Level | Pressure | Flow | Temperature | Liquid Analysis | Registration | Systems Components | Services | Solutions

Technical Information

Liquiphant S FTL70, FTL71

Vibration Limit Switch
High-temperature level limit switch for all liquids.
For use also in hazardous locations.

Application

The Liquiphant S is a level limit switch which can be used in all liquids

– for process temperatures from –60 °C to 280 °C (300 °C for max. 50 h cumulative; without temperature shock limitation)
– for pressure up to 100 bar
– for viscosity up to 10000 mm^2/s
– for density of 0.5 g/cm^3 or 0.7 g/cm^3, other settings on request
– foam detection on request

The function is not affected by flow, turbulence, bubbles, foam, vibration, solids content or build-up. The Liquiphant is thus the ideal substitute for float switches.

FTL70:
Compact design, also for pipework

FTL71:
With extension pipe up to 3 m (6 m on request)

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 in accordance with IEC 61508/IEC 61511-1
- With component parts resistant to high temperatures: for medium temperatures **up to 280 °C** (300 °C for max. 50 h cumulative)
- With welded gas-tight bushing: maximum safety in the event of damaged sensor
- Process connections from ¾" and small tuning fork dimensions: also for areas difficult to access
- Large number of process connections to choose from: universal usage
- Wide variety of electronics, e.g. NAMUR, relay, DC-PMP, thyristor, PFM signal output: the right connection for every process control system
- PROFIBUS PA interface: for optimum start-up 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)

TI354F/00/en

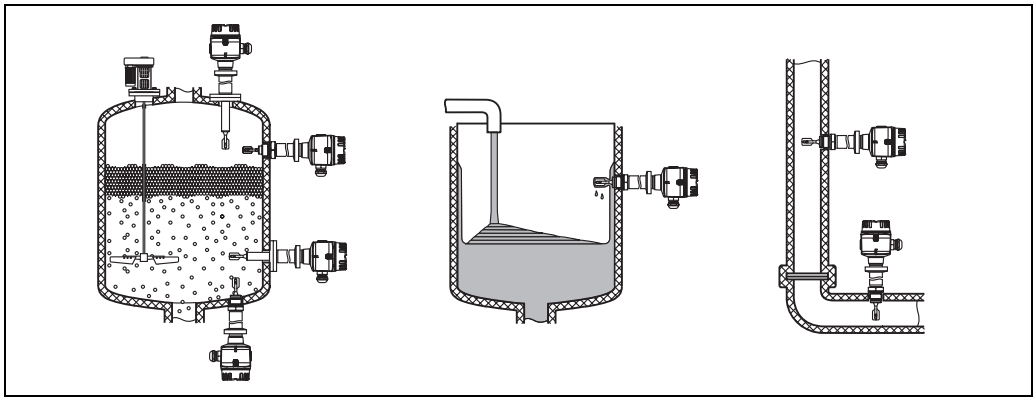
Endress+Hauser
People for Process Automation

Table of contents

Application

Level limit detection

Maximum or minimum detection in tanks or pipework with cold to very hot liquids of all kinds, also in hazardous locations and in the food and pharmaceutical industries



L00-FTL7xxxx-11-05-xx-xx-001

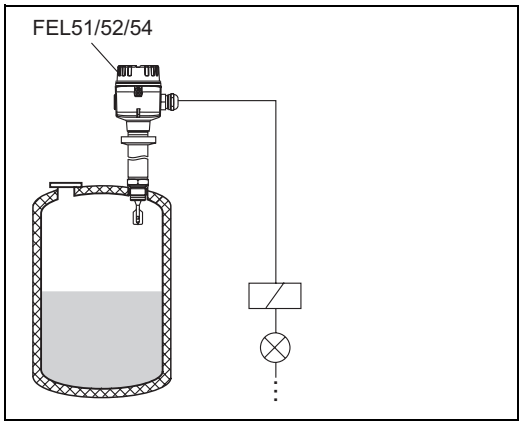
Function and system design

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 S FTL with electronic inserts
FEL51, FEL52, FEL54



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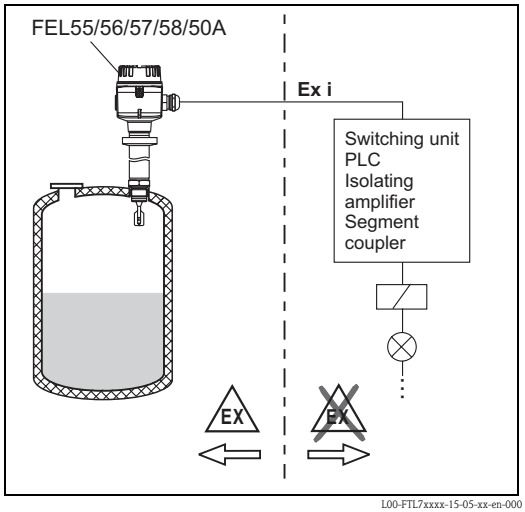
Level sensor
Liquiphant S FTL with electronic inserts
FEL55, FEL56, FEL57, FEL58, FEL50A
for connecting to a separate switching unit
an isolating amplifier or for connecting to
a PROFIBUS PA segment coupler



L00-FTL7xxxx-15-05-xx-en-000

Electronic versions for level limit switch	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) on 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) on 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 connected switching unit
Design	FTL70: Compact FTL71: With extension pipe

Input

Measured variable	Level (limit value)
Measuring range (detection range)	FTL70: Depends on mounting point. FTL71: 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^3 or > 0.7 g/cm^3 (other on request)

Electronic insert AC, FEL51

Power supply

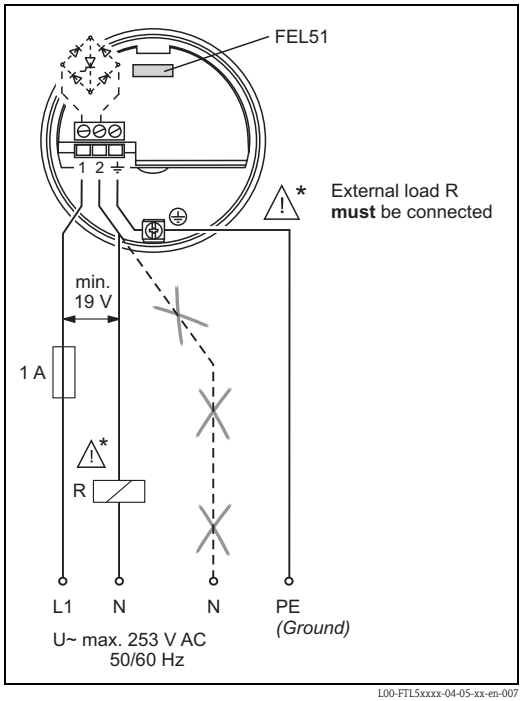
Supply voltage: 19...253 V AC
Power consumption: < 0.83 W
Residual current consumption: < 3.8 mA
Short-circuit protection
FEM51 overvoltage protection: overvoltage category III

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-en-007

Output signal

IL = 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	LEDs 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 (10 mA) or > 0.5 VA at 24 V (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 or < 8.4 VA at 24 V
- 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 DC PNP, FEL52

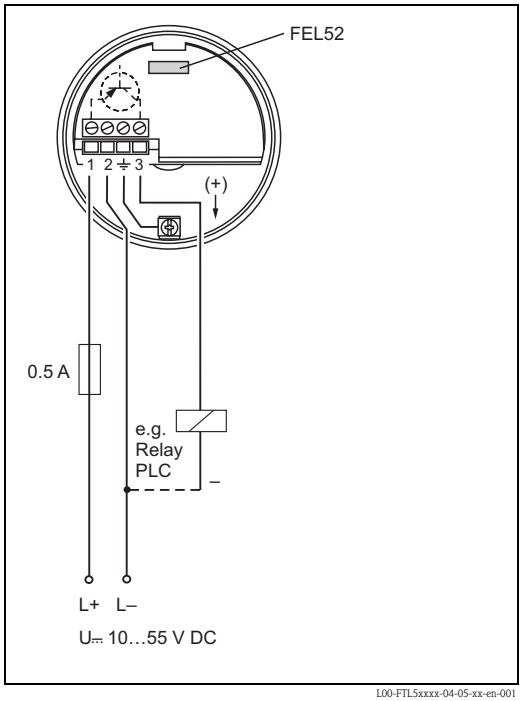
Power supply

DC voltage: 10…55 V
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

IL = load current (switched through)

< 100 µA = residual current (blocked)

☼ = lit

● = unlit

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

Safety mode	Level	Output signal	LEDs green	LEDs red
Max.		L+ 1 → I_L → + 3	☼	●
		1 --- < 100 µA ---→ 3	☼	☼
Min.		L+ 1 → I_L → + 3	☼	●
		1 --- < 100 µA ---→ 3	☼	☼

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

Signal on alarm

Output signal on power failure or in the event of damaged sensor: < 100 µA

Connectable load

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

Electronic insert AC/DC with relay output, FEL54

Power supply

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

Electrical connection

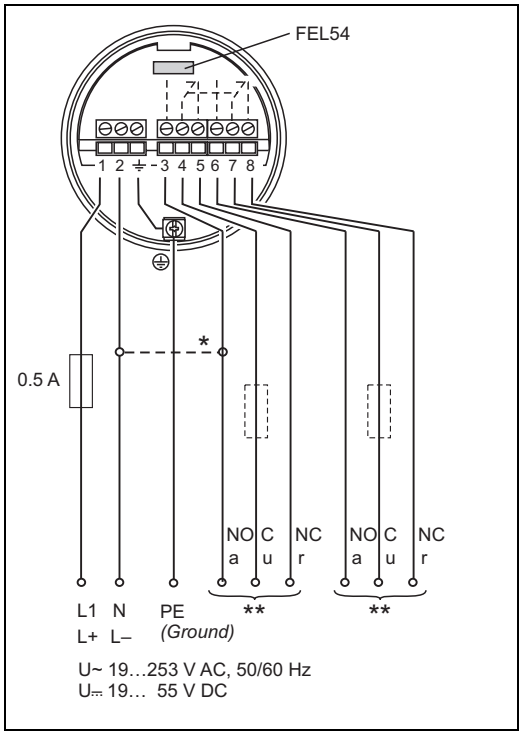
Universal current connection with relay output

