

ABB MEASUREMENT & ANALYTICS | DATA SHEET

LWT300 series

Guided wave radar level transmitter Level and interface level measurement



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 bar (3,000 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 radar that uses 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 temperatures, 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. They also 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 bar (3,000 psi)

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



How the technology works

Guided wave radar uses 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. The probe guides the microwave energy to the product surface, instead of having it be dispersed in a cone, as it would 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 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 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.

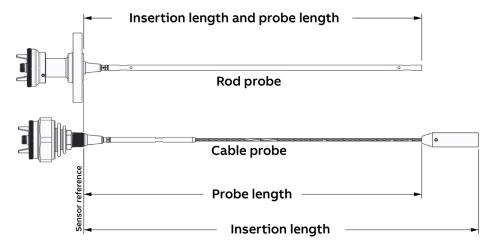


When two liquids are in the tank and are separated, if the dielectric constant difference between the two is more than 10, it is possible to detect the total level and the interface level at the same time. The radar wave will go through the first layer (having a low dielectric constant) and reach the top of the second layer (having a higher dielectric constant).

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, excluding accessories such as a cable weight. For a flanged interface, the probe length is measured from the bottom of the flange to the end of the probe, excluding accessories.

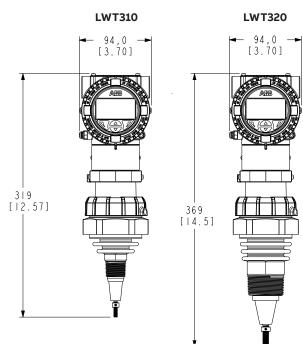


LWT310 vs. LWT320

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 with a 38 mm (1 $\frac{1}{2}$ -in.) NPT interface.

	LWT310	LWT320
NPT interface	19 mm (¾ in.)	38 mm (1 ½ in.)
Cable probe diameter	4.8 mm (¾16 in.)	6.4 mm (½ in.)
Rod probe diameter	9.5 mm (¾ in.)	12.7 mm (½ in.)
Coaxial probe diameter	22 mm (¾ in.)	n/a
Maximum pull force	450 kg (1,000 lb.)	635 kg (1,400 lb.)



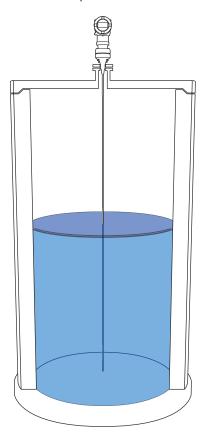
Applications

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 the 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 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.).

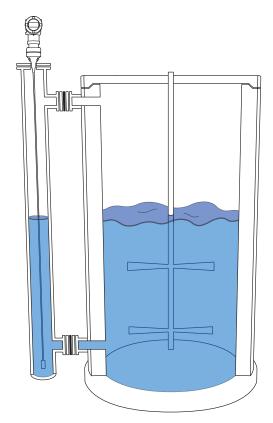
Note: Do not mount the probe where it can touch vessel walls or internal structures. Do not install the probe in the fill stream of the vessel. Coaxial probes or stilling wells are best if there is excessive foaming or installation in the fill stream that cannot be avoided. Rod and coaxial probes allow 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™

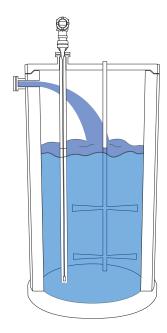
Applications such as boiler drums, feedwater heaters, compressed hydrocarbons and process vessels with multiple obstructions require external chambers.

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.



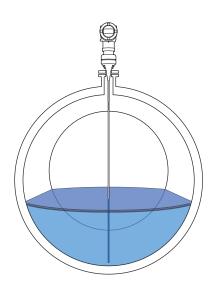
Stilling wells

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.



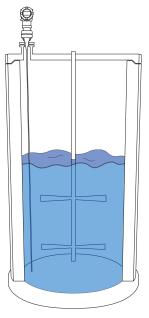
Horizontal cylinder

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 to 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, 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 ensure that the probe cannot become detached or make contact with the agitator blade. Considerations should be made for attaching 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 personnel may touch the sensor probe, excessive foaming may occur, 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 instruments 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.

Specifications

Accuracy

2 mm (5/64 in.) or 0.03%

Resolution

1 mm (3/64 in.)

Temperature drift (digital)

±0.2 mm/10 °C (max ± 2.5 mm)

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

- 1 to 207 bar at 38 °C (-14.5 to 3,000 psi at 100 °F)
- -1 to 83 bar at 204 °C (-14.5 to 1,200 psi at 400 °F)

Dielectric constant

- 1.4 (minimum)
- DC contrast for interface measurement: >10
- Minimum top level layer thickness when measuring interface level: 50 mm (2 in.)

