


Product introduction

Description



### Submersible Level Transmitter

633PI-BLT Submersible level transmitter is designed for dealing with the most severe demanding level measurement conditions. The sensor adopts the most advanced micro-processor technology with comprehensive linear error compensation and temperature error compensation to assure the highest precision of measuring result. The probe adopts full potting condensation-preventing technology, safe and reliable dual-seal design and fully welding technology with solid stainless steel body to assure long term stability and permanent air tightness. Signal transmitting module adopts transient voltage resistance protective circuits to assure operation regularly even under the harsh surge voltage environment. The seal of the cable adopts intensive cone plug sealing design to assure the long working life even under large mechanical load conditions during the installation and long-term use. 633PI-BLT Submersible level transmitter is the optimal choice to satisfy all of high demand level measuring applications.

Main parameters

Pressure types	Gauge pressure
Measuring range	1mH <sub>2</sub> O-200mH <sub>2</sub> O, please refer to the ordering information chapter
Output signal	4-20mA、4-20mA+HART、Modbus-RTU/RS485, customer
Reference accuracy	±0.5% URL, optional ±0.1% URL

Measuring medium

Water, waste water, oil

Field of application

Level measurement in container, others

Approvals



**Technical specifications**

**Measuring range and limit**

Nominal value	Smallest calibratable span	Lower range limit (LRL)	Upper range limit (URL)	Overload limit
20kPa	10kPa	0kPa	20kPa	30kPa
35kPa	20kPa	0kPa	35kPa	52.5kPa
100kPa	35kPa	0kPa	100kPa	150kPa
200kPa	100kPa	0kPa	200kPa	300kPa
350kPa	200kPa	0kPa	350kPa	525kPa
700kPa	350kPa	0kPa	700kPa	1050kPa
1MPa	500kPa	0kPa	1MPa	1.5MPa
1.7MPa	1MPa	0kPa	1.7MPa	2.55MPa
*3.5MPa	1.7MPa	0kPa	2MPa	5.25MPa

The unit of the measuring range above can be converted into mH<sub>2</sub>O@4°C, mmH<sub>2</sub>O@4°C, inH<sub>2</sub>O@4°C, m, mm and mHg@0°C. Please provide the density of measuring medium if the unit is m, mm. Other measuring range is available according to requirements.

\*Due to the seal structure limit of the products, the upper range limit(URL) is lower than the nominal value(see chart above). (1MPa = 102 mH<sub>2</sub>O@4°C)

**Standard specifications and reference conditions**

Test standard: GB/T28474 / IEC60770 Zero based-calibration span, Linear output, Silicon oil filling, 316L stainless steel isolated diaphragm.

**Performance specifications**

The overall performance including but not limited to **【reference accuracy】**, **【environment temperature effects】** and other comprehensive error

Typical accuracy: ±0.1%URL

Stability: ±0.2% URL/ year

**Reference accuracy**

Including linearity, hysteresis and repeatability. calibration temperature: 20 °C ± 5 °C

Linear output accuracy	Typical	±0.1%URL	Nominal value: 20kPa、35kPa、100kPa、200kPa 350kPa、700kPa 1MPa、1.7MPa 3.5MPa
	Max/ Voltage output	±0.5% URL	

**Ambient temperature effects**

Within the range - 20-80 °C total impact ±0.2%URL/10k

**Power supply effects**

Zero and span change should not be more than ± 0.005% URL/V

**Loading effects**

Zero and span change should not be more than ± 0.05% URL/kΩ

**Durability performance**

All the measuring range, working life> 10 million pressure circulation@25°C

**Vibration effects**

According to IEC61298-3/GB/T 18271.3 testing 20g (5-2000HZ, Max imum vibration value< 3mm)

**Output signal**

Signal	Type	Output
4-20mA	Linearity	Two wire
4-20mA+HART	Linearity	Two wire
Modbus-RTU/RS485	Linearity	Four wire

**Performance specifications**

**Insulation resistance**

≥20MΩ@, 100VDC

**Damping time**

Total damping time constant: equal to the sum of damping time of amplifier and sensor capsule
Damping time of amplifier : 0-100S adjustable
Diaphragm capsule (isolated diaphragm and silicon oil filling) damping time: ≤0.2S
Startup after power off : ≤6S
Normal services after data recovery : ≤31S

**Weight**

Net weight: about 2.36kg (With 10m cable, without mounting brackets and process connection accessories)

**Environment condition**

Items	Operation condition
Working temperature	-10-70°C
Storage temperature	-30-80°C
Media temperature	-10-70°C
Protection class	IP68
Dangerous condition	ExialICT4(GYB16.1963X)*
*Please consult engineers for details	

**EMC environment**

NO.	Test items	Basic standards	Test conditions	Performance level
1	Radiated interference	GB/T 9254/CISPR22	30MHz-1000MHz	OK
2	Conducted interference (DC power port)	GB/T 9254/CISPR22	0.15MHz-30MHz	OK
3	Electrostatic discharge immunity test (ESD)	GB/T 17626.2/IEC61000-4-2	4kV(Contact), 8kV(Air)	B(Note2)
4	Immunity to radio frequency EM-fields	GB/T 17626.3/IEC61000-4-3	10V/m(80MHz-1GHz)	A(Note1)
5	Power frequency magnetic field Immunity test	GB/T 17626.8/IEC61000-4-8	30A/m	A(Note1)
6	Electrical fast transient / Burst Immunity Test	GB/T 17626.4/IEC61000-4-4	2kV(5/50ns, 100kHz)	B(Note2)
7	Surge immunity requirements	GB/T 17626.5/IEC61000-4-5	1kV(Line to line) 2kV(Line to ground) (1.2us/50us)	B(Note2)
8	Immunity to conducted disturbances induced by radio frequency fields	GB/T 17626.6/IEC61000-4-6	3V(150kHz-80MHz)	A(Note1)

