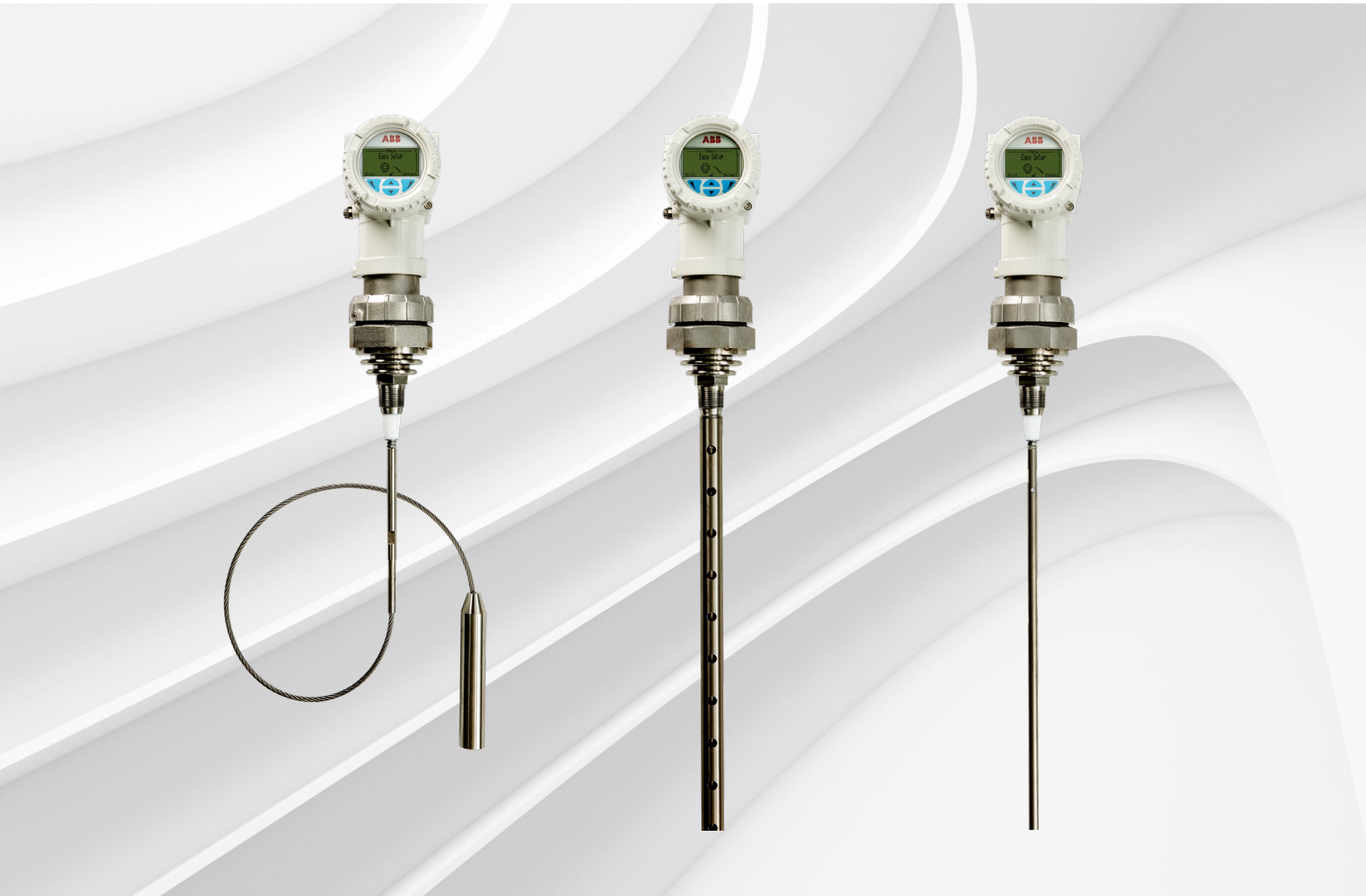
ABB MEASUREMENT & ANALYTICS | DATA SHEET

# LWT300 series

## Guided wave radar



# Measurement made easy

## LevelExpert™: the expert inside

**LevelExpert concentrates 20 years of industrial level measurement experience into an intelligent instrument made to accurately detect levels, even in the most demanding conditions.**

**Forget about baseline mapping and echo selection; LevelExpert knows how to find the right level through the clutter. The expert is now inside your guided-wave radar.**

**LWT300 series instruments cover a wide range of applications. They can meet your needs for applications up to 204 °C (400 °F) and 207 bars (3000 psi).**

## Customer benefits

With fast and reliable settings, ABB's LWT300 series of instruments emphasizes measurement made easy. With its LevelExpert technology based on 20 years of experience, simply enter installation data and basic process conditions, and let LevelExpert do the rest: no echo mapping or baseline correction required.

Unlike traditional guided-wave radars that use device parameters requiring multiple adjustments, the LWT300 series of instruments does it for you. The instrument uses built-in intelligence to differentiate between the actual level and other false signals. It also keeps monitoring all these false signals while maintaining a reliable level reading. It is like having a level expert in each device.

ABB’s LWT300 series transmitters are equipped with on-board diagnostics that can be used for safety monitoring, improved reliability, downtime reduction, and performance verification. Standard on-board diagnostics monitor minimum and maximum electronics temperature, input voltage, probe loss or breakage, buildup detection and leakage of the primary process seal. These diagnostic features assist you in troubleshooting common problems without extensive testing and allow device health monitoring without requiring removal from the process or taking the device offline, thus saving valuable time and improving uptime.

## Main features

To meet the most challenging applications, the LWT300 series of instruments offers a wide range of configurations.

Temperature range: –50 to 204 °C (–58 to 400 °F)
Maximum process pressure: vacuum to 207 bars (3000 psi)

- LevelExpert software for easy configuration, reliable surface detection and easy troubleshooting
- 2-wire powered, and HART 7 communication model, with SIL 2 (no redundancy), SIL 3 (redundant configuration)
- Modbus communication model
- Certified for potentially explosive atmospheres

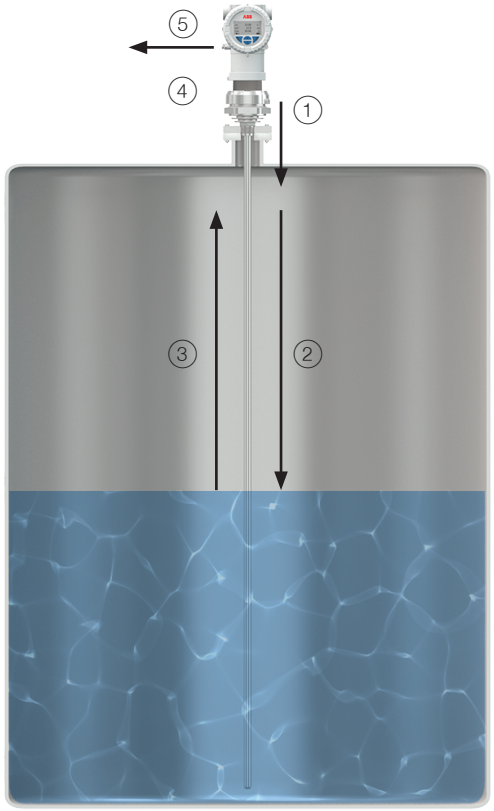


## How the technology works

Guided wave radars use very low power microwave energy to determine the level or interface of the products being measured.

To obtain optimum performance, it is important to understand the basic principles of operation. The instrument electronics housing (a.k.a. “the head”) is fitted with a special adapter (the coupler) that serves as a connection between the head and the process in which measurements will be taken. A rod or cable (the probe) hangs from the coupler into the product being measured and acts as a wave-guide, i.e. the probe guides the microwave energy to the product surface, instead of being dispersed in a cone, as it would be if there was no probe.

