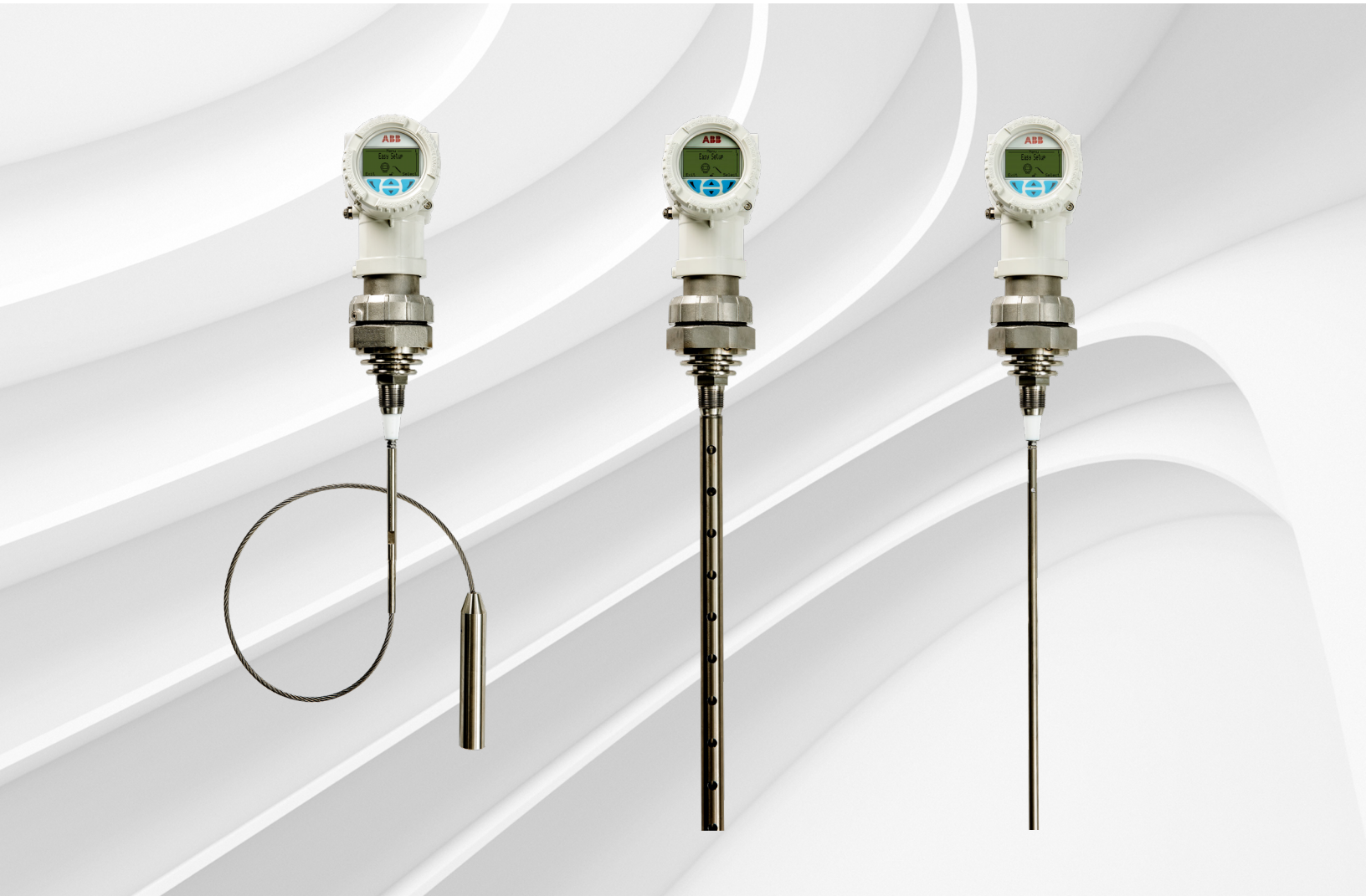
ABB MEASUREMENT & ANALYTICS | DATA SHEET

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)

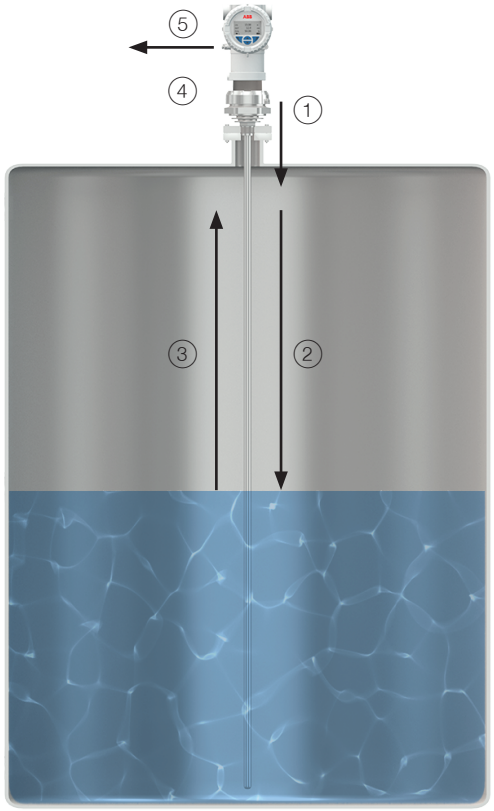
- LevelExpert software for easy configuration, reliable surface detection and easy troubleshooting
- 2-wire powered, and HART 7 communication model, with SIL 2 (no redundancy), SIL 3 (redundant configuration)
- Modbus communication model
- Certified for potentially explosive atmospheres