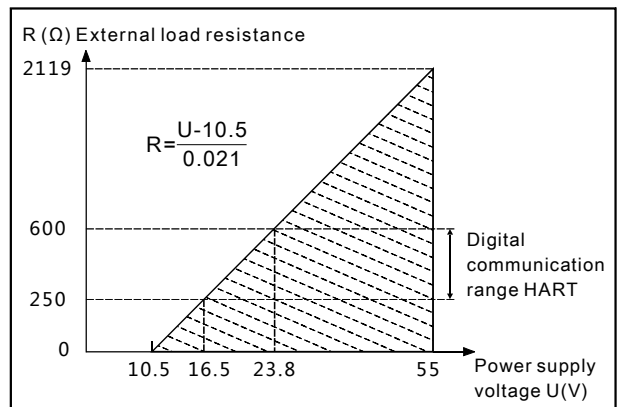
(Note 1) Performance level A: The performance within the limits of normal technical specifications.

(Note 2) Performance level B: Temporary reduction or loss of functionality or performance, it can restore itself. The actual operating conditions, storage and data will not be changed.

**Power supply**

Items	Operating conditions
Standard/flame proof	10.5-55VDC
HART protocol	16.5-55VDC, communication load resistance 250Ω
RS485	5VDC/9-30VDC
Load resistance	0-2119 Ω for working condition, 250-600Ω for HART protocol
Transmission distance	<1000 meters
Power consumption	≤500mW@24VDC, 20.8mA

**Power supply and load requirements**



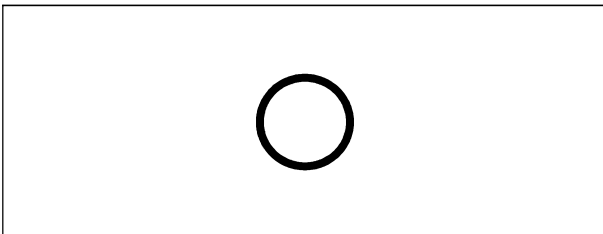
**Product selection instruction**

**Sensor type**

Code	Nominal value	Description
L203G	20kPa	Range 0kPa-20kPa, smallest calibratable span 10kPa
L353G	35kPa	Range 0kPa-35kPa, smallest calibratable span 20kPa
L104G	100kPa	Range 0-100kPa, smallest calibratable span 35kPa
L204G	200kPa	Range 0kPa-200kPa, smallest calibratable span 100kPa
L354G	350kPa	Range 0kPa-350kPa, smallest calibratable span 200kPa
S704G	700kPa	Range 0kPa-700kPa, smallest calibratable span 350kPa
L105G	1MPa	Range 0kPa-1MPa, smallest calibratable span 500kPa
L175G	1.7MPa	Range 0kPa-1.7MPa, smallest calibratable span 1MPa
L355G	3.5MPa	Range 0kPa-2MPa, smallest calibratable span 1.7MPa

Code	Position	Instruction
S	Isolated diaphragm material	SUS316
S	Isolated filling fluid	Silicon oil, process temperature: -45-205°C
S	Sensor seal	O-ring, FKM, process temperature: -20°C-200°C
F		Stainless steel welding seal

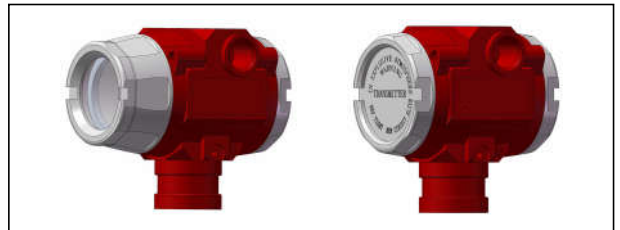
**Sensor seal (S)**



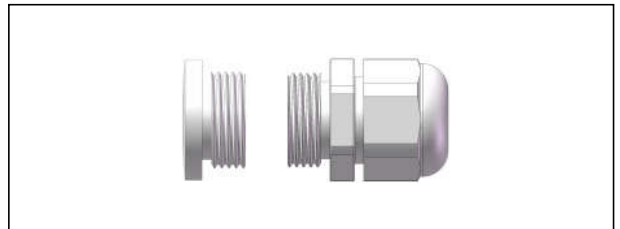
**Probe select instruction**

Code	Item	Description
T1	Electrical connection	Aluminum-alloy terminal, 2 cable entry M20*1.5(F), red body, white cover
R1	Cable entry protector	Waterproof connector M20X1.5 one side, blind plug another side, PVC material, 6-8mm diameter cable only, IP67
R2		Flame proof, 1/2 NPT(F) one side, blind plug another side, stainless steel material, 6-8mm diameter cable only, IP67
R3		Flame proof, M20X1.5(F) one side, blind plug another side, stainless steel material, 6-8mm diameter cable only, IP67

