamp</b><br>1 1/2" = $\varnothing 50.5$ mm<br>2" = $\varnothing 64.0$ mm<br>ISO 2852                              | TC2<br>TE2        | <br>L00-FTL5xxxx-06-05-xx-xx-009   | Clamping ring and front seal installed on site<br><br>In conformity with FDA*                                                                                         | max. 16 bar<br>max. 120 °C<br><br>max. 2 bar<br>max. 150 °C                                                 |
| <b>Threaded pipe joint</b><br>DN 32<br>DN 40<br>DN 50<br>DIN 11851<br><br>with screw cap                                  | MA2<br>MC2<br>ME2 | <br>L00-FTL5xxxx-06-05-xx-xx-010   | Sealing ring with collar, installed on site<br><br>In conformity with FDA*                                                                                            | DN 32, DN 40:<br>max. 40 bar to 100 °C<br>max. 25 bar to 140 °C<br><br>DN 50:<br>max. 25 bar<br>max. 140 °C |
| <b>Flush-mounted for 1" welding neck</b><br>Factory standard<br>Endress+Hauser with silicone seal and screw cap: supplied | EE2               | <br>L00-FTL5xxxx-06-05-xx-xx-011   | <b>Welding neck</b><br>(fork can be positioned)<br>Endress+Hauser 52001047<br><br>In conformity with FDA*<br><br>See "Accessories"                                    | max. 40 bar<br>max. 100 °C<br><br>max. 25 bar<br>max. 150 °C                                                |
| <b>Aseptic</b><br>DN 50<br>DIN 11864-1<br>Form A<br>for pipe DIN 11850<br>with screw cap                                  | HE2               | <br>L00-FTL5xxxx-06-05-xx-xx-012  | Sealing ring, installed on site<br><br>In conformity with FDA*                                                                                                        | max. 25 bar<br>max. 140 °C                                                                                  |
| <b>DRD</b><br>With clamped flange                                                                                         | PE2               | <br>L00-FTL5xxxx-06-05-xx-xx-013 | Welding flange with PTFE flat seal (fork can be positioned)<br>Endress+Hauser 52002041<br><br>In conformity with FDA*<br><br>See "Accessories" (or installed on site) | max. 40 bar<br>max. 100 °C<br><br>max. 25 bar<br>max. 150 °C                                                |
| <b>SMS</b><br>2"<br>(DN 51)<br>with screw cap                                                                             | UE2               | <br>L00-FTL5xxxx-06-05-xx-xx-014 | Sealing ring, installed on site<br><br>In conformity with FDA*                                                                                                        | max. 25 bar<br>max. 140 °C                                                                                  |
| <b>Varivent</b><br>for piping<br>$\geq$ DN 65<br>$\geq$ O.D. 3"<br>$\geq$ I.P.S. 3"                                       | WE2               | <br>L00-FTL5xxxx-06-05-xx-xx-015 | Clamping ring and O-ring seal, installed on site<br><br>In conformity with FDA*                                                                                       | See specification as per Tuchenhausen VARIVENT-Inline housing but:<br><br>max. 25 bar<br>max. 150 °C        |
| * FDA approved materials according to 21 CFR Part 177.1550/2600                                                           |                   |                                                                                                                      |                                                                                                                                                                       |                                                                                                             |

Sensor length L for FTL51 and FTL51H,  
depending on process connection



Any length L:  
148...3000 mm (6...115 in); special version (TSP) on request up to 6000 mm (235 in)



Note!

The switchpoints of the Liquiphant **M** are at other positions to those of the previous version Liquiphant **II**.

Special length "L II":

With vertical mounting from above the same switchpoint as for the Liquiphant II  
FTL360, FTL365, FDL30, FDL35

"L II" depends on process connection:

- 115 mm for flanges and flange-like process connections
- 99 mm for threads NPT and R (BSPT)
- 118 mm for threads G 1 (BSP 1)
- 115 mm for threads G  $\frac{3}{4}$  (BSP  $\frac{3}{4}$ )
- 104 mm for flush-mounted 1" (Endress+Hauser)

## Weights

See "Product structure"

## Material

- Wetted parts:
  - Process connection and extension pipe: AISI 316L (1.4435) or 2.4610 (AlloyC4)
  - Tuning fork: AISI 316L (1.4435) or 2.4610 (AlloyC4)
- Flat seal for process connection G  $\frac{3}{4}$  or G 1: elastomer fibre, asbestos-free
- Polyester housing: PBT-FR
  - with PBT-FR cover or with PA12 cover with sight glass,
  - Cover seal: EPDM
- Steel housing: AISI 316L,
  - Cover seal: silicone
- Aluminium housing: EN-AC-ALSi10Mg, plastic-coated,
  - Cover seal: EPDM
- Compact housing: valve connector or M12 connector
- Cable gland: polyamide or brass, nickel-plated
- Temperature spacer: AISI 316L (1.4435)
- Flameproof bushing: AISI 316L (1.4435)

## Process connections

- Parallel thread G ¾, G 1 to DIN ISO 228/1 with flat seal to DIN 7603
- Tapered thread R ¾, R 1 to EN10226
- Tapered thread ¾ -14 NPT, 1 - 1½ NPT to ANSI B 1.20.1
- Flush-mounted with welding neck to factory standard Endress+Hauser (G ¾, G 1)
- Flush-mounted with welding neck to factory standard Endress+Hauser (1"),  
Sensor can be positioned
- Tri-Clamp 1½", 2" to ISO 2852
- Threaded pipe joint DN 32, 40, 50 to DIN 11851
- Aseptic connection DN 50 to DIN 11864-1 Form A for pipe DIN 11850
- SMS connection 2" (DN 51)
- DRD flange
- Varivent® DN 50 (50/40) to factory standard Tuchenhausen
- Flanges to EN/DIN from DN 25, for standards see "Product structure", to ANSI B 16.5 from 1",  
to JIS B2220 (RF)

## Human interface

## Electronic inserts

With FEL51, FEL52, FEL54, FEL55:

- 2 switches for safety mode and density change,
- green LED to indicate operational status,
- red LED to indicate the switching status, flashes in the event of corrosion damage on sensor or if the electronics are defect

With FEL56:

- 2 switches for safety mode and density change,
- green LED flashes to indicate operational status,
- red LED to indicate the switching status,  
flashes in the event of corrosion damage  
on sensor or if the electronics are defect

With FEL57:

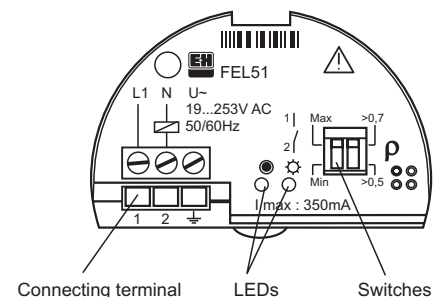
- 2 switches for density change and cyclical checking,
  - green LED to indicate operational status,
  - yellow LED to indicate the covered status,
- flashes in the event of corrosion damage on sensor or if the electronics are defect

With FEL58:

- 2 switches for safety mode and density change,
  - green LED
    - flashes quickly to indicate operational status,
    - flashes slowly to indicate corrosion damage at the sensor or if the electronics are defect,
  - yellow LED to indicate the switching status,
- Test key – breaks the cable connection

With FEL50A:

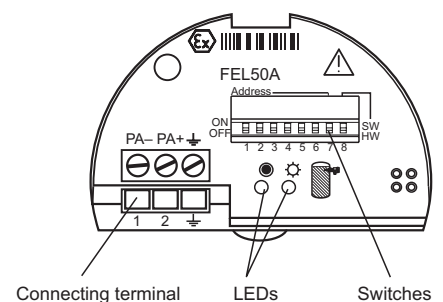
- 8 switches for configuring the device address,
- green LED to indicate operational status, pulsing to indicate communication;
- yellow LED to indicate the switching status, flashes in the event of corrosion damage on sensor or if the electronics are defect



L00-FTL5xxx-03-05-xx-en-001



L00-FTL5xxxx-03-05-xx-xx-013



100-ET15XXXX-03-05-xx-en-002

## Compact housings

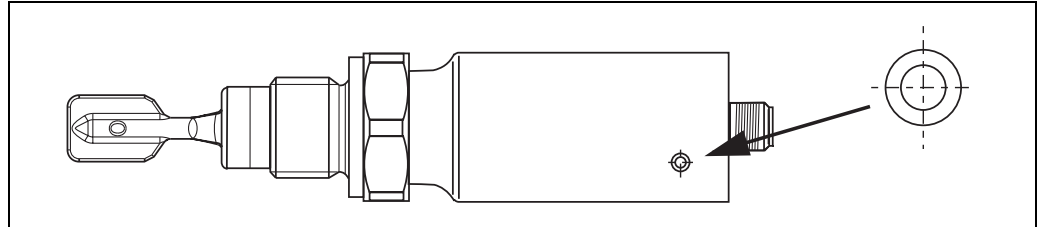
### Function test with test magnet

Versions AC, DC-PNP and NAMUR:

During the test, the current state of the electronic switch is reversed.

*Performing the test*

Hold the test magnet against the marking on the nameplate:

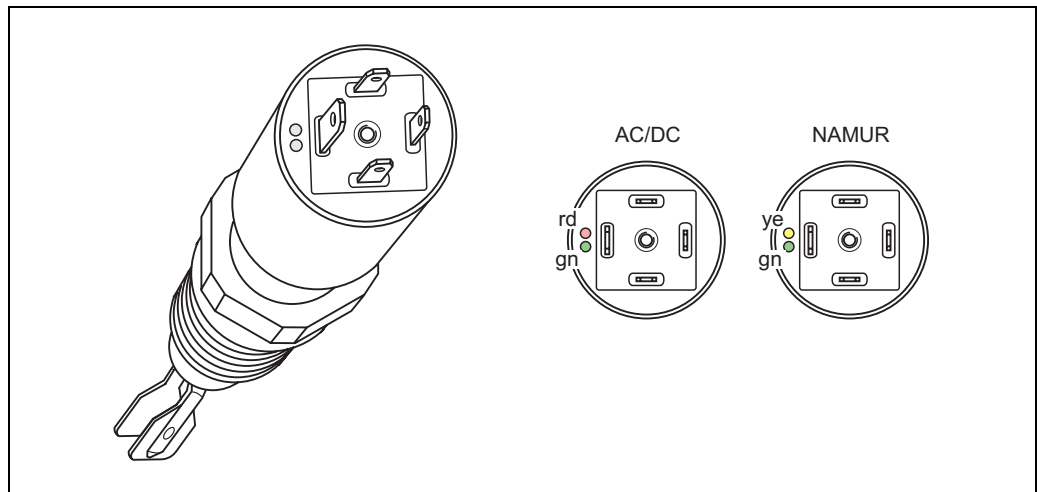


L00-FTL5xxxx-19-05-xx-xx-001

The switching status is changed.

### Light signals

Versions AC and DC-PNP with valve connector or cable tail



L00-FTL5xxxx-07-05-xx-xx-005

#### Green light (gn) light up (AC/DC):

Liquiphant M is connected to the power supply and is operational.