Process viscosity

- · Coaxial probe: 500 cp
- · Cable probe or rod 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

 $^{3}\!\!\!/4$ in. (LWT310) or 1 $^{1}\!\!\!/2$ in. (LWT320). Optional adapter bushings are available for 3- and 4-inch process connections (LWT310).

Flanged

ASME flanges: from 1 $\frac{1}{2}$ to 8 in., class 150 to 900 DN flanges: from DN 20 to DN 200, PN25 to PN160

Display

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

Communication protocols

- 4-20 mA analog output with HART 7 communication
- · Modbus communication
- · LevelMaster communication

Lifespan

MTBF: 76 years

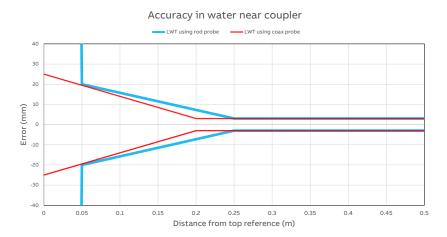
Wetted materials

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

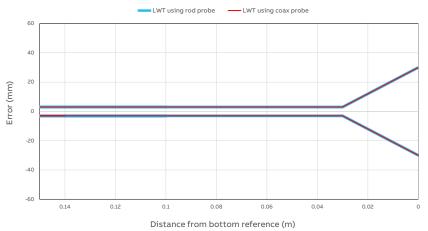
¹ See tables in FM/CSA approval certificate for limits of different protection methods

Deadband and accuracy near coupler (top) and end of probe (bottom)

Instruments from the LWT300 series can measure at distances very close to the top and bottom 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.

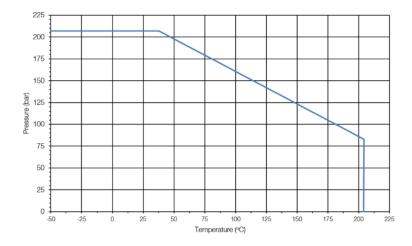


Accuracy in water near end of probe (EOP)



Pressure/temperature curves¹

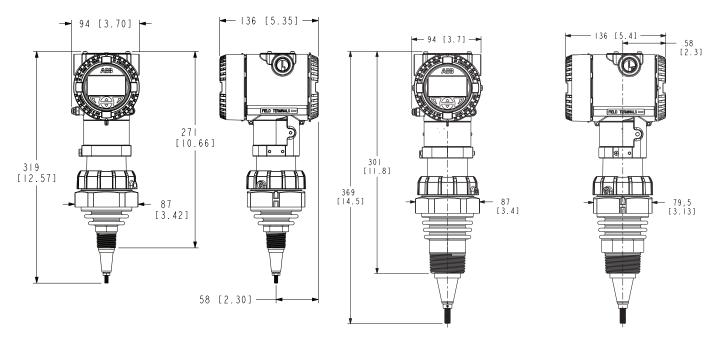
For LWT310 and LWT320.



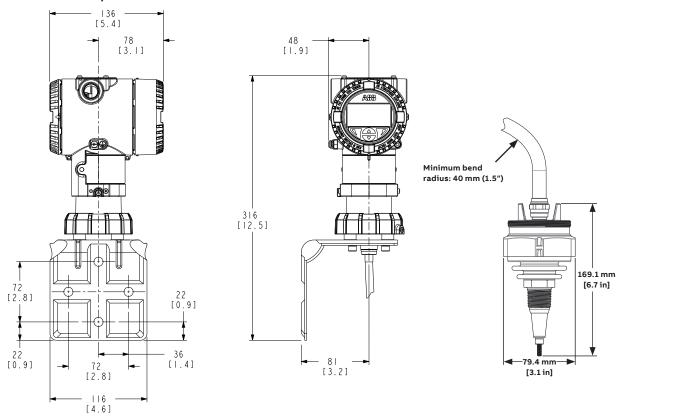
¹ Coupler temperatures are based on O-ring temperature ratings. Please refer to the O-ring chart for more information.

Dimensions (mm [in.])