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"

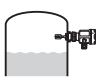
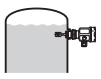
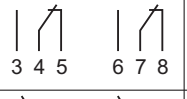
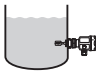
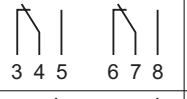
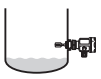
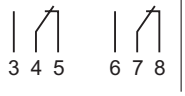


L00-FTL5xxxx-04-05-xx-xx-002

Output signal

= relay energised
= relay de-energised
= lit
= unlit

L00-FTL2xxxx-07-05-xx-xx-001

Safety mode	Level	Output signal	LEDs green	LEDs red
Max.		 3 4 5 6 7 8	☼	●
		 3 4 5 6 7 8	☼	☼
Min.		 3 4 5 6 7 8	☼	●
		 3 4 5 6 7 8	☼	☼

L00-FTL5xxxx-04-05-xx-xx-005

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
- I~ max. 6 A, U~ max. 253 V AC; P~ max. 1500 VA, cos φ = 1, P~ max. 750 VA, cos φ > 0.7
- I⎓ max. 6 A to 30 V, I⎓ max. 0.2 A to 125 V
- 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 8/16 mA, FEL55

Power supply

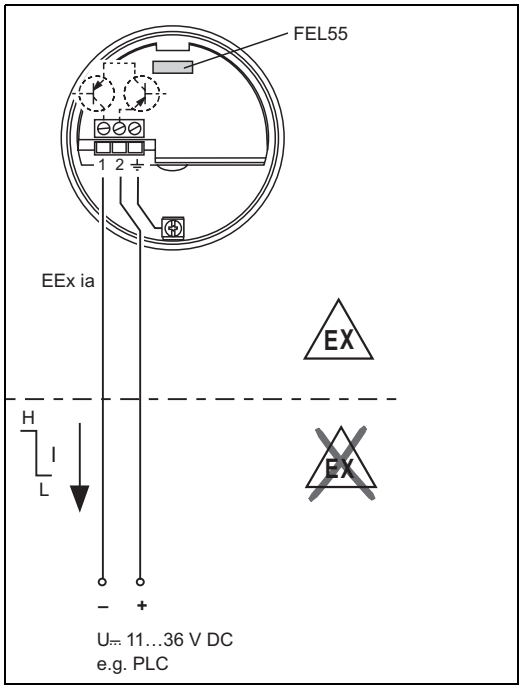
Supply voltage: 11...36 V DC
Power consumption: < 600 mW
Reverse polarity protection
Overvoltage protection FEL55: overvoltage category III

Electrical connection

Two-wire connection for separate switching unit

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

(H-L edge)



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 green	LEDs 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 DC voltage 11…36 V

Electronic insert NAMUR L-H edge, FEL56

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

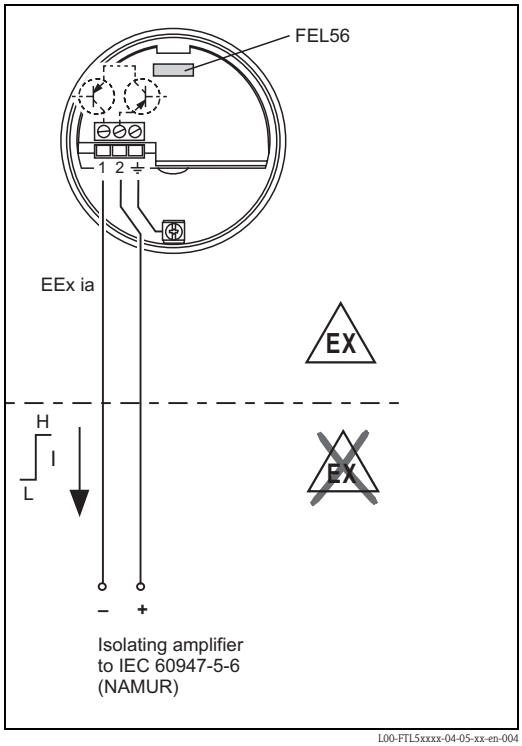
Electrical connection

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	LEDs red
Max.		+ 2 — 0.6 … 1.0 mA → 1	☼	●
		+ 2 — 2.2 … 2.8 mA → 1	☼	☼
Min.		+ 2 — 0.6 … 1.0 mA → 1	☼	●
		+ 2 — 2.2 … 2.8 mA → 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 NAMUR L-H edge, FEL58

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

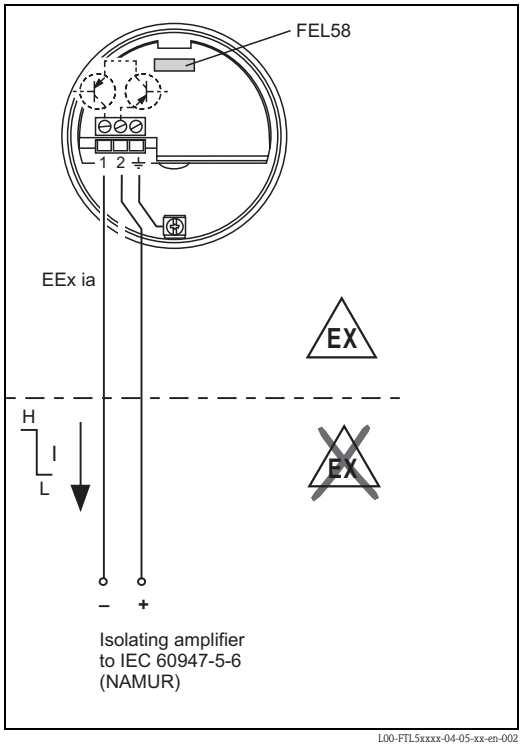
For connecting to isolating amplifiers acc. to NAMUR (IEC 60947-5-6), e.g. FXN421, FXN422, FTL325N, FTL375N or Commutec SIN100, SIN110 from Endress+Hauser.
Output signal jump from high to *low current on limit.*.

(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-en-002

Output signal

= lit
= flashes
= unlit

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

Safety mode	Level	Output signal	LEDs green	LEDs yellow
Max.		+ 2 → 1 2.2 … 3.5 mA	☼	☼
		+ 2 → 1 0.6 … 1.0 mA	☼	●
Min.		+ 2 → 1 2.2 … 3.5 mA	☼	☼
		+ 2 → 1 0.6 … 1.0 mA	☼	●

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)

Electronic insert PFM, FEL57

Power supply

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

Electrical connection

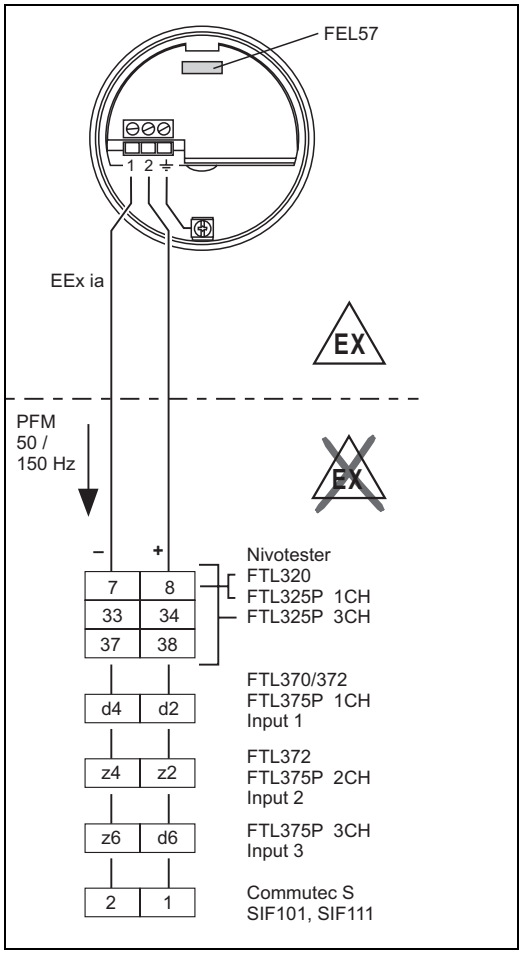
Two-wire connection for separate switching unit

For connecting to switching units
Nivotester FTL320, FTL325P, FTL370, FTL372
FTL375P (also with cyclical checking),
Commutec SIF101, SIF111 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:

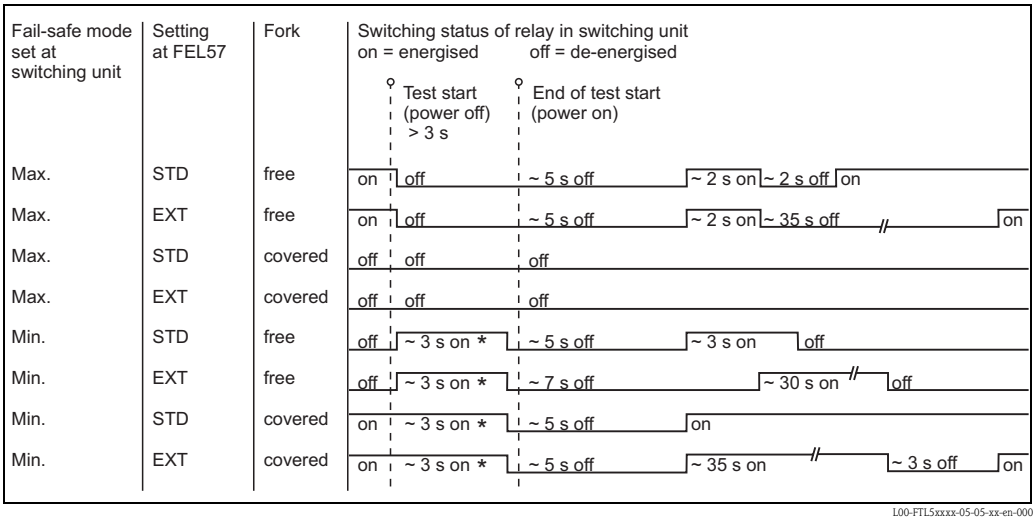
– Standard (STD):
  for low corrosive liquids;
  simulation approx. 8 s
  tuning fork exposed – covered – exposed.
– Extended (EXT):
  for highly corrosive liquids;
  simulation approx. 41 s
  tuning fork exposed – covered – corroded – exposed.