#### Green light (gn) flashing (NAMUR):

Liquiphant M is connected to the power supply and is operational.

#### Red light (rd) lights up (AC/DC):

MAX application mode (overflow protection): sensor is immersed in liquid.

MIN application mode (dry running protection): sensor is not immersed in liquid.

#### Yellow light (ye) lights up (NAMUR):

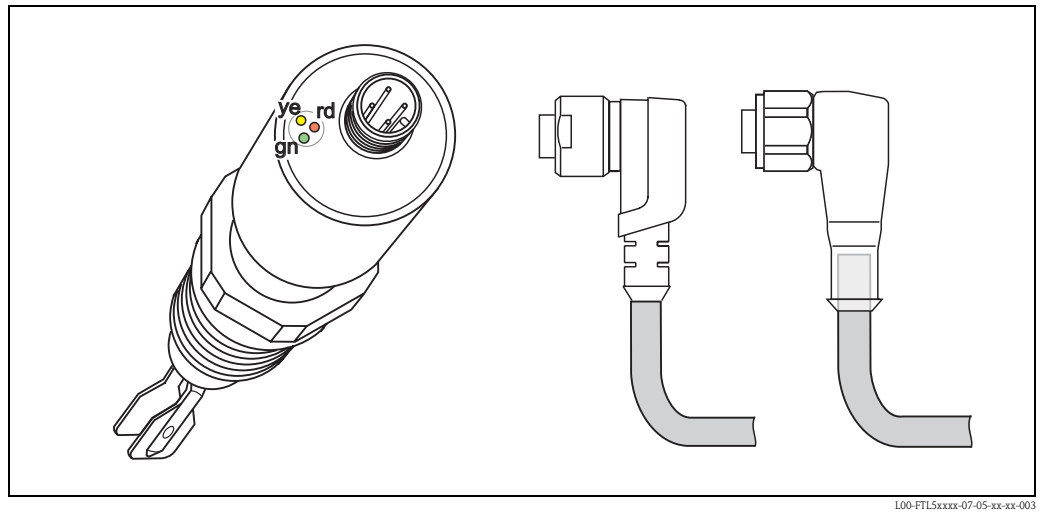
MAX application mode (overflow protection): sensor is not immersed in liquid.

MIN application mode (dry running protection): sensor is immersed in liquid.

#### Red light (rd) flashing (AC/DC):

Liquiphant M has detected a fault.

*Version NAMUR and DC-PNP with M12x1 round connector 316L*



**Green light (gn) lights up (DC-PNP):**

Liquiphant M is connected to the power supply and is operational.

**Green light (gn) flashing with 1 Hz (NAMUR):**

Liquiphant M is connected to the power supply and is operational.

**Yellow light (ye) lights up (DC-PNP):**

Sensor is immersed in liquid.

**Yellow light (ye) lights up (NAMUR):**

MAX application mode (overflow protection): sensor is not immersed in liquid.  
MIN application mode (dry running protection): sensor is immersed in liquid.

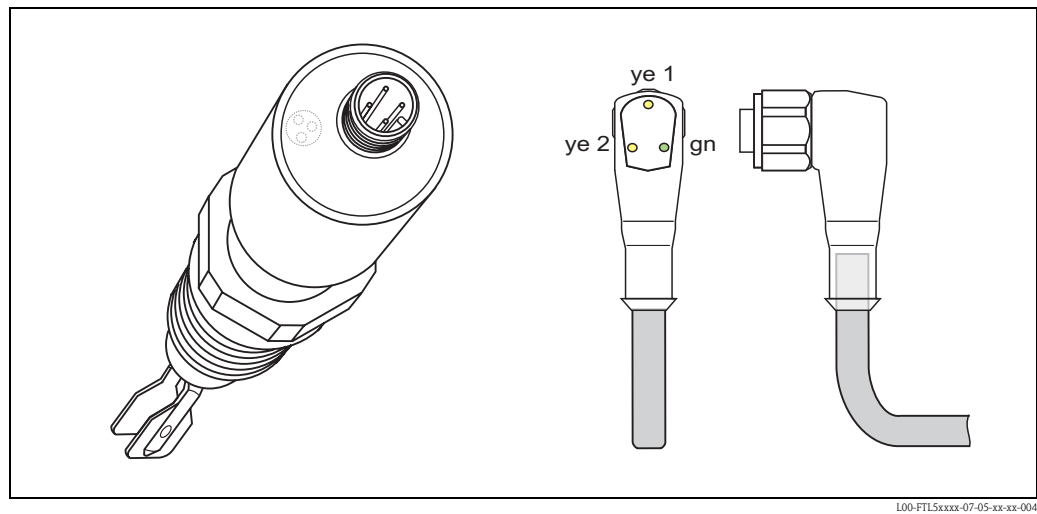
**Red light (rd) flashing (DC-PNP):**

Liquiphant M has detected a fault.

**Green light (gn) flashing with 0.3 Hz (NAMUR):**

Liquiphant M has detected a fault.

Version DC-PNP with M12x1 round connector 316L



**Green light (gn) lights up:**

Liquiphant M is connected to the power supply and is operational.

**Yellow light (ye 1) lights up:**

MAX application mode (overflow protection): sensor is not immersed in liquid.

MIN application mode (dry running protection): sensor is not immersed in liquid.

**Yellow light (ye 2) lights up:**

MAX application mode (overflow protection): sensor is immersed in liquid.

MIN application mode (dry running protection): sensor is immersed in liquid.

**Green light (gn) lights up, both yellow lights (ye 1+2) do not light up:**

Liquiphant M has detected a fault.

**Operating concept**

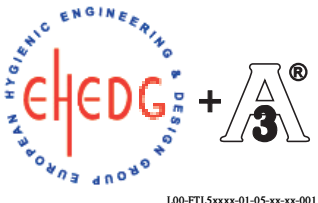
Onsite configuration

## Certificates and approvals

### General approvals

For Liquiphant M FTL50H, FTL51H the following approvals are available:

- EHEDG: Certification (from TNO, The Netherlands), Report No. V99.394
- 3A: 3A Certificate (USA), Authorization No. 459

| Process connections                                 | Order Code    |  |
|-----------------------------------------------------|---------------|-------------------------------------------------------------------------------------|
| Flush-mounted G ¾, G1 (with welding neck)           | GQ2, GW2      | X                                                                                   |
| Tri-Clamp 2" (special seal from Hyjoin Limited, UK) | TE2           | X                                                                                   |
| Threaded pipe joint                                 | MA2, MC2, ME2 | X                                                                                   |
| Flush-mounted (fork can be positioned)              | EE2           | X                                                                                   |
| Aseptic                                             | HE2           | X                                                                                   |
| DRD                                                 | PE2           | X                                                                                   |
| SMS                                                 | UE2           | X                                                                                   |
| Varivent®                                           | WE2           | X                                                                                   |



Note!

For CIP (Clean in Place) and SIP (Sterilize in Place) processes the pressure and temperature specifications of the process connections must be observed.



Warning!

To avoid risk of contamination, install according to the "Hygienic Equipment Design Criteria (HDC)" as stated in the Subgroup Design Principles of the EHEDG, Doc. 8, July 1993. The flow of liquid during cleaning is important and should be in compliance with HDC.

### Other certificates

See "Ordering information"

### Combination of housings and electronic inserts

Based on the various certificates, permissible combinations of housings \*) and electronic inserts are given in the following table.

\*) Abbreviations: Polyester = PBT, Steel 316L = St., Aluminium = Alu

Aluminium housing with separate connection compartment = Alu/sep

|   | Certificate, applications                                 | Housing                 | Electronic inserts                 |
|---|-----------------------------------------------------------|-------------------------|------------------------------------|
| A | Without any special certificate (for non-hazardous area)  | PBT, St., Alu, Alu/sep. | FEL51/52/54,<br>FEL55/56/57/58/50A |
| D | Overfill protection to WHG (Germany)                      | PBT, St., Alu, Alu/sep. | FEL51/52/54,<br>FEL55/56/57/58/50A |
| B | ATEX II 3G EEx nC IIC T6, WHG                             | PBT, St., Alu, Alu/sep. | FEL54                              |
|   | ATEX II 3G EEx nC IIC T6, WHG<br>ATEX II 3D T85°C         | St., Alu, Alu/sep.      | FEL54                              |
| C | ATEX II 3G EEx nA II T6, WHG                              | PBT, St., Alu, Alu/sep. | FEL51/52,<br>FEL55/56/57/58/50A    |
|   | ATEX II 3G EEx nA II T6, WHG<br>ATEX II 3D T85°C          | St., Alu, Alu/sep.      | FEL51/52,<br>FEL55/56/57/58/50A    |
| E | ATEX II 1/2 G, EEx de, WHG                                | Alu/sep.                | FEL51/52/54,<br>FEL55/56/57/58/50A |
| F | ATEX II 1/2 G, EEx ia IIC T6, WHG                         | PBT, St., Alu, Alu/sep. | FEL55/56/57/58/50A                 |
|   | ATEX II 1/2 G, EEx ia IIC T6, WHG<br>ATEX II 1/2 D, T80°C | St., Alu, Alu/sep.      | FEL55/56/57/58/50A                 |

| Certificate, applications |                                                      | Housing                                         | Electronic inserts                 |
|---------------------------|------------------------------------------------------|-------------------------------------------------|------------------------------------|
| G                         | ATEX II 1/2 G, EEx ia IIC T6                         | PBT, St., Alu, Alu/sep.                         | FEL55/56/57/58/50A                 |
|                           | ATEX II 1/2 G, EEx ia IIC T6<br>ATEX II 1/2 D, T80°C | St., Alu, Alu/sep.                              | FEL55/56/57/58/50A                 |
| H                         | ATEX II 1 G, EEx ia IIC T6                           |                                                 | FEL55/56/57/58/50A                 |
| J                         | ATEX II 1 G, EEx ia IIC T6, WHG                      |                                                 | FEL55/56/57/58/50A                 |
| I                         | ATEX II 1/2 G, EEx de                                | Alu/sep.                                        | FEL51/52/54,<br>FEL55/56/57/58/50A |
| K                         | ATEX II 1/2 G, EEx d IIC T6                          | Alu                                             | FEL51/52/54,<br>FEL55/56/57/58/50A |
| L                         | ATEX II 1/2 G, EEx d IIC T6, WHG                     | Alu                                             | FEL51/52/54,<br>FEL55/56/57/58/50A |
| P                         | FM, IS, Cl. I, II, III, Div. 1, Gr. A-G              | PBT, St., Alu, Alu/sep.<br>with NPT cable entry | FEL55/56/57/58                     |
| Q                         | FM, XP, Cl. I, II, III, Div. 1, Gr. A-G              | Alu<br>with NPT cable entry                     | FEL51/52/54,<br>FEL55/56/57/58     |
| R                         | FM, NI, Cl. I, Div. 2, Gr. A-D                       | St., Alu, Alu/sep.<br>with NPT cable entry      | FEL51/52/54,<br>FEL55/56/57/58     |
|                           |                                                      | PBT<br>with NPT cable entry                     | FEL55/56/57/58                     |
| U                         | CSA, General Purpose                                 | St., Alu, Alu/sep.<br>with NPT cable entry      | FEL51/52/54,<br>FEL55/56/57/58     |
|                           |                                                      | PBT<br>with NPT cable entry                     | FEL51/52,<br>FEL55/56/57/58        |
| S                         | CSA, IS, Cl. I, II, III, Div. 1, Gr. A-G             | PBT, St., Alu, Alu/sep.<br>with NPT cable entry | FEL55/56/57/58                     |
| T                         | CSA, XP, Cl. I, II, III, Div. 1, Gr. A-G             | Alu<br>with NPT cable entry                     | FEL51/52/54,<br>FEL55/56/57/58     |
| V                         | TIIS Ex ia IIC T3                                    | PBT, St., Alu                                   | FEL57                              |
| W                         | TIIS Ex d IIB T3                                     | Alu                                             | FEL52/54                           |
| Y                         | Other certificate<br>(for non-hazardous area)        | PBT, St., Alu, Alu/sep.                         | FEL51/52/54,<br>FEL55/56/57/58/50A |



Note!

on polyester housing (PBT), electric connecting cables run in pipes:  
Do not screw cable entries firmly to the piping. Use flexible connections (e.g. with armoured hose).  
If the piping is used for earthing then ensure that there is a continuous electrical connection.