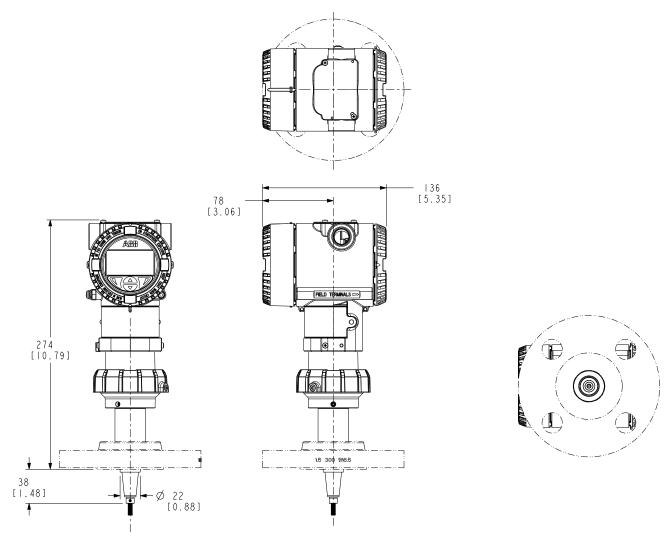
Instrument, threaded interface (LWT310 left, LWT320 right)



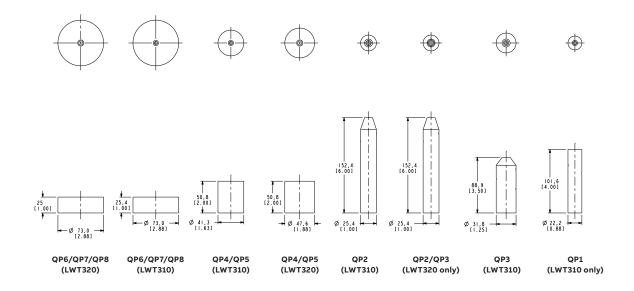
Remote head and coupler



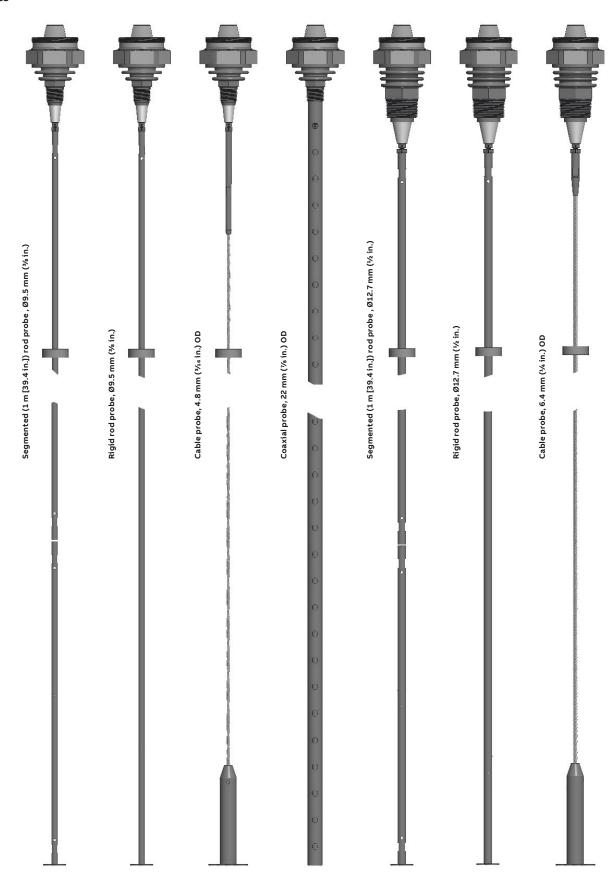
Flanged interface



Probe weight options



Probe types



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
	Electromagnetic Compatibility (EMC) directive 2014/30/EU	EN/IEC 61010-1:2010
	Restriction of Hazardous Substances (RoHS) directive 2011/65/EU	
	Waste of Electrical and Electronic Equipment (WEEE) 2012/19/EU	
CSA (cCSAus) (Modi	bus units only)	CSA 22.2 No.30 M1986 (R2007
	Explosion proof/dust-ignition proof with IS, SI probe (local configuration):	CSA 22.2 No.60079-11:201 CSA 22.2 No.25-1
	Class I, II, III, Division 1, Groups C-G T6T1, T. Amb50°C to 70°C85°C	FM 3600:201
	Explosion proof/dust-ignition proof with IS, SI connection for probe (remote configuration):	FM 3615:201 FM 3616:201
	Class I, II, III, Division 1, Groups C-G T6T5, T. Amb50°C to 75°C85°C	ANSI/ISA-60079-11:2009 CSA C22.2 No.60079-0:2019
	Flameproof/dust-ignition proof (local configuration):	CSA C22.2 No.60079-0.201
	Class I, Zone 0/1 AEx/Ex ia/db IIB T6T1 Ga/Gb T. Amb50°C to 70°C85°C	CSA C22.2 No.60079-11:201
	Zone 20/21 AEx/Ex ia/tb IIIC T77°CT358°C Da/Db	CSA C22.2 No.60079-26:2010 CSA C22.2 No.60079-31:201
	Flameproof/dust-ignition proof (remote configuration):	ANSI/UL 60079-0:2019
	Class I, Zone 1 AEx/Ex db [ia Ga] IIB T6T5 Gb T. Amb50°C to 75°C85°C	ANSI/UL 60079-1:201
	Zone 21 AEx/Ex tb [ia Da] IIIC T77°CT87°C Db	ANSI/ISA 60079-11:201 ANSI/UL 60079-26:201
	Flameproof/dust-ignition proof (remote configuration):	ANSI/UL 60079-31:201