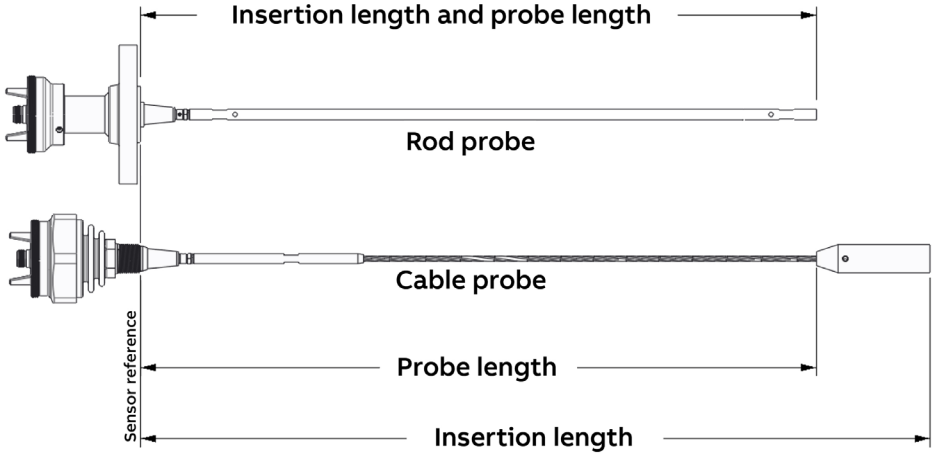
**A measurement cycle consists of the following:**
The head sends a very short pulse of microwave energy through the coupler and down the probe (1). That pulse travels along the length of the probe (2) and, when it encounters the product surface (or some other change in the dielectric constant), some of the energy is reflected and travels back towards the coupler (3). When the reflected energy reaches the coupler, it is sensed by the electronics (4). By measuring the time elapsed between the initial pulse and the reflected one, the electronics can calculate the product level (5).




Since microwave energy travels at the speed of light, one complete measurement cycle is made up of several thousand pulses. The time domain reflectometry (TDR) sampling technique is used to reconstruct, from these numerous pulses, a waveform that can be processed by the instrument microprocessor. Depending on instrument configuration and probe length, measurement cycles are created up to five times every second. Results from these cycles are processed to generate a current output proportional to the level of the product.

## How to measure probe length

The probe length is defined in one of two ways, depending on the type of process interface. For a threaded interface, the probe length is measured from the thread closest to the bottom of the coupler to the end of the probe, including accessories such as a cable weight, for instance. For a flanged interface, the probe length is measured from the bottom of the flange to the end of the probe, including accessories.

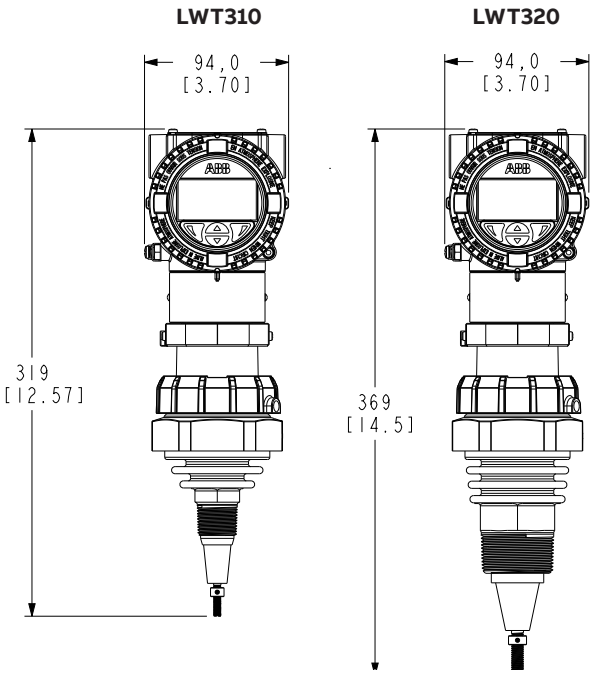



## LWT310 vs LWT320

The LWT300 series is comprised of the LWT310 and LWT320. The LWT310 fits in a 19 mm (¾ in) NPT interface while the LWT320 fits in a 38 mm (1 ½ in) NPT interface. Both are offered in flanged versions.

For solids applications, the LWT320 is recommended since it can withstand a higher pull force. The LWT320 is also useful for applications having a 38 mm (1 ½ in) NPT interface.

| | LWT310 | LWT320 |
|---|---|---|
| **NPT interface** | **19 mm (¾ in)** | **38 mm (1 ½ in)** |
| **Cable probe diameter** | **4.8 mm (3⁄16 in)** | **6.4 mm (¼ in)** |
| **Rod probe diameter** | **9.5 mm (⅜ in)** | **12.7 mm (½ in)** |
| **Coaxial probe diameter** | **22 mm (⅞ in)** | **n/a** |
| **Maximum pull force** | **450 kg (1000 lb)** | **635 kg (1400 lb)** |

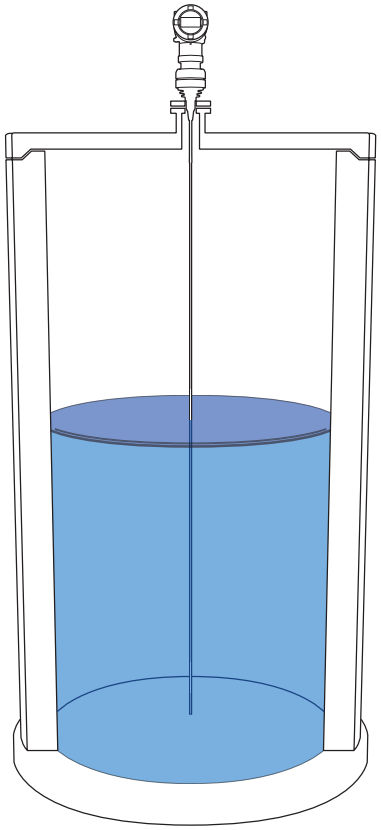


## Applications

**Storage vessel**
Storage vessels are one of the most common applications for guided wave radar.

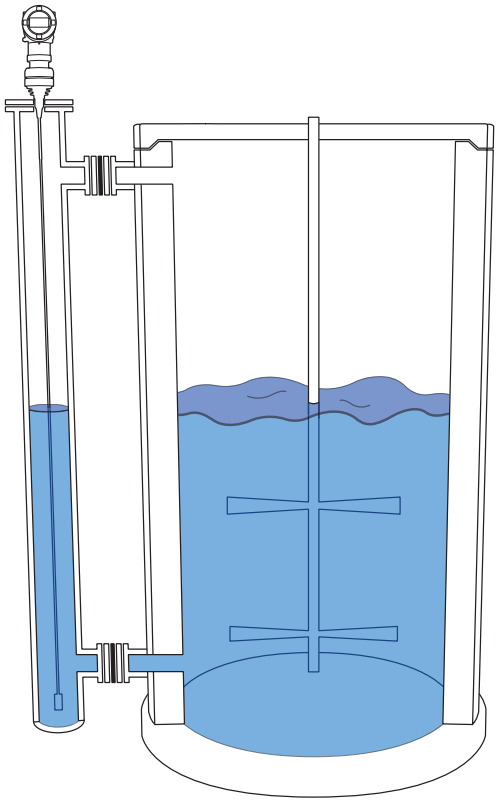
- Guided wave works where most other technologies fail because of its very strong signal-to-noise ratio (SNR) and its ability to master fluids with low or changing dielectrics.
- Instrument signal **is not** affected by mist, spray, turbulence, flashing, changing pressures or temperatures, or changing dielectrics.
- Foam generally does not affect signal, but **excessive** foam can cause a negative offset.
- Light buildup can be managed, but heavy buildup should be avoided.
- Probe selection: rod and coaxial probes can be used at depths comprised between 0.3 m (12 in) and 6.1 m (20 ft). Cable probes are preferred and can be used from 0.3 m (12 in) up to 60 m (197 ft).

**Note:** Do not mount the probe where it can touch vessel walls or internal structures. Do not install the probe in the fill stream of the vessel. Coaxial probes or stilling wells are best if there is excessive foaming or installation in the fill stream cannot be avoided. Rod and coaxial probes allow measurements very close to the EOP. Cable probes with a heavy weight should be used in extremely turbulent or agitated conditions. A tie-down should be considered if the probe must remain stationary.

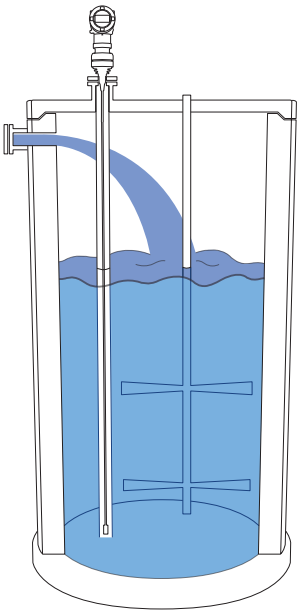


**External chamber/bridle/displacer replacement/MagWave™**
Applications such as boiler drums, feedwater heaters, compressed hydrocarbons and process vessels with multiple obstructions require external chambers.