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.

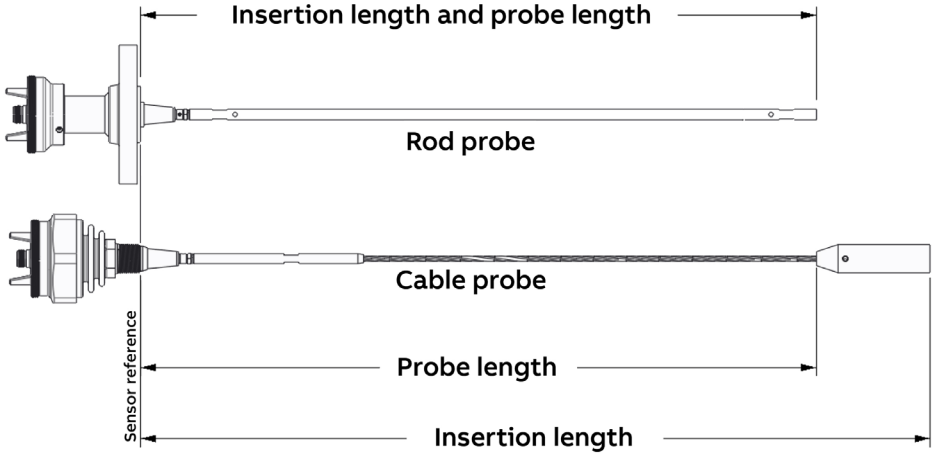
A measurement cycle consists of the following:
The head sends a very short pulse of microwave energy through the coupler and down the probe (1). That pulse travels along the length of the probe (2) and, when it encounters the product surface (or some other change in the dielectric constant), some of 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.

