

ABB MEASUREMENT & ANALYTICS | DATA SHEET

# **LST300 Compact ultrasonic level transmitter**

The most powerful ultrasonic level transmitter in compact form



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# Measurement made easy

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## Features

- 2 wire instrument with HART digital communication
- Up to 10 m measurement range
- Wide temperature range of  $-40$  to  $85$  °C
- Accuracy of  $\pm 2$  mm (0.08 in) or 0.2 % of full span (the larger of the two)
- Beam angle as low as  $5^\circ$  with false echo filtering for narrow spaces
- Easy installation with graphic echo display, advanced diagnostic and easy setup menu
- Unique GAP technology ensures the best performance under any conditions
- IP66/67/68 and NEMA 4X (can submerge to 2 m depth for 24 hours)
- ATEX, IEC & FM Intrinsic safe and non sparking approved

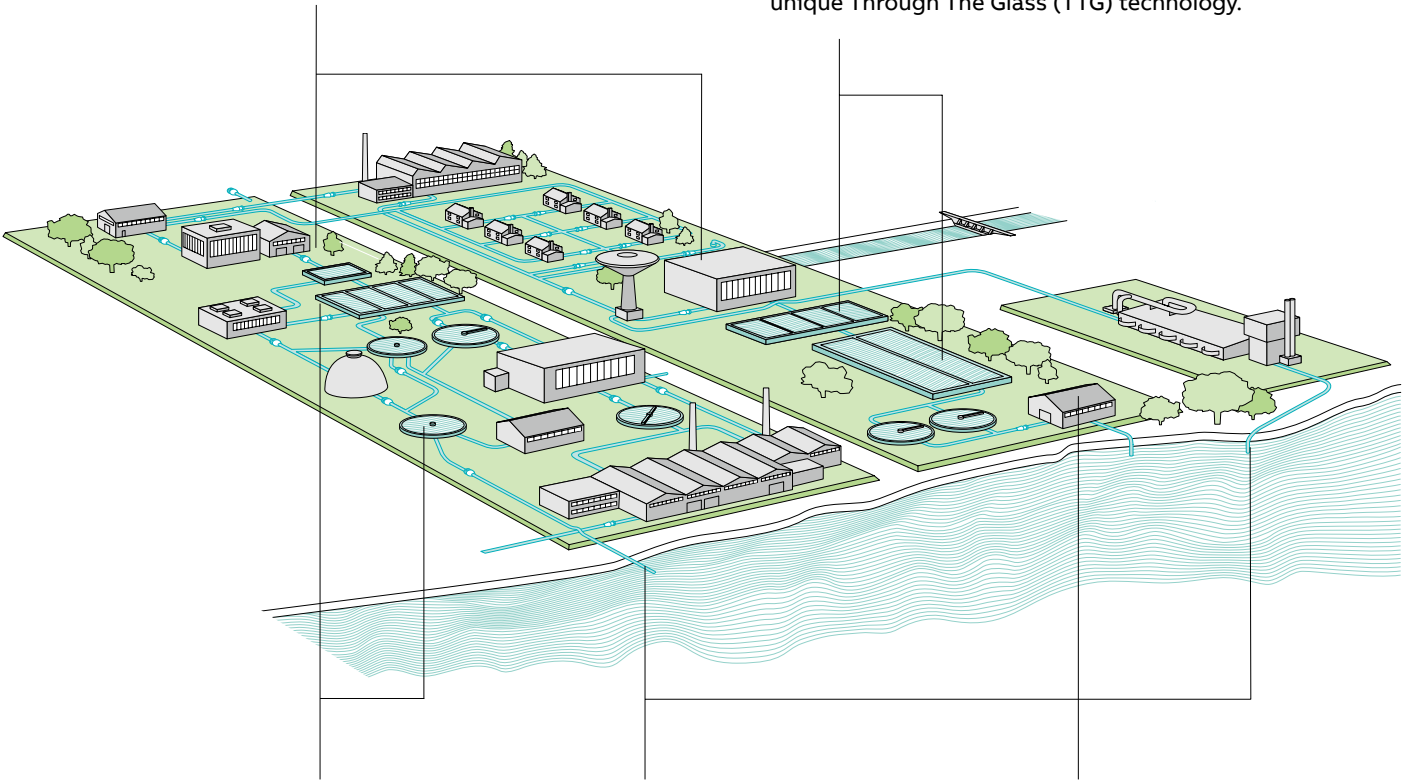
## The perfect fit for all water and waste water applications

### Chemical storage

- LST300 is made from metal and PVDF, and is resistant to corrosion, even if the whole instrument gets in contact with chemicals.
- LST300 automatically adapts to process conditions using unique GAP technology. It is the only product that works even in conditions with some vapor.

