

Level gauges Series LT

Level indicator, switch and transmitter for liquids

- Simple construction
- Resistant under extreme temperature and pressure conditions
- No risk of leakage
- Excellent chemical resistance
- Measuring range: from 150 mm to 15 m
- Accuracy: ± 4 mm measured value
- Connections:
 - EN 1092-1 or ANSI flanges. Other flange standards on request (JIS,...)
 - BSP or NPT threaded connections
 - Sanitary couplings according to ISO 2852, SMS 1145, DIN 11851, TRI-CLAMP®
- Materials: EN 1.4404 (AISI 316L), PVC, PP, PVDF, PTFE, PVC-C. Others on request
- Local indication:
 - By means of external float in a glass tube
 - By means of magnetic strips
- Options:
 - Switches. Optional with Ex d IIC T6 Explosion Proof Enclosure (ATEX certified)
 - Electronic transmitter with 4-20 mA analog output for safe or hazardous area (Ex ia IIC T6 protection, ATEX certified). HART, PROFIBUS, FIELDBUS protocols available on request



HART
COMMUNICATION PROTOCOL

Working principle

According to communicating vessels principle. A float submersed in a chamber communicated with the tank whose liquid level needs to be measured floats on liquid surface and moves together with it, as level increases or decreases.

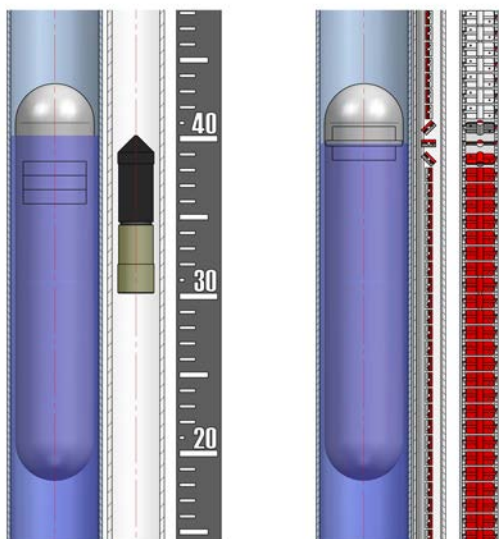
The float is designed for the specific working liquid density and shows the tank level by means of magnetic coupling with an external float or with a magnetic strips rail (depending on model). Both of them are mounted externally and isolated of the level gauge chamber.

Applications

- Chemical and petrochemical industries
- Process industry
- Thermal plants and cryogenic installations
- Ship industry
- Boilers
- Storage installations

Models

- **LT.../** : indication by means of external float in a borosilicate glass tube. Graduated scale in cm included. Maximum liquid temperature for AISI 316L versions: 400°C
- **LTL.../** : indication by means of bi-color magnetic strips (red-white) mounted in an anodized aluminium rail with polycarbonate cover. Optional graduated scale in cm. Maximum liquid temperature for AISI 316L versions: 250°C



- **LT ... LTL106** body in AISI 316L, flanged connection
- **LT ... LTL116** body in AISI 316L, threaded connection
- **LT ... LTL14** body in PVC, PVC-C, PP or PVDF
- **LT ... LTL15** body in SS 316L with internal PTFE coating

Technical data

- **Accuracy:** ± 4 mm measured value
- **Scale in cm** for LT models
For LTL models, scale in cm available on request
- **Liquid density:** 0.55 ... 2 kg/l (others on request)
- **Liquid viscosity:** 1500 cSt maximum
- **Measuring range:** 150 mm ... 15 m
- **Liquid temperature:**
 - LTL106: -20°C ... 250°C
 - LTL106: -20°C ... 400°C, depending on config.
 - LT ... LTL14 / PVC: 0°C ... 45°C
 - LT ... LTL14 / PP: -10°C ... 90°C
 - LT ... LTL14 / PVDF: -20°C ... 145°C
 - LT ... LTL15 / PTFE: -20°C ... 150°C
- **Working pressure:**
 - Models in AISI 316L: PN16 ... PN40 (up to 100 bar max. on request)
 - Models in PVC, PVC-C, PP, PVDF: PN10
 - Models in PTFE: PN16 ... PN40
- **Connections:**
 - EN 1092-1 or ANSI flanges. Other flange standards on request (JIS,...)
 - BSP or NPT threaded connections (for LT ... LTL116)
 - Sanitary couplings according to ISO 2852, SMS 1145, DIN 11851, TRI-CLAMP® (for LT ... LTL106)
- **Mounting:** vertical, tank side
- **Certificate Type Approval** for ship, "offshore" and industry in general, models LTL106 and LTL116 (up to PN25 / ANSI 150# RF) by Lloyd's Register