Note!

Despite the additional Dust-Ex-certificate, the FTL5x(H) is to be used as a liquid limit switch only.

## Ordering information



Note!

This overview does not mark options which are mutually exclusive.

### Product structure

**Liquiphant M**  
**FTL50**  
**FTL51**

| Design |                     | Basic weight |
|--------|---------------------|--------------|
| FTL50  | Compact             | 0.6 kg       |
| FTL51  | With extension pipe | 0.6 kg       |

| 10 | Approval:            |                      |                                                 |
|----|----------------------|----------------------|-------------------------------------------------|
| A  | Non-hazardous area   |                      |                                                 |
| B  | ATEX II 3 G          | EEx nC II T6         | Overfill protection to WHG (Germany)            |
|    | ATEX II 3 D          | T 85 °C*             |                                                 |
| C  | ATEX II 3 G          | EEx nA II T6         | Overfill protection to WHG (Germany)            |
|    | ATEX II 3 D          | T 85 °C*             |                                                 |
| D  | Non-hazardous area   |                      |                                                 |
| E  | ATEX II 1/2 G        | EEx de IIC T6        | Overfill protection to WHG (Germany)            |
| F  | ATEX II 1/2 D        | EEx ia IIC T6        | Overfill protection to WHG (Germany)            |
|    | ATEX II 1/2 D        | T 80 °C*             |                                                 |
| G  | ATEX II 1/2 G        | EEx ia IIC T6        |                                                 |
|    | ATEX II 1/2 D        | T 80 °C*             |                                                 |
| H  | ATEX II 1 G          | EEx ia IIC T6        |                                                 |
| I  | ATEX II 1/2 G        | EEx de IIC T6        |                                                 |
| J  | ATEX II 1 G          | EEx ia IIC T6        | Overfill protection to WHG (Germany)            |
| K  | ATEX II 1/2 G        | EEx d IIC T6         |                                                 |
| L  | ATEX II 1/2 G        | EEx d IIC T6         | Overfill protection to WHG (Germany)            |
| P  | FM                   | IS, Class I, II, III | Division 1, Group A-G                           |
| Q  | FM                   | XP, Class I, II, III | Division 1, Group B-G, for E5 housing Group A-G |
| R  | FM                   | NI, Class I          | Division 2, Group A-D                           |
| S  | CSA                  | IS, Class I, II, III | Division 1, Group A-G                           |
| T  | CSA                  | XP, Class I, II, III | Division 1, Group A-G                           |
| U  | CSA                  | General Purpose      |                                                 |
| V  | TIIS                 | Ex ia IIC T3         |                                                 |
| W  | TIIS                 | Ex d IIB T3          |                                                 |
| X  | TIIS                 | Ex ia IIC T6         |                                                 |
| 7  | TIIS                 | Ex d IIC T3          |                                                 |
| 8  | TIIS                 | Ex d IIC T6          |                                                 |
| Y  | Special version      |                      |                                                 |
|    | *) not valid for PBT |                      |                                                 |

| 20  | Process Connection:                                                                          |           |                | Additional weight             |
|-----|----------------------------------------------------------------------------------------------|-----------|----------------|-------------------------------|
|     | Note!                                                                                        |           |                |                               |
|     | For 100 bar process pressure, please select the appropriate option under "Additional option" |           |                |                               |
| GO2 | G ¾                                                                                          | 316L      | Thread ISO 228 |                               |
|     | Installation > accessory: welding neck                                                       |           |                |                               |
| GO5 | G ¾                                                                                          | AlloyC4   | Thread ISO 228 |                               |
| GR2 | G 1                                                                                          | 316L      | Thread ISO 228 | 0.2 kg                        |
| GR5 | G 1                                                                                          | AlloyC4   | Thread ISO 228 | 0.2 kg                        |
| GW2 | G 1                                                                                          | 316L      | Thread ISO 228 | 0.2 kg                        |
|     | Installation > accessory: welding neck                                                       |           |                |                               |
| GM2 | NPT ¾                                                                                        | 316L      | Thread ANSI    |                               |
| GM5 | NPT ¾                                                                                        | AlloyC4   | Thread ANSI    |                               |
| GN2 | NPT 1                                                                                        | 316L      | Thread ANSI    | 0.2 kg                        |
| GN5 | NPT 1                                                                                        | AlloyC4   | Thread ANSI    | 0.2 kg                        |
| GE2 | R ¾                                                                                          | 316L      | Thread EN10226 |                               |
| GE5 | R ¾                                                                                          | AlloyC4   | Thread EN10226 |                               |
| GF2 | R 1                                                                                          | 316L      | Thread EN10226 | 0.2 kg                        |
| GF5 | R 1                                                                                          | AlloyC4   | Thread EN10226 | 0.2 kg                        |
| BA2 | DN32                                                                                         | PN6 A     | 316L           | Flange EN 1092-1 (DIN 2527 B) |
|     |                                                                                              |           |                | 1.2 kg                        |
| BB2 | DN32                                                                                         | PN25/40 A | 316L           | Flange EN 1092-1 (DIN 2527 B) |
|     |                                                                                              |           |                | 2.0 kg                        |
| BC2 | DN40                                                                                         | PN6 A     | 316L           | Flange EN 1092-1 (DIN 2527 B) |
|     |                                                                                              |           |                | 1.4 kg                        |
| BD2 | DN40                                                                                         | PN25/40 A | 316L           | Flange EN 1092-1 (DIN 2527 B) |
|     |                                                                                              |           |                | 2.4 kg                        |
| BE2 | DN50                                                                                         | PN6 A     | 316L           | Flange EN 1092-1 (DIN 2527 B) |
|     |                                                                                              |           |                | 1.6 kg                        |

| 20 | Process Connection: |       |            |                      |                               | Additional weight |
|----|---------------------|-------|------------|----------------------|-------------------------------|-------------------|
|    | BG2                 | DN50  | PN25/40 A  | 316L                 | Flange EN 1092-1 (DIN 2527 B) | 3.2 kg            |
|    | BH2                 | DN65  | PN6 A      | 316L                 | Flange EN 1092-1 (DIN 2527 B) | 2.4 kg            |
|    | BJ2                 | DN50  | PN100 A    | 316L (FTL51)         | Flange EN 1092-1 (DIN 2527 B) |                   |
|    | BK2                 | DN65  | PN25/40 A  | 316L                 | Flange EN 1092-1 (DIN 2527 B) | 4.3 kg            |
|    | BM2                 | DN80  | PN10/16 A  | 316L                 | Flange EN 1092-1 (DIN 2527 B) | 4.8 kg            |
|    | BN2                 | DN80  | PN25/40 A  | 316L                 | Flange EN 1092-1 (DIN 2527 B) | 5.9 kg            |
|    | BO2                 | DN100 | PN10/16 A  | 316L                 | Flange EN 1092-1 (DIN 2527 B) | 5.6 kg            |
|    | BR2                 | DN100 | PN25/40 A  | 316L                 | Flange EN 1092-1 (DIN 2527 B) | 7.5 kg            |
|    | B12                 | DN80  | PN100 A    | 316L (FTL51)         | Flange EN 1092-1 (DIN 2527 B) |                   |
|    | B82                 | DN25  | PN25/40 A  | 316L                 | Flange EN 1092-1 (DIN 2527 B) | 1.4 kg            |
|    | CA2                 | DN32  | PN6 B1     | 316L                 | Flange EN 1092-1 (DIN 2527 C) | 1.1 kg            |
|    | CA5                 | DN32  | PN6        | AlloyC4 >316L        | Flange EN 1092-1 (DIN 2527)   | 1.1 kg            |
|    | CE2                 | DN50  | PN6 B1     | 316L                 | Flange EN 1092-1 (DIN 2527 C) | 1.5 kg            |
|    | CE5                 | DN50  | PN6        | AlloyC4 >316L        | Flange EN 1092-1 (DIN 2527)   | 1.5 kg            |
|    | CG2                 | DN50  | PN25/40 B1 | 316L                 | Flange EN 1092-1 (DIN 2527 C) | 2.9 kg            |
|    | CG5                 | DN50  | PN25/40    | AlloyC4 >316L        | Flange EN 1092-1 (DIN 2527)   | 2.9 kg            |
|    | CJ2                 | DN50  | PN100 B2   | 316L (FTL51)         | Flange EN 1092-1 (DIN 2527)   |                   |
|    | CN2                 | DN80  | PN25/40 B1 | 316L                 | Flange EN 1092-1 (DIN 2527 C) | 5.2 kg            |
|    | CN5                 | DN80  | PN25/40    | AlloyC4 >316L        | Flange EN 1092-1 (DIN 2527)   | 5.2 kg            |
|    | CO2                 | DN100 | PN10/16 B1 | 316L                 | Flange EN 1092-1 (DIN 2527 C) | 5.3 kg            |
|    | CO5                 | DN100 | PN10/16    | AlloyC4 >316L        | Flange EN 1092-1 (DIN 2527)   | 5.3 kg            |
|    | C12                 | DN80  | PN100 B2   | 316L (FTL51)         | Flange EN 1092-1 (DIN 2527)   |                   |
|    | C82                 | DN25  | PN25/40 B1 | 316L                 | Flange EN 1092-1 (DIN 2527 C) | 1.3 kg            |
|    | C85                 | DN25  | PN25/40    | AlloyC4 >316L        | Flange EN 1092-1 (DIN 2527)   | 1.3 kg            |
|    | DG2                 | DN50  | PN40 B1    | 316L                 | Flange EN 1092-1 (DIN 2526 D) |                   |
|    | DN2                 | DN80  | PN40 B1    | 316L                 | Flange EN 1092-1 (DIN 2526 D) |                   |
|    | D82                 | DN25  | PN40 B1    | 316L                 | Flange EN 1092-1 (DIN 2526 D) |                   |
|    | FG2                 | DN50  | PN40 C     | 316L                 | Flange EN 1092-1 (DIN 2512 F) | 2.6 kg            |
|    | NG2                 | DN50  | PN40 D     | 316L                 | Flange EN 1092-1 (DIN2512 N)  | 2.9 kg            |
|    | AA2                 | 1¼"   | 150 lbs    | RF 316/316L          | Flange ANSI B16.5             | 1.2 kg            |
|    | AB2                 | 1¼"   | 300 lbs    | RF 316/316L (FTL51)  | Flange ANSI B16.5             | 2.0 kg            |
|    | AC2                 | 1½"   | 150 lbs    | RF 316/316L          | Flange ANSI B16.5             | 1.5 kg            |
|    | AD2                 | 1½"   | 300 lbs    | RF 316/316L (FTL51)  | Flange ANSI B16.5             | 2.7 kg            |
|    | AE2                 | 2"    | 150 lbs    | RF 316/316L          | Flange ANSI B16.5             | 2.4 kg            |
|    | AE5                 | 2"    | 150 lbs    | RF AlloyC4 >316/316L | Flange ANSI B16.5             | 2.4 kg            |
|    | AF2                 | 2"    | 300 lbs    | RF 316/316L          | Flange ANSI B16.5             | 3.2 kg            |
|    | AG2                 | 2"    | 600 lbs    | RF 316/316L (FTL51)  | Flange ANSI B16.5             | 4.2 kg            |
|    | AJ2                 | 2½"   | 300 lbs    | RF 316/316L (FTL51)  | Flange ANSI B16.5             | 4.8 kg            |
|    | AL2                 | 3"    | 150 lbs    | RF 316/316L          | Flange ANSI B16.5             | 4.9 kg            |
|    | AM2                 | 3"    | 300 lbs    | RF 316/316L (FTL51)  | Flange ANSI B16.5             | 6.8 kg            |
|    | AN2                 | 3"    | 600 lbs    | RF 316/316L (FTL51)  | Flange ANSI B16.5             |                   |
|    | AP2                 | 4"    | 150 lbs    | RF 316/316L          | Flange ANSI B16.5             | 7.0 kg            |
|    | AQ2                 | 4"    | 300 lbs    | RF 316/316L (FTL51)  | Flange ANSI B16.5             | 11.5 kg           |
|    | AR2                 | 4"    | 600 lbs    | RF 316/316L (FTL51)  | Flange ANSI B16.5             | 17.3 kg           |
|    | A82                 | 1"    | 150 lbs    | RF 316/316L          | Flange ANSI B16.5             | 1.0 kg            |