	CL I, ZONE 1, AEx/Ex db [ia Ga] IIB T6T5 Gb	CSA 22.2 No.61010-1:201 ANSI/ISA 61010-1:201
	ZONE 21 AEx/Ex tb [ia Da] IIIC T77°CT87°C Db	ANSI/ISA 01010-1:201 ANSI/ISA 12.27.01:201
		ANSI/IEC 60529:200
		CSA C22.2 No. 60529:2005 (R2015 ANSI/NEMA 250:201
		CSA C22.2 No. 94:201
ATEX, IECEx (HART u	nits only)¹	
	ATEX: FM19ATEX0007X, IECEx FMG 19.0006X	
	Flameproof/dust proof (local configuration):	
	II 1/2 G Ex ia/db IIB T6T1 Ga/Gb -50 °C ≤ Ta ≤ +75 °C+85 °C	EN/IEC 60079-0, EN/IEC 60079-1
	II 1/2 D Ex ia/tb IIIC T77°CT358°C Da/Db -50 °C ≤ Ta ≤ +75 °C+85 °C	EN/IEC 60079-11, EN/IEC 60079-15
	Flameproof/dust proof (remote configuration):	EN/IEC 60079-26, EN/IEC 60079-31
	II (1)2 G Ex db [ia Ga] IIB T6T5 Gb -50 °C ≤ Ta ≤ +75 °C+85 °C	CSA C22.1:2018
	II (1)2 D Ex tb [ia Da] IIIC T77°C87°C Db -50 °C ≤ Ta ≤ +75 °C+85 °C	CSA C22.2 No. 25:2014
	Intrinsically safe (local configuration):	CSA 22.2 No. 30:1986 (R2012) CSA C22.2 No. 213:2017
	II 1 G Ex ia IIC T4T1 Ga -50 °C ≤ Ta ≤ +75 °C+85 °C	CSA C22.2 No. 60079-0:2019
	II 1 D Ex ia IIIC T88°CT368°C Da -50 °C ≤ Ta ≤ +75 °C+85 °C	CSA C22.2 No. 60079-1:2011 CSA C22.2 No. 60079-11:2014
	Intrinsically safe (remote configuration):	CSA C22.2 No. 60079-15:2016
	II 1 G Ex ia IIC T6T4 Ga -50 °C ≤ Ta ≤ +75 °C+85 °C	CSA C22.2 No. 60079-31:2015
	II 1 D Ex ia IIIC T52°CT93°C Da -50 °C ≤ Ta ≤ +75 °C+85 °C	CSA C22.2 No. 61010-1:2012 (R2017) ANSI/ISA 12.27.01:2011
	Category 3 (Zone 2) (remote configuration only):	CSA C22.2 No. 60529:2005 (R2015
	II (1)3 G Ex nAc [ia Ga] IIB T6T4 Gc -50 °C ≤ Ta ≤ +75 °C+85 °C	
	II (1)3 G Ex ic [ia Ga] IIB T6T4 Gc -50 °C ≤ Ta ≤ +75 °C+85 °C	