Limit switches and transmitters

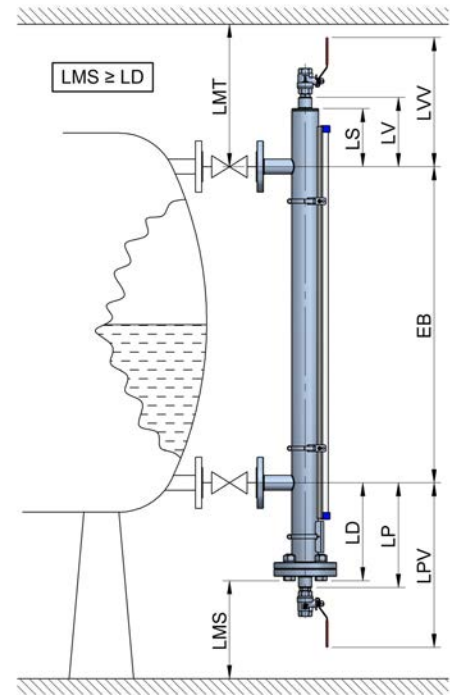
- **LT ... LTL-APR:** adjustable reed switches
 - **LT ... LTL-AAR:** adjustable reed switches (high temperature version)
 - **LT ... LTL-AMM:** adjustable micro-switches
 - **LT ... LTL-AMD:** adjustable inductive switches (+ relays on request)
- All switches can be supplied in Ex d IIC T6 version on request
- **LTE:** Resistive sensor transmitter 0 ... 4-20 mA:
 - TR2420: 24 VDC 2-wire system, compact mounted
 - TR420: 24, 125, 220 VAC, 50/60 Hz / 24 VDC 4-wire system, DIN rail mounted
- HART, PROFIBUS, FIELDBUS protocols, and Ex version available on request
- **LTDR:** Guided radar transmitter 4-20 mA, 4-wire system. Ex version available on request

Mounting

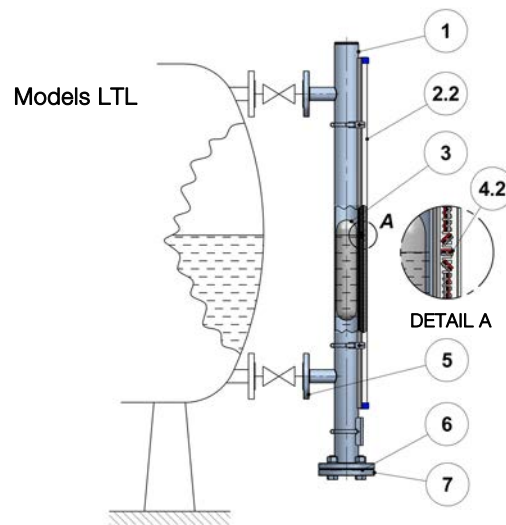
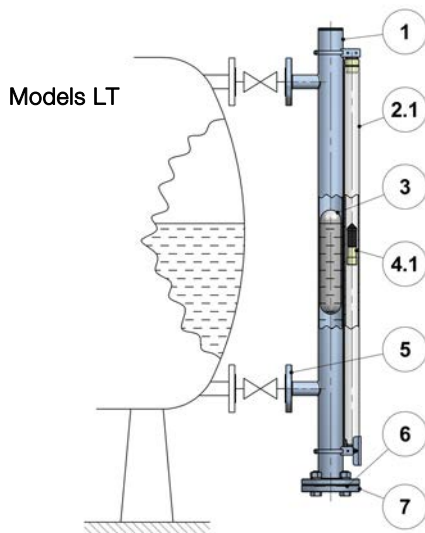
The lower dimension LD, LP or LPV of series LT level gauges is variable depending on working liquid density. The lower the density, the longer this dimension.