The check is activated and monitored at the switching unit.



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

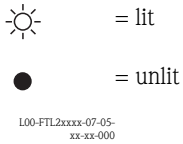
Switching behaviour of the connected device:



* 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 S with an FEL57 electronic insert.

Output signal



Safety mode	Level	Output signal (PFM)	LEDs green	LEDs yellow
		150 Hz		
		50 Hz		

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

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 device Nivotester FTL320, FTL325P, FTL370, FTL372, FTL375P or Commutec SIF101, SIF111
- For contact load see the Technical Data of the switching unit

Electronic insert PROFIBUS PA, FEL50A

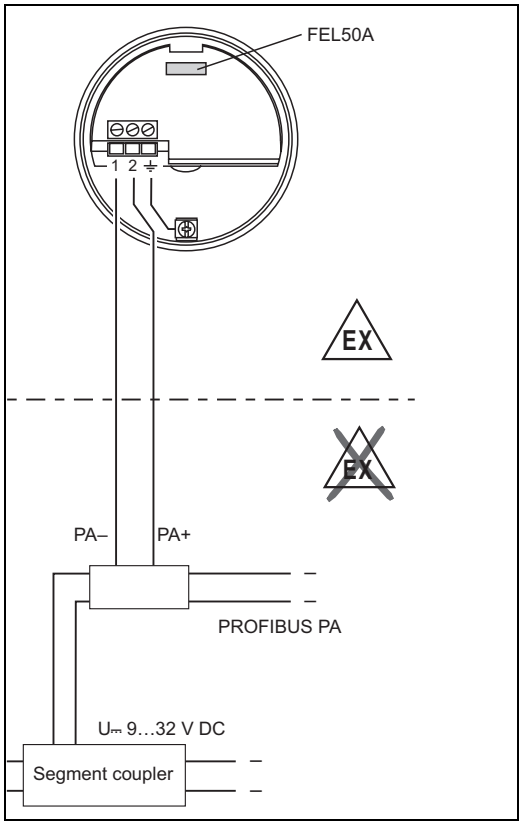
Electrical connection

Two-wire connection for power supply and data transfer

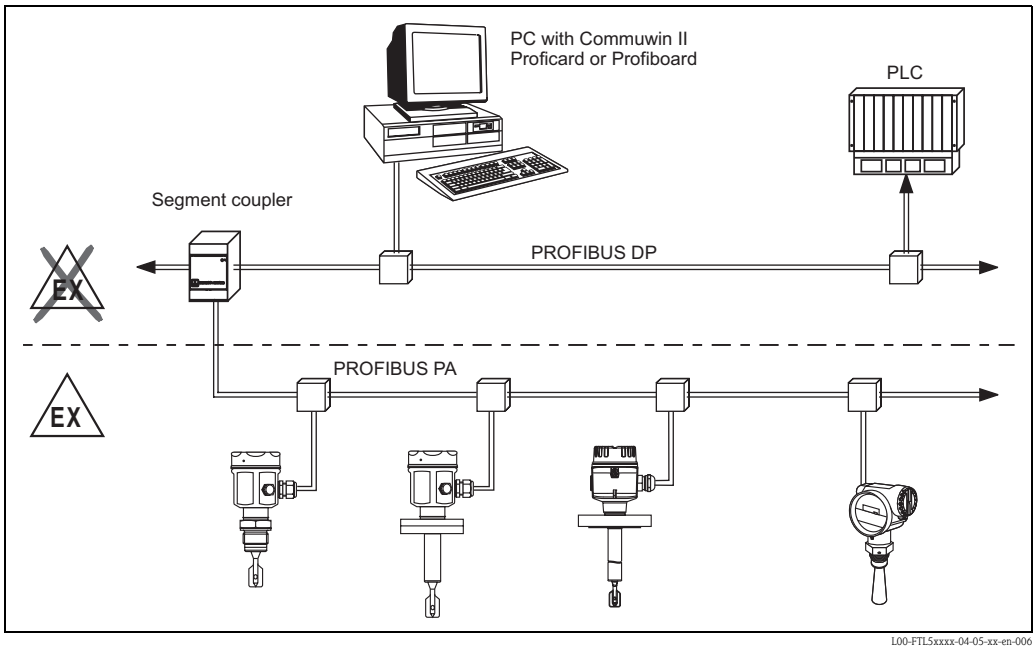
For connecting to PROFIBUS PA

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 for more information



L00-FTL5xxxx-04-05-xx-en-005



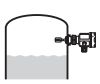
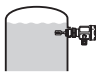
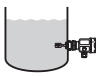
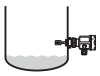
L00-FTL5xxxx-04-05-xx-en-006

Output signal

☼ = lit

● = unlit

L00-FTL5xxxx-07-05-xx-xx-000

Setting	Level	LEDs green	LEDs yellow	FEL50A
not inverted		☼	●	OUT_D = 0 PA bus signal
		☼	☼	OUT_D = 1 PA bus signal
inverted		☼	☼	OUT_D = 1 PA bus signal
		☼	●	OUT_D = 0 PA bus signal

L00-FTL5xxxx-04-05-xx-xx-009

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 mm²; strand in ferrule to DIN 46228
- Protective earth in housing: cross-section max. 2.5 mm²
- External equipotential bonding connection on housing: cross-section max. 4 mm²

Safety 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

Min. = 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

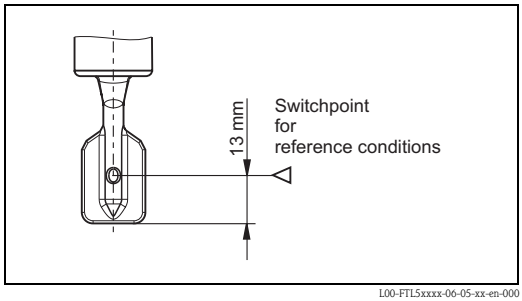
Product density: 1 g/cm³ (water)

Viscosity: 1 mm²/s

Medium pressure p_e: 0 bar

Sensor mounting: vertical from above

Density switch: to > 0.7



L00-FTL5xxxx-06-05-xx-en-000

Maximum measured error

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

Repeatability

0.1 mm

Hysteresis

Approx. 2 mm

Influence of medium temperature

Max. +1.4…–5.5 mm (–60…+280 °C)

Influence of product density

Max. +4.8…–3.5 mm (0.5…1.5 g/cm³)

Influence of medium pressure

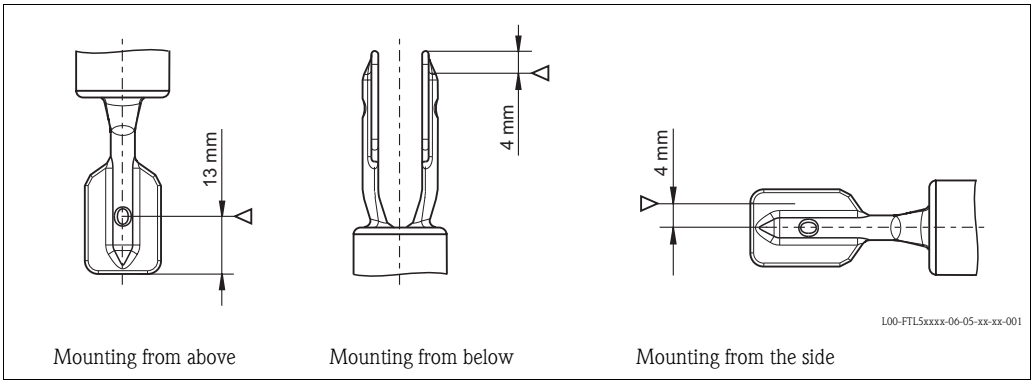
Max. 0…–3.9 mm (–1…100 bar)

Operating conditions

Installation

Installation instructions

Switch points ▷ on the sensor depend on the mounting position, with reference to water,
Density 1 g/cm³, 23 °C, p_e 0 bar.