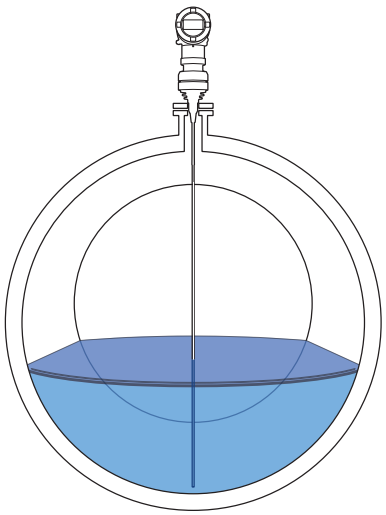
The LWT310 guided wave radar is the best measurement choice for installation in external chambers, bridles, and displacer retrofits. Due to the concentrated signal, it is used for measuring low dielectric fluids. If a chamber is 100 mm (4 in) or smaller, this actually helps to further concentrate the signal.



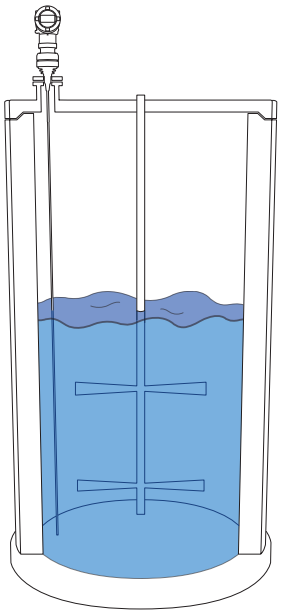
**Stilling wells**
Stilling wells are used if the probe must be installed in the process fill stream, to avoid obstructions and agitators as well as to retain signal strength in applications with very low dielectric fluids and long measuring lengths.



**Horizontal cylinder**
Horizontal cylinders are commonly used as settling tanks, separation vessels, and storage tanks. The LWT310 is not affected by the internal geometry of horizontal cylinders. Unlike traditional non-contact devices which must contend with false level reflections being created by the cylinder walls, the LWT retains the signal on the probe. Furthermore, the LWT is able to measure close top the end of the probe, allowing measurement until the vessel is near empty.



**Agitated vessel**
Reactor vessel and mixing tanks often have agitator blades. Best practice is to use a non-contact device such as the LLT100 laser or LST300 ultrasonic or a stilling well in these applications. If these solutions are not possible, guided wave radar can be used in agitated vessels without a stilling well, but care should be taken to insure the probe cannot become detached or make contact with the agitator blade. Consideration should be made concerning fixing the probe at the bottom, lateral forces and vibration. Consult engineering for assistance in these applications.



**Open sumps and lift stations**
- The LWT310 works well in open sumps, lift stations, cooling tower sumps, catch basins, etc.
- Signal is unaffected by rain, turbulent surface conditions, floating debris, algae growth, or foam.
- Probe selection: Rod and coaxial probes can be used at depths comprised between 0.3 m (12 in) and 6.1 m (20 ft). Cable probes can be used from 0.3 m (12 in) up to 60 m (197 ft)

**Note:** Coaxial probes are best when there are concerns of personnel touching the sensor probe or presence of excessive foaming, or if installation in the fill stream cannot be avoided. Rod and coaxial probes allow measurements very close to the EOP. In extremely turbulent or agitated conditions, cable probes with a heavy weight should be used. A tie-down should be considered if the probe must remain stationary.

**Plastic vessels**
In plastic vessels, RF waves slow down when interacting with the sides of the vessel.

LWT300 series instrument can easily compensate for this effect, providing accurate level measurement.

For RF waves to be properly guided down the probe, a conductive launch plate must be used (metal plate of flange) at the top of the vessel.

# Specification

## Accuracy
2 mm (5⁄64 in) or 0.03 %

## Resolution
1 mm (3⁄64 in)

## Temperature drift (digital)
0.001 %/°C

## Range
Maximum: 60.00 m (197 ft)
Minimum: 0.05 m (0.16 ft) (with rod probe; for more details, see accuracy diagram on next page)

## Update rate
5 Hz

## Temperatures
**Ambient operating**
–50 to 85 °C (–58 to 185 °F)[1]
**Process**
–50 to 204 °C (–58 to 400 °F)
**Storage**
–50 to 85 °C (–58 to 185 °F)
**Process seal type vs temperature rating**
- Viton (–26 to 204 °C [–15 to 400 °F])
- Kalrez (–20 to 204 °C [–4 to 400°F])
- EPDM (–50 to 120 °C [–58 to 248 °F])
- Markez (–10 to 204 °C [14 to 400 °F])

## Process pressure
- 207 bar at 38 °C/3000 psi at 100 °F
- 83 bar at 204 °C/1200 psi at 400 °F

## Dielectric constant
1.4 (minimum)

## Process viscosity
- Coaxial probe: 500 cp
- Single probe: 10,000 cp

## Power supply
- 15.5 to 42 V DC (4–20 mA functionality)
- 21 to 42 V DC (HART functionality)
- 10.5 to 28.5 V DC @ 30 mW (max.) (Modbus units)

## Power consumption
- 56 mW (@ 15.5 V DC, 3.6 mA)
- 903 mW (@ 42 V DC, 21.5 mA)
- 30 mW (Modbus units)

## Line resistance
950 Ω (maximum @ 36 V, 21.5 mA)

## Enclosure material
Powder coated aluminum or 316 L stainless steel

## Vibration resistance
IEC 60068-2-64
IEC 60068-2-6

## EMI/EMC
FCC part 15 subpart B, CISPR11
IES61000-4-3

## Protection class
IP 66/68
NEMA 4X/6P

## Process connections
**Threaded**
¾ inch (LWT310) or 1 ½ inch (LWT320)
**Flanged**
ASME flanges: from 1 ½ to 8 inches, class 150 to 900
DN flanges: from DN 20 to DN 200, PN25 to PN160

## Display
- Integrated 128 × 64 pixels liquid crystal display (LCD) with through-the-glass (TTG) interface
- Push button display (does not allow waveform display on screen)

## Communication protocols
- 4–20 mA analog output with HART 7 communication (currently allows measurement of level only, not interface)
- Modbus communication (allows measurement of level and interface)

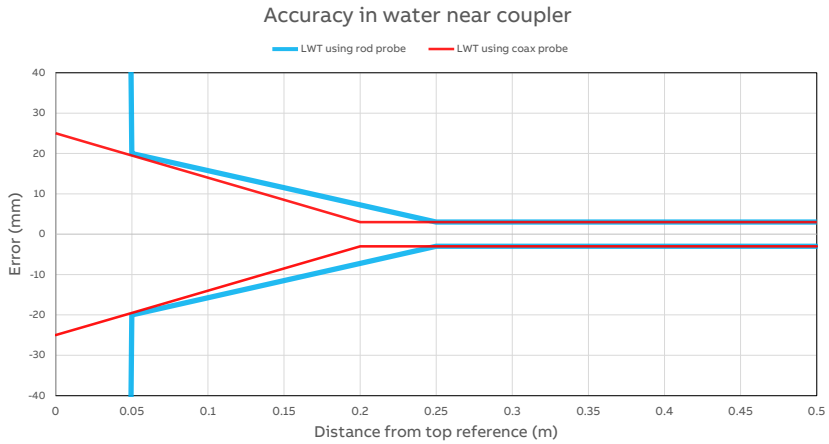
## Lifespan
MTBF : 76 years

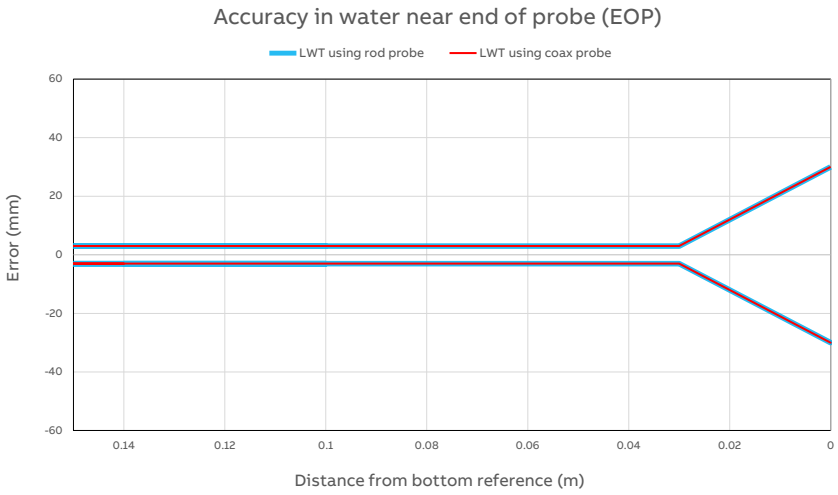
## Wetted materials
- Duplex 2205 stainless steel
- Super duplex 2507 stainless steel
- C-276 alloy
- 304L stainless steel
- 316L stainless steel

[1] See tables in FM/CSA approval Certificate for limits of different protection methods