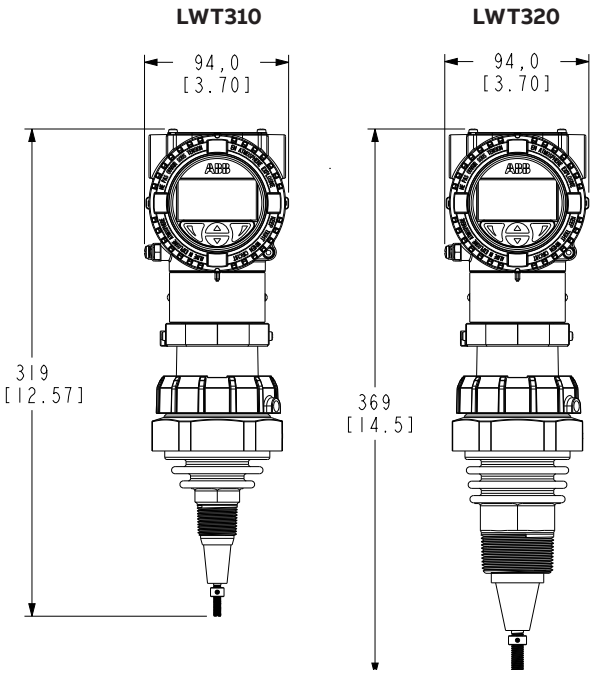


LWT310 vs LWT320

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)**

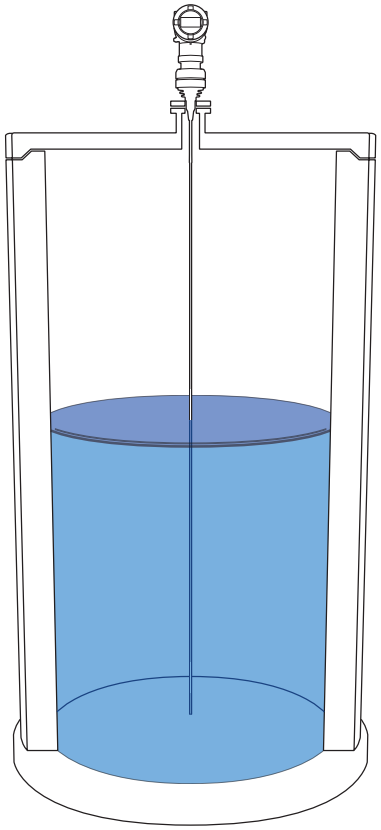


Applications

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

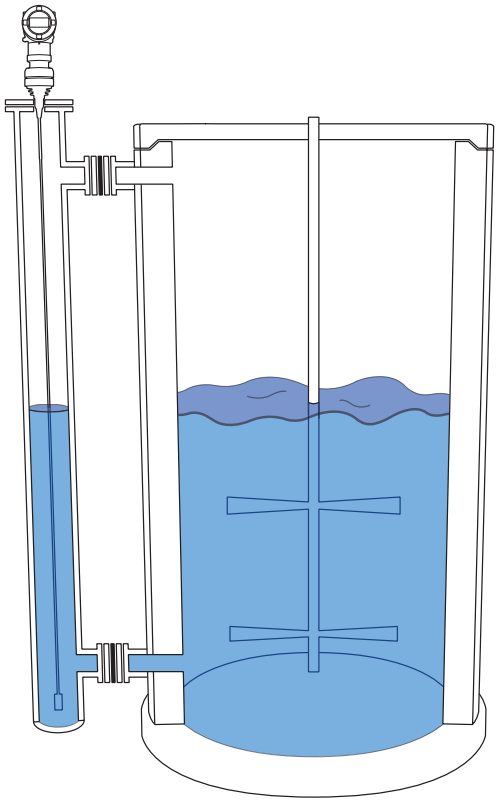
- Guided wave works where most other technologies fail because of its very strong signal-to-noise ratio (SNR) and its ability to master fluids with low or changing dielectrics.
- Instrument signal **is not** affected by mist, spray, turbulence, flashing, changing pressures or temperatures, or changing 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.

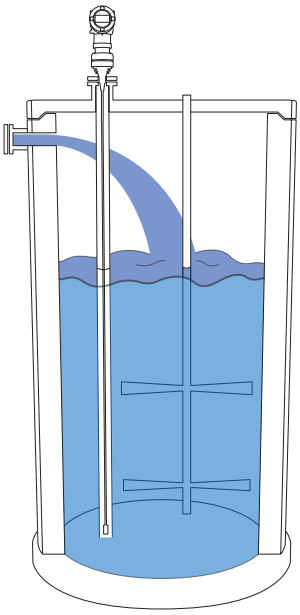


External chamber/bridle/displacer replacement/MagWave™
Applications such as boiler drums, feedwater heaters, compressed hydrocarbons and process vessels with multiple obstructions require external chambers.

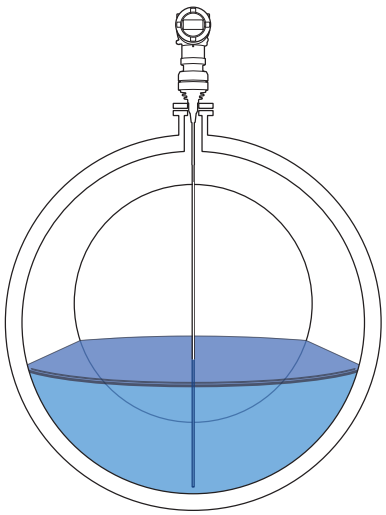
The LWT310 guided wave radar is the best measurement choice for installation in external chambers, bridles, and displacer retrofits. Due to the concentrated signal, it is used for measuring low dielectric fluids. If a chamber is 100 mm (4 in) or smaller, this actually helps to further concentrate the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



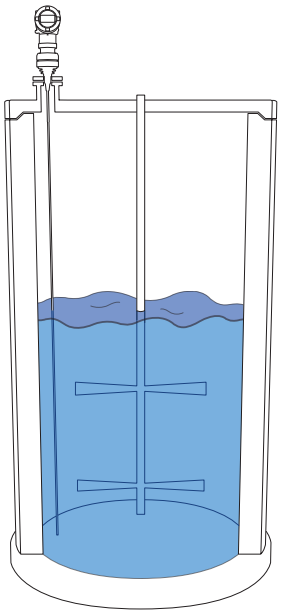
Stilling wells
Stilling wells are used if the probe must be installed in the process fill stream, to avoid obstructions and agitators as well as to retain signal strength in applications with very low dielectric fluids and long measuring lengths.