### Storage, lagoons & settling ponds

- Easy setup of functional level measurement using the quick start menu.
- Familiar and easy-to-learn menu structure for anyone who has used other ABB instruments.
- Direct interaction with the instrument without opening the front window cover, using ABB's innovative and unique Through The Glass (TTG) technology.



### Process basins including aeration, chlorine contact, skimmer tanks, sedimentation and flotation thickeners

- With advanced diagnostic functions such as detailed signal quality tracking and noise level diagnostics, LST300 replaces remote instruments as the most easy to install level transmitter.
- Works easily in the presence of turbulence and foam using unique GAP technology.

### Irrigation, plant inlet and final discharge

- Built-in equations and supporting software for open channel flow save you from doing the math manually.
- Class leading 2 mm (0.08 in) accuracy with temperature compensation ensures accuracy at all temperature ranges.
- Totalizer counts up to 10 million, keeping accurate track of the total flow over the device lifetime or the flow over an interval for your channel.

### Wet wells, lift stations and pumping stations

- Immune to noise caused by the presence of heavy equipment such as like variable speed drives, LST300 is the perfect choice for pumping stations.
- Market leading beam angle of 5° ensures easy installation and effective operation in narrow spaces.
- LST300 false echo filtering algorithm filters false echoes from agitators or submerged pumps in direct sight of the instrument.
- The entire LST300 is submersible in water, thus it can survive flooding conditions.

## Serving your industry



### Chemical industry

- With the highest temperature ratings in the industry, LST300 is the perfect choice at higher than ambient temperatures.
- LST300 is made from metal and PVDF, so it's corrosion resistant even if it gets in contact with chemicals.
- Automatic adjustment process conditions using GAP unique technology makes LST300 the only product that works even in the presence of some vapor.
- LST300 can handle any hazardous area and has full FM, IEC, ATEX and NEPSI approvals.

### Power industry

- LST300 quick start menu guides you through the most important steps to easily configure a functional level measurement.
- LST300 applies a menu structure similar to other ABB devices. Learning curve is drastically reduced.
- ABB Through The Glass (TTG) technology ensures direct operation without opening the front window cover.



### Mining & metals industry

- With ABB unique GAP technology, LST300 can work in dusty and noisy environments and settings can be continuously optimized for changing conditions.
- LST300 can be configured without opening the front window cover, avoiding potential splashes getting into the instrument in environments like sumps.
- Designed for rough, industrial conditions such as a mine, LST300 can produce reliable measurements for many years.

### Pulp & paper industry

- Class leading 2 mm (0.08 in) accuracy ensures accurate billing based on actual water usage for this highly water intensive industry.
- LST300 has the easiest setup for your inlet and discharge channels; no math work for you due to its built-in equations and supporting software.
- No sensitive electronics means stable measurements are ensured even in harsh environments such as paper mills.

## Discover all the innovative features

### The most powerful ultrasonic level transmitter in compact form

LST300 is the most powerful compact ultrasonic level instrument in the market, which removed many limitations that existed before.

Most ultrasonic level transmitters have serious limitations, forcing you to compromise on accuracy, power consumption, ingress protection, chemical resistance, HMI capabilities and measurement range. LST300 changed this, as the first product that provides all the benefits of the most advanced technology without the need to compromise.

### The world's first compact ultrasonic instrument designed for the industrial environment

The IP66/67 rated (as standard) LST300 easily survives tough outdoor environments and can be fully submerged in flood conditions. Many other devices in the market only provide high IP ratings on the sensor (wetted parts), while their main electronics have only IP65 protection. However, LST300 is an integrated, yet fully protected device and its IP rating applies to the whole of the instrument. IP68 is a special degree of protection, and can be tested on request according to your requirements.