## Deadband and accuray near coupler (top) and end of probe (bottom)

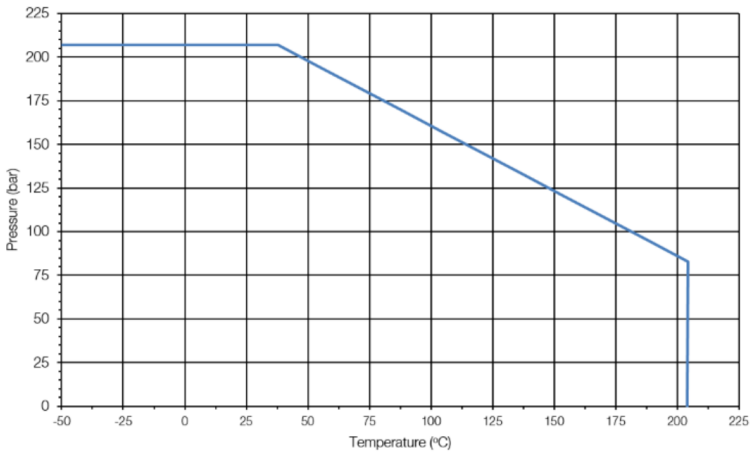
Instruments from the LWT300 series can measure at distances very close to the top and end of the probe. However accuracy decreases in these regions. The following plots show this reduced accuracy for different probes. Notice the short deadband for rod probes (the same applies to cables, even if not shown) and the absence of deadband for coaxial probes.




## Pressure/Temperature Curves[1]

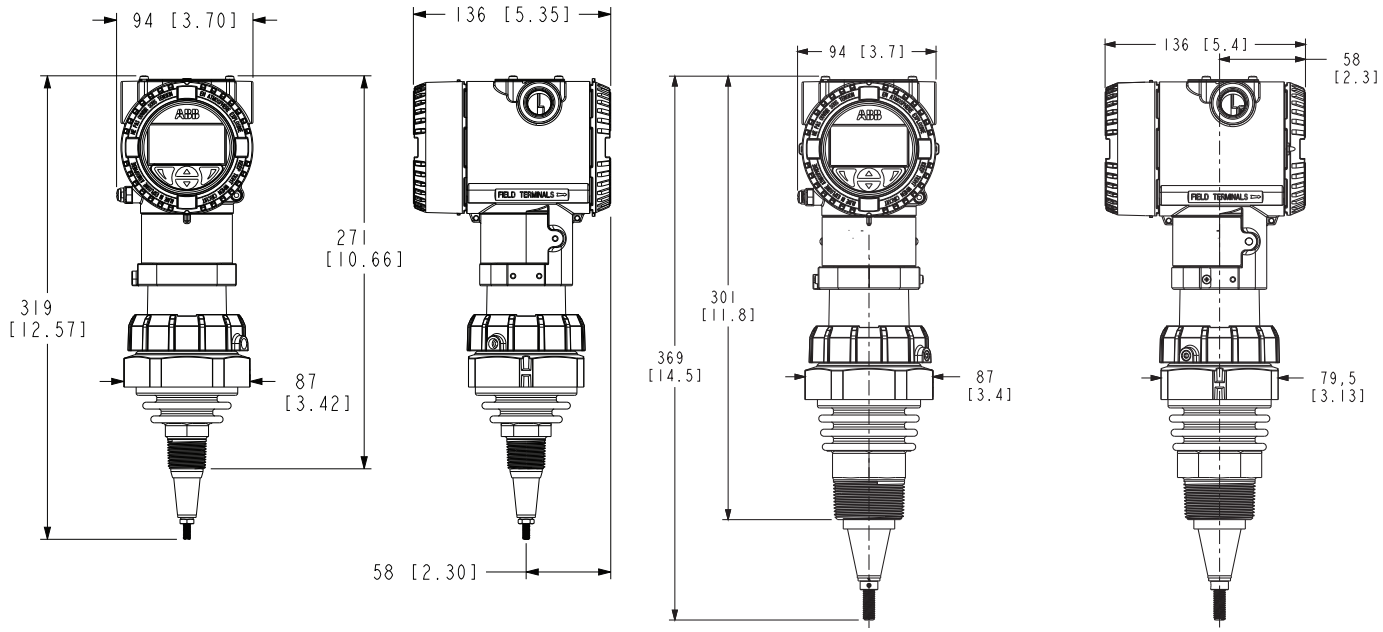
For LWT310 and LWT320



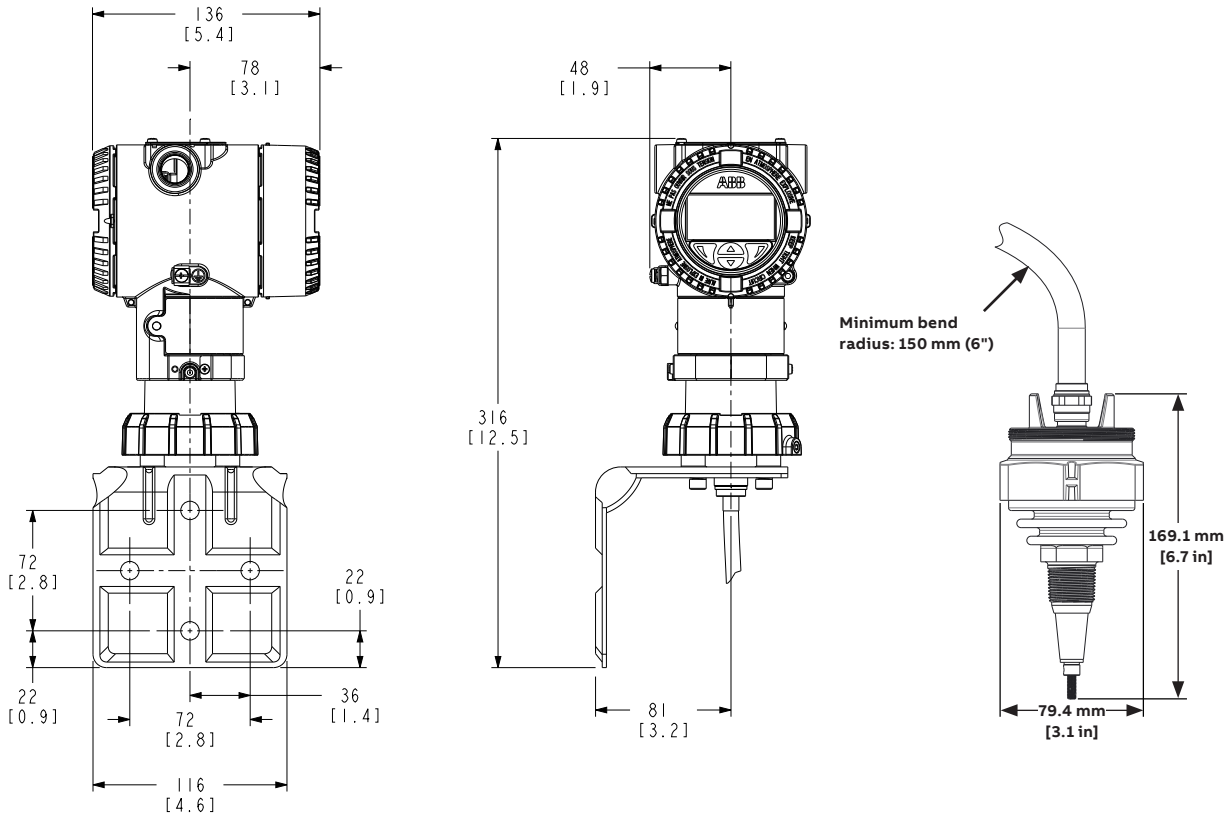

[1] Coupler temperatures are based on O-ring temperature ratings. Please refer to the O-ring chart for more information.