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)

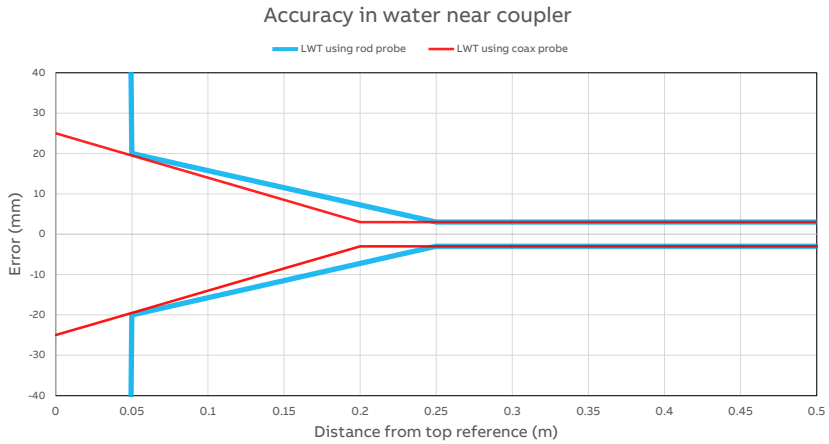
Lifespan
MTBF : 76 years

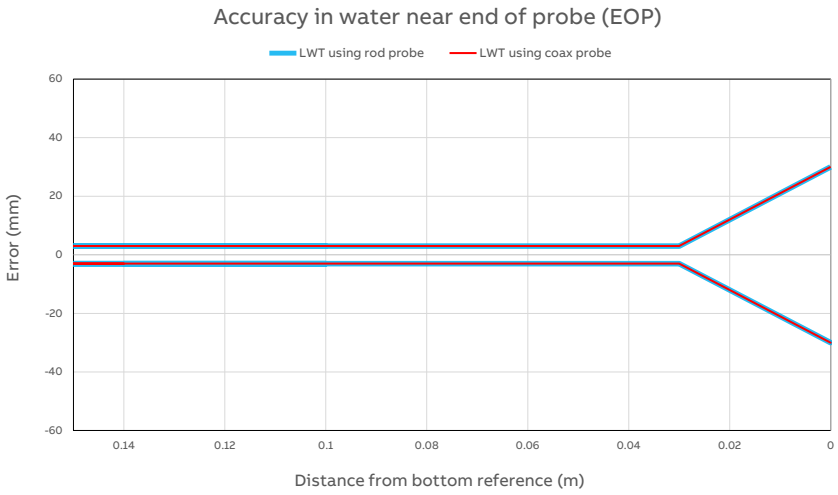
Wetted materials
- Duplex 2205 stainless steel
- Super duplex 2507 stainless steel
- C-276 alloy
- 304L stainless steel
- 316L stainless steel

[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)

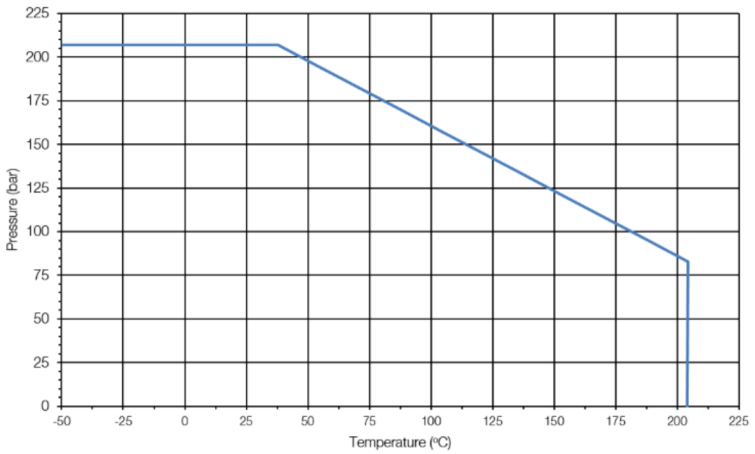
Instruments from the LWT300 series can measure at distances very close to the top and end of the probe. However accuracy decreases in these regions. The following plots show this reduced accuracy for different probes. Notice the short deadband for rod probes (the same applies to cables, even if not shown)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





Pressure/Temperature Curves[1]