| 20 | Process Connection:                                                                                                                                                                                |                                      |                                  |                               | Additional weight  |               |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|----------------------------------|-------------------------------|--------------------|---------------|
|    | KA2                                                                                                                                                                                                | 10 K 25                              | RF                               | 316L                          | Flange JIS B2220   |               |
|    | KC2                                                                                                                                                                                                | 10 K 40                              | RF                               | 316L                          | Flange JIS B2220   |               |
|    | KE2                                                                                                                                                                                                | 10 K 50                              | RF                               | 316L                          | Flange JIS B2220   | 1.7 kg        |
|    | KE5                                                                                                                                                                                                | 10 K 50                              | RF                               | AlloyC4 >316L                 | Flange JIS B2220   | 1.7 kg        |
|    | KL2                                                                                                                                                                                                | 10 K 80                              | RF                               | 316L                          | Flange JIS B2220   |               |
|    | KP2                                                                                                                                                                                                | 10 K 100                             | RF                               | 316L                          | Flange JIS B2220   |               |
|    | TC2                                                                                                                                                                                                | DN25-38 (1...1½")                    |                                  | 316L                          | ISO 2852 Tri-Clamp |               |
|    | TE2                                                                                                                                                                                                | DN40-51 (2")                         |                                  | 316L                          | ISO 2852 Tri-Clamp | 0.1 kg        |
|    | YY9                                                                                                                                                                                                | Special version                      |                                  |                               |                    |               |
| 30 | Probe Length; Type:                                                                                                                                                                                |                                      |                                  |                               |                    |               |
|    | FTL50                                                                                                                                                                                              |                                      |                                  |                               |                    |               |
|    | AA                                                                                                                                                                                                 | Compact;                             |                                  | Ra <3.2 µm/80 grit            |                    |               |
|    | IA                                                                                                                                                                                                 | Compact;                             |                                  | temperature spacer            |                    | 0.6 kg        |
|    | QA                                                                                                                                                                                                 | Compact;                             |                                  | pressure tight feed through   |                    | 0.7 kg        |
|    | FTL51                                                                                                                                                                                              |                                      |                                  |                               |                    |               |
|    | BB                                                                                                                                                                                                 | ..... mm;                            | 316L**                           | Ra <3.2 µm/80 grit            |                    |               |
|    | BE                                                                                                                                                                                                 | ..... mm;                            | AlloyC4**                        | Ra <3.2 µm/80 grit            |                    |               |
|    | CB                                                                                                                                                                                                 | ..... inch;                          | 316L**                           | Ra <3.2 µm/80 grit            |                    |               |
|    | CE                                                                                                                                                                                                 | ..... inch;                          | AlloyC4**                        | Ra <3.2 µm/80 grit            |                    | 2.3 kg/100 in |
|    | DB                                                                                                                                                                                                 | Length: type II*;                    | 316L                             | Ra <3.2 µm/80 grit            |                    | 0.1 kg        |
|    | DE                                                                                                                                                                                                 | Length: type II*;                    | AlloyC4                          | Ra <3.2 µm/80 grit            |                    | 0.1 kg        |
|    | JB                                                                                                                                                                                                 | ..... mm;                            | 316L**                           | + temperature spacer          |                    | 0.9 kg/m      |
|    |                                                                                                                                                                                                    |                                      |                                  |                               |                    | +0.6 kg       |
|    | JE                                                                                                                                                                                                 | ..... mm;                            | AlloyC4**                        | + temperature spacer          |                    | 0.9 kg/m      |
|    |                                                                                                                                                                                                    |                                      |                                  |                               |                    | +0.6 kg       |
|    | KB                                                                                                                                                                                                 | ..... inch;                          | 316L**                           | + temperature spacer          |                    | 2.3 kg/100 in |
|    |                                                                                                                                                                                                    |                                      |                                  |                               |                    | +0.6 kg       |
|    | KE                                                                                                                                                                                                 | ..... inch;                          | AlloyC4**                        | + temperature spacer          |                    | 2.3 kg/100 in |
|    |                                                                                                                                                                                                    |                                      |                                  |                               |                    | +0.6 kg       |
|    | LB                                                                                                                                                                                                 | Length: type II*;                    | 316L                             | + temperature spacer          |                    | 0.1 kg        |
|    |                                                                                                                                                                                                    |                                      |                                  |                               |                    | +0.6 kg       |
|    | LE                                                                                                                                                                                                 | Length: type II*;                    | AlloyC4                          | + temperature spacer          |                    | 0.1 kg        |
|    |                                                                                                                                                                                                    |                                      |                                  |                               |                    | +0.6 kg       |
|    | RB                                                                                                                                                                                                 | ..... mm;                            | 316L**                           | + pressure tight feed through |                    | 0.9 kg/m      |
|    |                                                                                                                                                                                                    |                                      |                                  |                               |                    | +0.7 kg       |
|    | RE                                                                                                                                                                                                 | ..... mm;                            | AlloyC4**                        | + pressure tight feed through |                    | 0.9 kg/m      |
|    |                                                                                                                                                                                                    |                                      |                                  |                               |                    | +0.7 kg       |
|    | SB                                                                                                                                                                                                 | ..... inch;                          | 316L**                           | + pressure tight feed through |                    | 2.3 kg/100 in |
|    |                                                                                                                                                                                                    |                                      |                                  |                               |                    | +0.7 kg       |
|    | SE                                                                                                                                                                                                 | ..... inch;                          | AlloyC4**                        | + pressure tight feed through |                    | 2.3 kg/100 in |
|    |                                                                                                                                                                                                    |                                      |                                  |                               |                    | +0.7 kg       |
|    | TB                                                                                                                                                                                                 | Length: type II*;                    | 316L                             | + pressure tight feed through |                    | 0.1 kg        |
|    |                                                                                                                                                                                                    |                                      |                                  |                               |                    | +0.7 kg       |
|    | TE                                                                                                                                                                                                 | Length: type II*;                    | AlloyC4                          | + pressure tight feed through |                    | 0.1 kg        |
|    |                                                                                                                                                                                                    |                                      |                                  |                               |                    | +0.7 kg       |
|    | YY                                                                                                                                                                                                 | Special version                      |                                  |                               |                    |               |
|    | *) Replacing instruments: when vertically mounting a Liquiphant <b>M</b> FTL51 with length II, the switch point is at the same height as for the Liquiphant <b>II</b> FTL360, FTL365, FDL30, FDL35 |                                      |                                  |                               |                    |               |
|    | **) Order 3001...6000 mm (116...235 in) via yy                                                                                                                                                     |                                      |                                  |                               |                    |               |
| 40 | Electronics; Output:                                                                                                                                                                               |                                      |                                  |                               |                    |               |
|    | A                                                                                                                                                                                                  | FEL50A                               | PROFIBUS PA                      |                               |                    |               |
|    | 1                                                                                                                                                                                                  | FEL51*                               | 2-wire,                          | 19...253 V AC                 |                    |               |
|    | 2                                                                                                                                                                                                  | FEL52*                               | 3-wire PNP,                      | 10... 55 V DC                 |                    |               |
|    | 4                                                                                                                                                                                                  | FEL54                                | relay DPDT,                      | 19...253 V AC, 19...55 V DC   |                    |               |
|    | 5                                                                                                                                                                                                  | FEL55                                | 8/16 mA,                         | 11... 36 V DC                 |                    |               |
|    | 6                                                                                                                                                                                                  | FEL56                                | NAMUR (L-H signal)               |                               |                    |               |
|    | 7                                                                                                                                                                                                  | FEL57                                | 2-wire PFM                       |                               |                    |               |
|    | 8                                                                                                                                                                                                  | FEL58*                               | NAMUR + test button (H-L signal) |                               |                    |               |
|    | 9                                                                                                                                                                                                  | Special version                      |                                  |                               |                    |               |
|    |                                                                                                                                                                                                    | *) Also available in compact housing |                                  |                               |                    |               |
| 50 | Housing; Cable Entry:                                                                                                                                                                              |                                      |                                  |                               |                    |               |
|    | C3                                                                                                                                                                                                 | Compact 316L                         | IP66/68;                         | cable 5 m                     |                    |               |
|    | D3                                                                                                                                                                                                 | Compact 316L                         | IP65;                            | plug Pg11 ISO 4400            |                    |               |