# Dimensions (mm [in])

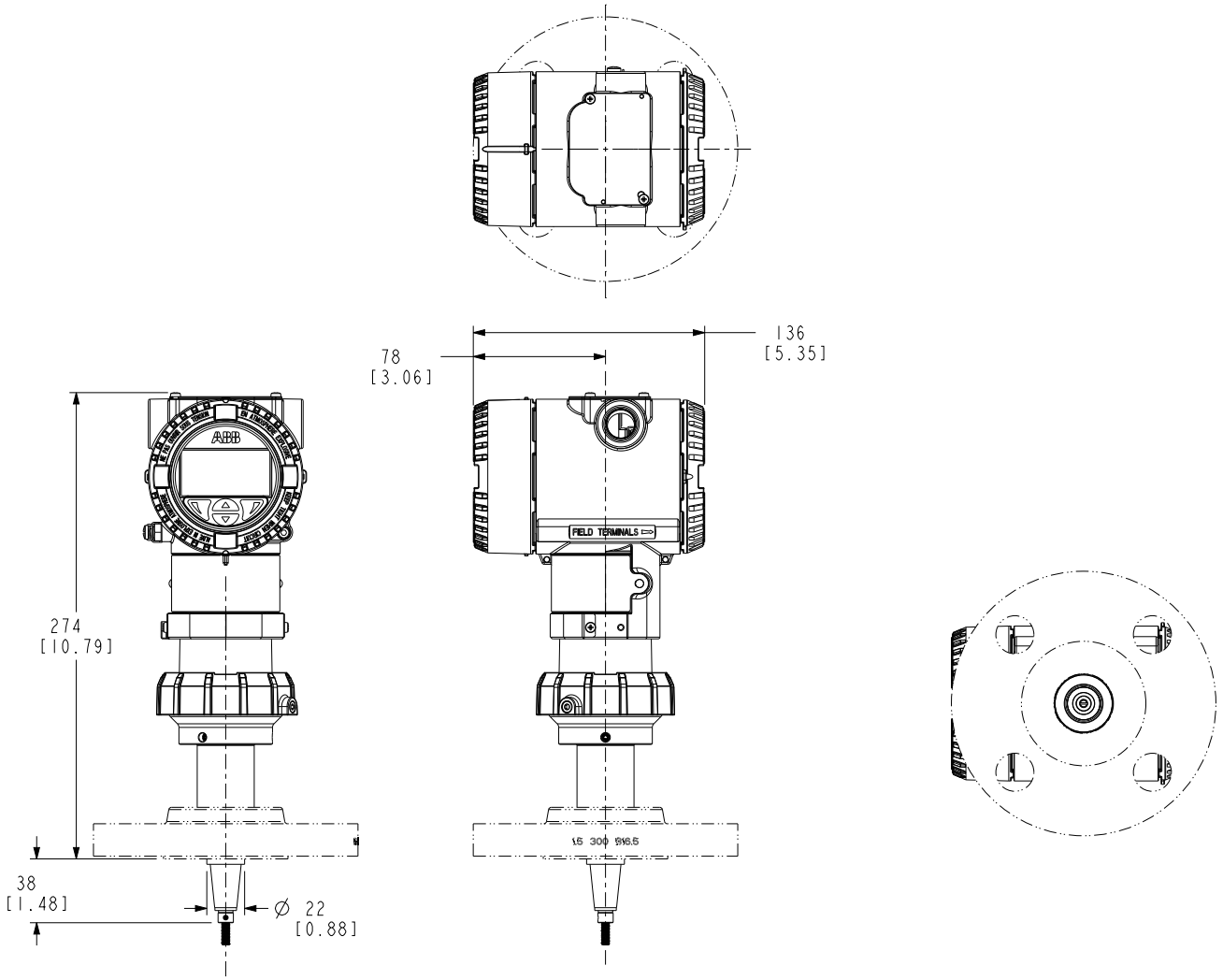
### Instrument, threaded interface (LWT310 left, LWT320 right)



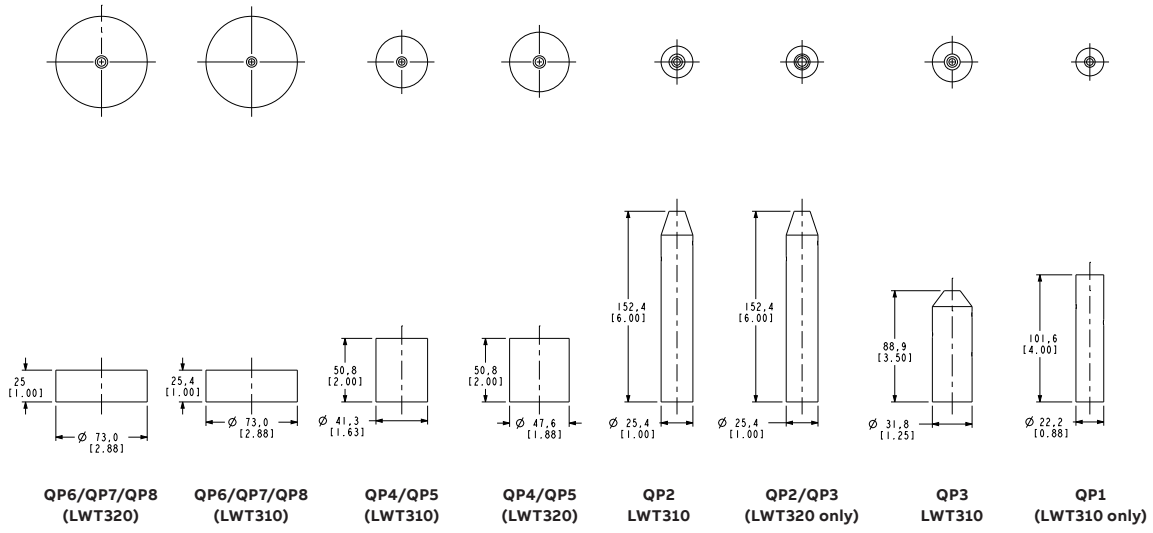

### Remote head and coupler



**Flanged interface**

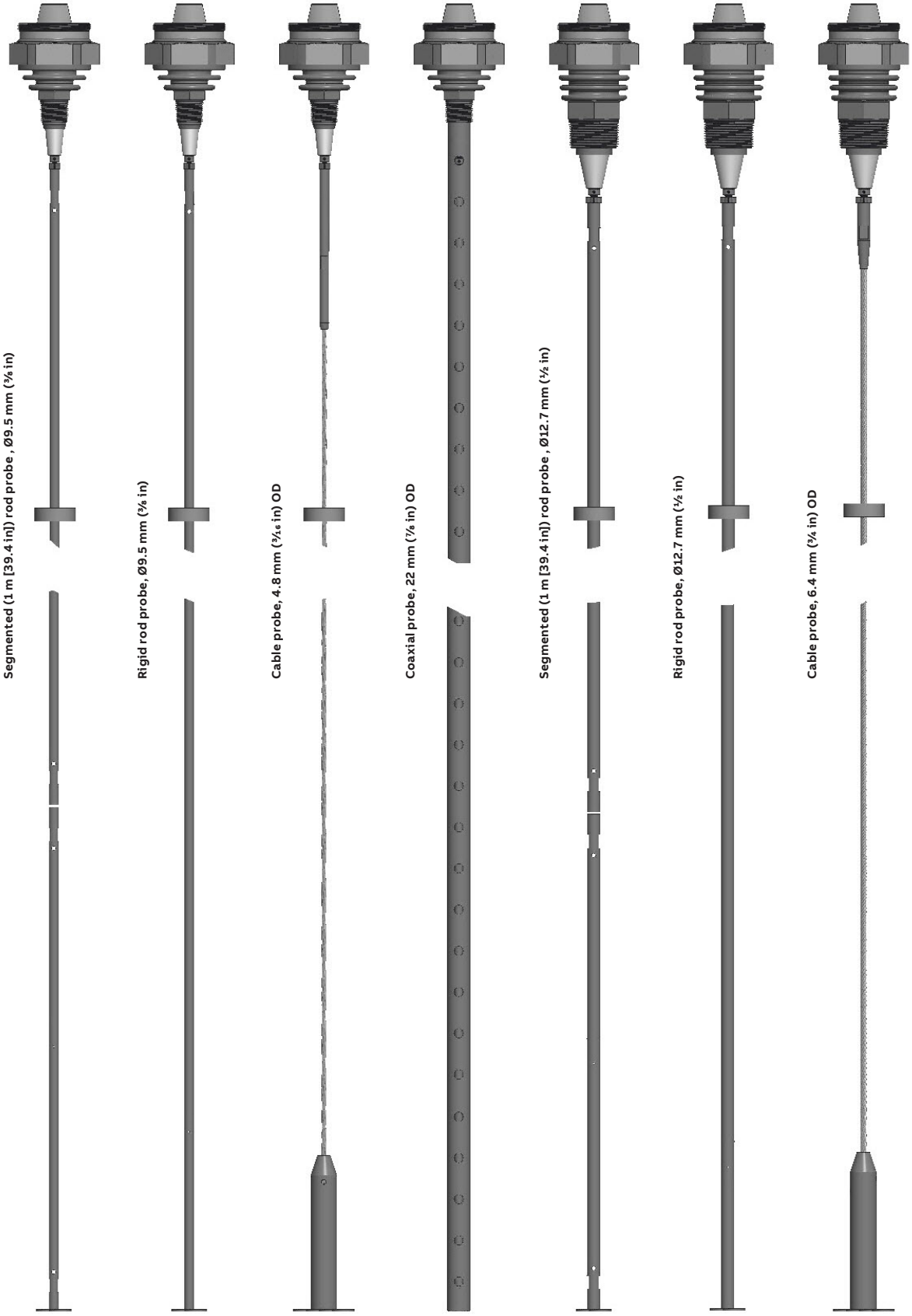



**Probe weight options**




**QP6/QP7/QP8 (LWT320)** | **QP6/QP7/QP8 (LWT310)** | **QP4/QP5 (LWT310)** | **QP4/QP5 (LWT320)** | **QP2 LWT310** | **QP2/QP3 (LWT320 only)** | **QP3 LWT310** | **QP1 (LWT310 only)**