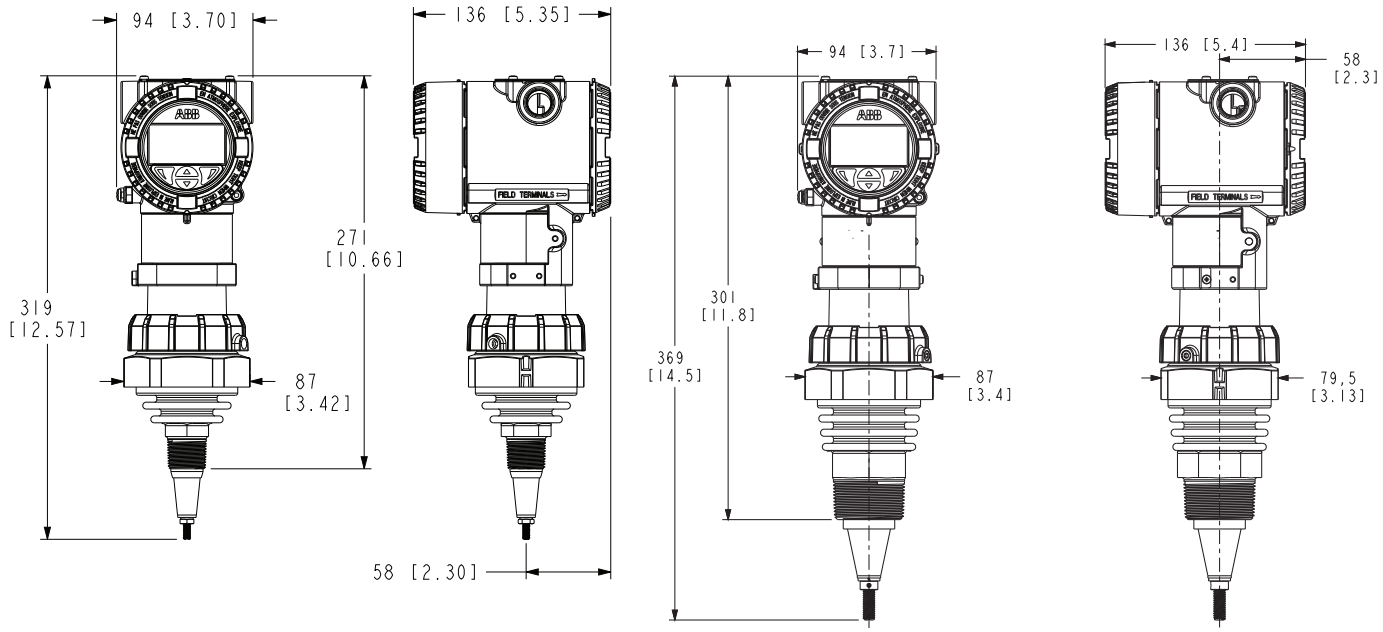
For LWT310 and LWT320



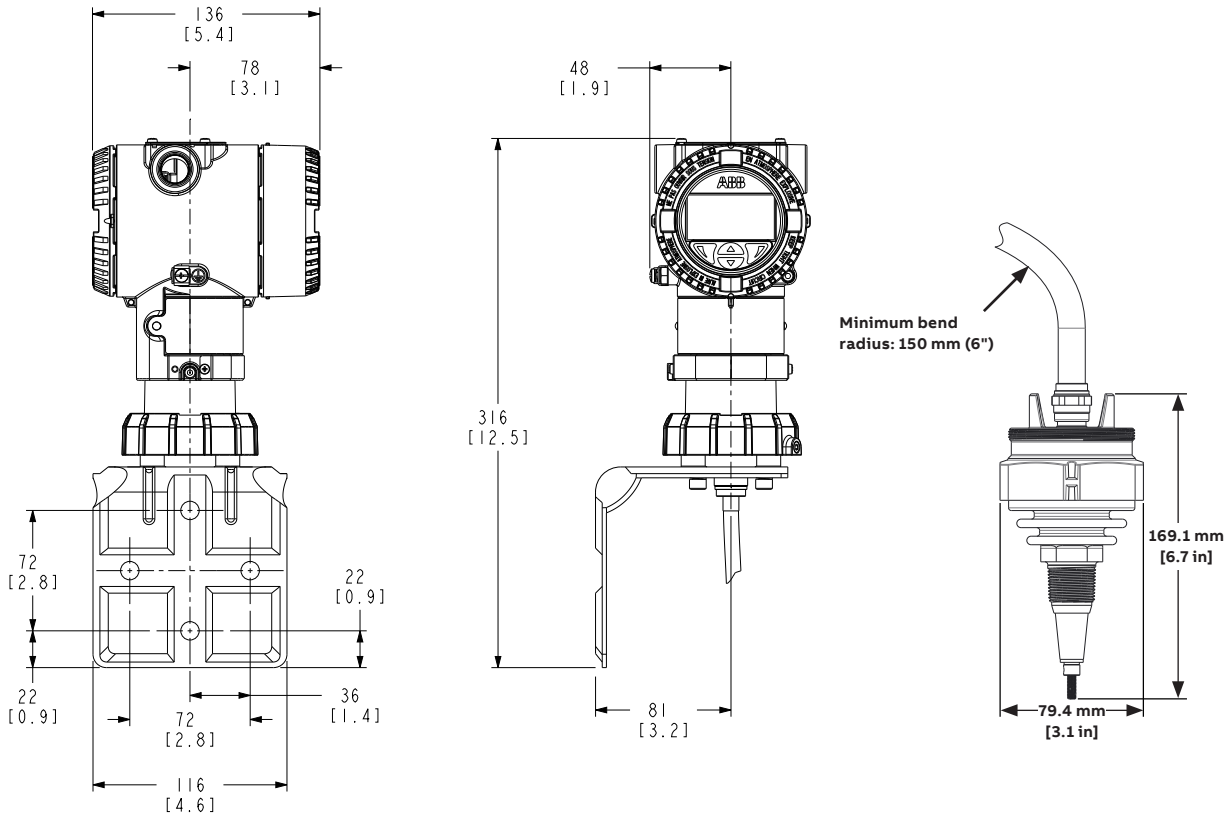
[1] Coupler temperatures are based on O-ring temperature ratings. Please refer to the O-ring chart for more information.