| 50      |  |  |  |  |  | Housing; Cable Entry:        |                                                                                                                   |
|---------|--|--|--|--|--|------------------------------|-------------------------------------------------------------------------------------------------------------------|
|         |  |  |  |  |  | E3                           | Compact 316L NEMA4X; plug NPT ½ ISO 4400                                                                          |
|         |  |  |  |  |  | N3                           | Compact 316L IP66/68; plug M12                                                                                    |
|         |  |  |  |  |  | E4                           | F16 Polyester NEMA4X; thread NPT ½                                                                                |
|         |  |  |  |  |  | E5                           | F13/F17 Alu NEMA4X; thread NPT ¾ 0.5 kg                                                                           |
|         |  |  |  |  |  | E6                           | F15 316L NEMA4X; thread NPT ½ 0.1 kg                                                                              |
|         |  |  |  |  |  | E7                           | T13 Alu coated IP66; thread NPT ¾ 0.9 kg                                                                          |
|         |  |  |  |  |  |                              | separate connection compartment                                                                                   |
|         |  |  |  |  |  | F4                           | F16 Polyester IP66; thread G ½                                                                                    |
|         |  |  |  |  |  | F5                           | F13/F17 Alu IP66; thread G ½ 0.5 kg                                                                               |
|         |  |  |  |  |  | F6                           | F15 316L IP66; thread G ½ 0.1 kg                                                                                  |
|         |  |  |  |  |  | F7                           | T13 Alu coated IP66; thread G ½ 0.9 kg                                                                            |
|         |  |  |  |  |  |                              | separate connection compartment                                                                                   |
|         |  |  |  |  |  | G4                           | F16 Polyester IP66; gland M20                                                                                     |
|         |  |  |  |  |  | G5                           | F13/F17 Alu IP66; gland M20 0.5 kg                                                                                |
|         |  |  |  |  |  |                              | (EEx d > thread M20)                                                                                              |
|         |  |  |  |  |  | G6                           | F15 316L IP66; gland M20 0.1 kg                                                                                   |
|         |  |  |  |  |  | G7                           | T13 Alu coated IP66; gland M20 0.9 kg                                                                             |
|         |  |  |  |  |  |                              | separate connection compartment (EEx d > thread M20)                                                              |
|         |  |  |  |  |  | N4                           | F16 Polyester IP66; plug M12                                                                                      |
|         |  |  |  |  |  | N5                           | F13/F17 Alu IP66; plug M12                                                                                        |
|         |  |  |  |  |  | N6                           | F15 316L IP66; plug M12                                                                                           |
|         |  |  |  |  |  | Y9                           | Special version                                                                                                   |
| 60      |  |  |  |  |  | Additional Option:           |                                                                                                                   |
|         |  |  |  |  |  | A                            | Basic version                                                                                                     |
|         |  |  |  |  |  | C                            | EN 10204 - 3.1 material (316L wetted parts) Inspection certificate                                                |
|         |  |  |  |  |  | N                            | EN 10204 - 3.1 material, NACE MR0175 (316L wetted parts) Inspection certificate                                   |
|         |  |  |  |  |  | P                            | 100 bar process pressure (FTL51)                                                                                  |
|         |  |  |  |  |  | R                            | 100 bar process pressure, EN 10204 - 3.1 material, NACE MR0175 (316L wetted parts) Inspection certificate (FTL51) |
|         |  |  |  |  |  | S                            | GL/ABS marine certificate (FTL51: max. 1600 mm)                                                                   |
|         |  |  |  |  |  | Y                            | Special version                                                                                                   |
| FTL5# - |  |  |  |  |  | Complete product designation |                                                                                                                   |



Note!

The basic weight includes the compact sensor, thread adapter G ¾, electronic insert, polyester housing

**Product structure**  
**Liquiphant M**  
**FTL50H**  
**FTL51H**

| Design |                     | Basic weight |        |
|--------|---------------------|--------------|--------|
| FTL50H | Compact             |              | 0.7 kg |
| FTL51H | With extension pipe |              | 0.7 kg |

| 10 | Approval:            |                      |                                                 |
|----|----------------------|----------------------|-------------------------------------------------|
| A  | Non-hazardous area   |                      |                                                 |
| B  | ATEX II 3 G          | EEx nC II T6         | Overfill protection to WHG (Germany)            |
|    | ATEX II 3 D          | T 85 °C*             |                                                 |
| C  | ATEX II 3 G          | EEx nA II T6         | Overfill protection to WHG (Germany)            |
|    | ATEX II 3 D          | T 85 °C*             |                                                 |
| D  | Non-hazardous area   |                      |                                                 |
| E  | ATEX II 1/2 G        | EEx de IIC T6        | Overfill protection to WHG (Germany)            |
| F  | ATEX II 1/2 G        | EEx ia IIC T6        | Overfill protection to WHG (Germany)            |
|    | ATEX II 1/2 D        | T 80 °C*             |                                                 |
| G  | ATEX II 1/2 G        | EEx ia IIC T6        |                                                 |
|    | ATEX II 1/2 D        | T 80 °C*             |                                                 |
| H  | ATEX II 1 G          | EEx ia IIC T6        |                                                 |
| I  | ATEX II 1/2 G        | EEx de IIC T6        |                                                 |
| J  | ATEX II 1 G          | EEx ia IIC T6        | Overfill protection to WHG (Germany)            |
| K  | ATEX II 1/2 G        | EEx d IIC T6         |                                                 |
| L  | ATEX II 1/2 G        | EEx d IIC T6         | Overfill protection to WHG (Germany)            |
| P  | FM                   | IS, Class I, II, III | Division 1, Group A-G                           |
| Q  | FM                   | XP, Class I, II, III | Division 1, Group B-G, for E5 housing Group A-G |
| R  | FM                   | NI, Class I          | Division 2, Group A-D                           |
| S  | CSA                  | IS, Class I, II, III | Division 1, Group A-G                           |
| T  | CSA                  | XP, Class I, II, III | Division 1, Group A-G                           |
| U  | CSA                  | General Purpose      |                                                 |
| V  | TIIS                 | Ex ia IIC T3         |                                                 |
| W  | TIIS                 | Ex d IIB T3          |                                                 |
| X  | TIIS                 | Ex ia IIC T6         |                                                 |
| 7  | TIIS                 | Ex d IIC T3          |                                                 |
| 8  | TIIS                 | Ex d IIC T6          |                                                 |
| Y  | Special version      |                      |                                                 |
|    | *) not valid for PBT |                      |                                                 |

| 20 | Process Connection: |                                        |               | Additional weight             |        |
|----|---------------------|----------------------------------------|---------------|-------------------------------|--------|
|    | GQ2                 | G ¾                                    | 316L (FTL50H) | Thread ISO 228                |        |
|    |                     | Installation > accessory: welding neck |               |                               |        |
|    | GW2                 | G 1                                    | 316L          | Thread ISO 228                | 0.2 kg |
|    |                     | Installation > accessory: welding neck |               |                               |        |
|    | BA2                 | DN32 PN6 A                             | 316L          | Flange EN 1092-1 (DIN 2527 B) | 1.2 kg |
|    | BB2                 | DN32 PN25/40 A                         | 316L          | Flange EN 1092-1 (DIN 2527 B) | 2.0 kg |
|    | BC2                 | DN40 PN6 A                             | 316L          | Flange EN 1092-1 (DIN 2527 B) | 1.4 kg |
|    | BD2                 | DN40 PN25/40 A                         | 316L          | Flange EN 1092-1 (DIN 2527 B) | 2.4 kg |
|    | BE2                 | DN50 PN6 A                             | 316L          | Flange EN 1092-1 (DIN 2527 B) | 1.6 kg |
|    | BG2                 | DN50 PN25/40 A                         | 316L          | Flange EN 1092-1 (DIN 2527 B) | 3.2 kg |
|    | BH2                 | DN65 PN6 A                             | 316L          | Flange EN 1092-1 (DIN 2527 B) | 2.4 kg |
|    | BK2                 | DN65 PN25/40 A                         | 316L          | Flange EN 1092-1 (DIN 2527 B) | 4.3 kg |
|    | BM2                 | DN80 PN10/16 A                         | 316L          | Flange EN 1092-1 (DIN 2527 B) | 4.8 kg |
|    | BN2                 | DN80 PN25/40 A                         | 316L          | Flange EN 1092-1 (DIN 2527 B) | 5.9 kg |
|    | BQ2                 | DN100 PN10/16 A                        | 316L          | Flange EN 1092-1 (DIN 2527 B) | 5.6 kg |
|    | BR2                 | DN100 PN25/40 A                        | 316L          | Flange EN 1092-1 (DIN 2527 B) | 7.5 kg |
|    | B82                 | DN25 PN25/40 A                         | 316L          | Flange EN 1092-1 (DIN 2527 B) | 1.4 kg |
|    | CG2                 | DN50 PN25/40 B1                        | 316L          | Flange EN 1092-1 (DIN 2527 C) | 3.2 kg |
|    | CN2                 | DN80 PN25/40 B1                        | 316L          | Flange EN 1092-1 (DIN 2527 C) | 5.9 kg |

| 20 | Process Connection:                    |                             |                |                      |                               | Additional weight  |        |
|----|----------------------------------------|-----------------------------|----------------|----------------------|-------------------------------|--------------------|--------|
|    | CQ2                                    | DN100                       | PN10/16 B1     | 316L                 | Flange EN 1092-1 (DIN 2527 C) | 5.6 kg             |        |
|    | EE2                                    | 1" flush-mounted (52001047) |                |                      | 316L                          | 0.3 kg             |        |
|    | Installation > accessory: welding neck |                             |                |                      |                               |                    |        |
|    | HE2                                    | DN50                        | Tube DIN 11850 | 316L                 | DIN 11864-1 A                 | 0.3 kg             |        |
|    | AA2                                    | 1¼"                         | 150 lbs        | RF 316/316L          | Flange ANSI B16.5             | 1.2 kg             |        |
|    | AC2                                    | 1½"                         | 150 lbs        | RF 316/316L          | Flange ANSI B16.5             | 1.5 kg             |        |
|    | AE2                                    | 2"                          | 150 lbs        | RF 316/316L          | Flange ANSI B16.5             | 2.4 kg             |        |
|    | AF2                                    | 2"                          | 300 lbs        | RF 316/316L          | Flange ANSI B16.5             | 3.2 kg             |        |
|    | AJ2                                    | 2½"                         | 300 lbs        | RF 316/316L (FTL51H) | Flange ANSI B16.5             | 4.8 kg             |        |
|    | AL2                                    | 3"                          | 150 lbs        | RF 316/316L          | Flange ANSI B16.5             | 4.9 kg             |        |
|    | AM2                                    | 3"                          | 300 lbs        | RF 316/316L (FTL51H) | Flange ANSI B16.5             | 6.8 kg             |        |
|    | AP2                                    | 4"                          | 150 lbs        | RF 316/316L          | Flange ANSI B16.5             | 7.0 kg             |        |
|    | AQ2                                    | 4"                          | 300 lbs        | RF 316/316L (FTL51H) | Flange ANSI B16.5             | 11.5 kg            |        |
|    | A82                                    | 1"                          | 150 lbs        | RF 316/316L          | Flange ANSI B16.5             | 1.0 kg             |        |
|    | KA2                                    | 10 K 25                     |                | RF 316L              | Flange JIS B2220              |                    |        |
|    | KC2                                    | 10 K 40                     |                | RF 316L              | Flange JIS B2220              |                    |        |
|    | KE2                                    | 10 K 50                     |                | RF 316L              | Flange JIS B2220              | 1.7 kg             |        |
|    | KL2                                    | 10 K 80                     |                | RF 316L              | Flange JIS B2220              |                    |        |
|    | KP2                                    | 10 K 100                    |                | RF 316L              | Flange JIS B2220              |                    |        |
|    | MA2                                    | DN32                        | PN25           | 316L                 | DIN 11851                     | 0.1 kg             |        |
|    | MC2                                    | DN40                        | PN25           | 316L                 | DIN 11851                     | 0.2 kg             |        |
|    | ME2                                    | DN50                        | PN25           | 316L                 | DIN 11851                     | 0.3 kg             |        |
|    | PE2                                    | DRD                         | 65 mm          | 316L                 |                               | 0.3 kg             |        |
|    | TC2                                    | DN25-38 (1...1½")           |                |                      | 316L                          | ISO 2852 Tri-Clamp |        |
|    | TE2                                    | DN40-51 (2")                |                |                      | 316L                          | ISO 2852 Tri-Clamp | 0.1 kg |
|    | UE2                                    | SMS 2"                      | PN25           | 316L                 |                               | 0.2 kg             |        |
|    | WE2                                    | DN65-162 PN10               |                |                      | 316L                          | Varivent N tube    | 0.5 kg |
|    | YY9                                    | Special version             |                |                      |                               |                    |        |