In order to remove the float due to a change in density or for maintenance purposes, a minimum distance LMS, longer or equal to LD distance, must be kept between the lowest side of the level gauge and the floor.

| Model | Liquid density kg/l | Lower dimension | | | Upper dimension | | |
|-------------------------------|---------------------|--------------------|-----------------|--------------------------|-------------------|----------------|-------------------------|
| | | Without drain (LD) | With drain (LP) | With drain + valve (LPV) | Without vent (LS) | With vent (LV) | With vent + valve (LVV) |
| LT ... LTL / SS (PN16 ... 40) | 0.55 ... 0.59 | 430 | 445 | 580 | | | |
| | 0.60 ... 0.91 | 340 | 355 | 490 | 130 | 155 | 290 |
| | ≥ 0.92 | 260 | 275 | 410 | | | |
| LT ... LTL / PVC (PN10) | 0.60 ... 0.79 | | 400 | 525 | | | |
| | 0.80 ... 0.89 | | 310 | 435 | 150 | 140 | 265 |
| | ≥ 0.90 | | 240 | 365 | | | |
| LT ... LTL / PP (PN10) | ≥ 0.75 | | 240 | 365 | 150 | 165 | 290 |
| LT ... LTL / PVDF (PN10) | 0.80 ... 0.99 | | 355 | 480 | 150 | 165 | 290 |
| | ≥ 1.00 | | 245 | 370 | | | |



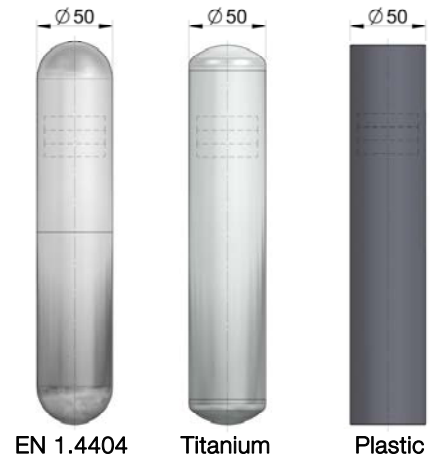
Materials



| N° | Description | Models LT | | | | | Models LTL | | | | |
|-----|-----------------|----------------------|---------------------|----|------|------------------|---------------------------|---------------------|----|------|------------------|
| | | EN 1.4404 | PVC | PP | PVDF | PTFE | EN 1.4404 | PVC | PP | PVDF | PTFE |
| 1 | Body | EN 1.4404 | PVC | PP | PVDF | PTFE + EN 1.4404 | EN 1.4404 | PVC | PP | PVDF | PTFE + EN 1.4404 |
| 2.1 | Guide tube | Borosilicate glass | | | | | --- | | | | |
| 2.2 | Mag strips rail | --- | | | | | Aluminium + Polycarbonate | | | | |
| 3 | Float | EN 1.4404 / Titanium | PVC | PP | PVDF | PTFE | EN 1.4404 / Titanium | PVC | PP | PVDF | PTFE |
| 4.1 | External float | PP / Aluminium | | | | | --- | | | | |
| 4.2 | Mag strips | --- | | | | | POM resin | | | | |
| 5 | Connection | EN 1.4404 | PVC | PP | PVDF | PTFE | EN 1.4404 | PVC | PP | PVDF | PTFE |
| 6 | Gasket | Belpa® CSA-50 | NBR / Viton® / EPDM | | | PTFE | Belpa® CSA-50 | NBR / Viton® / EPDM | | | PTFE |
| 7 | End connection | EN 1.4404 | PVC | PP | PVDF | PTFE | EN 1.4404 | PVC | PP | PVDF | PTFE |

Float types

| Material | Liquid density kg/l | Maximum pressure bar |
|-----------|------------------------|-------------------------|
| Titanium | 0.55 ... 0.83 | PN40 |
| EN 1.4404 | 0.84 ... 2.00 | PN40 |
| EN 1.4404 | 0.77 ... 2.00 | PN63 |
| EN 1.4404 | 0.81 ... 2.00 | 100 |
| PVC | 0.60 ... 2.00 | PN10 |
| PP | 0.75 ... 2.00 | PN10 |
| PVDF | 0.80 ... 2.00 | PN10 |