With metal at the top, and PVDF at the bottom. LST300 is the first instrument that can be installed in the rough, corrosive conditions where only remote sensor instruments were previously used. All other compact ultrasonic instruments provide corrosion resistance only on the sensor, and require you to separate the transmitter from the environment.

### Class leading accuracy

The leading 2 mm (0.08 in) accuracy of LST300 includes temperature compensation to ensure accuracy at all temperature ranges. The sonic speed changes when the temperature changes. LST300 measures temperature and automatically compensates for a change of conditions.

Easy to use two point calibration helps you to quickly obtain the best possible accuracy in your application. Calibrate the measurement to two known points and make sure you get the most out of your instrument. There is no need for complicated calibration procedures to achieve the optimal performance.

### Easy installation and configuration

Configuration is easy with the quick start menu where LST300 guides you through the most important steps to set up a functional level measurement. The familiar menu structure is easy to use for anyone who has used other ABB instruments before, drastically reducing the learning curve when moving to the new device.

LST300 is the first to have full graphic capability and allows you to visualize the process on the instrument, while other compact instruments have simple character display systems only. Detailed tracking of signal quality, noise levels and many other important diagnostics make LST300 the easiest level transmitter to install.

Another unique feature of the LST300 is its Through The Glass (TTG) buttons. This exclusive and innovative option enables direct interaction with the instrument without opening the front window cover. This means you can maintain an ingress protection rating of IP67 even during configuration. Protection against splashes during configuration is another way that LST300 makes installation easier.



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## Discover all the innovative features

### Measure in the most constrained spaces

LST300 has a beam angle of as low as only 5° full angle (or only 2.5° half angle), which means the measurement is much more directional than most instruments in the market. Easily aim the instrument at the target and watch as it avoids all obstructions. This allows LST300 to measure effectively in narrow spaces, not even requiring false echo filtering for obstructions outside the 5° window.

LST300 contains a false echo filtering algorithm, which allows you to easily inform the instrument which echoes to ignore. It's no problem for LST300 even in case of obstructions within the 5° space. This function is especially useful in applications with agitators or submerged pumps.

### Automatically adapts to process conditions using GAP unique technology

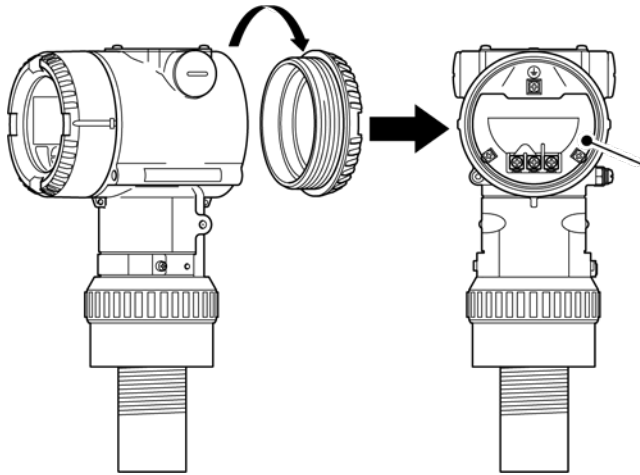
LST300 contains an improved version of the already powerful GAP technology found in LST400. The LST300 constantly monitors measurement data and optimizes the system for the best signal to noise at any tank size. This function ensures the LST300 always runs at the highest accuracy. LST300 is easy to install in both small areas like stilling wells, and large tanks in difficult conditions.