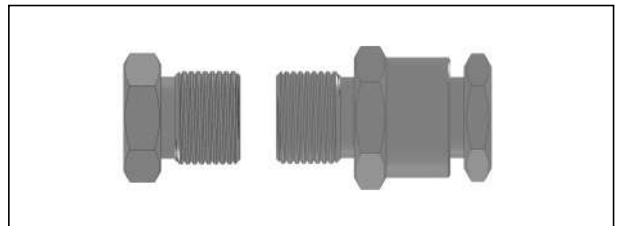
**Housing(T1)**



**Standard cable protection adaptor (R1)**



**Flame-proof cable protection adaptor (R2/R3)**



**Product selection instruction**

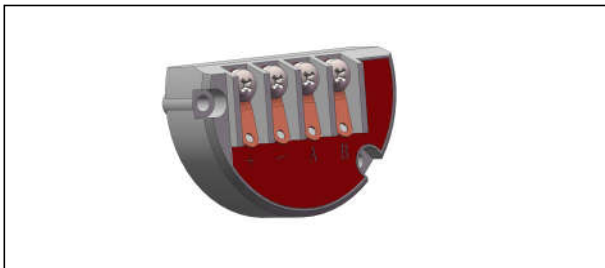
**Transmission module**

Code	Items	Description
F	Output signal	4-20mA two wire, power supply: 10.5-55VDC
H		4-20mA+HART two wire, power supply: 16.5-55VDC
R		Modbus-RTU/RS485 four wire, power supply: 5VDC/9-30VDC
A	Display	Without display
C		With LCD display

**Display module ( C )**



**Signal**



**Cable select instruction**

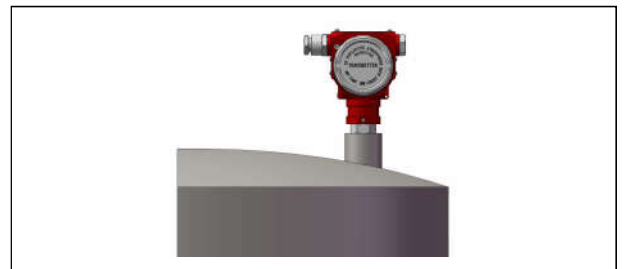
Code	Items	Description
N1	Specification	PUR cable, outer diameter (7.5±0.2)mm
N2		PTFE cable, outer diameter (7.5±0.2)mm
N4*		SUS304, outer diameter 16mm
N6*		SUS316, outer diameter 16mm

\*The stainless steel tube body length> 2m, please consult engineers for details.

**Probe select instruction**

Code	Items	Description
4	Process connection material	Stainless steel, SUS304
6		Stainless steel, SUS316
M05	Specification	Male thread M20*1.5, pylome φ8, fixed outer diameter 8mm cable, GB/T 193-2003, ISO261
M06		Male thread M42*1.5, pylome φ8, fixed outer diameter 8mm cable, GB/T 193-2003, ISO261
H01		HG/T 20592-2009 DN50PN10 flange
H02		HG/T 20592-2009 DN25PN10 flange
R08		Male thread 2"PT, pylome φ8, fixed outer diameter 8mm cable
R09		Male thread 1-1/2"PT, pylome φ8, fixed outer diameter 8mm cable

**Thread connection(M05-M06、 R08-R09)**



**Flange connection(H01-H02)**

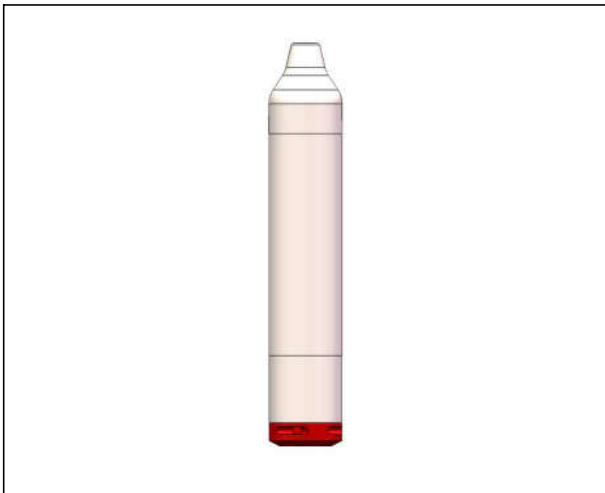


**Product selection instruction**

**Probe select instruction**

Code	Items	Description
4	Material	Stainless steel, SUS304
6		Stainless steel, SUS316
H28	Specification	Submersible probe, outer diameter 28 mm

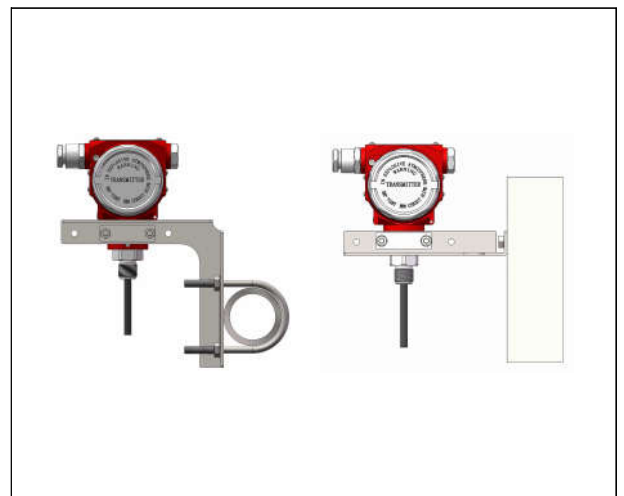
**Probe sketch(H28)**



**Probe select instruction**

Code	Items	Description
B4	Fixed mounting accessory	U-shaped bracket, pipe 2", apply to T-shaped structure