Mounting from above | Mounting from below | Mounting from the side

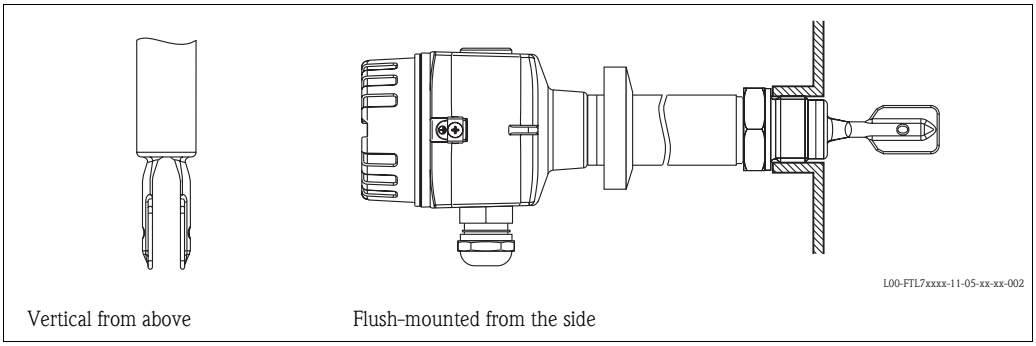
Note!
Switch points of the Liquiphant S FTL70/71 are at other positions to those of the previous version FDL60/61.

Examples of mounting

Examples of mounting with regard to the viscosity ν of the liquid and the tendency to form build-up

Optimum mounting, without problem even with high viscosity:

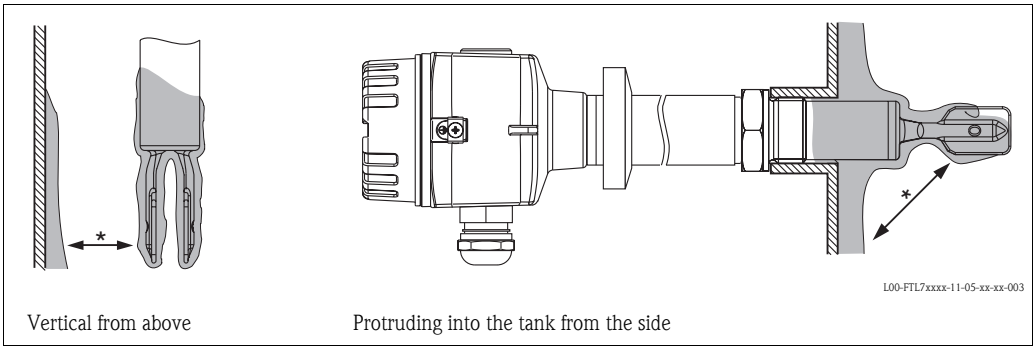
Position the fork so that the narrow edge of the tines is vertical.
This ensures that the liquid can run off easily.



Vertical from above | Flush-mounted from the side

With build-up on the tank walls:

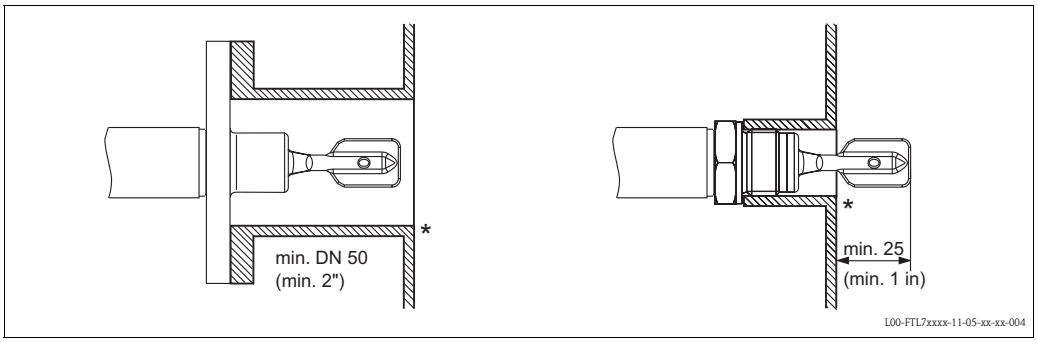
* Ensure that there is sufficient distance between the build-up expected on the tank wall and the fork.



Vertical from above | Protruding into the tank from the side

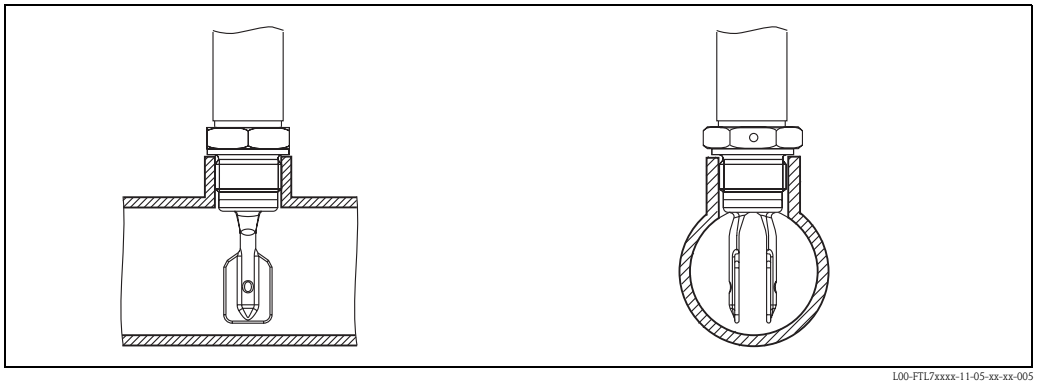
Mounting positions with low viscosity (up to 2000 mm²/s):

* Deburr the nozzle surfaces

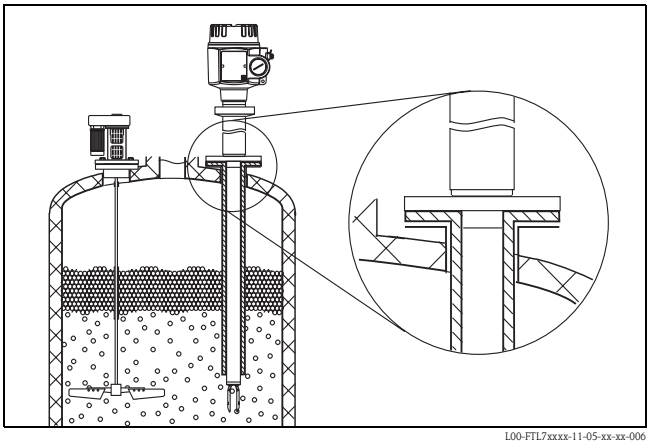


Mounting in piping from 2":

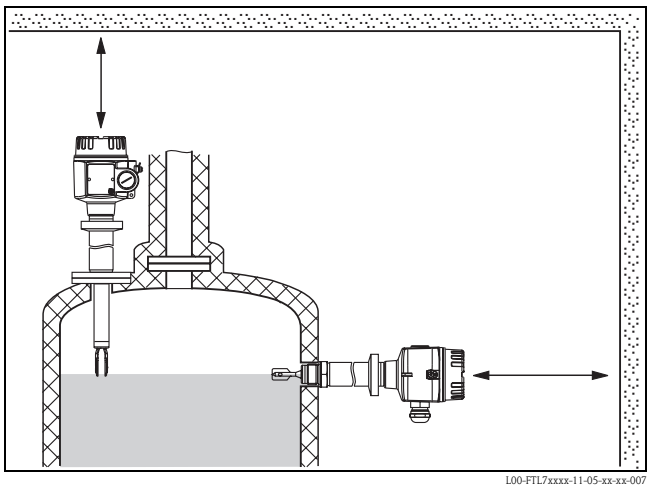
Fluid velocities up to 5 m/s for viscosity 1 mm²/s and density 1 g/cm³.
(Check the function for other operating conditions.)



Support the Liquiphant S FTL71 in the event of severe dynamic load.



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



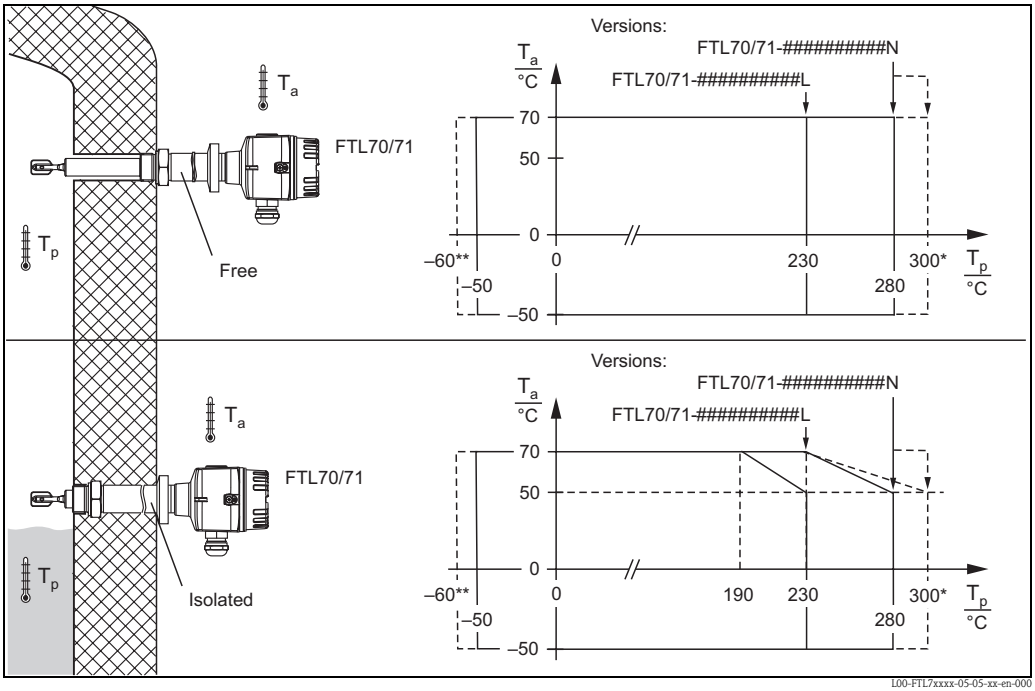
Orientation

FTL70, and FTL71 with short pipe (up to approx. 500 mm) - any position,
FTL71 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:



