Product introduction

Description

Submersible Level Transmitter

633PI-TCB 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-TCB Submersible level transmitter is the optimal choice to satisfy all of high demand level measuring applications.

Main parameters

Pressure types	Gauge pressure
Measuring range	1mH2O-200mH2O, please refer to the ordering information chapter
Output signal	4-20mA, 4-20mA+HART, Modbus-RTU/RS485, customer
Reference accuracy	±0.5% URL, optional ±0.2% URL

Field of application

Pressure, level

Approvals

CE MC Ex VEPSU

Measuring medium

Liquid, gas, or steam level, density and pressure

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	600kPa
40kPa	20kPa	0kPa	40kPa	600kPa
100kPa	40kPa	0kPa	100kPa	1MPa
200kPa	100kPa	0kPa	200kPa	1.8MPa
400kPa	200kPa	0kPa	400kPa	2.5MPa
1MPa	400kPa	0kPa	1MPa	4MPa
2MPa	1MPa	0kPa	2MPa	4MPa
The unit of the measuring range above can be converted into mH2O@4℃, mmH2O@4℃, inH2O@4℃ , m, mm and mHg@0℃. Please provide the density of measuring medium if the unit is m, mm. Other measuring range is available according to requirements.				

Standard specifications and reference conditions

Test standard: GB/T28474 / IEC60770; Zero based-calibration span, Linear output.

Performance specifications

The overall performance including but not limited to 【reference accuracy】, 【environment temperature effects】and other comprehensive error
Typical accuracy: ±0.2%URL (with HART protocol: ±0.1%URL)
Stability: ±0.2% URL/ year

Reference accuracy

Including linearity, hysteresis and repeatability. calibration temperature: 20 ℃ ± 5 ℃			
Linear output accuracy	Typical	±0.2%URL (with HART protocol: ±0.1%URL)	Nominal value: 20kPa、40kPa 100kPa、200kPa 400kPa、1MPa 2MPa
	Max/ Voltage output	±0.5% URL	

Ambient temperature effects

Within the range - 20-80 ℃ 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℃

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 amplifer and sensor capsule
Damping time of amplifer : 0-100S adjustable
Reaction time of the sensor: ≤ 1ms
Startup after power off : ≤6S
Normal services after data recovery : ≤31S

Weight

Net weight: about 2.36kg (without mounting brackets、process connection accessories with 10m cable)

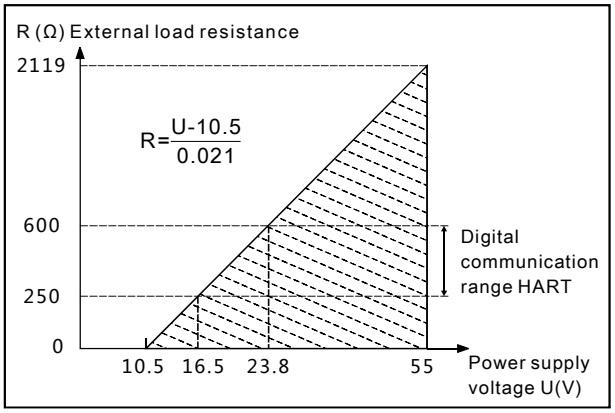
Environment condition

Items	Operation condition
Working temperature	-10-70℃
Storage temperature	-30-80℃
Media temperature	-10-70℃
Protection class	IP68

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



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 preformance within the limits of normal technical specifications.
(Note 2)Performance level B: Temporary reduction or loss of functionality or preformance, it can restore itself. The actual operating conditions, storage and data will not be changed.

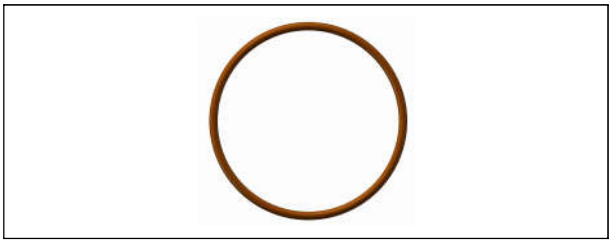
Product selection instruction

Sensor type

Code	Nominal value	Description
C203G	20kPa	Range 0kPa-20kPa, smallest calibratable span 10kPa
C403G	40kPa	Range 0kPa-40kPa, smallest calibratable span 20kPa
C104G	100kPa	Range 0kPa-100kPa, smallest calibratable span 40kPa
C204G	200kPa	Range 0kPa-200kPa, smallest calibratable span 100kPa
C404G	400kPa	Range 0kPa-400kPa, smallest calibratable span 200kPa
C105G	1MPa	Range 0kPa-1MPa, smallest calibratable span 400kPa
C205G	2MPa	Range 0kPa-2MPa, smallest calibratable span 1MPa
Adjust requirements: lower range value (LRV) and upper range value (URV) can be adjusted within the scope of the upper and lower range limit, minimum measuring range≤| URV - LRV |≤maximum measuring range		