## Probe types


Segmented (1 m [39.4 in]) rod probe , Ø9.5 mm (⅜ in)
Rigid rod probe, Ø9.5 mm (⅜ in)
Cable probe, 4.8 mm (3⁄16 in) OD
Coaxial probe, 22 mm (⅞ in) OD
Segmented (1 m [39.4 in]) rod probe , Ø12.7 mm (½ in)
Rigid rod probe, Ø12.7 mm (½ in)
Cable probe, 6.4 mm (¼ in) OD

# Approvals

| Standard body | | Applied standard |
|---|---|---|
| **CE** | | |
| | ATEX directive 2014/34/EU ("nnnn" refers to the notified body doing factory surveillance) | EN 61326-1:2013, EN/IEC 60529, EN/IEC 61010-1:2010 |
| | Electromagnetic Compatibility (EMC) directive 2014/30/EU | |
| | Restriction of Hazardous Substances (RoHS) directive 2011/65/EU | |
| | Waste of Electrical and Electronic Equipment (WEEE) 2012/19/EU | |
| **CSA (cCSAus)** (Modbus units only) | | CSA 22.2 No.30 M1986 (R2007)<br>CSA 22.2 No.60079-11:2014<br>CSA 22.2 No.25–17<br>FM 3600:2018<br>FM 3615:2018<br>FM 3616:2011<br>ANSI/ISA-60079-11:2009<br>CSA C22.2 No.60079-0:2019<br>CSA C22.2 No.60079-1:2016<br>CSA C22.2 No.60079-11:2014<br>CSA C22.2 No.60079-26:2016<br>CSA C22.2 No.60079-31:2015<br>ANSI/UL 60079-0:2019<br>ANSI/UL 60079-1:2015<br>ANSI/ISA 60079-11:2014<br>ANSI/UL 60079-26:2017<br>ANSI/UL 60079-31:2015<br>CSA 22.2 No.61010-1:2012<br>ANSI/ISA 61010-1:2012<br>ANSI/ISA 12.27.01:2011<br>ANSI/IEC 60529:2004<br>CSA C22.2 No. 60529:2005 (R2015)<br>ANSI/NEMA 250:2014<br>CSA C22.2 No. 94:2011 |
| | **Explosion Proof/Dust-ignition proof with IS, SI probe (local configuration):** | |
| | Class I, II, III, Division 1, Groups C-G T6…T1, T. Amb. –50°C to 70°C…85°C | |
| | **Explosion Proof/Dust-ignition proof with IS, SI connection for probe (remote configuration):** | |
| | Class I, II, III, Division 1, Groups C-G T6…T5, T. Amb. –50°C to 75°C…85°C | |
| | **Flameproof/dust-ignition proof (local configuration):** | |
| | Class I, Zone 0/1 AEx/Ex ia/db IIB T6…T1 Ga/Gb T. Amb. –50°C to 70°C…85°C | |
| | Zone 20/21 AEx/Ex ia/tb IIIC T77°C…T358°C Da/Db | |
| | **Flameproof/dust-ignition proof (remote configuration):** | |
| | Class I, Zone 1 AEx/Ex db [ia Ga] IIB T6…T5 Gb T. Amb. –50°C to 75°C…85°C | |
| | Zone 21 AEx/Ex tb [ia Da] IIIC T77°C…T87°C Db | |
| | **Flame proof/dust-ignition proof (remote configuration):** | |
| | CL I, ZONE 1, AEx/Ex db [ia Ga] IIB T6…T5 Gb | |
| | ZONE 21 AEx/Ex tb [ia Da] IIIC T77°C…T87°C Db | |
| **ATEX, IECEx** (HART units only)[1] | | EN/IEC 60079-0, EN/IEC 60079-1, EN/IEC 60079-11, EN/IEC 60079-15, EN/IEC 60079-26, EN/IEC 60079-31, EN/IEC 60529<br>CSA C22.1:2018,<br>CSA C22.2 No. 25:2014,<br>CSA 22.2 No. 30:1986 (R2012),<br>CSA C22.2 No. 213:2017,<br>CSA C22.2 No. 60079-0:2019,<br>CSA C22.2 No. 60079-1:2011,<br>CSA C22.2 No. 60079-11:2014,<br>CSA C22.2 No. 60079-15:2016,<br>CSA C22.2 No. 60079-31:2015,<br>CSA C22.2 No. 61010-1:2012 (R2017),<br>ANSI/ISA 12.27.01:2011,<br>CSA C22.2 No. 60529:2005 (R2015) |
| | ATEX: FM19ATEX0007X, IECEx FMG 19.0006X | |
| | **Flame proof/dust proof (local configuration):** | |
| | II 1/2 G Ex ia/db IIB T6…T1 Ga/Gb –50 °C ≤ Ta ≤ +75 °C...+85 °C | |
| | II 1/2 D Ex ia/tb IIIC T77°C…T358°C Da/Db –50 °C ≤ Ta ≤ +75 °C...+85 °C | |
| | **Flame proof/dust proof (remote configuration):** | |
| | II (1)2 G Ex db [ia Ga] IIB T6…T5 Gb –50 °C ≤ Ta ≤ +75 °C...+85 °C | |
| | II (1)2 D Ex tb [ia Da] IIIC T77°C…87°C Db –50 °C ≤ Ta ≤ +75 °C...+85 °C | |
| | **Intrinsically safe (local configuration):** | |
| | II 1 G Ex ia IIC T4…T1 Ga –50 °C ≤ Ta ≤ +75 °C...+85 °C | |
| | II 1 D Ex ia IIIC T88°C…T368°C Da –50 °C ≤ Ta ≤ +75 °C...+85 °C | |
| | **Intrinsically safe (remote configuration):** | |
| | II 1 G Ex ia IIC T6…T4 Ga –50 °C ≤ Ta ≤ +75 °C...+85 °C | |
| | II 1 D Ex ia IIIC T52°C…T93°C Da –50 °C ≤ Ta ≤ +75 °C...+85 °C | |
| | **Category 3 (Zone 2) (remote configuration only):** | |
| | II (1)3 G Ex nAc [ia Ga] IIB T6…T4 Gc –50 °C ≤ Ta ≤ +75 °C...+85 °C | |
| | II (1)3 G Ex ic [ia Ga] IIB T6…T4 Gc –50 °C ≤ Ta ≤ +75 °C...+85 °C | |
| | II (1)3 D Ex ic [ia Da] IIIC T52°C…T93°C Dc –50 °C ≤ Ta ≤ +75 °C...+85 °C | |