Dimensions (mm [in])

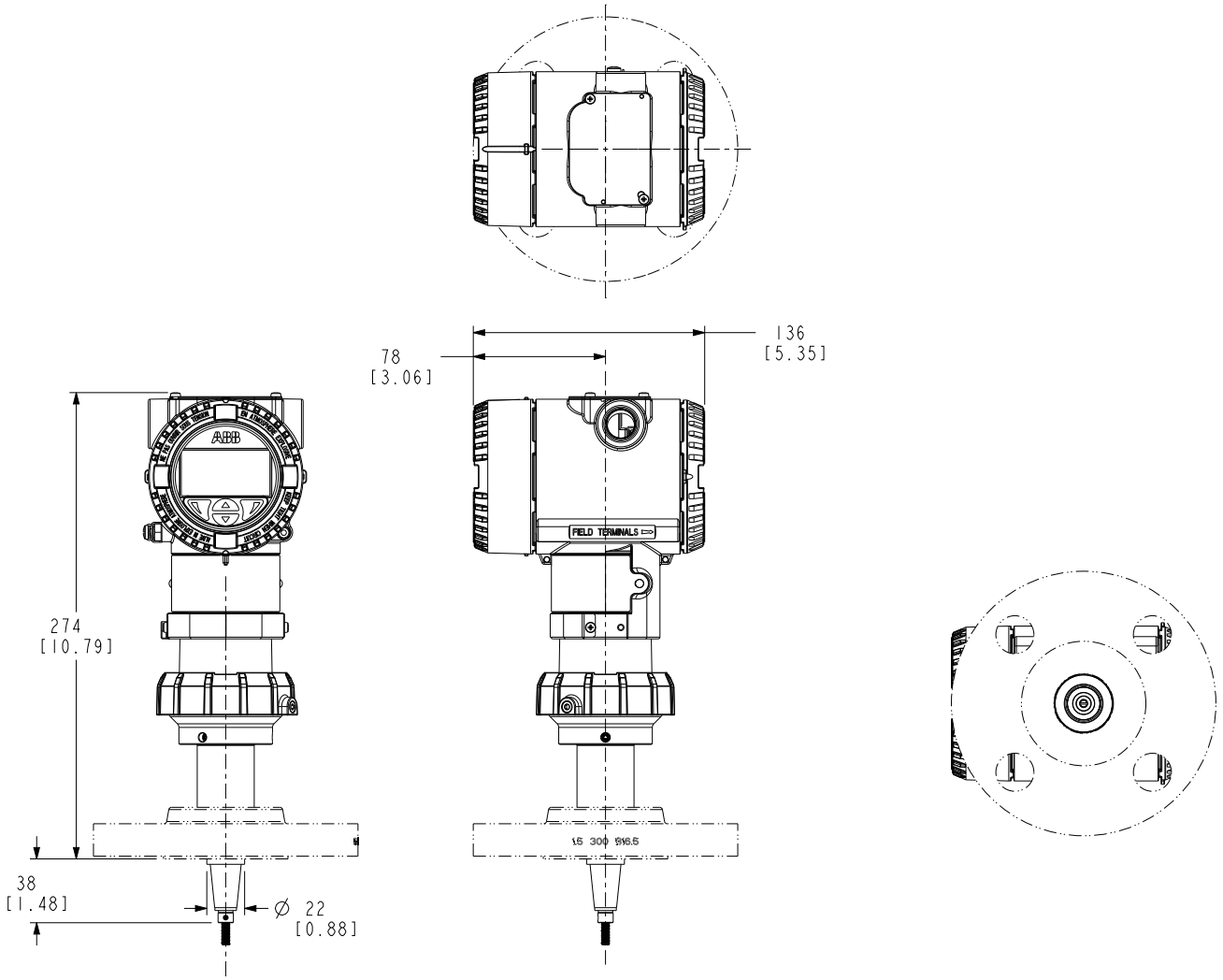
Instrument, threaded interface (LWT310 left, LWT320 right)