**U-shaped bracket (B4)**

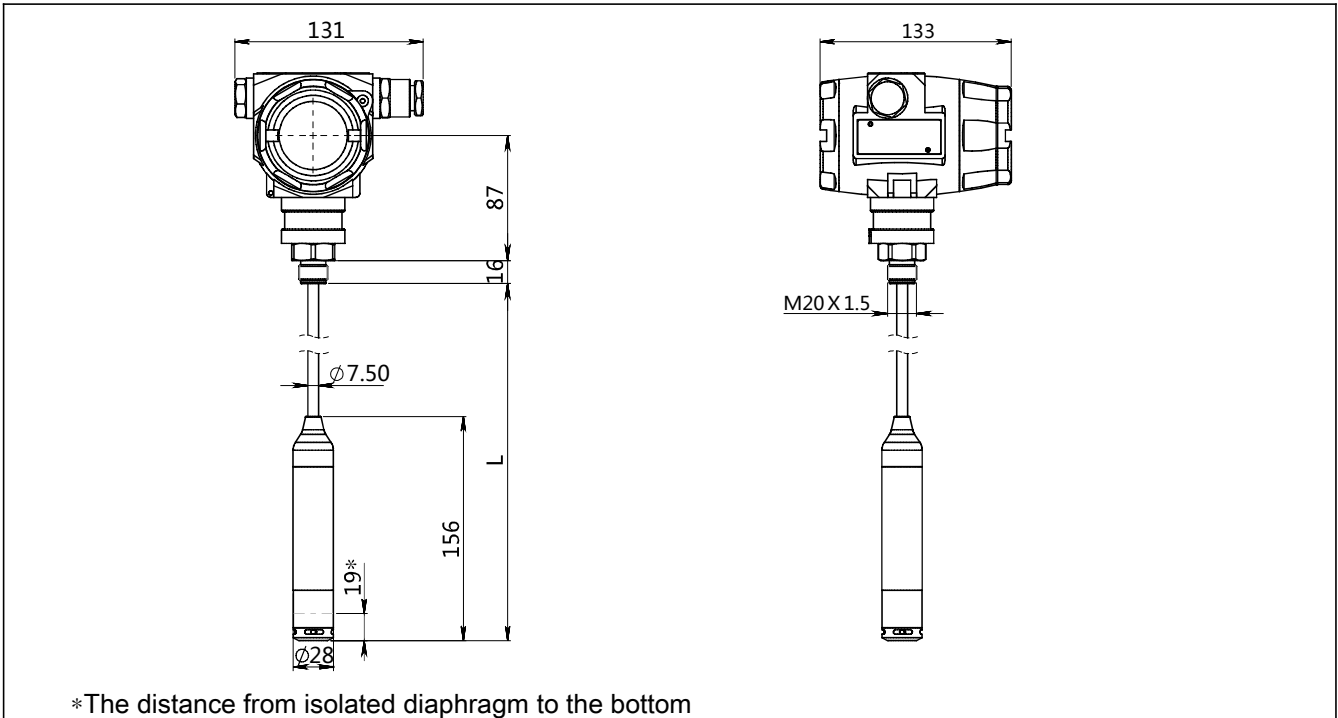


**Fixed mounting accessory select instruction**

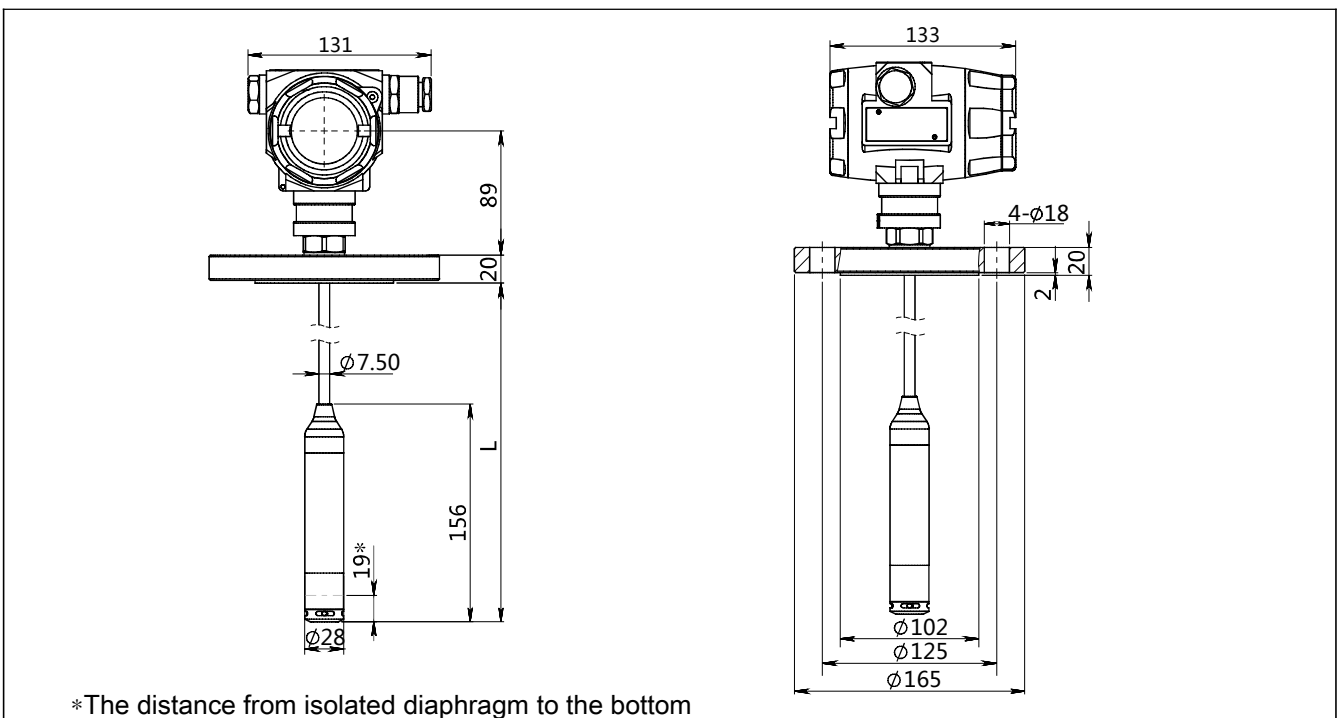
Code	Items	Description
P1	Fixed mounting accessory	Counter weight (to fix products in fast flow rate area/large density medium)