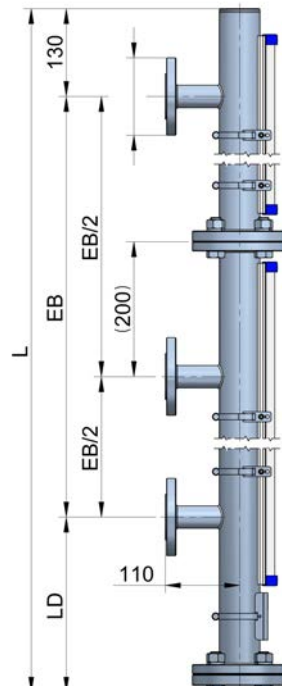
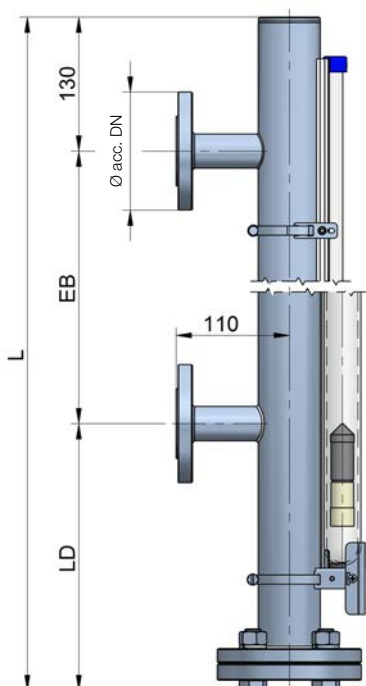
Dimensions and specific technical data

Models LT ... LTL106 ... 116 / LT ... LTL17

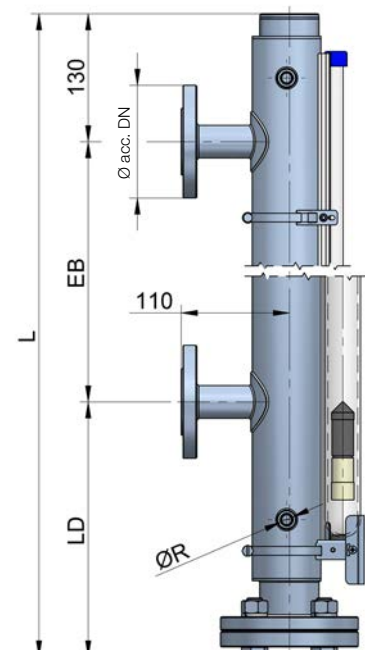
Technical data

- **Material:** EN 1.4404 (AISI 316L)
- **Measuring range:** 150 ... 15000 mm (supplied in separate sections for measuring ranges longer than 5500 mm; one single section on request). Longer ranges on request.
- **Liquid temperature:**
 - 20°C ... 250°C: magnetic strips indication
 - 20°C ... 400°C: glass tube indication
- **Working pressure:** PN16 ... PN40 (up to 100 bar max. on request)
- **Connections:**
 - LT ... LTL106: DN15 ... DN50 EN 1092-1 flanges (other flange standards and sizes on request)
 - LT ... LTL116: G½ ... G2 threaded connection (other thread standards and sizes on request)

- **Limit switches:** LT ... LTL-APR / AAR / AMM / AMD Ex d IIC T6 version on request
- **Transmitter** LTE 0 ... 4-20 mA or guided radar LTDR

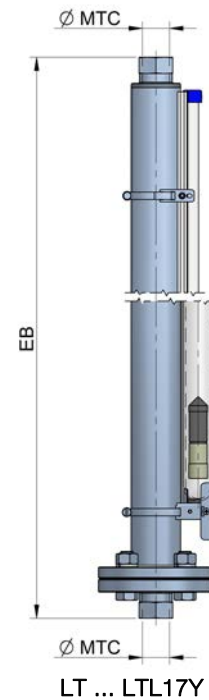
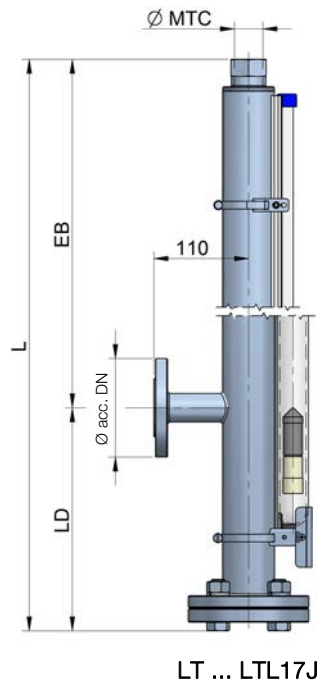
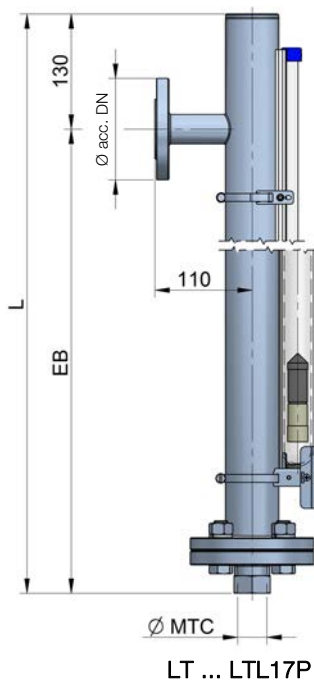