| 30 | Probe Length; Type: |                   |                                                        |  |  |                       |
|----|---------------------|-------------------|--------------------------------------------------------|--|--|-----------------------|
|    | FTL50H              |                   |                                                        |  |  |                       |
|    | AC                  | Compact;          | Ra <1.5 µm/120 grit                                    |  |  |                       |
|    | AD                  | Compact;          | Ra <0.3 µm/320 grit / A3                               |  |  |                       |
|    | IC                  | Compact;          | Ra <1.5 µm/120 grit + temperature spacer               |  |  | 0.6 kg                |
|    | ID                  | Compact;          | Ra <0.3 µm/320 grit / A3 + temperature spacer          |  |  | 0.6 kg                |
|    | QC                  | Compact;          | Ra <1.5 µm/120 grit + pressure tight feed through      |  |  | 0.7 kg                |
|    | QD                  | Compact;          | Ra <0.3 µm/320 grit / A3 + pressure tight feed through |  |  | 0.7 kg                |
|    | FTL51H              |                   |                                                        |  |  |                       |
|    | BC                  | ..... mm;         | Ra <1.5 µm/120 grit                                    |  |  | 0.9 kg/m              |
|    | BD                  | ..... mm;         | Ra <0.3 µm/320 grit / A3                               |  |  | 0.9 kg/m              |
|    | CC                  | ..... inch;       | Ra <1.5 µm/120 grit                                    |  |  | 2.3 kg/100 in         |
|    | CD                  | ..... inch;       | Ra <0.3 µm/320 grit / A3                               |  |  | 2.3 kg/100 in         |
|    | DC                  | Length: type II*; | Ra <1.5 µm/120 grit                                    |  |  | 0.1 kg                |
|    | DD                  | Length: type II*; | Ra <0.3 µm/320 grit / A3                               |  |  | 0.1 kg                |
|    | JC                  | ..... mm;         | Ra <1.5 µm/120 grit + temperature spacer               |  |  | 0.9 kg/m +0.6 kg      |
|    | JD                  | ..... mm;         | Ra <0.3 µm/320 grit + temperature spacer               |  |  | 0.9 kg/m +0.6 kg      |
|    | KC                  | ..... inch;       | Ra <1.5 µm/120 grit + temperature spacer               |  |  | 2.3 kg/100 in +0.6 kg |
|    | KD                  | ..... inch;       | Ra <0.3 µm/320 grit + temperature spacer               |  |  | 2.3 kg/100 in +0.6 kg |
|    | LC                  | Length: type II*; | Ra <1.5 µm/120 grit + temperature spacer               |  |  | 0.1 kg +0.6 kg        |
|    | LD                  | Length: type II*; | Ra <0.3 µm/320 grit + temperature spacer               |  |  | 0.1 kg +0.6 kg        |
|    | RC                  | ..... mm;         | Ra <1.5 µm/120 grit + pressure tight feed through      |  |  | 0.9 kg/m +0.7 kg      |
|    | RD                  | ..... mm;         | Ra <0.3 µm/320 grit + pressure tight feed through      |  |  | 0.9 kg/m +0.7 kg      |
|    | SC                  | ..... inch;       | Ra <1.5 µm/120 grit + pressure tight feed through      |  |  | 2.3 kg/100 in +0.7 kg |
|    | SD                  | ..... inch;       | Ra <0.3 µm/320 grit + pressure tight feed through      |  |  | 2.3 kg/100 in +0.7 kg |

| 30       |  |  |  | Probe Length; Type:   |                                                                                                                                                                                                           |                                                |                   |
|----------|--|--|--|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|-------------------|
|          |  |  |  | TC                    | Length: type II*;<br>Ra <1.5 µm/120 grit<br>+ pressure tight feed through                                                                                                                                 |                                                | 0.1 kg<br>+0.7 kg |
|          |  |  |  | TD                    | Length: type II*;<br>Ra <0.3 µm/320 grit<br>+ pressure tight feed through                                                                                                                                 |                                                | 0.1 kg<br>+0.7 kg |
|          |  |  |  | YY                    | Special version                                                                                                                                                                                           |                                                |                   |
|          |  |  |  |                       | *) Replacing instruments: when vertically mounting a Liquiphant <b>M</b><br>FTL51H with length II, the switch point is at the same height as for the<br>Liquiphant <b>II</b> FTL360, FTL365, FDL30, FDL35 |                                                |                   |
| 40       |  |  |  | Electronics; Output:  |                                                                                                                                                                                                           |                                                |                   |
|          |  |  |  | A                     | FEL50A                                                                                                                                                                                                    | PROFIBUS PA                                    |                   |
|          |  |  |  | 1                     | FEL51*                                                                                                                                                                                                    | 2-wire, 19...253 V AC                          |                   |
|          |  |  |  | 2                     | FEL52*                                                                                                                                                                                                    | 3-wire PNP, 10... 55 V DC                      |                   |
|          |  |  |  | 4                     | FEL54                                                                                                                                                                                                     | relay DPDT, 19...253 V AC, 19...55 V DC        |                   |
|          |  |  |  | 5                     | FEL55                                                                                                                                                                                                     | 8/16 mA, 11... 36 V DC                         |                   |
|          |  |  |  | 6                     | FEL56                                                                                                                                                                                                     | NAMUR (L-H signal)                             |                   |
|          |  |  |  | 7                     | FEL57                                                                                                                                                                                                     | 2-wire PFM                                     |                   |
|          |  |  |  | 8                     | FEL58*                                                                                                                                                                                                    | NAMUR + test button (H-L signal)               |                   |
|          |  |  |  | 9                     | Special version                                                                                                                                                                                           |                                                |                   |
|          |  |  |  |                       | *) Also available in compact housing                                                                                                                                                                      |                                                |                   |
| 50       |  |  |  | Housing; Cable Entry: |                                                                                                                                                                                                           |                                                |                   |
|          |  |  |  | C3                    | Compact 316L                                                                                                                                                                                              | IP66/68; cable 5 m                             |                   |
|          |  |  |  | D3                    | Compact 316L                                                                                                                                                                                              | IP65; plug Pg11                                | ISO 4400          |
|          |  |  |  | E3                    | Compact 316L                                                                                                                                                                                              | NEMA4X; plug NPT ½                             | ISO 4400          |
|          |  |  |  | N3                    | Compact 316L                                                                                                                                                                                              | IP66/68; plug M12                              |                   |
|          |  |  |  | E4                    | F16 Polyester                                                                                                                                                                                             | NEMA4X; thread NPT ½                           | –0.1 kg           |
|          |  |  |  | E5                    | F13/F17 Alu                                                                                                                                                                                               | NEMA4X; thread NPT ¾                           | 0.4 kg            |
|          |  |  |  | E6                    | F15 316L                                                                                                                                                                                                  | NEMA4X; thread NPT ½                           |                   |
|          |  |  |  | E7                    | T13 Alu                                                                                                                                                                                                   | coated IP66; thread NPT ¾                      | 0.8 kg            |
|          |  |  |  |                       | separate connection compartment                                                                                                                                                                           |                                                |                   |
|          |  |  |  | F4                    | F16 Polyester                                                                                                                                                                                             | IP66; thread G ½                               | –0.1 kg           |
|          |  |  |  | F5                    | F13/F17 Alu                                                                                                                                                                                               | IP66; thread G ½                               | 0.4 kg            |
|          |  |  |  | F6                    | F15 316L                                                                                                                                                                                                  | IP66; thread G ½                               |                   |
|          |  |  |  | F7                    | T13 Alu                                                                                                                                                                                                   | coated IP66; thread G ½                        | 0.8 kg            |
|          |  |  |  |                       | separate connection compartment                                                                                                                                                                           |                                                |                   |
|          |  |  |  | G4                    | F16 Polyester                                                                                                                                                                                             | IP66; gland M20                                | –0.1 kg           |
|          |  |  |  | G5                    | F13/F17 Alu                                                                                                                                                                                               | IP66; gland M20<br>(EEx d > thread M20)        | 0.4 kg            |
|          |  |  |  | G6                    | F15 316L                                                                                                                                                                                                  | IP66; gland M20                                |                   |
|          |  |  |  | G7                    | T13 Alu                                                                                                                                                                                                   | coated IP66; gland M20<br>(EEx d > thread M20) | 0.8 kg            |
|          |  |  |  |                       | separate connection compartment                                                                                                                                                                           |                                                |                   |
|          |  |  |  | N4                    | F16 Polyester                                                                                                                                                                                             | IP66; plug M12                                 |                   |
|          |  |  |  | N5                    | F13/F17 Alu                                                                                                                                                                                               | IP66; plug M12                                 |                   |
|          |  |  |  | N6                    | F15 316L                                                                                                                                                                                                  | IP66; plug M12                                 |                   |
|          |  |  |  | Y9                    | Special version                                                                                                                                                                                           |                                                |                   |
| 60       |  |  |  | Additional Option:    |                                                                                                                                                                                                           |                                                |                   |
|          |  |  |  | A                     | Basic version                                                                                                                                                                                             |                                                |                   |
|          |  |  |  | B                     | CoC, EN 10204 – 3.1 material (316L wetted parts)<br>Inspection certificate                                                                                                                                |                                                |                   |
|          |  |  |  | C                     | EN 10204 – 3.1 material (316L wetted parts)<br>Inspection certificate                                                                                                                                     |                                                |                   |
|          |  |  |  | S                     | GL/ABS marine certificate (FTL51H: max. 1600 mm)                                                                                                                                                          |                                                |                   |
|          |  |  |  | Y                     | Special version                                                                                                                                                                                           |                                                |                   |
|          |  |  |  |                       |                                                                                                                                                                                                           |                                                |                   |
| FTL5#H – |  |  |  |                       | Complete product designation                                                                                                                                                                              |                                                |                   |



Note!