* *Maximum 50 hours cumulative*
** *–60 °C only for ATEX and CSA certificates*

Ambient temperature limits

–50…+70 °C

Storage temperature

–50…+80 °C

Climate class

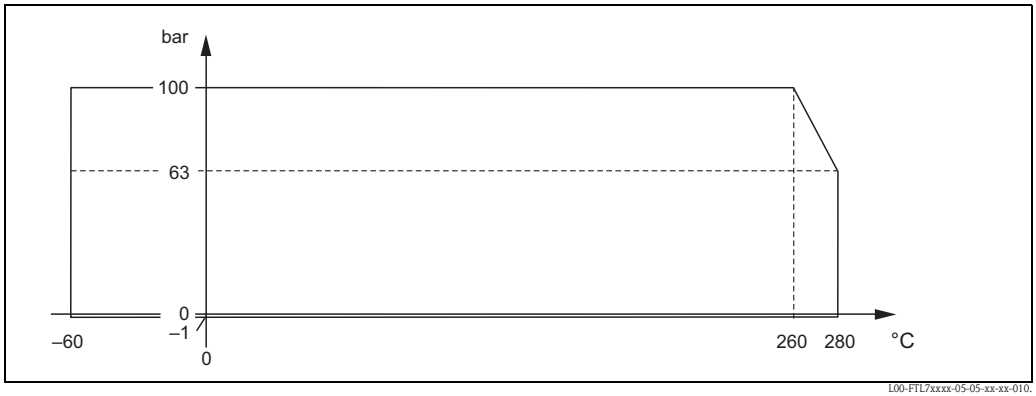
Climate protection to IEC 68, Part 2-38, Fig. 2a

Degree of protection

- Polyester and aluminium housing: IP66/IP67 to EN 60529
- Aluminium housing (EEx d, EEx de): IP66/IP68 to EN 60529 (1 m, 24 h)

Vibration resistance	To IEC 68, Part 2-6 (10…55 Hz, 0.15 mm, 100 cycles)
Electromagnetic compatibility	Interference emission to EN 61326, Electrical Equipment Class B Interference immunity to EN 61326; Annex A (Industrial) and NAMUR Recommendation NE 21 (EMC) If the fork tines are joined together on account of build-up, the useful signal is attenuated to such an extent that the original EMC values can no longer be completely observed. (EN 61000-4-3 Electromagnetic fields, EN 61000-4-6 HF coupling)

Medium conditions

Medium temperature range	–60…+280 °C (300 °C for max. 50 h cumulative)
Thermal shock	Without restriction within the medium temperature range.
Medium pressure p_e	 L00-FTL7xxxx-05-05-xx-xx-010.

Note!
Flange connections: The pressure and temperature allocations of the appropriate stadards (e.g. EN 1092-1, ANSI, JIS) must be observed.

Test pressure	max. 150 bar at 20 °C, (no function during test pressure) Burst pressure of diaphragm 400 bar
State of aggregation	Liquid
Density	Min. 0.5 g/cm^3 (other density settings on request)
Viscosity	Max. 10000 mm^2/s
Solids content	Max. ø5 mm

Mechanical construction

Design

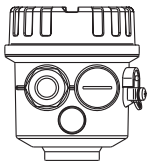
Summary of all electrical and mechanical versions

Plug-in electronic inserts to mount in the housing

L00-FTL5xxxx-03-05-xx-xx-000

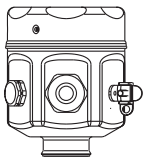
FEL51:	Two-wire AC connection
FEL52:	Three-wire DC connection PNP
FEL54:	Universal current connection, 2 relay outputs
FEL55:	Output 16/8 mA for separate switching unit
FEL56:	Output 0.6…1.0 / 2.2…2.8 mA for separate switching unit (NAMUR)
FEL58:	Output 2.2…3.5 / 0.6…1.0 mA for separate switching unit (NAMUR)
FEL57:	Output 150/50 Hz, PFM, for separate switching unit (Nivotester)
FEL50A:	Digital communication PROFIBUS PA

Housing



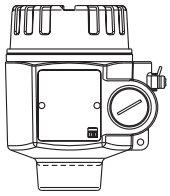
L00-FTL5xxxx-03-05-xx-xx-001

F16
Polyester (PBT)



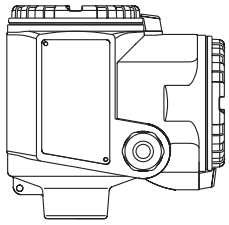
L00-FTL5xxxx-03-05-xx-xx-002

F15
Steel (316L)



L00-FTL5xxxx-03-05-xx-xx-003

F17/F13
Aluminium
(also for EEx d),
coated

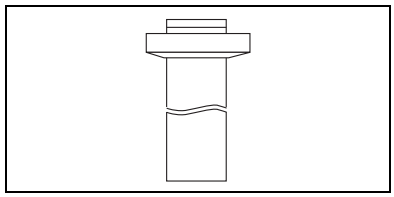


L00-FTL5xxxx-03-05-xx-xx-004

T13
Aluminium with separate
connection compartment
(also for EEx de and EEx d), coated

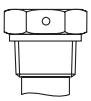
Temperature spacer

Temperature spacer with gas-tight bushing
approx. 160 mm up to 230 °C ("L")
approx. 200 mm up to 280 °C ("N")



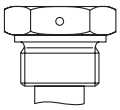
L00-FTL7xxxx-03-05-xx-xx-002

Process connections



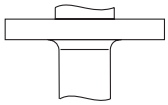
L00-FTL5xxxx-03-05-xx-xx-006

G ¾, DIN ISO 228/I
R ¾, DIN 2999
NPT ¾, ANSI B 1.20.1
(AF 32)



L00-FTL5xxxx-03-05-xx-xx-007

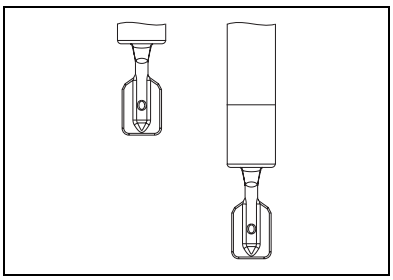
G 1, DIN ISO 228/I
R 1, DIN 2999
NPT 1, ANSI B 1.20.1
(AF 41)



L00-FTL5xxxx-03-05-xx-xx-009

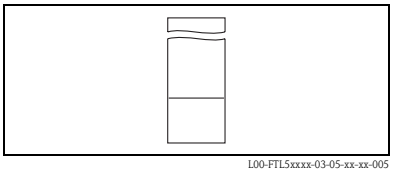
Flanges to DIN, ANSI, JIS
from DN 25 / 1"

Sensors
Compact or with extension pipe up to 3 m
(6 m on request)



L00-FTL5xxxx-03-05-xx-xx-018

Bushings
Temperature spacer and flameproof bushing

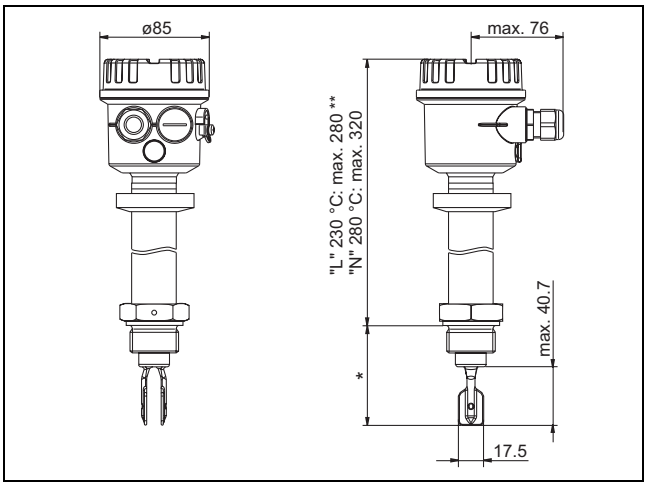


L00-FTL5xxxx-03-05-xx-xx-005

Dimensions (in mm)

Housing and sensor FTL70/71

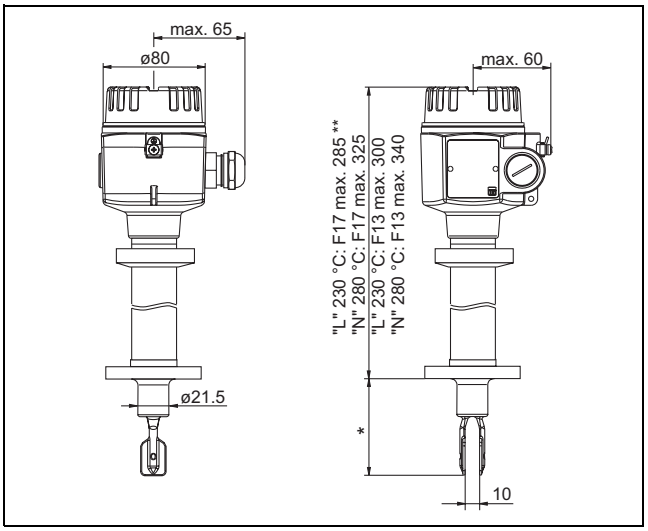
F16 Polyester



L00-FTL7xxxx-06-05-xx-xx-001

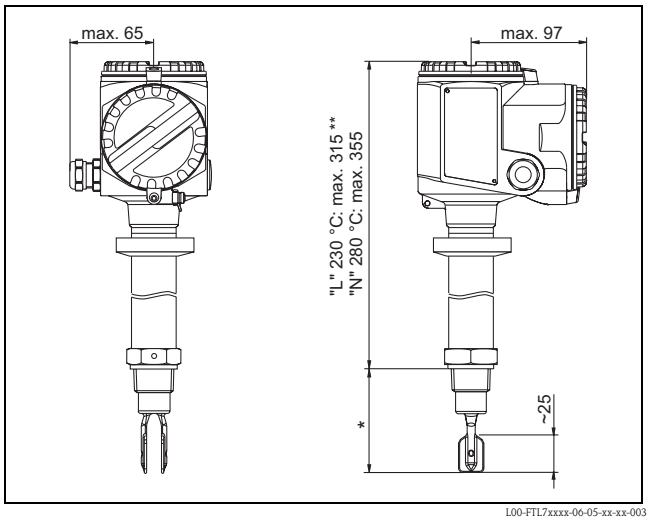
F17 Alu

F13 Alu
(for EEx d)