### Non-Contact measurement means no maintenance

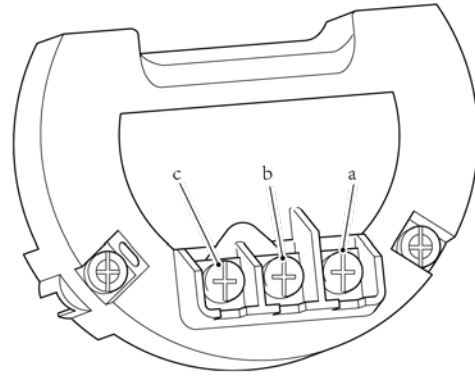
As is the case with all the other ABB ultrasonic and laser level instruments, there are no moving parts, so nothing ever wears out. LST300 is a maintenance-free device that delivers the highest level of reliability throughout its operational life. The advanced sensor design has a low beam angle and high sensitivity. This results in a highly reliable instrument. LST300 never lets you down during changing seasons, humid conditions and even flooding.



## Terminal connections

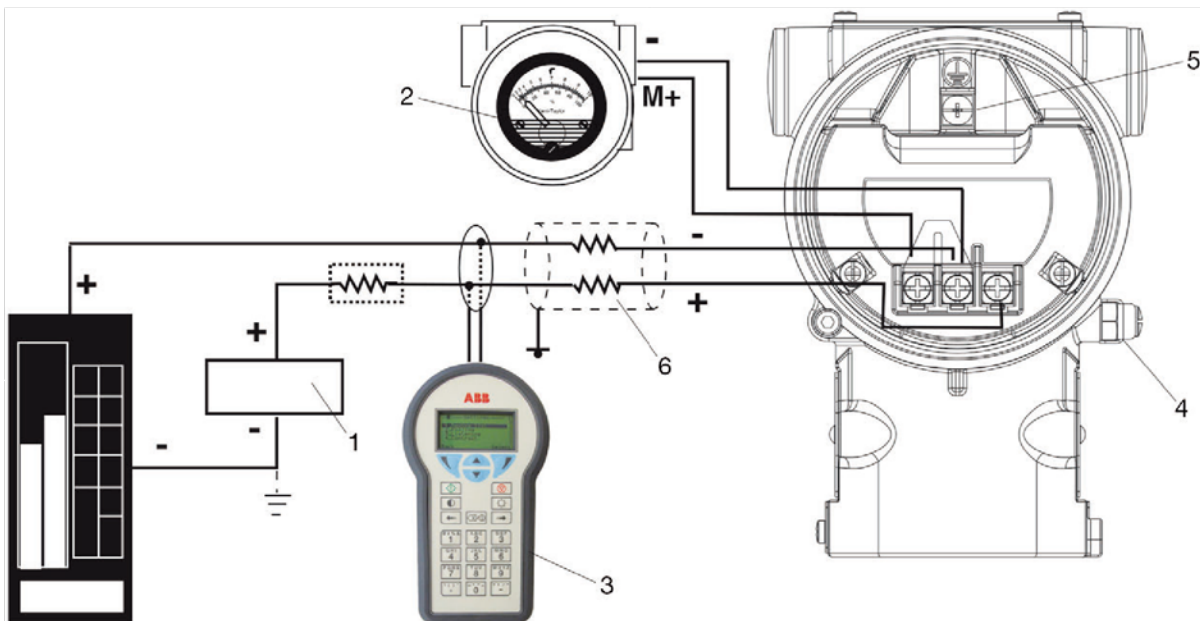


Cable connection area



### Termination introduction

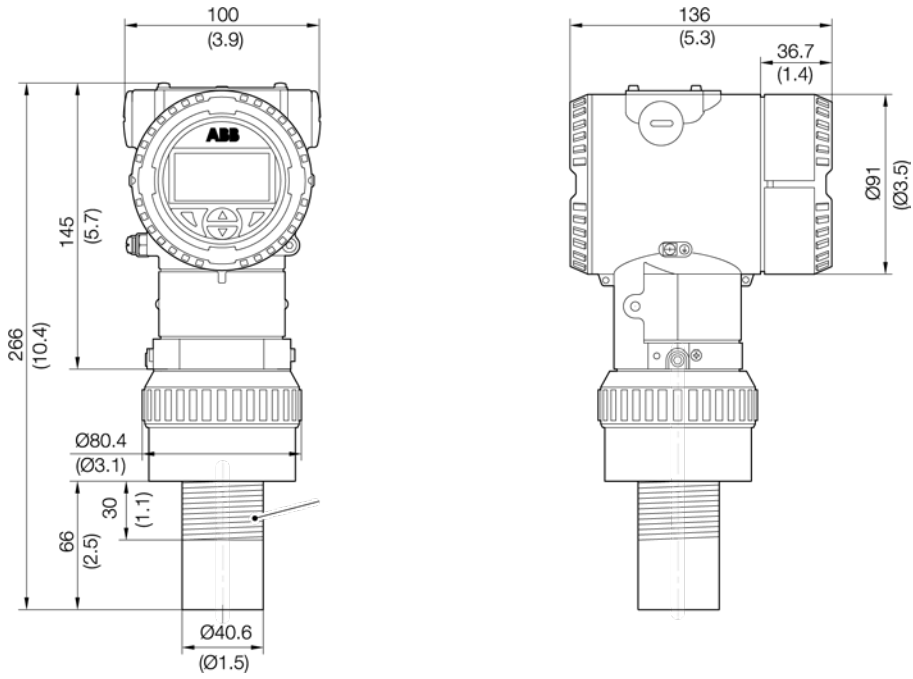
- a. Positive polarity of power supply (+)
- b. Negative polarity of power supply (-)
- c. External meter



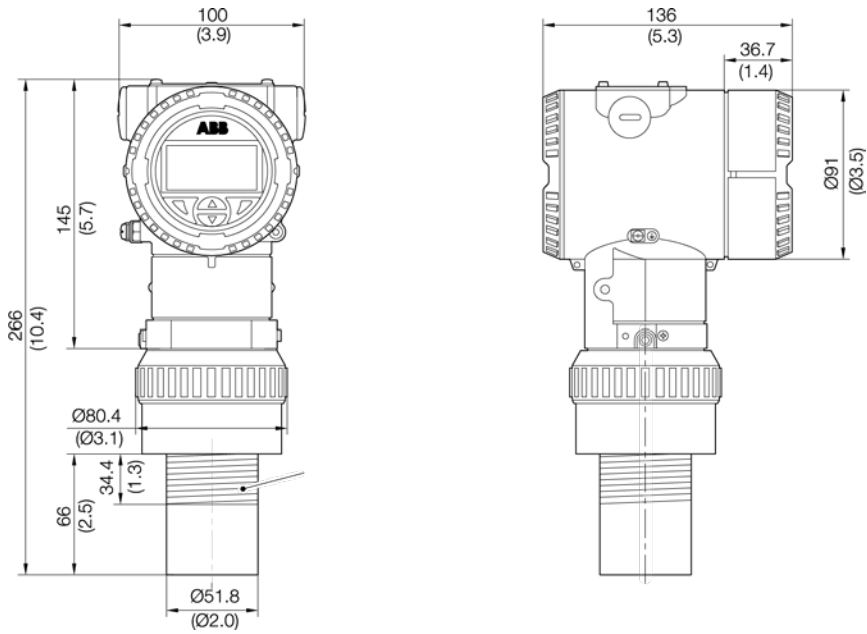
### Electrical connection – HART version

1. Power supply
2. Remote display
3. Handheld terminal
4. External ground connection
5. Internal ground connection
6. Cable entry

## Dimensions



Transmitter with 1.5 inch thread