Separate sections



Heating-cooling chamber

Special models LT ... LTL17



Models LT ... LTL15 / PTFE

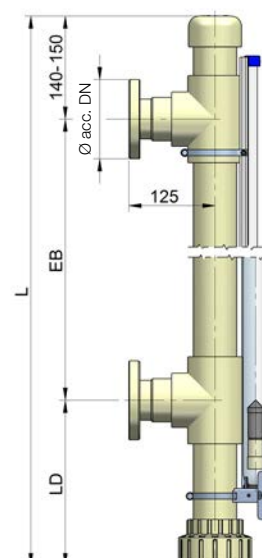
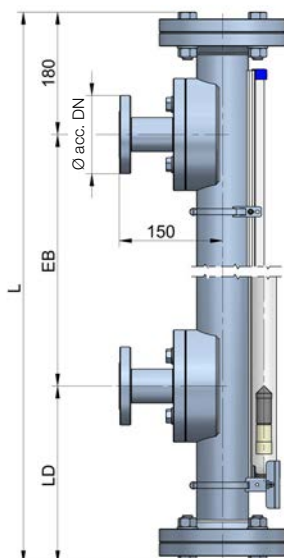
Technical data

- **Material:** EN 1.4404 (AISI 316L) with internal PTFE coating
- **Measuring range:** 6000 mm max. Longer ranges on request
- **Liquid temperature:**
-20°C ... 150°C
- **Working pressure:** PN16 ... PN40
- **Connections:** DN15 ... DN50 EN 1092-1 flanges (other flange standards and sizes on request)
- **Limit switches:** LT ... LTL-APR / AMM / AMD
Ex d IIC T6 version on request
- **Transmitter** LTE 0 ... 4-20 mA or guided radar LTDR

Models LT ... LTL14 / PP, PVC, PVC-C, PVDF

Technical data

- **Material:** PP, PVC, PVDF
- **Measuring range:** 6000 mm max. Longer ranges on request
- **Liquid temperature:** PVC: 0°C ... 45°C
PP: -10°C ... 90°C / PVDF: -20°C ... 145°C
- **Working pressure:** PN10
- **Connections:** DN15 ... DN50 EN 1092-1 flanges (other flange standards and sizes on request)
- **Limit switches:** LT ... LTL-APR / AMM / AMD
Ex d IIC T6 version on request
- **Transmitter** LTE 0 ... 4-20 mA or guided radar LTDR



Limit switches

Adjustable switch LT ... LTL-APR

- SPDT bi-stable reed switch
- IP65 polycarbonate housing
- Contact rating: 0.5 A 220 VAC 60 VA
- Hysteresis: ± 6 mm
- Liquid temperature: -20°C ... 200°C
- Ambient temperature: -10°C ... 70°C
- Suitable for hazardous area, considered as "Simple apparatus"



Adjustable switch LT ... LTL-AAR

- SPDT bi-stable reed switch
- Aluminium housing & thermal separator for high temperature
- Contact rating: 0.5 A 220 VAC 60 VA
- Hysteresis: ± 6 mm
- Liquid temperature: -20°C ... 400°C
- Ambient temperature: -10°C ... 70°C
- Suitable for hazardous area, considered as "Simple apparatus"



Adjustable switch LT ... LTL-AMM

- SPDT bi-stable micro-switch
- IP65 coated aluminium housing
- Contact rating: 3 A 220 VAC
- Hysteresis: ± 6 mm
- Liquid temperature: -20°C ... 200°C
- Ambient temperature: -25°C ... 80°C
- Mechanical life: 20×10^6 operations
- Suitable for hazardous area, considered as "Simple apparatus"



Adjustable switch LT ... LTL-AMD

NAMUR (EN 60947-5-6) 3.5 mm slot type inductive detector activated by vane, mounted in an aluminium housing.