L00-FTL7xxxx-06-05-xx-xx-002

T13 Alu
with separate
connection compartment

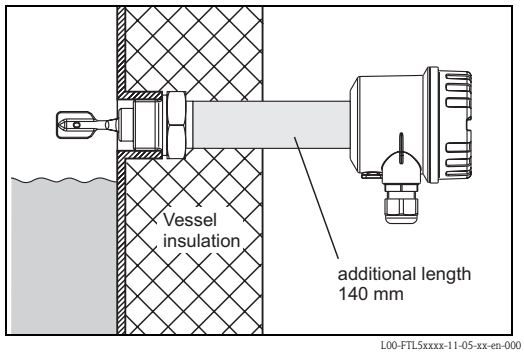


* see Process connections
** "L" = version FTL70/71 - # # # # # # # # # # L for 230 °C
"N" = version FTL70/71 - # # # # # # # # # # N for 280 °C

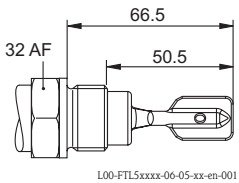
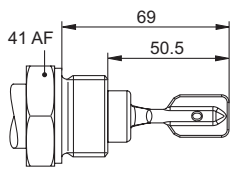
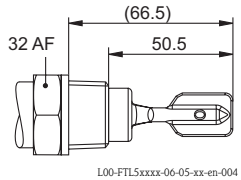
The dimensions apply to process connections with G, R, NPT threads;
for flanged versions dimensions may be up to 30 mm bigger.

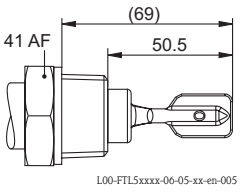
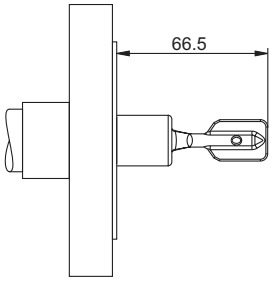
Note!
The switch points of the Liquiphant S are at other positions to those of the previous version FDL60/61.

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

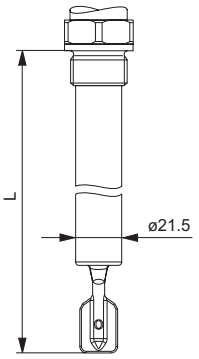
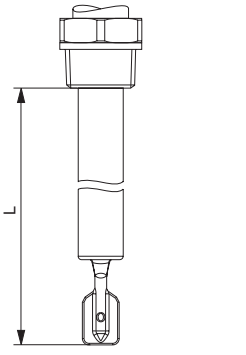
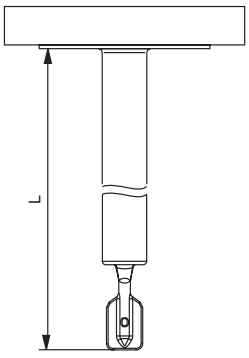


Process connections

Process connection		**Dimensions**	**Accessories**	**Pressure Temperature**
G ¾ DIN ISO 228/I with elastomer flat seal to DIN 7603 (supplied)	GQ2 GQ5		Flat seal to DIN 7603; installed on site	max. 100 bar max. 280 °C
G 1 DIN ISO 228/I with elastomer flat seal to DIN 7603 (supplied)	GR2 GR5		Flat seal to DIN 7603; installed on site	max. 100 bar max. 280 °C
NPT ¾ ANSI B 1.20.1 or **R ¾** DIN 2999	GM2 GM5 GE2 GE5		In conformity with FDA*	max. 100 bar max. 280 °C

Process connection		Dimensions	Accessories	Pressure Temperature
NPT 1 ANSI B 1.20.1 or **R 1** DIN 2999	GN2 GN5 GF2 GF5	 L00-FTL5xxxx-06-05-xx-en-005	In conformity with FDA*	max. 100 bar max. 280 °C
Flanges ANSI B 16.5 EN 1092-1 (DIN 2527 B) JIS B 2210	A## B## C## K##	 L00-FTL5xxxx-06-05-xx-xx-008	Seal depending on design; installed on site In conformity with FDA*	See nominal pressure of flange, however max. 100 bar max. 280 °C At high temperatures: note pressure capacity of flange depending on the temperature!
* FDA-compliant material according to 21 CFR Part 177.1550/2600				

Sensor length L for FTL71,
depending on process connection

Thread: G ¾ G 1	Thread: NPT ¾ NPT 1 R ¾ R 1	Flanges and flange-like process connections
 L00-FTL5xxxx-06-05-xx-xx-016	 L00-FTL5xxxx-06-05-xx-xx-017	 L00-FTL5xxxx-06-05-xx-xx-018
From seal surface of thread adapter	From lower edge of thread	

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

Note!
The switch points of the Liquiphant S FTL70/71 are at other positions to those of the previous version FDL60/61.

Special length "L II":
With vertical mounting from above the same switchpoint as for the Liquiphant II FTL360, FTL365, FDL30, FDL35

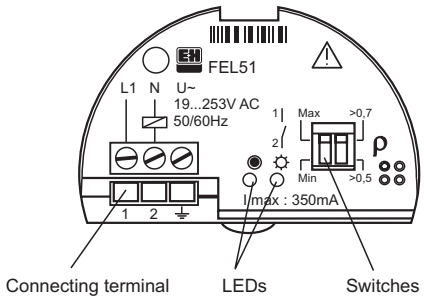
"L II" depends on process connection:
115 mm for flanges and flange-like process connections
99 mm for threads NPT and R (BSPT)
118 mm for threads G 1 (BSP 1)
115 mm for threads G ¾ (BSP ¾)
104 mm for flush-mounted 1" (Endress+Hauser)

Weights	See Product structure
Material	– Wetted parts: Process connection and extension pipe: AISI 316L (1.4435) or 2.4610 (AlloyC4) Tuning fork: AISI S31803 (1.4462) or 2.4610 (AlloyC4) – Flat seal for process connection G ¾ 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 – Aluminium housing: EN-AC-AlSi10Mg, plastic-coated, Cover seal: EPDM – Cable gland: polyamide or brass, nickel-plated – Temperature spacer: AISI 316L (1.4435)
Process connections	– Parallel thread G ¾, G 1½ to DIN ISO 228/I with flat seal to DIN 7603 installed on site – Tapered thread R ¾, R 1 to DIN 2999 Part 1 – Tapered thread ¾-14 NPT, 1-11½ NPT to ANSI B 1.20.1 – Flanges to EN/DIN from DN 25, for standards see Product structure, to ANSI B16.5 from 1", to JIS B2238 (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



L00-FTL5xxxx-03-05-xx-en-001

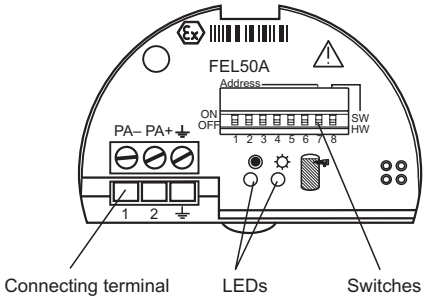
With FEL56:
2 switches for safety mode and density change,
green LED flashes to indicate operational status,
red LED to indicate the switching status,
flashes in the event of corrosion damage on sensor
or if the electronics are defect

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

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

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-FTL5xxxx-03-05-xx-en-002

Operating concept

On-site configuration

Certificates and approvals

Certificates

See Product structure

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, Alu, Alu/sep.	FEL51/52/54 FEL55/56/57/58/50A
D	Overfill protection to WHG (Germany)	PBT, Alu, Alu/sep.	FEL51/52/54 FEL55/56/57/58/50A
B	ATEX II 3G EEx nC IIC T6, WHG	PBT, Alu, Alu/sep.	FEL54
	ATEX II 3G EEx nC IIC T6, WHG ATEX II 3D T85°C, WHG	Alu, Alu/sep.	FEL54
C	ATEX II 3G EEx nA II T6, WHG	PBT, Alu, Alu/sep.	FEL51/52 FEL55/56/57/58/50A
	ATEX II 3G EEx nA II T6, WHG ATEX II 3D T85°C, WHG	Alu, Alu/sep.	FEL51/52 FEL55/56/57/58/50A
E	ATEX II 1/2 G, EEx de, WHG	Alu/sep.	FEL51/52/54 FEL55/56/57/58/50A
F	ATEX II 1/2 G, EEx ia IIC T6, WHG	PBT, Alu, Alu/sep.	FEL55/56/57/58/50A
	ATEX II 1/2 G, EEx ia IIC T6, WHG ATEX II 1/2 D, T80°C	Alu, Alu/sep.	FEL55/56/57/58/50A
L	ATEX II 1/2 G, EEx d IIC T6, WHG	Alu	FEL51/52/54 FEL55/56/57/58/50A
P	FM, IS, Cl. I, II, III, Div. 1, Gr. A-G	PBT, St., Alu, Alu/sep. with NPT cable entry	FEL55/56/57/58
Q	FM, XP, Cl. I, II, III, Div. 1, Gr. A-G	Alu with NPT cable entry	FEL51/52/54 FEL55/56/57/58
R	FM, NI, Cl. I, Div. 2, Gr. A-D	St., Alu, Alu/sep. with NPT cable entry	FEL51/52/54 FEL55/56/57/58
		PBT with NPT cable entry	FEL51/52 FEL55/56/57/58
U	CSA, General Purpose	St., Alu, Alu/sep. with NPT cable entry	FEL51/52/54 FEL55/56/57/58
		PBT with NPT cable entry	FEL51/52 FEL55/56/57/58
S	CSA, IS, Cl. I, II, III, Div. 1, Gr. A-G	PBT, St., Alu, Alu/sep. with NPT cable entry	FEL55/56/57/58
T	CSA, XP, Cl. I, II, III, Div. 1, Gr. A-G	Alu with NPT cable entry	FEL51/52/54 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 (for non-hazardous area)	PBT, St., Alu, Alu/sep.	FEL51/52/54 FEL55/56/57/58/50A