Standard body		Applied standard
FM (cFMus) (HART units only)	ı	
	FM19US0023X, FM19CA0013X	
	Explosion proof/dust-ignition proof with IS, SI probe (local configuration):	FM Class 3600:2011
	CL I,II,III, DIV 1, GR C-G, T6T1 T. Amb50 °C to 70 °C85 °C	FM Class 3610
	Explosion proof/dust-ignition proof with IS, SI probe (remote configuration):	FM Class 3611 FM Class 3615:2006
	CL I,II,III, DIV 1, GR C-G, T6T5 T. Amb50 °C to 75 °C85 °C	FM Class 3616:2011
		FM Class 3810:2005
	Flameproof/dust-ignition proof (local configuration):	ANSI/ISA 61010- 1:2012
	CL I, Zone 0/1, AEx/Ex ia/db IIB T6T1 Ga/Gb T. Amb50 °C to 70 °C85 °C	ANSI/ISA 60079-0:2013
	Zone 20/21 AExEx ia/tb IIIC T77 °CT358 °C Da/Db	ANSI/UL 60079-1:2015 ANSI/ISA 60079-11
	Flameproof/dust-ignition proof (remote configuration):	ANSI/ISA 60079-11
	CL I, ZONE 1, AEx/Ex db [ia Ga] IIB T6T5 Gb T. Amb50 °C to 75 °C85 °C	ANSI/ISA 60079-26: 2011
	ZONE 21 AEx/Ex tb [ia Da] IIIC T77 °CT87 °C Db	ANSI/ISA 60079-31:2015
		ANSI/ISA 12.27.01:2011
	Intrinsically safe IS, SI (local configuration):	UL50 ANSI/NEMA 250:2014
	CL I, II, III, DIV 1, GP A-G, T4T1 T. Amb50 °C to 43 °C75 °C	ANSI/IEC 60529:2004
	CL I, ZONE 0, AEx/Ex ia IIC T4T1 Ga	CSA-C22.2 No. 0.4:2013
	Zone 20, AEx/Ex ia IIIC T88°CT368 °C Da	CSA-C22.2 No. 0.5:2012
	Intrinsically safe IS, SI (remote configuration):	CSA-C22.2 No. 25:2014
	CL I, II, III, DIV 1, GP A-G T6T4 T. Amb50 °C to 40 °C85 °C	CSA-C22.2 No. 30:2012 CSA-C22.2 No. 94:2011
		CAN/CSAC22.2 No. 60079-0:2015
	CL 1, ZONE 0, AEx/Ex ia IIC T6T4 Ga	CAN/CSAC22.2 No. 60079-1:2011
	ZONE 20, AEx/Ex ia IIIC T52 °CT93 °C Da	CAN/CSAC22.2 No. 60079-11
	Division 2/Zone 2/22 (remote configuration only):	CAN/CSAC22.2 No. 60079-15
	CL I, DIV 2, Gp C, D, T6T4, 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.	CAN/CSAC22.2 No. 60079-26 CAN/CSAC22.2 No. 60079-31:2015
	Class I, Zone 2, AEx/Ex ic [ia Ga] IIB T6T4 Gc	CSAC22.2 No. 60529:2015 CAN/CSAC22.2 No. 61010-1:2012
	Zone 22, AEx /Ex ic [ia Da] IIIC T52 °CT93 °C Dc	CAN/ CSAC22.2 NO. 01010-1:2012
	T. Amb50 °C to 40 °C85 °C	
CRN		
	Canadian Registration Number (CRN) # 0F20795.5C	CAN/CSA No. B51:2014 ASME B31.1/ASME B31.3
	Category "F" Type of fittings - Measuring devices	ASME D31.1/ASME B31
SIL (Safety Integrity Level)		150 61 500
	Certificate # TUV No. Z10 064584 0044 SIL 2/SIL 3 capable device	IEC 61508

Ordering information

		- 1	Main co	de							Option code
LWT310/LWT320	ХX	XX	ХX	XXX	Х	XX	XXXX	XX	ХX	XX	XXX
pprovals											
General purpose	YO										
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 to be marked by customer)	M1										
Combination Approval - Canadian standards cFM, ATEX, IECEx - Flameproof/explosion proof, intrinsically safe, dustproof (protection type to be marked by customer) (also meeting FMus)	M2										
cFMus standards, intrinsically safe, Ex ia	N1										
FM US standards, explosion 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 Explosion 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										
Vetted material											
C-276 alloy		H1									
304L stainless steel		S4									
316L stainless steel		S6									
eal type (O-ring)											
Viton, process service temperature range: -26 to 204 $^{\circ}$ C (-15 to 400 $^{\circ}$ F)			VO								
Kalrez, process service temperature range: -20 to 204 °C (-4 to 400 °F)			KO								
EPDM, process service temperature range: -50 to 120 °C (-58 to 248 °F)	-		EO								
Markez,process service temperature range: -10 to 204 °C (14 to 400 °F)	-		M0								
rocess connection type and pressure rating				J							
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 c	ode								Option code
	LWT310/LWT320	XX	XX	XX	X	ΚX	Х	XX	xxxx	хх	XX	XX	XXX
Process connection size													
DN 20/ANSI 3/4 in. (LWT310 only)							В						
DN 25/ANSI 1 in. (LWT310 only)							С						
DN 40/ANSI 1 ½ in.							Е						
DN 50/ANSI 2 in.							F						
DN 80/ANSI 3 in.							н						
DN 100/ANSI 4 in.							J						
DN 150/ANSI 6 in.							М						
DN 200/ANSI 8 in.							Р						
Special (industry recognized standard flanges only	/)						z						
Probe type													
LWT310 rod probes													
Rod probe													
Ø9.5 mm (¾ in.), 6.1 m (20 ft.) maximum length								R2					
Segmented rod probe (1 m [39.4 in.]) Ø9.5 mm ($\%$ in.), 6.1 m (20 ft.) maximum length								R5					
LWT320 rod probes													
Rod probe								R3					
Ø12.7 mm (½ in.), 6.1 m (20 ft.) maximum length								КЭ					
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 (¾6 in.) O.D. 61 m (200 ft.) maximum length								F1					
Cable probe 4.8 mm (¾6 in.) O.D., with Teflon spacers 61 m (200 ft.) maximum length								FB					
LWT320 cable probes													
Cable probe 6.4 mm (¾ in.) O.D. 61 m (200 ft.) maximum length								F2					
LWT310 coaxial probes													
Coaxial probe 22 mm (1/18 in.) O.D. with Teflon spacers								СТ					
6.7 m (22 ft.) maximum length								СТ					
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											LO		
With HMI TTG and display and glass cover											L2		
Output													
												H1	
Single 4 to 20 mA + HART communication Modbus and LevelMaster communication												M1	