- Power supply: 8 VDC
- Hysteresis: ± 6 mm
- Liquid temperature: -20°C ... 200°C
- Ambient temperature: -25°C ... $+70^{\circ}\text{C}$
- ATEX certification Ex ia IIC T6



Control relay (on request)

NAMUR (EN 60947-5-6) for 1 or 2 inductive detectors.

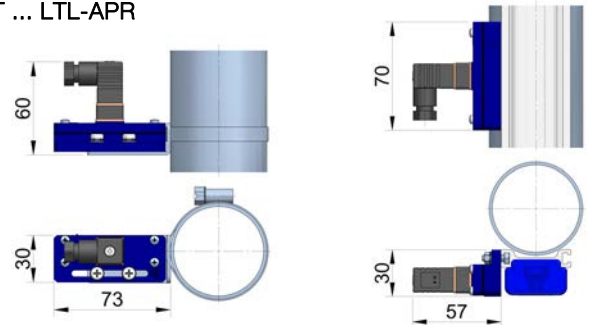
- Power supply: 24 ... 253 VAC 50-60 Hz / 24 ... 300 VDC
- Input: NAMUR Ex ia IIC
- Output: 1 or 2 relay contacts
- Output rating: 2 A 250 VAC 100 VA / 1 A 24 VDC
- Ambient temperature: -25°C ... $+70^{\circ}\text{C}$

Ex d IIC T6 version

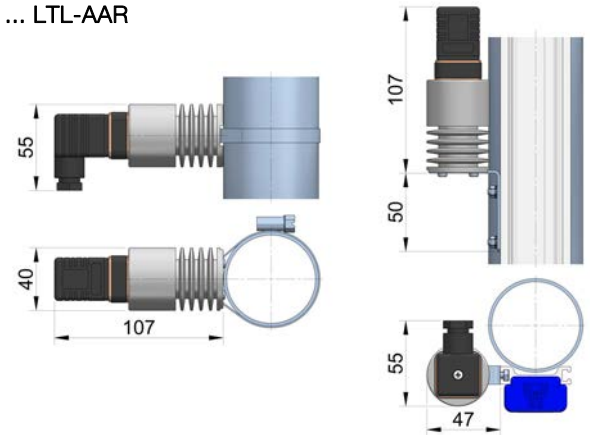
All switches can be supplied with Ex d IIC T6 Explosion Proof Enclosure on request, ATEX certified



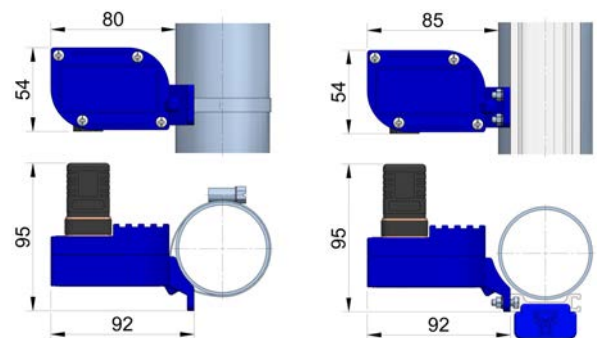
LT ... LTL-APR



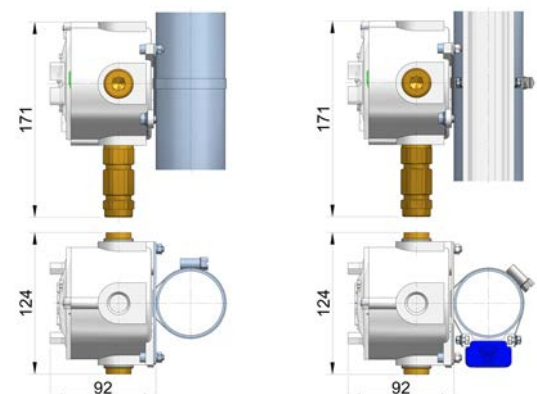
LT ... LTL-AAR



LT ... LTL-AMM / AMD



ATEX version Ex d IIC T6



Transmitters

Transmitter LTE 0 ... 4-20 mA

Transmitter composed of a resistive sensor based on a reed and resistances chain, mounted on a printed circuit placed inside a guide tube. Not wetted by the process liquid.

Variations in level inside the tank move the internal LT or LTL float, which by means of magnetic coupling changes the value of the resistance of the resistive sensor in correspondence to the measured liquid level.