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

Ordering information

Liquiphant S
FTL70
FTL71
Product structure

Design:		*Basic weight*
FTL70	Compact	0.7 kg
FTL71	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		Overfill protection to WHG (Germany)
	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*	
	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 T2	
	W	TIIS	Ex d IIC T2	
	Y	Special version		

*) Not for PBT

20		**Process Connection:**				*Additional weight*
		Threaded connection				
	GQ2	G ¾		316L	Thread ISO 228	
	GQ5	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
	GE2	R ¾		316L	Thread DIN 2999	
	GE5	R ¾		AlloyC4	Thread DIN 2999	
	GF2	R 1		316L	Thread DIN 2999	0.2 kg
	GF5	R 1		AlloyC4	Thread DIN 2999	0.2 kg
	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
		EN flanges				
	B82	DN25	PN25/40 A	316L	Flange EN 1092-1 (DIN 2527 B)	1.4 kg
	C82	DN25	PN25/40 B1	316L	Flange EN 1092-1 (DIN 2527 C)	1.3 kg
	C85	DN25	PN25/40	AlloyC4 >1.4462	Flange EN 1092-1 (DIN 2527)	1.3 kg
	D82	DN25	PN40 B1	316L	Flange EN 1092-1 (DIN 2526 D)	1.4 kg
	BB2	DN32	PN25/40 A	316L	Flange EN 1092-1 (DIN 2527 B)	2.0 kg
	BD2	DN40	PN25/40 A	316L	Flange EN 1092-1 (DIN 2527 B)	2.4 kg
	CF2	DN50	PN10/16 B1	316L	Flange EN 1092-1 (DIN 2527 C)	2.5 kg
	BG2	DN50	PN25/40 A	316L	Flange EN 1092-1 (DIN 2527 B)	3.2 kg
	CG2	DN50	PN25/40 B1	316L	Flange EN 1092-1 (DIN 2527 C)	2.9 kg
	DG2	DN50	PN40 B1	316L	Flange EN 1092-1 (DIN 2526 D)	2.9 kg
	CG5	DN50	PN25/40	AlloyC4 >1.4462	Flange EN 1092-1 (DIN 2527)	2.9 kg
	BI2	DN50	PN63 A	316L	Flange EN 1092-1 (DIN 2527 B)	4.5 kg

20		Process Connection:					Additional weight
	CI2	DN50	PN63 B2		316L	Flange EN 1092-1 (DIN 2527 E)	4.5 kg
	CI5	DN50	PN63		AlloyC4 >1.4462	Flange EN 1092-1 (DIN 2527)	4.5 kg
	BJ2	DN50	PN100 A		316L	Flange EN 1092-1	5.5 kg
	CJ2	DN50	PN100 B2		316L	Flange EN 1092-1	5.5 kg
	BK2	DN65	PN25/40 A		316L	Flange EN 1092-1 (DIN 2527 B)	4.3 kg
	CM2	DN80	PN10/16 B1		316L	Flange EN 1092-1 (DIN 2527 C)	4.8 kg
	BN2	DN80	PN25/40 A		316L	Flange EN 1092-1 (DIN 2527 B)	5.9 kg
	CN2	DN80	PN25/40 B1		316L	Flange EN 1092-1 (DIN 2527 C)	5.2 kg
	DN2	DN80	PN40 B1		316L	Flange EN 1092-1 (DIN 2526 D)	5.2 kg
	CN5	DN80	PN25/40		AlloyC4 >1.4462	Flange EN 1092-1 (DIN 2527)	5.2 kg
	B02	DN80	PN63 A		316Ti	Flange EN 1092-1 (DIN 2527 B)	6.9 kg
	C02	DN80	PN63 B2		316L	Flange EN 1092-1 (DIN 2527 E)	6.9 kg
	C05	DN80	PN63		AlloyC4 >1.4462	Flange EN 1092-1 (DIN 2527)	6.9 kg
	B12	DN80	PN100 A		316L	Flange EN 1092-1	8.0 kg
	C12	DN80	PN100 B2		316L	Flange EN 1092-1	8.0 kg
	CQ2	DN100	PN10/16 B1		316L	Flange EN 1092-1 (DIN 2527 C)	5.3 kg
	BR2	DN100	PN25/40 A		316L	Flange EN 1092-1 (DIN 2527 B)	7.5 kg
	BU2	DN100	PN63 A PN63 A		316L	Flange EN 1092-1 (DIN 2527 B)	10.1 kg
	CU2	DN100	PN63 B2		316L	Flange EN 1092-1 (DIN 2527 E)	10.1 kg
	CU5	DN100	PN63		AlloyC4 >1.4462	Flange EN 1092-1 (DIN 2527)	10.1 kg
		ANSI flanges					
	A82	1"	150 lbs	RF	316/316L	Flange ANSI B16.5	1.0 kg
	AB2	1¼"	300 lbs	RF	316/316L	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	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		AlloyC4 >1.4462	Flange ANSI B16.5	2.4 kg
	AF2	2"	300 lbs	RF	316/316L	Flange ANSI B16.5	3.2 kg
	AF5	2"	300 lbs		AlloyC4 >1.4462	Flange ANSI B16.5	3.2 kg
	AG2	2"	600 lbs	RF	316/316L	Flange ANSI B16.5	4.2 kg
	AG5	2"	600 lbs		AlloyC4 >1.4462	Flange ANSI B16.5	4.2 kg
	AL2	3"	150 lbs	RF	316/316L	Flange ANSI B16.5	4.9 kg
	AM2	3"	300 lbs	RF	316/316L	Flange ANSI B16.5	6.8 kg
	AN2	3"	600 lbs	RF	316/316L	Flange ANSI B16.5	8.5 kg
	AN5	3"	600 lbs		AlloyC4 >1.4462	Flange ANSI B16.5	8.5 kg
	AP2	4"	150 lbs	RF	316/316L	Flange ANSI B16.5	7.0 kg
	AQ2	4"	300 lbs	RF	316/316L	Flange ANSI B16.5	11.5 kg
	AR2	4"	600 lbs	RF	316/316L	Flange ANSI B16.5	17.3 kg
		JIS flanges					
	KF2	20 K 50		RF	316L	Flange JIS B2238	1.9 kg
	KF5	20 K 50		RF	AlloyC4 >316L	Flange JIS B2238	1.9 kg
	YY9	Special version					

30			Probe Length:			
			FTL70			
		AB	Compact version Fork: 318L	Ra < 3.2 µm/80 grit,	316L	
		AE	Compact version	Ra < 3.2 µm/80 grit,	AlloyC4	
			FTL71			
		BB	..... mm L Fork: 318L	Ra < 3.2 µm/80 grit,	316L	0.9 kg/m

30	Probe Length:				
	BE	..... mm L	Ra < 3.2 µm/80 grit,	AlloyC4	0.9 kg/m
	CB	..... inch L	Ra < 3.2 µm/80 grit,	316L	
		Fork: 318L			2.3 kg/100 in
	CE	..... inch L	Ra < 3.2 µm/80 grit,	AlloyC4	2.3 kg/100 in
	YY	Special version			

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

50	Housing; Cable Entry:				
	E4	F16 Polyester	NEMA4X;	thread NPT ½	
	E5	F17 Alu	NEMA4X;	thread NPT ¾	0.5 kg
	E7	T13 Alu	coated IP66;	thread NPT ¾	
		separate connection compartment			1.1 kg
	E8	F13 Alu	NEMA4X;	thread NPT ¾	
		suitable for EEx d/XP			0.5 kg
	F4	F16 Polyester	IP66;	thread G ½	
	F5	F17 Alu	IP66;	thread G ½	0.5 kg
	F7	T13 Alu	coated IP66;	thread G ½	
		separate connection compartment			1.1 kg
	F8	F13 Alu	IP68;	thread G ½	
		suitable for EEx d/XP			0.5 kg
	G4	F16 Polyester	IP66;	gland M20	
	G5	F17 Alu	IP66;	gland M20	0.5 kg
	G7	T13 Alu	coated IP66;	gland M20	
		separate connection compartment (EEx d > thread M20)			1.1 kg
	G8	F13 Alu	IP68;	gland M20	
		suitable for EEx d/XP			0.5 kg
	N4	F16 Polyester	IP66;	plug M12	
	N5	F17 Alu	IP66;	plug M12	
	Y9	Special version			

60	Additional Option:	
	A	Basic version
	C	EN 10204 - 3.1 material (316L/318L wetted parts) inspection certificate
	N	EN 10204 - 3.1 material, NACE MR0175 (316L wetted parts) inspection certificate
	S	GL/ABS marine certificate
	Y	Special version

70	Application:		
	L	230 °C (450 °F), gas-tight feed through	
	N	280 °C (540 °F), gas-tight feed through	0.2 kg
	Y	Special version	

								Complete product designation

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

Accessories

Lap joint flange

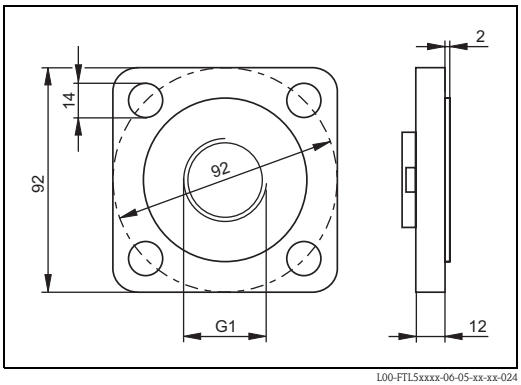
with G 1 thread for mounting
a Liquiphant S FTL70/71
with process connection GR2.