			М	ain coc	ie						
Ī	LWT310/LWT320	XX	ХХ	XX	XXX	Х	XX	XXXX	XX	XX	XX
Inmounted accessories											
Stopping plug, nickel-plated brass											
Cable gland, nickel-plated brass											
3 in. to ³ / ₄ in. bushing (Class 150)											
4 in. to ¾ in. bushing (Class 150)											
Other accessory											
emote electronics coaxial cable length (for remote of 1.5 m (≅5 ft.)	coupler only)										
3 m (≅10 ft.)											
5 m (≅16 ft.)											
6 m (≅20 ft.)											
10 m (≅32 ft.)											
15 m (≅49 ft.)											
20 m (≅66 ft.)											
25 m (≅82 ft.)											
30 m (≅98 ft.)											
35 m (≅115 ft.)											
40 m (≅131 ft.)											
45 m (≅147 ft.)											
50 m (≅164 ft.)											
60 m (≅197 ft.)											
Custom coaxial remote length (max. 60 m [197 ft.])											
Cable weight (removable) Cable weight (welded, LWT320 only)											
Centering disks											
Metal centering disk											
evice identification plate											
Device identification plate Additional stainless-steel hang tag											
•											
Additional stainless-steel hang tag Additional screwed-on steel tag plate											
Additional stainless-steel hang tag Additional screwed-on steel tag plate Gertificates Test report 2.2 acc. EN 10204											
Additional stainless-steel hang tag Additional screwed-on steel tag plate Gertificates Test report 2.2 acc. EN 10204 MTR 3.1, Material monitoring with inspection certi		10204									
Additional stainless-steel hang tag Additional screwed-on steel tag plate Sertificates Test report 2.2 acc. EN 10204 MTR 3.1, Material monitoring with inspection certification of compliance with the order 2.1 acc. E	N 10204	10204									
Additional stainless-steel hang tag Additional screwed-on steel tag plate ertificates Test report 2.2 acc. EN 10204 MTR 3.1, Material monitoring with inspection certification of compliance with the order 2.1 acc. EM With dye penetrant test on pressure bearing parts	N 10204	10204									
Additional stainless-steel hang tag Additional screwed-on steel tag plate ertificates Test report 2.2 acc. EN 10204 MTR 3.1, Material monitoring with inspection certifold because of compliance with the order 2.1 acc. Ewith dye penetrant test on pressure bearing parts Certificate of origin	N 10204	10204									
Additional stainless-steel hang tag Additional screwed-on steel tag plate ertificates Test report 2.2 acc. EN 10204 MTR 3.1, Material monitoring with inspection certitoelelelelelelelelelelelelelelelelelelel	:N 10204	10204									
Additional stainless-steel hang tag Additional screwed-on steel tag plate ertificates Test report 2.2 acc. EN 10204 MTR 3.1, Material monitoring with inspection certic peclaration of compliance with the order 2.1 acc. EWith dye penetrant test on pressure bearing parts Certificate of origin Attested certificate of origin Printed record of configured settings in transmitters.	:N 10204	10204									
Additional stainless-steel hang tag Additional screwed-on steel tag plate ertificates Test report 2.2 acc. EN 10204 MTR 3.1, Material monitoring with inspection certifold peclaration of compliance with the order 2.1 acc. Ewith dye penetrant test on pressure bearing parts. Certificate of origin Attested certificate of origin Printed record of configured settings in transmitted with hydrostatic test report.	:N 10204	10204									