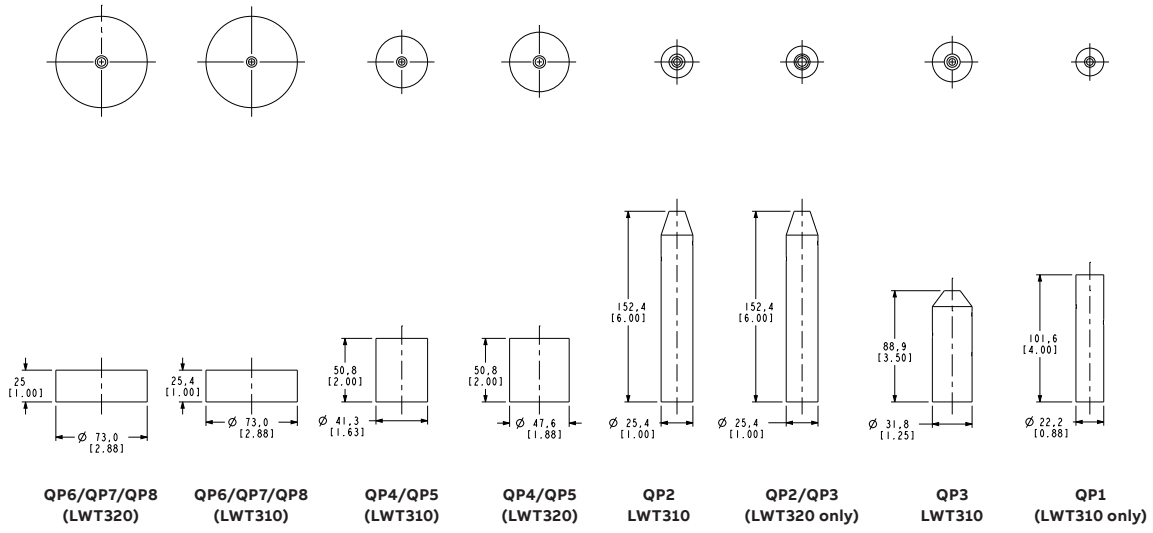
Remote head and coupler



Flanged interface

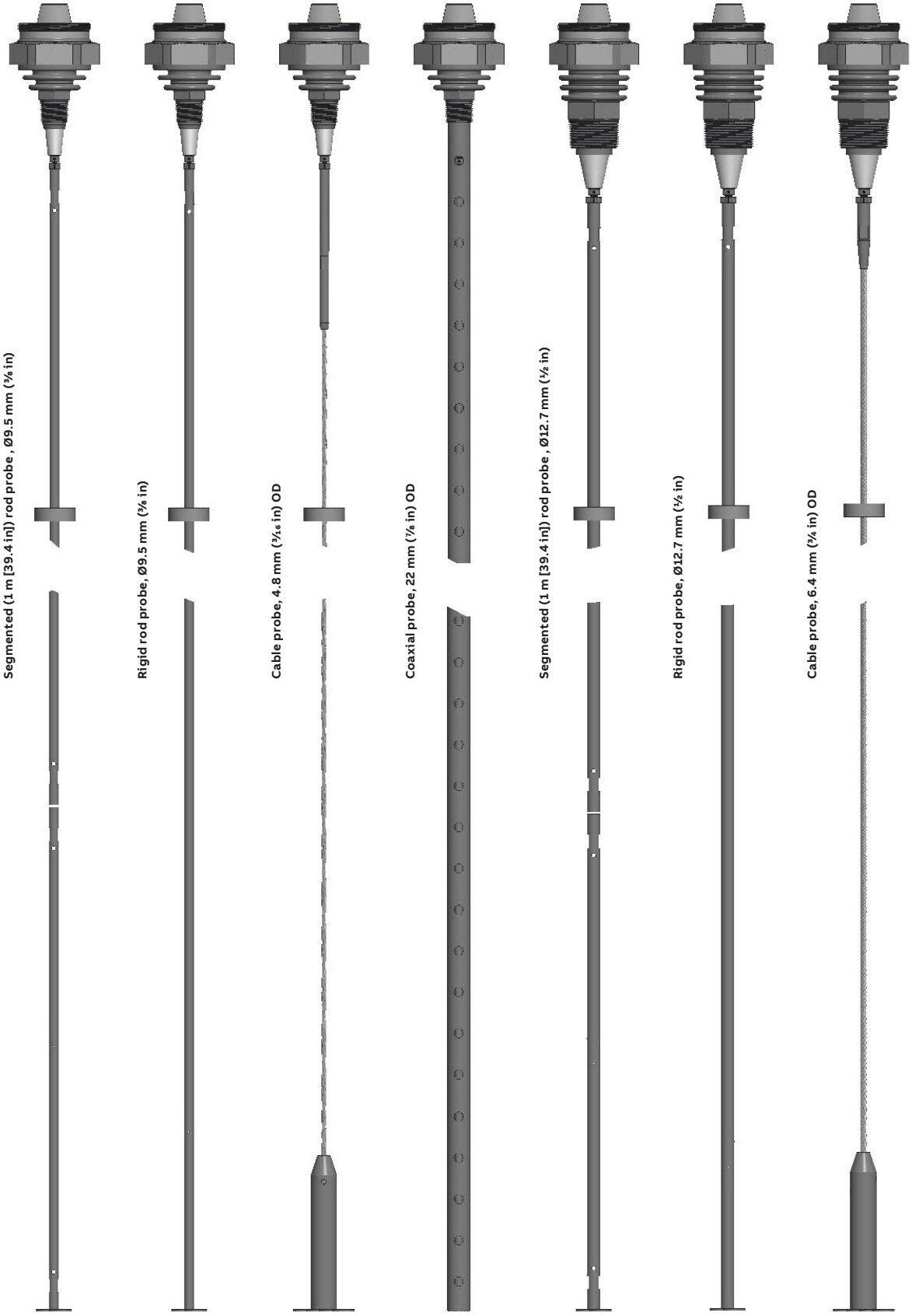


Probe weight options



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) CSA 22.2 No.60079-11:2014 CSA 22.2 No.25–17 FM 3600:2018 FM 3615:2018 FM 3616:2011 ANSI/ISA-60079-11:2009 CSA C22.2 No.60079-0:2019 CSA C22.2 No.60079-1:2016 CSA C22.2 No.60079-11:2014 CSA C22.2 No.60079-26:2016 CSA C22.2 No.60079-31:2015 ANSI/UL 60079-0:2019 ANSI/UL 60079-1:2015 ANSI/ISA 60079-11:2014 ANSI/UL 60079-26:2017 ANSI/UL 60079-31:2015 CSA 22.2 No.61010-1:2012 ANSI/ISA 61010-1:2012 ANSI/ISA 12.27.01:2011 ANSI/IEC 60529:2004 CSA C22.2 No. 60529:2005 (R2015) ANSI/NEMA 250:2014 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 CSA C22.1:2018, CSA C22.2 No. 25:2014, CSA 22.2 No. 30:1986 (R2012), CSA C22.2 No. 213:2017, CSA C22.2 No. 60079-0:2019, CSA C22.2 No. 60079-1:2011, CSA C22.2 No. 60079-11:2014, CSA C22.2 No. 60079-15:2016, CSA C22.2 No. 60079-31:2015, CSA C22.2 No. 61010-1:2012 (R2017), ANSI/ISA 12.27.01:2011, 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 Intrinsically safe, Ex ia IIC Ga, Ex ia IIIC Da	E1										
ATEX/IECEx Flameproof/dustproof housing, Ex db/ia, Ex ta ia	E2										
ATEX/IECEx Non-sparking, Ex nAc/ia, Category 3/1 (remote probe only)	E3										
ATEX/IECEx Ex ic/ia, Category 3/1 (remote probe only)	E9										
Combination Approval - US standards FMus, ATEX, IECEx - Flameproof/Explosion proof, intrinsically safe, dustproof (protection type marked by customer)	M1										
Combination Approval - Canadian standards cFM, ATEX, IECEx - Flameproof/Explosion proof, intrinsically safe, dustproof (protection type marked by customer) (also meeting FMus)	M2										
cFMus standards, intrinsically safe, Ex ia	N1										
FM US standards, Exposion proof/flameproof/dustproof, Ex db/ia, Ex ta ia	N2										