Transmitter with 2 inch thread



## Specification

### Measurement

#### Measurement range

C06 sensor: 0.25 to 6.00 m (10 in to 20 ft)

C10 sensor: 0.35 to 10.00 m (14 in to 32 ft)

#### Beam angle (@ -3 dB, full angle)

C06 sensor: 7°

C10 sensor: 5°

#### Accuracy

±2 mm (0.08 in) or 0.20 % of full span (the larger of the two)

#### Repeatability

±0.2 % of measurement range

### Mechanical Data

#### Housing material

Metal parts: Aluminum alloy

Plastic parts: PVDF

#### Dimensions

Length: 136 mm (5.3 in)

Width: 100 mm (3.9 in) (excluding glands)

Height: 266 mm (10.5 in)

#### Weight

2 kg (4.4 lbs)

#### Cable entry type

Two options:

127 mm (0.5 in) threaded bore for cable gland, directly on housing: Supplied with 254 x 127 mm (1.0 x 0.5 in) NPT cable gland

M20 x 1.5 threaded bore for cable gland, directly on housing: Supplied with M20 x 1.5 cable gland

### Electrical Data

#### Terminals

Three connections for wire cross sections of up to 2.5 mm<sup>2</sup> (0.1 in [14 AWG]) as connection points for power supply and communication purposes.