1 For all wiring see drawings # 3KXL001177U0109, 3KXL001177U0209 and 3KXL001177U0309. ENCL TYPE 4X, 6P. IP66/68

| Standard body | | Applied standard |
|---|---|---|
| **FM (cFMus) (HART units only)[1]** | | FM Class 3600:2011, FM Class 3610, FM Class 3611, FM Class 3615:2006, FM Class 3616:2011, FM Class 3810:2005, ANSI/ISA 61010- 1:2012, ANSI/ISA 60079-0:2013, ANSI/UL 60079-1:2015, ANSI/ISA 60079-11, ANSI/ISA 60079-15, ANSI/ISA 60079-26: 2011, ANSI/ISA 60079-31:2015, ANSI/ISA 12.27.01:2011, UL50, ANSI/NEMA 250:2014, ANSI/IEC 60529:2004, CSA-C22.2 No. 0.4:2013, CSA-C22.2 No. 0.5:2012, CSA-C22.2 No. 25:2014, CSA-C22.2 No. 30:2012, CSA-C22.2 No. 94:2011 CAN/CSAC22.2 No. 60079-0:2015, CAN/CSAC22.2 No. 60079-1:2011, CAN/CSAC22.2 No. 60079-11, CAN/CSAC22.2 No. 60079-15, CAN/CSAC22.2 No. 60079-26, CAN/CSAC22.2 No. 60079-31:2015, CSAC22.2 No. 60529:2015, CAN/CSAC22.2 No. 61010-1:2012 |
| | FM19US0023X, FM19CA0013X | |
| | **Explosion Proof/dust-ignition proof with IS, SI probe (local configuration):** | |
| | CL I,II,III, DIV 1, GR C-G, T6…T1 T. Amb. –50°C to 70°C…85°C | |
| | **Explosion Proof/dust-ignition proof with IS, SI probe (remote configuration):** | |
| | CL I,II,III, DIV 1, GR C-G, T6…T5 T. Amb. –50°C to 75°C…85°C | |
| | **Flame proof/dust-ignition proof (local configuration):** | |
| | CL I, Zone 0/1, AEx/Ex ia/db IIB T6…T1 Ga/Gb T. Amb. –50°C to 70°C…85°C | |
| | Zone 20/21 AExEx ia/tb IIIC T77°C...T358°C Da/Db | |
| | **Flame proof/dust-ignition proof (remote configuration):** | |
| | CL I, ZONE 1, AEx/Ex db [ia Ga] IIB T6…T5 Gb T. Amb. –50°C to 75°C…85°C | |
| | ZONE 21 AEx/Ex tb [ia Da] IIIC T77°C…T87°C Db | |
| | **Intrinsically Safe IS, SI (local configuration):** | |
| | CL I, II, III, DIV 1, GP A-G, T4…T1 T. Amb. –50°C to 43°C…75°C | |
| | CL I, ZONE 0, AEx/Ex ia IIC T4…T1 Ga | |
| | Zone 20, AEx/Ex ia IIIC T88°C…T368°C Da | |
| | **Intrinsically Safe IS, SI (remote configuration):** | |
| | CL I, II, III, DIV 1, GP A-G T6…T4 T. Amb. –50°C to 40°C…85°C | |
| | CL 1, ZONE 0, AEx/Ex ia IIC T6…T4 Ga | |
| | ZONE 20, AEx/Ex ia IIIC T52°C…T93°C Da | |
| | **Division 2/Zone 2/22 (remote configuration only):** | |
| | CL I, DIV 2, Gp C, D, T6…T4, with IS, SI connection for CL I, DIV 1, GROUPS C, D for remote probe. Supply/HART wiring may be installed with or without non-incendive field wiring. | |
| | Class I, Zone 2, AEx/Ex ic [ia Ga] IIB T6…T4 Gc | |
| | Zone 22, AEx /Ex ic [ia Da] IIIC T52°C…T93°C Dc | |
| | T. Amb. –50°C to 40°C…85°C | |
| **CRN** | | CAN/CSA No. B51:2014 ASME B31.1/ASME B31.3 |
| | Canadian Registration Number (CRN) # 0F20795.5C | |
| | Category "F" Type of fittings - Measuring devices | |
| **SIL (Safety Integrity Level)** | | IEC 61508/IEC 61511 |
| | Certificate # Z10 064584 xxxx SIL 2/SIL 3 capable device | |

1 For all wiring see drawings # 3KXL001177U0109, 3KXL001177U0209 and 3KXL001177U0309. ENCL TYPE 4X, 6P. IP66/68 (1 meter - 3 days)

# Ordering information

| | Main code | | | | | | | | | | Optional code |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **LWT310/LWT320** | **XX** | **XX** | **XX** | **XXX** | **X** | **XX** | **XXXX** | **XX** | **XX** | **XX** | **XXX** |
| **Approvals (all approvals are pending)** | | | | | | | | | | | |
| General purpose | Y0 | | | | | | | | | | |
| ATEX/IECEx<br>Intrinsically safe, Ex ia IIC Ga, Ex ia IIIC Da | E1 | | | | | | | | | | |
| ATEX/IECEx<br>Flameproof/dustproof housing, Ex db/ia, Ex ta ia | E2 | | | | | | | | | | |
| ATEX/IECEx<br>Non-sparking, Ex nAc/ia, Category 3/1 (remote probe only) | E3 | | | | | | | | | | |
| ATEX/IECEx<br>Ex ic/ia, Category 3/1 (remote probe only) | E9 | | | | | | | | | | |
| Combination Approval - US standards FMus, ATEX, IECEx -<br>Flameproof/Explosion proof, intrinsically safe, dustproof<br>(protection type marked by customer) | M1 | | | | | | | | | | |
| Combination Approval - Canadian standards cFM, ATEX, IECEx -<br>Flameproof/Explosion proof, intrinsically safe, dustproof<br>(protection type marked by customer) (also meeting FMus) | M2 | | | | | | | | | | |
| cFMus standards, intrinsically safe, Ex ia | N1 | | | | | | | | | | |
| FM US standards, Exposion proof/flameproof/dustproof,<br>Ex db/ia, Ex ta ia | N2 | | | | | | | | | | |
| cFMus standards, Non-incendive with intrinsically safe<br>probe & Ex nAc/ia (remote probe only) | N3 | | | | | | | | | | |
| Canadian standards by FM<br>Exposion proof/Flameproof/Dustproof<br>Ex db/ia, Ex ta ia (also meeting FMus) | N4 | | | | | | | | | | |
| US standards by CSA (for Modbus communication only)<br>Explosion proof/Flameproof/Dustproof<br>Ex db/ia, Ex tb ia | N5 | | | | | | | | | | |
| cFMus standards, Ex ic / ia (category 3/1) (remote probe only) | N6 | | | | | | | | | | |
| Canadian standards by CSA (for Modbus communication only)<br>Explosion proof/Flameproof/Dustproof<br>Ex db/ia, Ex tb ia (also meeting CSAus) | N7 | | | | | | | | | | |
| **Wetted material** | | | | | | | | | | | |
| C-276 alloy | | H1 | | | | | | | | | |
| 304L stainless steel | | S4 | | | | | | | | | |
| 316L stainless steel | | S6 | | | | | | | | | |
| **Seal type (O-ring)** | | | | | | | | | | | |
| Viton, process service temperature range:<br>–26 to 204 °C (–15 to 400 °F) | | | V0 | | | | | | | | |
| Kalrez, process service temperature range:<br>–20 to 204 °C (–4 to 400 °F) | | | K0 | | | | | | | | |
| EPDM, process service temperature range:<br>–50 to 120 °C (–58 to 248 °F) | | | E0 | | | | | | | | |
| Markez,process service temperature range:<br>–10 to 204 °C (14 to 400 °F) | | | M0 | | | | | | | | |
| **Process connection type and pressure rating** | | | | | | | | | | | |
| ANSI/ASME, raised face Class 150 | | | | ARD | | | | | | | |
| ANSI/ASME, raised face Class 300 | | | | ARE | | | | | | | |
| ANSI/ASME, raised face Class 600 | | | | ARG | | | | | | | |
| ANSI/ASME, raised face Class 900 | | | | ARH | | | | | | | |
| DIN, raised face PN25 | | | | DRD | | | | | | | |
| DIN, raised face PN40 | | | | DRE | | | | | | | |
| DIN, raised face PN100 | | | | DRG | | | | | | | |
| DIN, raised face PN160 | | | | DRH | | | | | | | |
| NPT threaded connection | | | | NTN | | | | | | | |
| Special (industry recognized standard flanges only) | | | | ZZZ | | | | | | | |