Additional stainless-steel hang tag Additional screwed-on steel tag plate Fertificates Test report 2.2 acc. EN 10204 MTR 3.1, Material monitoring with inspection certifuctorial policy in the order 2.1 acc. EWith dye penetrant test on pressure bearing parts. Certificate of origin Attested certificate of origin Printed record of configured settings in transmitted with hydrostatic test report PMI Positive Material Identification without carbon	er n content										
Additional stainless-steel hang tag Additional screwed-on steel tag plate Certificates Test report 2.2 acc. EN 10204 MTR 3.1, Material monitoring with inspection certifold peclaration of compliance with the order 2.1 acc. EWith dye penetrant test on pressure bearing parts Certificate of origin Attested certificate of origin Printed record of configured settings in transmitted With hydrostatic test report	er n content										
Additional stainless-steel hang tag Additional screwed-on steel tag plate Fertificates Test report 2.2 acc. EN 10204 MTR 3.1, Material monitoring with inspection certifuctorial monitoring with the order 2.1 acc. EWith dye penetrant test on pressure bearing parts. Certificate of origin Attested certificate of origin Printed record of configured settings in transmitted with hydrostatic test report PMI Positive Material Identification without carbon Material monitoring NACE MR 0175, MR 0103 with	er n content										
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				Main co	de								Optiona code
	LWT310/LWT32	о хх	XX	XX	XXX	Х	ХХ	Х	XXX	XX	XX	XX	XXX
Oocumentation language (user and safety guide	es, hard copy)												
German													M1
French													M4
English													M5
Programming and parameter settings													
Custom parameter settings													N6
alibration type 5-point calibration verification certificate, faction longer distance guaranteed verified by desig		50, 25 a	and 0%	of meas	uremer	nt leng	gth (m	aximu	m lengt	:h of 7 r	n, poin	ts at	R5
													_
9-point calibration verification certificate, faction longer distance guaranteed verified by designations.		5, 75, 67	7.5, 50, 3	37.5, 25	, 12.5 a	nd 0%	(max	imum	length (of 7 m,	points	at	R9
longer distance guaranteed verified by desig	n) reight or end-of-prob	e disk s	izing	,	•		`	imum	length (of 7 m,	points	at	R9 QP1
longer distance guaranteed verified by desig	reight or end-of-prob nm (1.34 in.), spacer (e disk s	izing	,	•		`	imum	length (of 7 m,	points	at	-
longer distance guaranteed verified by desig ripe or chamber internal diameter for spacer, w Inner diameter ≥24.3 mm (0.96 in.) and <34 n	reight or end-of-prob nm (1.34 in.), spacer (nm (1.69 in.)	e disk s	izing	,	•		`	imum	length o	of 7 m,	points	at	QP1
ipe or chamber internal diameter for spacer, w Inner diameter ≥24.3 mm (0.96 in.) and <34 n Inner diameter ≥34 mm (1.34 in.) and <42.8 n	n) reight or end-of-prob nm (1.34 in.), spacer (nm (1.69 in.) nm (2.13 in.)	e disk s	izing	,	•		`	imum	length o	of 7 m,	points	at	QP1 QP2
Pipe or chamber internal diameter for spacer, w Inner diameter ≥24.3 mm (0.96 in.) and <34 n Inner diameter ≥34 mm (1.34 in.) and <42.8 n Inner diameter ≥42.8 mm (1.69 in.) and <54 n	n) reight or end-of-prob nm (1.34 in.), spacer (nm (1.69 in.) nm (2.13 in.) nm (2.62 in.)	e disk s	izing	,	•		`	imum	length o	of 7 m,	points	at	QP1 QP2 QP3