The basic weight includes the compact sensor, thread adapter G ¾, electronic insert, steel housing

100-FT15XXXX-06-05-XX-XX-019

100-ET15XXXX-06-05-XX-XX-020

Endress+Hauser

### Welding neck G 1

Order number: 52001221  
with 3.1.B material certificate: 52011898  
for flush-mounting  
a Liquiphant M  
with process connection GW2

■ Sensor can be positioned

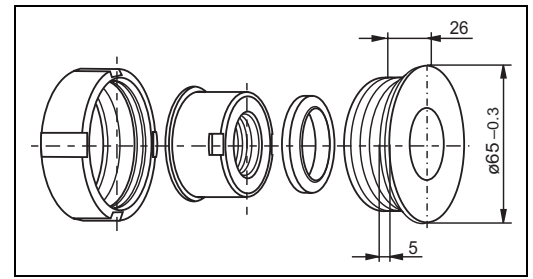
Material (wetted):  
corrosion-resistant steel  
1.4435 (AISI 316L)

Weight: 0.43 kg

Seal: silicone moulded seal  
Order number: 942816-0000

FDA approved materials according to  
21 CFR Part 177.1550/2600

max. 25 bar / max. 150 °C  
max. 40 bar / max. 100 °C



### Welding neck

Order number: 52001047  
with 3.1.B material certificate: 52006909  
for flush-mounting  
a Liquiphant FTL50H, FTL51H  
with process connection EE2

■ Sensor can be positioned

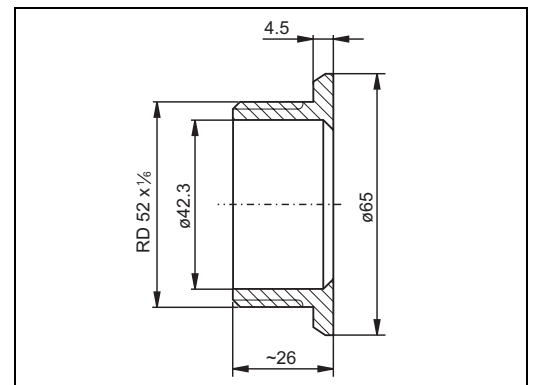
Material: corrosion-resistant steel  
1.4435 (AISI 316L)

Weight: 0.15 kg

Seal on Liquiphant: silicone moulded seal  
Order number: 942816-0000

FDA approved materials according to  
21 CFR Part 177.1550/2600

max. 25 bar / max. 150 °C  
max. 40 bar / max. 100 °C



### DRD welding flange

Order number: 52002041  
with 3.1.B material certificate: 52011899  
for flush-mounting  
a Liquiphant FTL50H, FTL51H  
with process connection PE2

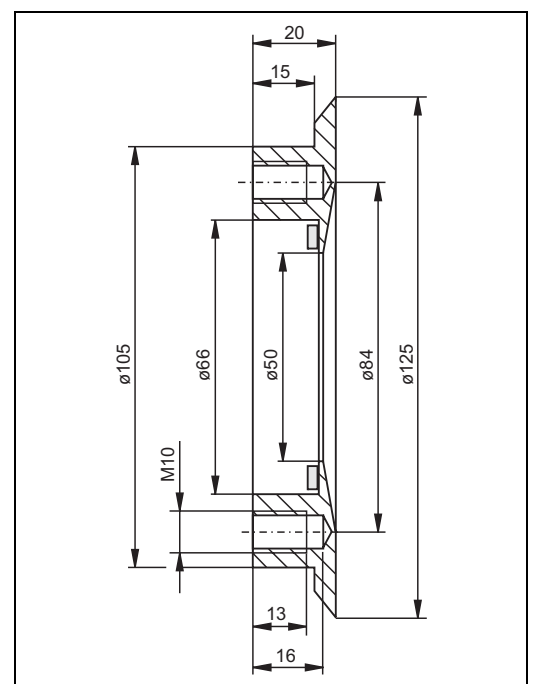
■ Sensor can be positioned

Material: corrosion-resistant steel  
1.4435 (AISI 316L)

Weight: 0.9 kg

Seal: PTFE flat seal (FDA listed)  
Order number: 916783-0000

FDA approved materials according to  
21 CFR Part 177.1550/2600



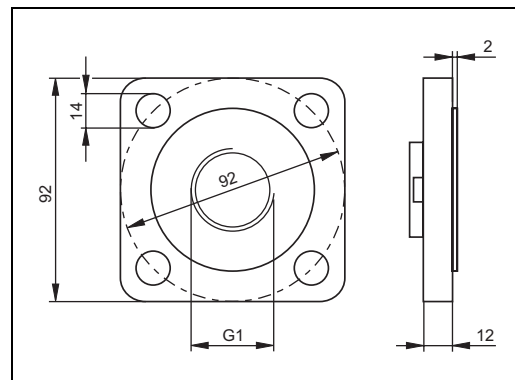
### Lap joint flange

Order number: 918158-0000  
with G 1 thread for mounting  
a Liquiphant FTL50, FTL51  
with process connection GR2

Pressure up to 40 bar

Material: corrosion-resistant steel  
1.4301 (AISI 304)

Weight: 0.54 kg



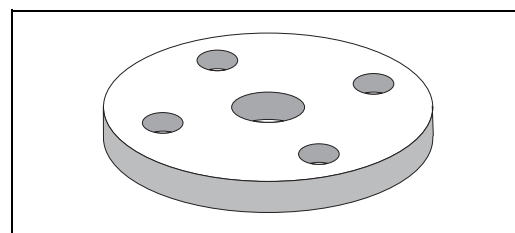
L00-FTL5xxxx-06-05-xx-xx-024

### Lap joint flanges

with G 1 thread for mounting  
a Liquiphant FTL50, FTL51  
with process connection GR2

Material: corrosion-resistant steel  
1.4571 (AISI 316Ti)

- Order number: 918143-0000  
Flange DN50 PN40, EN 1092-1  
Weight: 3.11 kg
- Order number: 918144-0000  
Flange ANSI 2", 150 psi, RF  
Weight: 2.38 kg



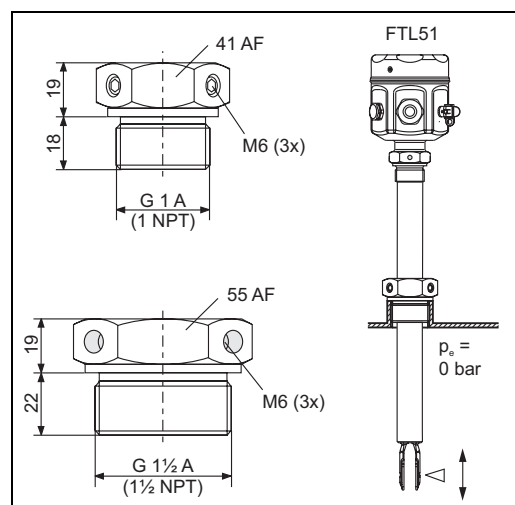
L00-FTL5xxxx-03-05-xx-xx-015

### Sliding sleeves for unpressurised operation

for continuous adjustment of the switch point  
of a Liquiphant M FTL51

Material: corrosion-resistant steel  
1.4435 (AISI 316L)

Weight for G 1, NPT 1: 0.21 kg  
Weight for G 1½, NPT 1½: 0.54 kg



L00-FTL5xxxx-06-05-xx-xx-006

| Thread | Standard      | Material           | Order number | Approval                 |
|--------|---------------|--------------------|--------------|--------------------------|
| G 1    | DIN ISO 228/1 | 1.4435 (AISI 316L) | 52003978     |                          |
| G 1    | DIN ISO 228/1 | 1.4435 (AISI 316L) | 52011888     | 3.1 material certificate |
| NPT 1  | ANSI B 1.20.1 | 1.4435 (AISI 316L) | 52003979     |                          |
| NPT 1  | ANSI B 1.20.1 | 1.4435 (AISI 316L) | 52011889     | 3.1 material certificate |
| G 1½   | DIN ISO 228/1 | 1.4435 (AISI 316L) | 52003980     |                          |
| G 1½   | DIN ISO 228/1 | 1.4435 (AISI 316L) | 52011890     | 3.1 material certificate |
| NPT 1½ | ANSI B 1.20.1 | 1.4435 (AISI 316L) | 52003981     |                          |
| NPT 1½ | ANSI B 1.20.1 | 1.4435 (AISI 316L) | 52011891     | 3.1 material certificate |

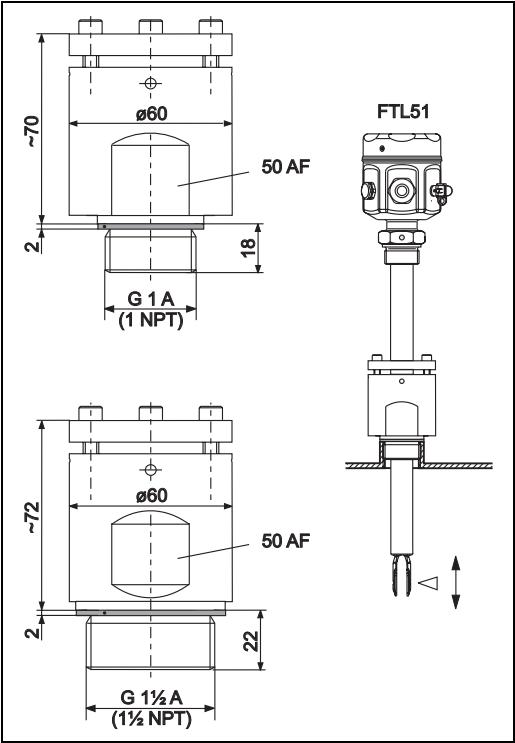
High pressure sliding sleeves

For continuous adjustment of the switch point of a Liquiphant M FTL51.