| | Main code | | | | | | | | | | | Optional code |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **LWT310/LWT320** | **XX** | **XX** | **XX** | **XXX** | **X** | **XX** | **XXXX** | **XX** | **XX** | **XX** | **XXX** |
| **Process connection size** | | | | | | | | | | | | |
| DN 20/ANSI ¾ in **(LWT310 only)** | | | | | | B | | | | | | |
| DN 25/ANSI 1 in **(LWT310 only)** | | | | | | C | | | | | | |
| DN 40/ANSI 1 ½ in | | | | | | E | | | | | | |
| DN 50/ANSI 2 in | | | | | | F | | | | | | |
| DN 80/ANSI 3 in | | | | | | H | | | | | | |
| DN 100/ANSI 4 in | | | | | | J | | | | | | |
| DN 150/ANSI 6 in | | | | | | M | | | | | | |
| DN 200/ANSI 8 in | | | | | | P | | | | | | |
| Special (industry recognized standard flanges only) | | | | | | Z | | | | | | |
| **Probe type** | | | | | | | | | | | | |
| **LWT310 rod probes** | | | | | | | | | | | | |
| Rod probe<br>Ø9.5 mm (⅜ in), 6.1 m (20 ft) maximum length | | | | | | | R2 | | | | | |
| Segmented rod probe (1 m [39.4 in])<br>Ø9.5 mm (⅜ in), 6.1 m (20 ft) maximum length | | | | | | | R5 | | | | | |
| **LWT320 rod probes** | | | | | | | | | | | | |
| Rod probe<br>Ø12.7 mm (½ in), 6.1 m (20 ft) maximum length | | | | | | | R3 | | | | | |
| Segmented rod probe (1 m [39.4 in]),<br>Ø12.7 mm (½ in), 6.1 m (20 ft) maximum length | | | | | | | R6 | | | | | |
| **LWT310 cable probes** | | | | | | | | | | | | |
| Cable probe 4.8 mm (3⁄16 in) O.D.<br>61 m (200 ft) maximum length | | | | | | | F1 | | | | | |
| Cable probe 4.8 mm (3⁄16 in) O.D.,<br>with Teflon spacers<br>61 m (200 ft) maximum length | | | | | | | FB | | | | | |
| **LWT320 cable probes** | | | | | | | | | | | | |
| Cable probe 6.4 mm (¼ in) O.D.<br>61 m (200 ft) maximum length | | | | | | | F2 | | | | | |
| **LWT310 coaxial probes** | | | | | | | | | | | | |
| Coaxial probe 22 mm (⅞ in) O.D.<br>with Teflon spacers<br>61 m (200 ft) maximum length | | | | | | | CT | | | | | |
| **Probe material** | | | | | | | | | | | | |
| C-276 alloy | | | | | | | | PMH1 | | | | |
| 304/L stainless steel | | | | | | | | PMS4 | | | | |
| 316/L stainless steel | | | | | | | | PMS6 | | | | |
| **Housing** | | | | | | | | | | | | |
| Aluminum with 2 × M20 × 1.5 | | | | | | | | | D1 | | | |
| Aluminum with 2 × NPT ½ in | | | | | | | | | D2 | | | |
| 316L stainless steel with 2 × M20 × 1.5 | | | | | | | | | D3 | | | |
| 316L stainless steel with 2 × NPT ½ in | | | | | | | | | D4 | | | |
| Remote/Aluminum 2 × M20 × 1.5 | | | | | | | | | R1 | | | |
| Remote/Aluminum 2 × NPT ½ in | | | | | | | | | R2 | | | |
| Remote/Stainless steel 2 × M20 × 1.5 | | | | | | | | | R3 | | | |
| Remote/Stainless steel 2 × NPT ½ in | | | | | | | | | R4 | | | |
| **Display** | | | | | | | | | | | | |
| No display, with blind cover | | | | | | | | | | L0 | | |
| With HMI pushbutton keypad display and glass cover<br>(no waveform function available) | | | | | | | | | | L1 | | |
| With HMI TTG and display and glass cover | | | | | | | | | | L2 | | |
| **Output** | | | | | | | | | | | | |
| Single 4 to 20 mA + HART communication<br>(allows top level measurement only) | | | | | | | | | | | H1 | |
| Modbus communication (top level and interface<br>measurement) | | | | | | | | | | | M1 | |

| | Main code | | | | | | | | | | | Optional code |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LWT310/LWT320 | XX | XX | XX | XXX | X | XX | XXXX | XX | XX | XX | XXX |
| **Remote electronics coaxial cable length (for remote coupler only)** | | | | | | | | | | | | |
| 1.5 m (≅5 ft) | | | | | | | | | | | | SRW |
| 3 m (≅10 ft) | | | | | | | | | | | | SRT |
| 5 m (≅16 ft) | | | | | | | | | | | | SR1 |
| 6 m (≅20 ft) | | | | | | | | | | | | SRR |
| 10 m (≅32 ft) | | | | | | | | | | | | SR2 |
| 15 m (≅49 ft) | | | | | | | | | | | | SR3 |
| 20 m (≅66 ft) | | | | | | | | | | | | SR4 |
| 25 m (≅82 ft) | | | | | | | | | | | | SR5 |
| 30 m (≅98 ft) | | | | | | | | | | | | SR6 |
| 35 m (≅115 ft) | | | | | | | | | | | | SR7 |
| 40 m (≅131 ft) | | | | | | | | | | | | SR8 |
| 45 m (≅147 ft) | | | | | | | | | | | | SR9 |
| 50 m (≅164 ft) | | | | | | | | | | | | SRA |
| 60 m (≅197 ft) | | | | | | | | | | | | SRB |
| Custom coaxial remote length (max. 60 m [197 ft]) | | | | | | | | | | | | SRZ |
| **End-of-probe attachments** | | | | | | | | | | | | |
| **Cable probe weight** | | | | | | | | | | | | |
| Cable weight | | | | | | | | | | | | WC1 |
| **Centering disks** | | | | | | | | | | | | |
| Metal centering disk | | | | | | | | | | | | WD1 |
| **Device identification plate** | | | | | | | | | | | | |
| Additional stainless steel hang tag | | | | | | | | | | | | T1 |
| Additional screwed-on steel tag plate | | | | | | | | | | | | TD |
| **Certificates** | | | | | | | | | | | | |
| Test report 2.2 acc. EN 10204 | | | | | | | | | | | | C1 |
| MTR 3.1, Material monitoring with inspection certificate 3.1 acc. EN 10204 | | | | | | | | | | | | C2 |
| Declaration of compliance with the order 2.1 acc. EN 10204 | | | | | | | | | | | | C4 |
| With dye penetrant test on pressure bearing parts | | | | | | | | | | | | C9 |
| Certificate of origin | | | | | | | | | | | | CO |
| Attested certificate of origin | | | | | | | | | | | | AC |
| Printed record of configured settings in transmitter | | | | | | | | | | | | CG |
| With hydrostatic test report | | | | | | | | | | | | CH |
| PMI Positive Material Identification without carbon content | | | | | | | | | | | | CJ |
| Material monitoring NACE MR 0175, MR 0103 with inspection certificate 3.1 acc. EN 10204 | | | | | | | | | | | | CN |
| SIL2 - certified acc. to IEC61508 | | | | | | | | | | | | CS |
| **Drawings** | | | | | | | | | | | | |
| Standard ABB drawings for approval prior to construction | | | | | | | | | | | | GD1 |
| Standard ABB drawing for record | | | | | | | | | | | | GD2 |
| Certified as built standard ABB drawings | | | | | | | | | | | | GD3 |
| Custom drawing considering customer requirements | | | | | | | | | | | | GDZ |
| **Documentation language (user and safety guides, hard copy)** | | | | | | | | | | | | |
| German | | | | | | | | | | | | M1 |
| French | | | | | | | | | | | | M4 |
| English | | | | | | | | | | | | M5 |
| **Programming and parameter settings** | | | | | | | | | | | | |
| Custom parameter settings | | | | | | | | | | | | N6 |

| | Main code | | | | | | | | | | | Optional code |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **LWT310/LWT320** | **XX** | **XX** | **XX** | **XXX** | **X** | **XX** | **XXXX** | **XX** | **XX** | **XX** | **XXX** |
| **Calibration type** | | | | | | | | | | | | |
| Calibration verification certificate | | | | | | | | | | | | R9 |
| Custom linearization or strapping table entered (up to 20 points) | | | | | | | | | | | | RL |
| | | | | | | | | | | | | |
| **Pipe or chamber internal diameter for spacer, weight or end-of-probe disk sizing** | | | | | | | | | | | | |
| Inner diameter ≥24.3 mm (0.96 in) and <34 mm (1.34 in), spacer O.D.: 22.3 mm (0.88 in) **(LWT310 only)** | | | | | | | | | | | | QP1 |
| Inner diameter ≥34 mm (1.34 in) and <42.8 mm (1.69 in) | | | | | | | | | | | | QP2 |
| Inner diameter ≥42.8 mm (1.69 in) and <54 mm (2.13 in) | | | | | | | | | | | | QP3 |
| Inner diameter ≥54 mm (2.13 in) and <66.7 mm (2.62 in) | | | | | | | | | | | | QP4 |
| Inner diameter ≥66.7 mm (2.62 in) and <82.8 mm (3.26 in) | | | | | | | | | | | | QP5 |
| Inner diameter ≥82.8 mm (3.26 in) and <102.3 mm (4.03 in) | | | | | | | | | | | | QP6 |
| Inner diameter ≥102.3 mm (4.03 in) and <122.3 mm (4.81 in) | | | | | | | | | | | | QP7 |
| Inner diameter ≥122.3 mm (4.81 in) | | | | | | | | | | | | QP8 |
| Custom dimension (not for gas phase compensation) | | | | | | | | | | | | QPZ |
| | | | | | | | | | | | | |
| **Probe length UOM (this code will not appear on label - only the length + units)** | | | | | | | | | | | | |
| mm | | | | | | | | | | | | QL3 |
| in | | | | | | | | | | | | QLN |



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