Pressure: up to 40 bar

Material: corrosion-resistant steel
1.4301 (AISI 304)

Weight: 0.54 kg

Order number: 918158-0000



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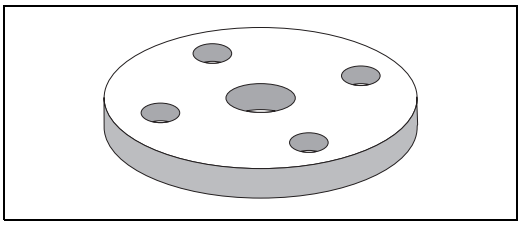
Lap joint flanges

with G 1 thread for mounting
a Liquiphant S FTL70/71
with process connection GR2.

Material: corrosion-resistant steel
1.4571 (AISI 113Ti)

– Flange DN 50, PN 40,
DIN 2527 form B
Weight: 3.11 kg
Order number: 918143-0000

– Flange ANSI 2", 150 psi, RF
Weight: 2.38 kg
Order number: 918144-0000

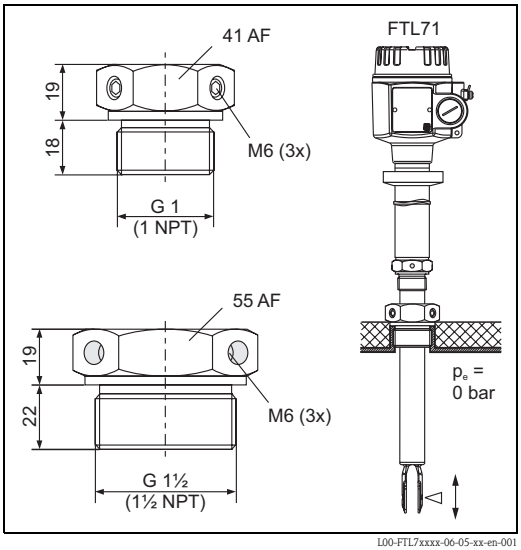

L00-FTL5xxxx-03-05-xx-xx-015

Sliding sleeves for unpressurized operation

for continuous adjustment of the switch point of a Liquiphant S FTL71.

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-FTL7xxxx-06-05-xx-en-001

Thread	Standard	Material	Order number	Approval
G 1	DIN ISO 228/I	1.4435 (AISI 316L)	52003978	
G 1	DIN ISO 228/I	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/I	1.4435 (AISI 316L)	52003980	
G 1½	DIN ISO 228/I	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

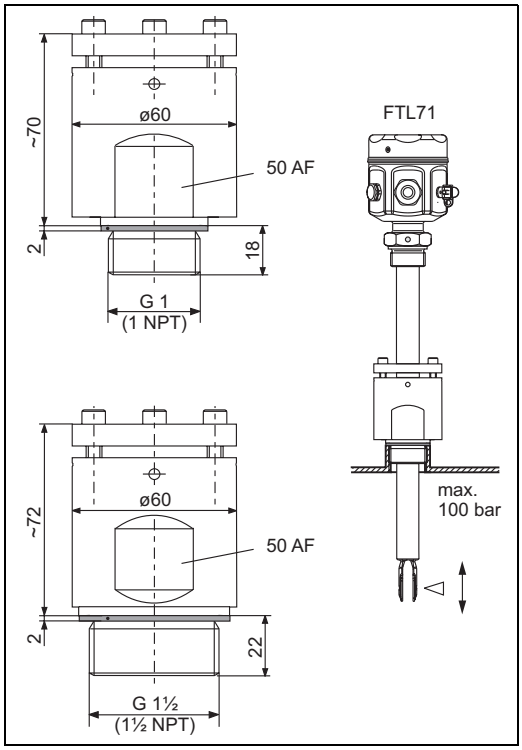
High pressure sliding sleeves

for continuous adjustment of the switch point of a Liquiphant S FTL71.

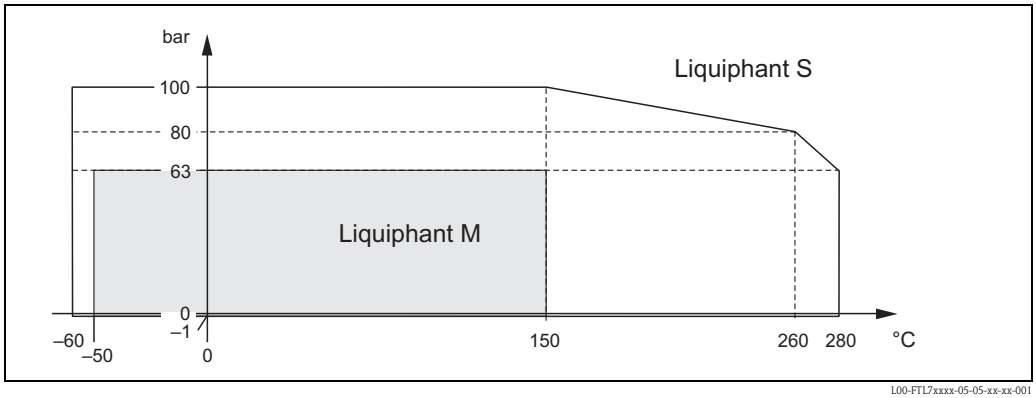
Material: corrosion-resistant steel 1.4435 (AISI 316L) or AlloyC4

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

Seal package made of graphite



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	



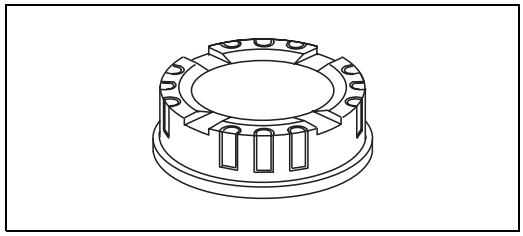
Cover with sight glass

for polyester housing

Material: PA 12

Weight: 0.04 kg

Order number: 943461-0001



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

Supplementary Documentation

Operating Instructions

Electronic insert FEL50A for Liquiphant M/S
PROFIBUS PA
BA141F/00/en

Liquiphant S FTL70, FTL71
KA172F/00/a6

Liquiphant S FTL70-####### # 7 #, FTL71-####### # 7 #
KA173F/00/a6

Technical Information

Nivotester FTL370/372, switching units in Racksyst design
for Liquiphant S with electronic insert FEL57
TI198F/00/en

Nivotester FTL320, switching unit in Minipac design
for Liquiphant S 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 S with electronic insert FEL56, FEL58
TI332F/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 M FTL50/51(H), for medium temperatures up to 150 °C
TI328F/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

Functional Safety (SIL)

Liquiphant M/S + Nivotester FTL325P
SD111F/00/en

Liquiphant M/S + Nivotester FTL375P
SD113F/00/en

Liquiphant M/S with FEL58 + Nivotester FTL325N (MAX)
SD161F/00/en

Liquiphant M/S with electronic insert FEL54 (MAX)
SD162F/00/en

Liquiphant M/S with electronic insert FEL52 (MAX)
SD163F/00/en

Liquiphant M/S with electronic insert FEL51 (MAX)
SD164F/00/en

Liquiphant M/S with electronic insert FEL55 (MAX)
SD167F/00/en

Liquiphant M/S with FEL56 + Nivotester FTL325N (MAX)
SD168F/00/en

Liquiphant M/S with FEL58 + Nivotester FTL325N (MIN)
SD170F/00/en

Liquiphant M/S with electronic insert FEL51 (MIN)
SD185F/00/en

Liquiphant M/S with electronic insert FEL52 (MIN)
SD186F/00/en

Liquiphant M/S with electronic insert FEL54 (MIN)
SD187F/00/en

Liquiphant M/S with FEL56 + Nivotester FTL325N (MIN)
SD188F/00/en

Safety Instructions (ATEX)

CE ⟨Ex⟩ II 1/2 G, EEx d IIC/B
(KEMA 99 ATEX 1157)
XA031F/00/a3

CE ⟨Ex⟩ II 1/2 G, EEx ia/ib IIC/B
(KEMA 99 ATEX 0523)
XA063F/00/a3

CE ⟨Ex⟩ II 1 G, EEx ia IIC/B
(KEMA 99 ATEX 5172 X)
XA064F/00/a3

CE ⟨Ex⟩ II 1/2 G, EEx de IIC/B
(KEMA 00 ATEX 2035)
XA108F/00/a3

CE ⟨Ex⟩ II 3 G, EEx nA/nC II
(EG 01 007-a)
XA182F/00/a3

System Information

Liquiphant M
SI040F/00/en

Note!
The specified certificates and approvals are available on www.endress.com.

International Head Quarter

Endress+Hauser
GmbH+Co. KG
Instruments International
Colmarer Str. 6
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