These variations of resistance are processed by an electronic converter in order to obtain a 0 ... 4-20 mA current output proportional to liquid level.

Technical data LTE

- Connection by means of IP65 connector, IP67 polycarbonate housing or IP65 aluminium housing
- Distance between reed switches: 10 mm
- Liquid temperature: -20°C ... 250°C
- Ambient temperature: -20°C ... 60°C



2-wire system

For 2-wire system, the TR2420 resistance/mA converter is supplied, in an IP67 plastic housing or optionally in an IP65 aluminium housing compact mounted on the sensor head.

Technical data TR2420

- Power supply: 12 ... 36 VDC, safe area version
- Power consumption: 0.8 W
- Output: 4-20 mA
- Programmable locally or by means of USB cable and software Winsmeter TR available for download at www.tecfluid.com

Also available with 2-wire system:

- TR2420Ex: hazardous area version ATEX Ex ia IIC T6
Power supply: 8 ... 30 VDC
- TR2420H (HART protocol), TR2420P (Profibus protocol) or TR2420F (Fieldbus protocol). Also available in combination with their Ex versions

4-wire system

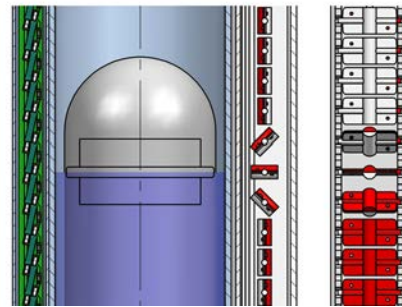
For 4-wire system the TR420 resistance/mA converter is supplied, DIN 46277 rail mounted.

Technical data TR420

- Power supply: 24, 110, 230, 240 VAC 50/60 Hz / 24 VDC
- Power consumption: <1 VA
- Outputs: 0-20 mA, 4-20 mA, 0-5 V, 0-10 V, 1-5 V, 2-10 V



TR420
(remote converter
Ω/mA)



Transmitter LTDR

LTDR uses TDR (Time Domain Reflectometry) technology.

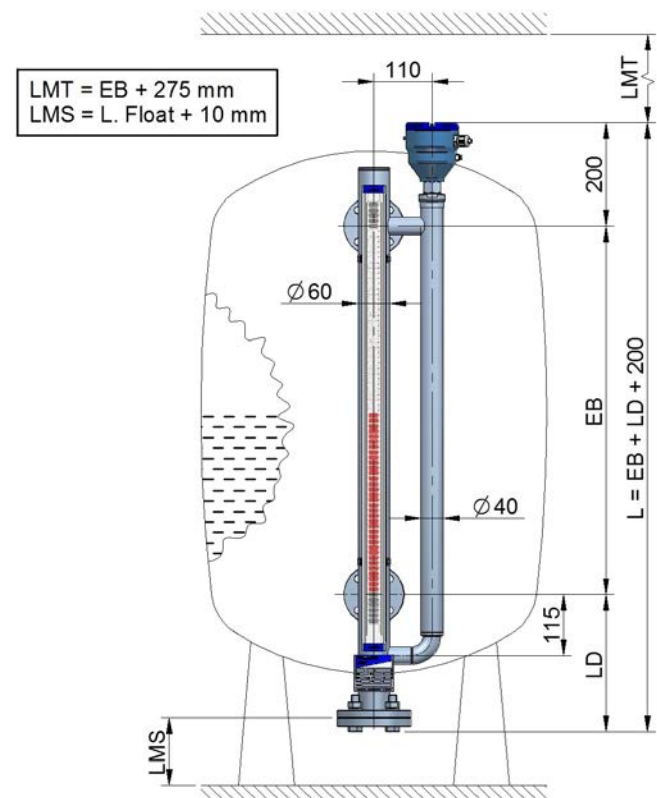
Low-energy, high-frequency electromagnetic impulses, generated by the sensor's circuitry, are propagated along the probe which is immersed in the liquid to be measured.

When these impulses hit the surface of the liquid, part of the impulse energy is reflected back up the probe to the circuitry which then calculates the fluid level from the time difference between the impulses sent and the impulses reflected.

The sensor can output the analyzed level as a continuous measurement reading through its analog output, or it can convert the values into freely positionable switching output signals.

LTDR Sensors are also known as Guided Radars or Guided Wave Radars.

For more details, see LTDR guided radar level transmitter datasheet. Available at www.tecfluid.com




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