cFMus standards, Non-incendive with intrinsically safe probe & Ex nAc/ia (remote probe only)	N3										
Canadian standards by FM Exposion proof/Flameproof/Dustproof Ex db/ia, Ex ta ia (also meeting FMus)	N4										
US standards by CSA (for Modbus communication only) Explosion proof/Flameproof/Dustproof 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) Explosion proof/Flameproof/Dustproof 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: –26 to 204 °C (–15 to 400 °F)			V0								
Kalrez, process service temperature range: –20 to 204 °C (–4 to 400 °F)			K0								
EPDM, process service temperature range: –50 to 120 °C (–58 to 248 °F)			E0								
Markez,process service temperature range: –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 Ø9.5 mm (⅜ in), 6.1 m (20 ft) maximum length							R2					
Segmented rod probe (1 m [39.4 in]) Ø9.5 mm (⅜ in), 6.1 m (20 ft) maximum length							R5					
LWT320 rod probes												
Rod probe Ø12.7 mm (½ in), 6.1 m (20 ft) maximum length							R3					
Segmented rod probe (1 m [39.4 in]), 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. 61 m (200 ft) maximum length							F1					
Cable probe 4.8 mm (3⁄16 in) O.D., with Teflon spacers 61 m (200 ft) maximum length							FB					
LWT320 cable probes												
Cable probe 6.4 mm (¼ in) O.D. 61 m (200 ft) maximum length							F2					
LWT310 coaxial probes												
Coaxial probe 22 mm (⅞ in) O.D. with Teflon spacers 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 (no waveform function available)										L1		
With HMI TTG and display and glass cover										L2		
Output												
Single 4 to 20 mA + HART communication (allows top level measurement only)											H1	
Modbus communication (top level and interface 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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