Product drawing and dimension

Thread drawing and dimension with display ( C ) ( unit:mm)



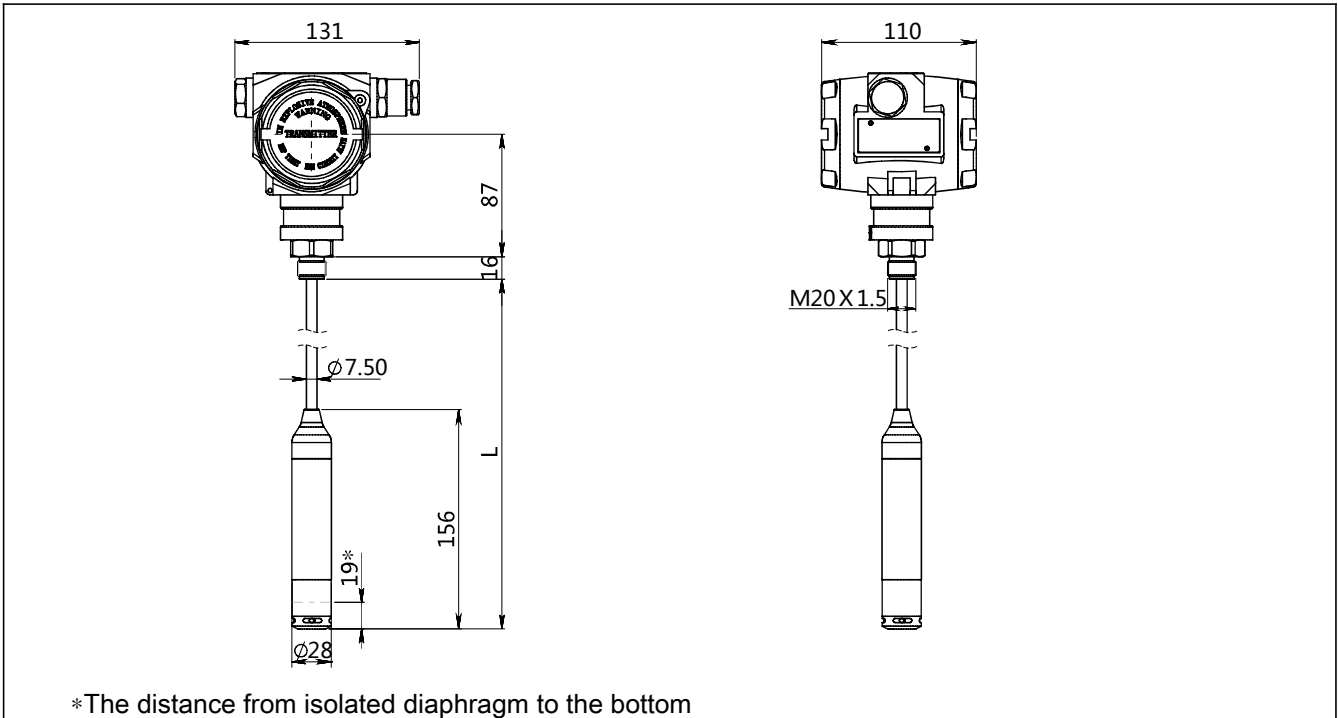
Flange drawing and dimension with display(C)(unit:mm)



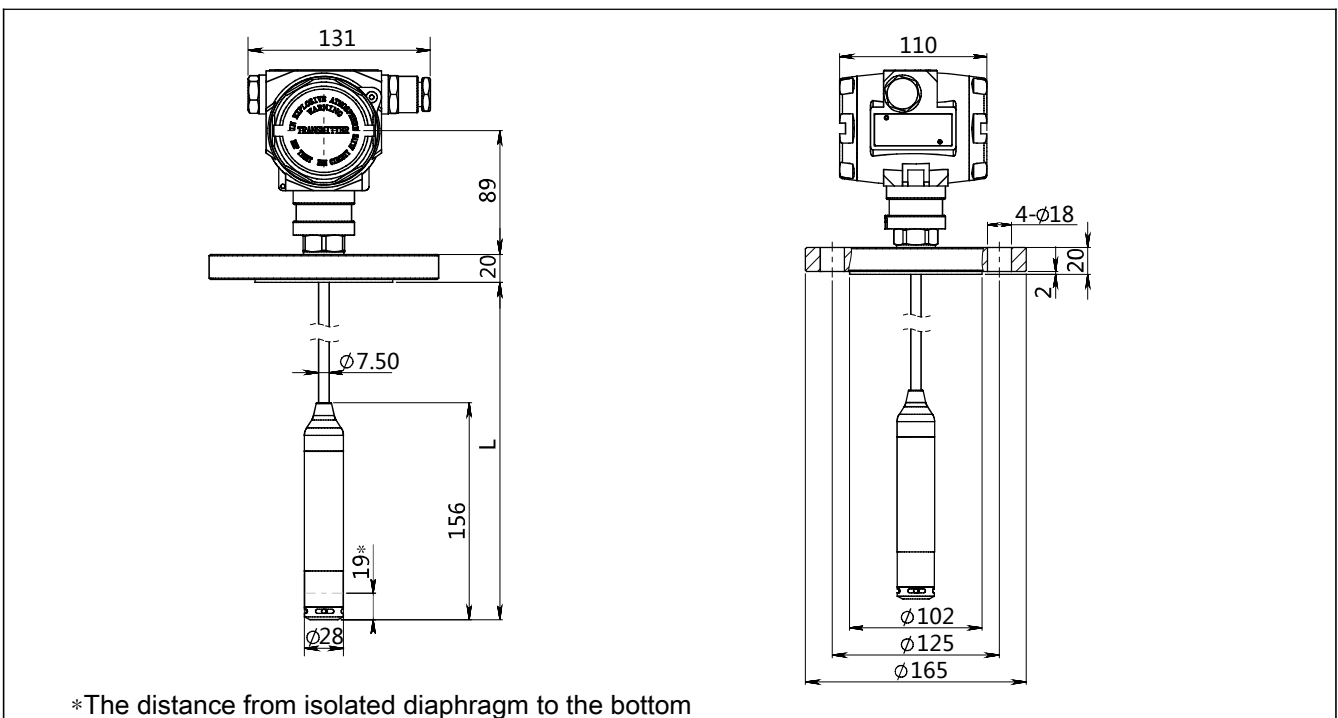
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Product drawing and dimension