longer distance guaranteed verified by designipe or chamber internal diameter for spacer, we Inner diameter ≥24.3 mm (0.96 in.) and <34 n Inner diameter ≥34 mm (1.34 in.) and <42.8 n Inner diameter ≥42.8 mm (1.69 in.) and <54 n Inner diameter ≥42.8 mm (2.13 in.) and <66.7 n	n) reight or end-of-prob nm (1.34 in.), spacer (nm (1.69 in.) nm (2.13 in.) nm (2.62 in.) 8 mm (3.26 in.)	e disk s	izing 3 mm (0).88 in.)	•		`	imum	length (of 7 m,	points	at	QP1 QP2 QP3 QP4
ipe or chamber internal diameter for spacer, w Inner diameter ≥24.3 mm (0.96 in.) and <34 n Inner diameter ≥34 mm (1.34 in.) and <42.8 n Inner diameter ≥42.8 mm (1.69 in.) and <54 n Inner diameter ≥42.8 mm (2.13 in.) and <66.7 n Inner diameter ≥54 mm (2.13 in.) and <82.8 Inner diameter ≥82.8 mm (3.26 in.) and <102.	n) reight or end-of-prob nm (1.34 in.), spacer (nm (1.69 in.) nm (2.13 in.) nm (2.62 in.) 8 mm (3.26 in.) .3 mm (4.03 in.) – Low	e disk s	izing 3 mm ((D.88 in.)	•		`	imum	length	of 7 m,	points	at	QP1 QP2 QP3 QP4 QP5
ipe or chamber internal diameter for spacer, w Inner diameter ≥24.3 mm (0.96 in.) and <34 n Inner diameter ≥34 mm (1.34 in.) and <42.8 n Inner diameter ≥42.8 mm (1.69 in.) and <54 n Inner diameter ≥42.8 mm (2.13 in.) and <66.7 n Inner diameter ≥54 mm (2.62 in.) and <66.7 n Inner diameter ≥66.7 mm (2.62 in.) and <82.8 Inner diameter ≥82.8 mm (3.26 in.) and <102. measurement Inner diameter ≥102.3 mm (4.03 in.) and <123.	n) reight or end-of-prob nm (1.34 in.), spacer (nm (1.69 in.) nm (2.13 in.) nm (2.62 in.) 8 mm (3.26 in.) .3 mm (4.03 in.) – Low	e disk s	izing 3 mm ((D.88 in.)	•		`	imum	length o	of 7 m,	points	at	QP1 QP2 QP3 QP4 QP5
longer distance guaranteed verified by design tipe or chamber internal diameter for spacer, we linner diameter ≥24.3 mm (0.96 in.) and <34 nd linner diameter ≥34 mm (1.34 in.) and <42.8 nd linner diameter ≥42.8 mm (1.69 in.) and <54 nd linner diameter ≥54 mm (2.13 in.) and <66.7 nd linner diameter ≥56.7 mm (2.62 in.) and <82.8 linner diameter ≥82.8 mm (3.26 in.) and <102 measurement linner diameter ≥102.3 mm (4.03 in.) and <123 measurement	reight or end-of-prob nm (1.34 in.), spacer (nm (1.69 in.) nm (2.13 in.) nm (2.62 in.) 8 mm (3.26 in.) .3 mm (4.03 in.) – Low	e disk s	izing 3 mm ((D.88 in.)	•		`	imum	length	of 7 m,	points	at	QP1 QP2 QP3 QP4 QP5 QP6
longer distance guaranteed verified by design tipe or chamber internal diameter for spacer, we have linner diameter ≥24.3 mm (0.96 in.) and <34 mm (1.34 in.) and <42.8 mm (1.34 in.) and <42.8 mm (1.69 in.) and <54 mm (1.69 in.) and <54 mm (1.69 in.) and <66.7 mm (1.69 in.) and <82.8 mm (1.69 in.) and <10.2 mm (1.69	reight or end-of-prob nm (1.34 in.), spacer (nm (1.69 in.) nm (2.13 in.) nm (2.62 in.) 8 mm (3.26 in.) .3 mm (4.03 in.) – Low	e disk s	izing 3 mm ((D.88 in.)	•		`	imum	length	of 7 m,	points	at	QP1 QP2 QP3 QP4 QP5 QP6 QP7 QP8
Pipe or chamber internal diameter for spacer, we Inner diameter ≥24.3 mm (0.96 in.) and <34 m Inner diameter ≥34 mm (1.34 in.) and <42.8 m Inner diameter ≥42.8 mm (1.69 in.) and <54 m Inner diameter ≥42.8 mm (1.69 in.) and <66.7 m Inner diameter ≥54 mm (2.13 in.) and <66.7 m Inner diameter ≥66.7 mm (2.62 in.) and <82.8 Inner diameter ≥82.8 mm (3.26 in.) and <102 measurement Inner diameter ≥102.3 mm (4.03 in.) and <124 measurement Inner diameter ≥122.3 mm (4.81 in.)	reight or end-of-prob nm (1.34 in.), spacer (1.34 in.), nm (1.69 in.) nm (2.13 in.) nm (2.62 in.) 3 mm (3.26 in.) 3 mm (4.03 in.) – Low 2.3 mm (4.81 in.) – Lo	e disk s D.D.: 22. profile w profil	izing 3 mm (0	D.88 in.)	•		`	imum	length	of 7 m,	points	at	QP1 QP2 QP3 QP4 QP5 QP6





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