Material: corrosion-resistant steel  
1.4435 (AISI 316L) or AlloyC4

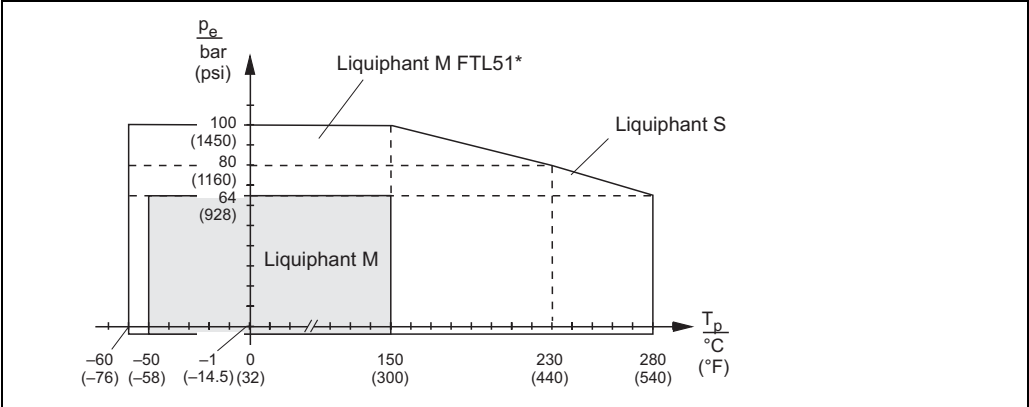
Weight for G 1, NPT 1: 1.13 kg  
Weight for G 1½, NPT 1½: 1.32 kg

Seal package made of graphite



L00-FTL5xxxx-06-05-xx-en-007

| Thread | Standard      | Material           | Order number | Approval                 |
|--------|---------------|--------------------|--------------|--------------------------|
| G 1    | DIN ISO 228/1 | 1.4435 (AISI 316L) | 52003663     |                          |
| G 1    | DIN ISO 228/1 | 1.4435 (AISI 316L) | 52011880     | 3.1 material certificate |
| G 1    | DIN ISO 228/1 | AlloyC4            | 52003664     |                          |
| NPT 1  | ANSI B 1.20.1 | 1.4435 (AISI 316L) | 52003667     |                          |
| NPT 1  | ANSI B 1.20.1 | 1.4435 (AISI 316L) | 52011881     | 3.1 material certificate |
| NPT 1  | ANSI B 1.20.1 | AlloyC4            | 52003668     |                          |
| G 1½   | DIN ISO 228/1 | 1.4435 (AISI 316L) | 52003665     |                          |
| G 1½   | DIN ISO 228/1 | 1.4435 (AISI 316L) | 52011882     | 3.1 material certificate |
| G 1½   | DIN ISO 228/1 | AlloyC4            | 52003666     |                          |
| NPT 1½ | ANSI B 1.20.1 | 1.4435 (AISI 316L) | 52003669     |                          |
| NPT 1½ | ANSI B 1.20.1 | 1.4435 (AISI 316L) | 52011883     | 3.1 material certificate |
| NPT 1½ | ANSI B 1.20.1 | AlloyC4            | 52003670     |                          |

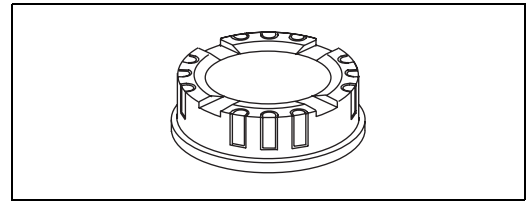


L00-FTL5xxxx-05-05-xx-xx-002

\* FTL51 with high pressure sliding sleeves (1450 psi). See "Additional Option" Page 37 ff. option "P" or "R".

### Transparent cover

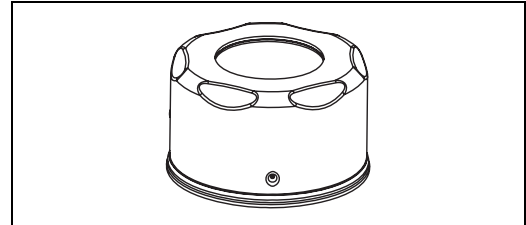
Order number: 943461-0001  
for polyester housing  
Material: PA 12  
Weight: 0.04 kg



L00-FTL5xxxx-03-05-xx-xx-016

### Cover with sight glass

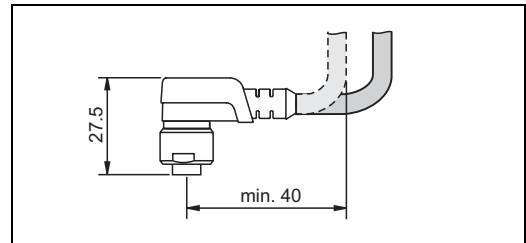
for steel housing  
Material: AISI 316L  
Weight: 0.16 kg  
– Order number: 943301-1000  
With glass sight glass  
– Order number: 52001403  
With PC sight glass  
(Not for CSA, General Purpose)



L00-FTL5xxxx-03-05-xx-xx-017

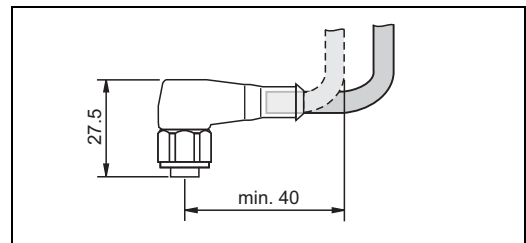
### Circular connector

Order number: 52010285  
4x0,34 M12 socket  
Cable: PVC (grey) 5 m length  
Body: PUR (blue)  
Coupling nut: Cu Sn/Ni  
Protection: IP67  
Temperature range: -25...+70 °C



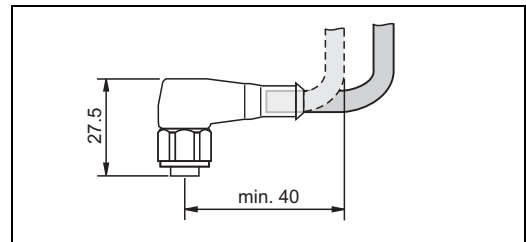
L00-FTL20Hxx-07-05-xx-xx-004

Order number: 52024216  
4x0,34 M12 socket  
Cable: PVC (orange) 5 m length  
Body: PVC (orange)  
Coupling nut: 316L  
Protection: IP69K (fully locked)  
Temperature range: -25...+70 °C



L00-FTL20Hxx-07-05-xx-xx-005

Order number: 52018763  
4x0,34 M12 socket with integrated LEDs  
Cable: PVC (orange) 5 m length  
Body: PVC (transparent)  
Coupling nut: 316L  
Protection: IP69K (fully locked)  
Temperature range: -25...+70 °C



L00-FTL20Hxx-07-05-xx-xx-005

## Supplementary Documentation



Note!

This supplementary documentation can be found on our product pages on [www.endress.com](http://www.endress.com)

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### Operating Instructions

Electronic insert FEL50A for Liquiphant M/S

PROFIBUS PA

BA141F/00/en

Liquiphant M FTL50, FTL51

KA143F/00/a6

Liquiphant M FTL50(H), FTL51(H)

KA144F/00/a6

Liquiphant M FTL51C

KA162F/00/a6

Liquiphant M FTL50-##### # 7 #, FTL51-##### # 7 #

KA163F/00/a6

Liquiphant M FTL50H-##### 7 #, FTL51H-##### 7 #

KA164F/00/a6

Liquiphant M FTL51C-##### 7 ##

KA165F/00/a6

Liquiphant M FTL5#-# ### ## # #3 #, FTL5#H-# ### ## # #3 #

KA220F/00/a6

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### Technical Information

Nivotester FTL370/372, switching units in Racksyst design

for Liquiphant M with electronic insert FEL57

TI198F/00/en

Nivotester FTL320, switching unit in Minipac design

for Liquiphant M with electronic insert FEL57

TI203F/00/en

General instructions for electromagnetic compatibility

(Test procedure, installation recommendation)

TI241F/00/en

Isolating amplifier FXN421/422, switching units for top-hat rail mounting

for Liquiphant M with electronic insert FEL56, FEL58

TI332F/00/en

Liquiphant M FTL51C, wetted parts with highly corrosion-resistant coating

made of ECTFE, PFA or enamel

TI347F/00/en

Isolating amplifier FTL325P, 1 or 3-channel switching units for top-hat rail mounting

for Liquiphant M/S with electronic insert FEL57

TI350F/00/en

Isolating amplifier FTL325N, 1 or 3-channel switching units for top-hat rail mounting

for Liquiphant M/S with electronic insert FEL56, FEL58

TI353F/00/en

Liquiphant S FTL70/71, for medium temperatures up to 280 °C

TI354F/00/en

Isolating amplifier FTL375P, 1 to 3-channel switching units for top-hat rail mounting

for Liquiphant M/S with electronic insert FEL57

TI360F/00/en

Isolating amplifier FTL375N, 1 to 3-channel switching units for top-hat rail mounting

for Liquiphant M/S with electronic insert FEL56, FEL58

TI361F/00/en

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|                                |                                                                      |
|--------------------------------|----------------------------------------------------------------------|
| <b>Functional Safety (SIL)</b> | Liquiphant M/S + Nivotester FTL325P<br>SD111F/00/en                  |
|                                | Liquiphant M/S + Nivotester FTL375P<br>SD113F/00/en                  |
|                                | Liquiphant M/S with FEL58 + Nivotester FTL325N (MAX)<br>SD161F/00/en |
|                                | Liquiphant M/S with electronic insert FEL54 (MAX)<br>SD162F/00/en    |
|                                | Liquiphant M/S with electronic insert FEL52 (MAX)<br>SD163F/00/en    |
|                                | Liquiphant M/S with electronic insert FEL51 (MAX)<br>SD164F/00/en    |
|                                | Liquiphant M/S with electronic insert FEL55 (MAX)<br>SD167F/00/en    |
|                                | Liquiphant M/S with FEL56 + Nivotester FTL325N (MAX)<br>SD168F/00/en |
|                                | Liquiphant M/S with FEL58 + Nivotester FTL325N (MIN)<br>SD170F/00/en |
|                                | Liquiphant M/S with electronic insert FEL51 (MIN)<br>SD185F/00/en    |
|                                | Liquiphant M/S with electronic insert FEL52 (MIN)<br>SD186F/00/en    |
|                                | Liquiphant M/S with electronic insert FEL54 (MIN)<br>SD187F/00/en    |
|                                | Liquiphant M/S with FEL56 + Nivotester FTL325N (MIN)<br>SD188F/00/en |

|                                   |                                                                                                                                                                |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Safety Instructions (ATEX)</b> | <b>CE</b>  II 1/2 G, EEx d IIC/B<br>(KEMA 99 ATEX 1157)<br>XA031F/00/a3     |
|                                   | <b>CE</b>  II 1/2 G, EEx ia/ib IIC/B<br>(KEMA 99 ATEX 0523)<br>XA063F/00/a3 |
|                                   | <b>CE</b>  II 1 G, EEx ia IIC/B<br>(KEMA 99 ATEX 5172 X)<br>XA064F/00/a3    |
|                                   | <b>CE</b>  II 1/2 G, EEx de IIC/B<br>(KEMA 00 ATEX 2035)<br>XA108F/00/a3    |
|                                   | <b>CE</b>  II 3 G, EEx nA/nC II<br>(EG 01 007-a)<br>XA182F/00/a3            |

|                           |                              |
|---------------------------|------------------------------|
| <b>System Information</b> | Liquiphant M<br>SI040F/00/en |
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