Thread drawing and dimension without display( A ) ( unit:mm)



Flange drawing and dimension without display( A ) ( unit:mm)

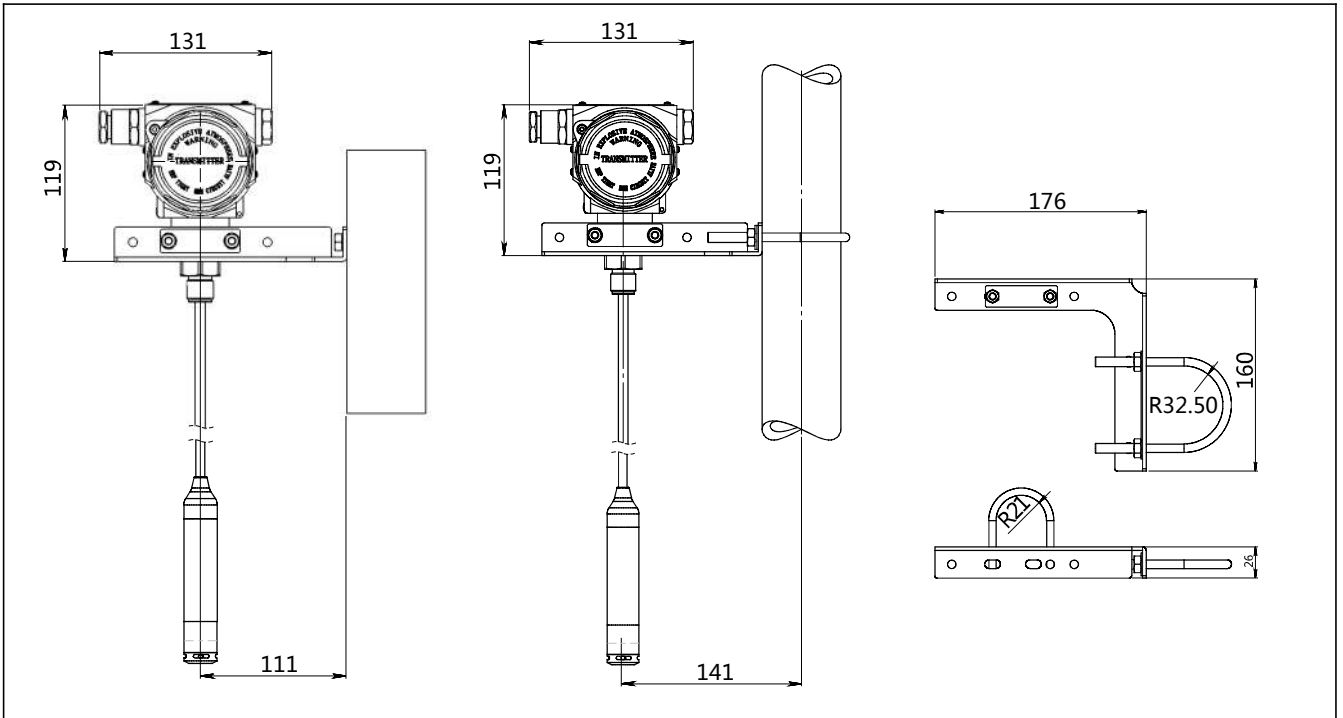


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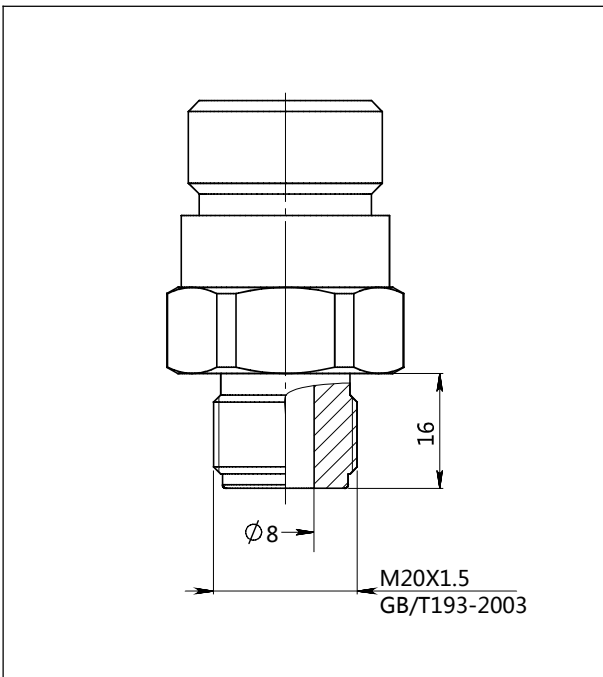