#### Grounding

Internal and external ground terminals are provided for 6 mm<sup>2</sup> (0.3 in [10 AWG]) wire cross sections.

#### Power supply

The transmitter operates from 16 to 42 V DC with no load and is protected against reversed polarity (additional loads enable operation above 42 V DC).

During use in Exia zones and in other intrinsically safe applications, the power supply must not exceed 30 V DC.

#### Ripple

Max. 2.2 mV RMS over a 500 Ω load as per HART specifications.

#### Load limitations

Total measurement circuit resistance at 4 to 20 mA and HART:

$$R(k\Omega) = \frac{\text{Voltage supply} - \text{Minimum operating voltage (V DC)}}{22 \text{ mA}}$$

A minimum resistance of 250 Ω is required for HART communication.

#### Analog output

Two-Wire output: 4 to 20 mA related to level / volume / flow, full compensation for temperature effects.

### Displays (Optional)

#### Integrated LCD display (code L7)

Widescreen LCD display, 128 x 64 pixels, 52.5 x 27.2 mm (2.06 x 1.07 in) dot matrix.

Four keys for device configuration and management. Easy setup for quick commissioning.

Customized visualizations which users can select. Totalized and actual value flow indication.

Temperature and diagnostics message display, and configuration settings.

#### Integrated LCD display with TTG operation (code L2)

Same specifications as the integrated LCD display (code L7).

An innovative Through The Glass (TTG) keypad which can be used to activate the device configuration and management menus without having to remove the transmitter housing cover.

TTG keys protected against accidental activation.

## Specification

### Hazardous Area Approvals

#### cFMus

Intrinsic Safety protection type:

Approval according to FM US and Canada IS Class 1 Div 1/ GP ABCD- CL II/ DIV 1/ GP EFG, Zone 0 AEx/Ex ia IIC T6...T4  
IS Control Drawing number: 3KXL065035U0009

Non Incendive protection type:

Approval according to FM US and Canada NI Class 1 Div 2/GP ABCD- DIP CL II/ DIV 2/ GP EFG, Zone 2, AEx/Ex nA IIC T6...T4

#### ATEX/IECEX

Intrinsic Safety protection type:

II 1 G Ex ia IIC T6...T4 Ga - II 1 D Ex ia IIIC T85 °C

For electrical parameters, refer to cert, FM15ATEX0063X Ex ia IIC T6...T4 Ga - Ex ia IIIC T85 °C

For electrical parameters, refer to cert, IECEX FME 15.0010X

Non Incendive protection type:

II 3 G Ex nA IIC T6...T4 Gc - II 3 D Ex tc IIIC T85 °C

For electrical parameters, refer to cert, FM15ATEX0064X Ex nA IIC T6...T4 Gc - Ex tc IIIC T85 °C

For electrical parameters, refer to cert, IECEX FME 15.0010X

#### NEPSI

Intrinsic Safety protection type:

Ex ia IIC T6...T4 Ga - Ex iaD 20 T85 °C

For electrical parameters, refer to cert, GYJXXXXXX

Non Incendive protection type:

Ex nA IIC T6...T4 Gc - DIP A22 TA85 °C

For electrical parameters, refer to cert, GYJXX.XXXX

### Environmental Data

#### Electromagnetic compatibility (EMC)

Meets requirements of EN 61326

Overvoltage strength (with surge protection): 2 kV (according to IEC 61000-4-5)

#### Temperature

-40 to 85 °C (-40 to 185 °F), according to EN 60068-2-14, 1 K/min, 100 cycles

#### Humidity

Relative humidity: Up to 100 %

Condensation, icing: Not permissible

#### Pressure

Measurement functional from -4 to 44 psi (-0.25 to 3.00 bar)

#### Vibration resistance

Acceleration up to 1 g (0.03 oz) at frequencies of up to 2,000 Hz (according to EN 60068-2-64)