Product drawing and dimension

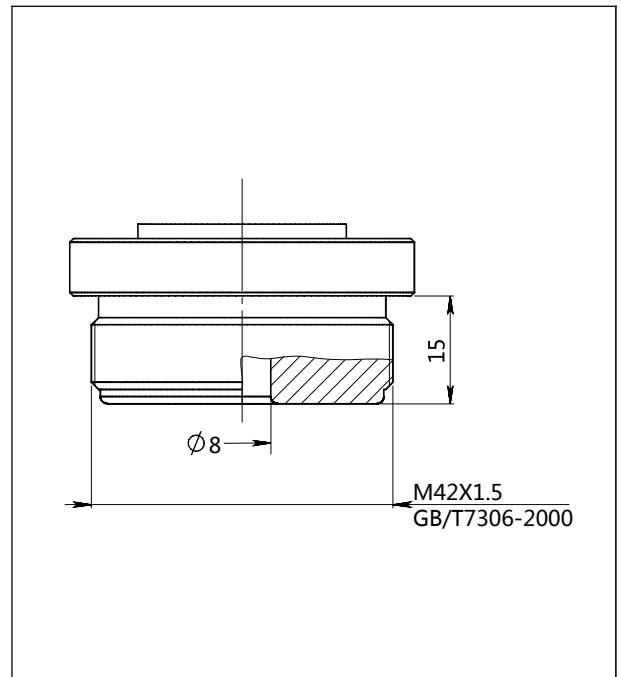
Mounting dimension with U-shaped bracket(B4) (unit:mm)



Process connection (M05) (unit: mm)

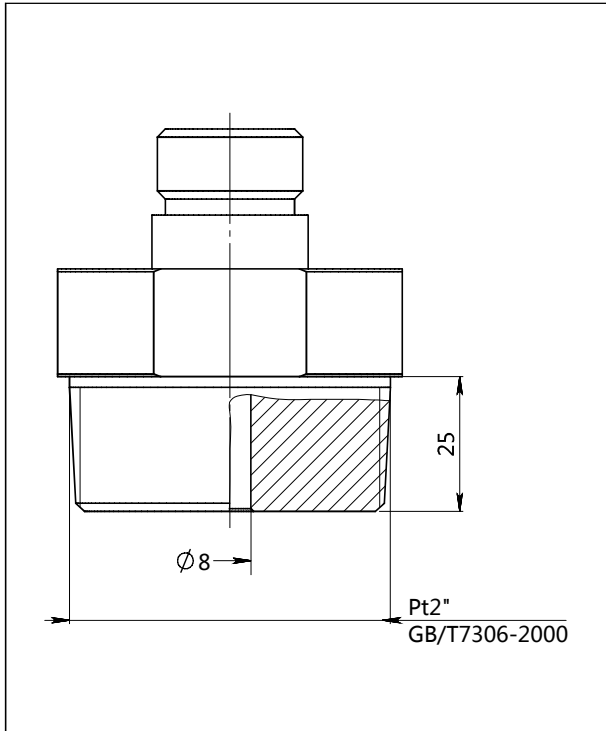


Process connection (M06) (unit: mm)

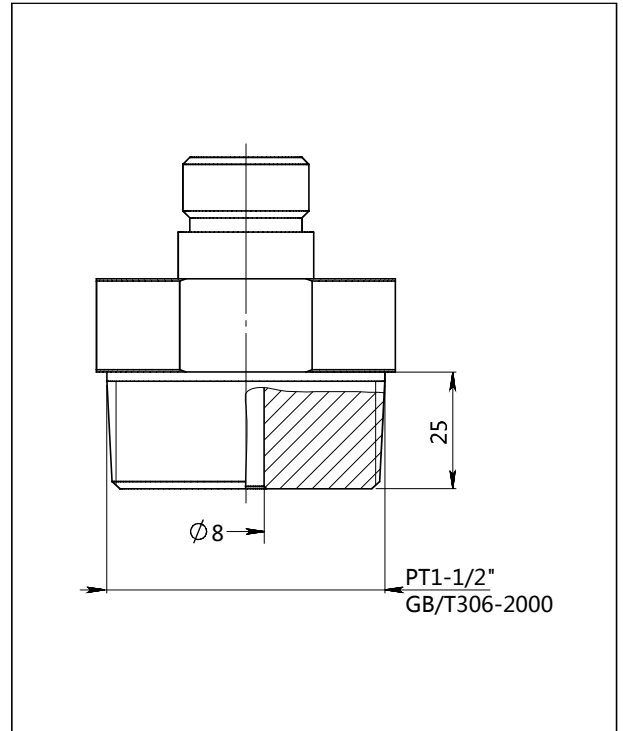


Product drawing and dimension

Process connection (R08) (unit: mm)



Process connection (R09) (unit: mm)



Counter weight(PI) (unit:mm)

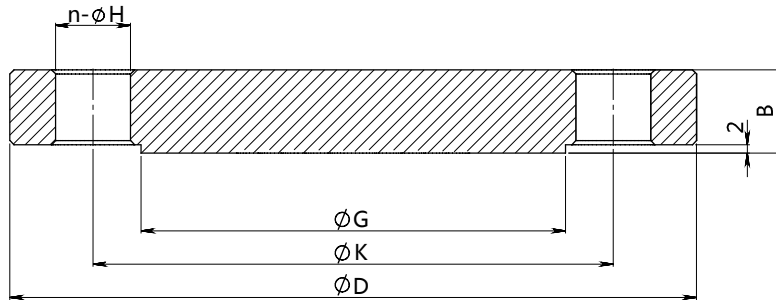
Note: After adding counter weight, the measuring result need to consider the errors of counter weight height and the height from sensing diaphragm to medium bottom

In order to prevent measurement errors caused by sideways movement of product and ensure accuracy, you can add additional counter weights by screwing together and then connecting directly to the product. Each product can be added three counter weights at the most.