#### Climate class

DIN EN 60068-2-38 (Test Z/AD) DIN/IEC 68 T2-30Db

## Ordering information

### Basic ordering information for LST300

Ultrasonic level transmitter	ab	cd	efg	hi	jk	lm	no
<b>LST300</b>							
<b>Explosion Protection Certification</b>							
General Purpose		Y0					
NEPSI non sparking Zone 2 (n)		C5					
NEPSI intrinsic safety		C6					
NEPSI combined C5 + C6 (Ex n + Ex ia)		C7					
ATEX / IECEx energy limited (Zone 2 / 22)		<b>E5</b>					
ATEX / IECEx intrinsic safety (Zone 0 / 20)		E6					
ATEX / IECEx combined E5 + E6 (Ex n + Ex ia)		E7					
cFMus energy limited Cl1 Div 2		<b>F3</b>					
cFMus intrinsic safety Cl1 Div 1 incl. energy limited (Div 2)		F4					
cFMus combined F3 + F4 (Ex n + Ex ia)		F8					
<b>Sensor Type and Range</b>							
Corrosion resistant transducer, range 10 m (approx. 30 ft)			C10				
Corrosion resistant transducer, range 6 m (approx. 20 ft)			C06				
<b>Process Connection Type</b>							
38 mm (1.5 in) Universal thread (NPT & BSP compatible) (only available with sensor C06)				U5			
51 mm (2 in) Universal thread (NPT & BSP compatible) (only available with sensor C10)				U2			
<b>Housing Material / Cable Glands</b>							
Aluminum / 2 pcs. Metric, M20 x 1.5, 2 x plugs mounted and 1 x cable gland included					A1		
Aluminum / 2 pcs. 127 mm (0.5 in). NPT threads, 2 x plugs mounted and 1 x cable gland included					B1		
<b>Power Supply</b>							
Loop powered						L1	
<b>Output Signal</b>							
HART digital communication and 4 to 20 mA							H1

## Additional ordering information

### Additional ordering information for LST300

Add one or more codes after basic ordering information to select all required options.

Ultrasonic level transmitter	xx	xx	xxx	xxx	xx	xx	xx	xxx	xxx
<b>Mounting Bracket Shape / Material</b>									
Extendable bracket (floor mounted)	BE								
L-shape bracket (floor mounted)	BF								
Extendable bracket (wall mounted)	BU								
L-shape bracket (wall mounted)	BV								
<b>Certificates</b>									
Inspection certificate 3.1 acc. EN 10204 for calibration, with test report	CE								
<b>Flange Options</b>									
Flange, 76 mm (3 in) ANSI / ASME connection, PVC			FA3						
Flange, 102 mm (4 in) ANSI / ASME connection, PVC			FA4						
Flange, 152 mm (6 in) ANSI / ASME connection, PVC			FA6						
Flange, 80 mm (3.1 in) connection, PVC			FD3						
Flange, 100 mm (3.9 in) connection, PVC			FD4						
Flange, 150 mm (5.9 in) connection, PVC			FD6						
<b>Shipping certificates</b>									
Certificate of origin			GS1						
Certificate of origin notarized by Local Chamber of Commerce			GS2						
<b>Integrated Digital Display (LCD)</b>									
No Display, with Blind Cover					L0				
With Push Buttons (TTG) and Display and Glass Cover					L2				
With Push Buttons and Display and Glass Cover					L7				
<b>Documentation Language</b>									
German						M1			
Italian						M2			
Spanish						M3			
French						M4			
English						M5			
Chinese						M6			
<b>Surge Protector</b>									
Surge / Transient Protector 1x							S1		
<b>Device Identification Plate</b>									
Stainless steel plate with TAG no.								TC1	
Supplemental wired-on stainless steel plate								TCS	
<b>Anti-Condensation Pad</b>									
Anti-condensation pad, for 38 mm (1.5 in) sensor (only available with sensor C06)									PD1
Anti-condensation pad, for 51 mm (2 in) sensor (only available with sensor C10)									PD2



Sales



Service

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**Note**

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## Note



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