Weight: about 500g

Product drawing and dimension

Process connection (H01-H02) (unit: mm)



Standard	Specification	Outer diameter( $\phi D$ )	Thickness(B)
HG/T20592-2009	DN50PN10-PN40	165	20
HG/T20592-2009	DN25PN10-PN40	115	16
Hole circle( $\phi K$ )	Raised-face diameter( $\phi G$ )	Hole diameter( $\phi H$ )	Number(N)
125	102	18	4
85	68	14	4

Ordering information chapter

Item	Parameters	Code	Instruction	(*)fast delivery available
	Model	633PI-BL <del>F</del> -TL	Piezoresistive silicon submersible level transmitter	
Sensor	Separator	-	Detailed specifications as following	
	Pressure range code	L203G	Nominal value(URL): 20kPa	
		L353G	Nominal value(URL): 35kPa	
		L104G	Nominal value(URL): 100kPa	*
		L204G	Nominal value(URL): 200kPa	*
		L354G	Nominal value(URL): 350kPa	*
		L704G	Nominal value(URL): 700kPa	*
		L105G	Nominal value(URL): 1MPa	*
		L175G	Nominal value(URL): 1.7MPa	*
		L355G	Nominal value(URL): 3.5MPa	
	Isolated diaphragm material	S	Stainless steel, SUS316	
Isolated filling fluid	S	Silicon oil, process temperature: -45-205°C		
Sensor seal	S	O-ring, FKM, process temperature: -20°C-200°C	*	
	F	Stainless steel welding seal		
Electrical connection	Separator	-	Detailed specifications as following	
	Electrical connection	T1	Aluminum-alloy terminal, 2 cable entry M20*1.5(F), red body, white cover	
	Cable entry protector	R1	Waterproof connector M20X1.5 one side , blind plug another side, PVC material, 6-8mm diameter cable only, IP67	
		R2	Flame proof, 1/2 NPT(F) one side, blind plug another side, stainless steel material, 6-8mm diameter cable only, IP67	*
		R3	Flame proof, M20X1.5(F) one side, blind plug another side, stainless steel material, 6-8mm diameter cable only, IP67	
Output	Separator	-	Detailed specifications as following	
	Output signal	F	4-20mA two wire, power supply: 10.5-55VDC	*
		H	4-20mA+HART two wire, power supply: 16.5-55VDC	*
		R	Modbus-RTU/RS485 four wire, power supply: 5VDC/9-30VDC	
		G	Modbus-RTU/RS485 four wire (with pressure and temperature signal), power supply: 5VDC/9-30VDC	
	Display	A	Without display	
		C	With LCD display	*
Process connection	Separator	-	Detailed specifications as following	
	Process connection material	4	Stainless steel, SUS304	*
		6	Stainless steel, SUS316	
	Specification	M06	Male thread M42*1.5, pylome $\varnothing$ 8, fixed outer diameter 8mm cable, GB/T193-2003, ISO2612003	*

Ordering information chapter

		H01	HG/T 20592-2009 DN50PN10 flange	
		H02	HG/T 20592-2009 DN25PN10 flange	
		R08	Male thread 2"PT, pylome $\phi 8$ , fixed outer diameter 8mm cable GB/T7306-2000	
		R09	Male thread 1-1/2"PT, pylome $\phi 8$ , fixed outer diameter 8mm cable GB/T7306-2000	
Probe	Separator	-	Detailed specifications as following	
	Material	4	Stainless steel, SUS304	*
		6	Stainless steel, SUS316	*
	Specification	H28	Submersible probe, outer diameter 28 mm	*
Cable	Separator	-	Detailed specifications as following	
	Specification	N1	PUR cable, outer diameter(7.5 $\pm$ 0.2)mm	*
		N2	PTFE cable, outer diameter(7.5 $\pm$ 0.2)mm	*
		N4	SUS304, outer diameter 16mm	
		N6	SUS316, outer diameter 16mm	
	Cable length	Ln	0 $\geq$ n $\leq$ 200, Eg. 5 m=L5, 10m = L10, 100m=L100. Allowed error range: 0-0.2m.	
Additional options	Separator	-	Detailed specifications as following	
	Fixed mounting accessory	/P1	Counter weight(to fix products in fast flow rate area/large density medium)	
	Calibration report	/Q1	Calibration report provided by our company	*
	Approvals (multiple)	/I1	Intrinsic safety certificate, ExialICT4, NEPSI	
		/F3	CE certificate	
	Wetted parts treatment	/G1	Ungrease treatment	
		/G2	Electropolishing treatment	

Approvals

Factory certificate

Certification organization	Intertek
Quality management system	ISO9001-2008
Scope of certification	Design and production of pressure transmitter
Registration number	110804039

CE

Certificate organization	ISET
License scope	633PI-BLT series submersible level transmitter
Mark	CE
EMC instruction	2014/30/EU
Standard	EN61326-1: 2013
Registration number	IT021353LG161207

Intrinsic safety certificate

Certification organization name	NEPSI
Licenses range	633PI-BLT series submersible level transmitter
Explosion-proof mark	ExiaIICT4
Ambient temperature	-40-+60°C
Medium maximum temperature	+120°C
Registration number	GYB16.1963X
Intrinsically safe parameter description	Maximum input voltage:28VDC
	Maximum input current:100mA
	Maximum input power:0.7w
	Maximum internal equivalent parametersCi(uF): 0
	Maximum internal equivalent parametersLi(mH): 0.01

## Level Measurement Expert

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