Code	Position	Instruction
C	Diaphragm material	Ceramic (AL2O3, content 99.9%)
N	Isolated filling fluid	None
S	Sensor seal	O-ring, FKM (temperature range: -20-200℃)

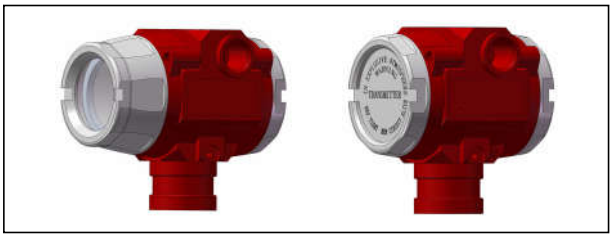
Sensor seal (S)



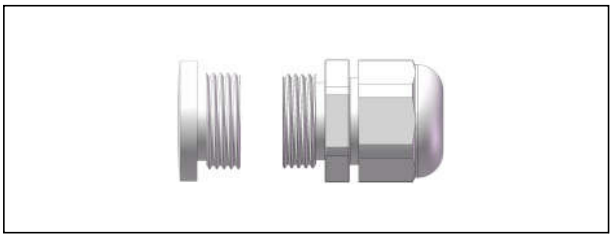
Probe select instruction

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

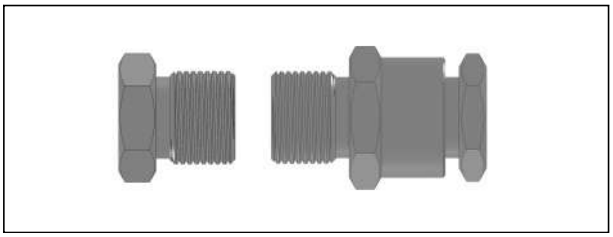
Housing(T1)



Standard cable protection adaptor (R1)



Flame-proof cable protection adaptor (R2/R3)



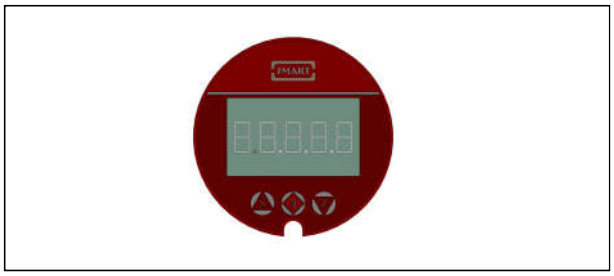
Disclaimer: all the data used in the product description is not legally binding. Relevant technical details may be changed due to further improve

Product selection instruction

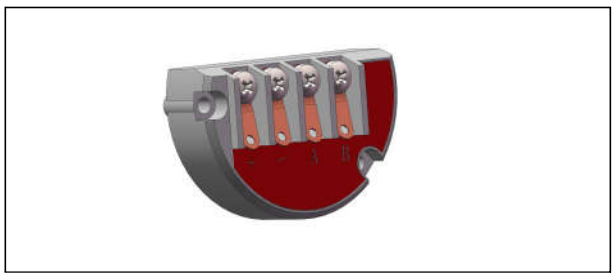
Transmission module

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
*Please consult the engineers if the stainless steel tube body length is longer than 2m.		

Probe select instruction

Code	Items	Description
4	Process connector material	Stainless steel, SUS304
6		Stainless steel, SUS316
M06	Specification	Male thread M42*1.5, pylome φ8, fixed outer diameter 8mm cable, GB/T193-2003, 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(M06、 R08-R09)

Flange connection(H01-H02)

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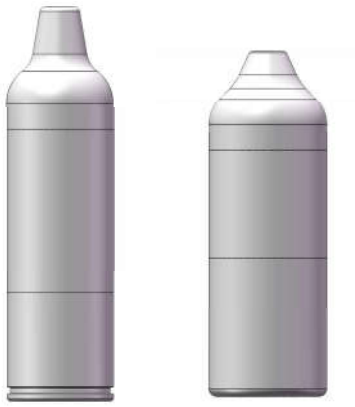
Product selection instruction

Probe select instruction

Code	Items	Description
2	Material	PP(maximum measuring range 2MPa)
5		PVDF(maximum measuring range 2MPa)
6		SUS316(maximum measuring range 2MPa)
H39	Specification	Submersible probe outer diameter 39mm(only suitable for SUS316)
H46		Submersible probe outer diameter 46mm(only suitable for PP, PVDF)

Probe sketch(H39,H46)



H39 H46

Probe select instruction

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

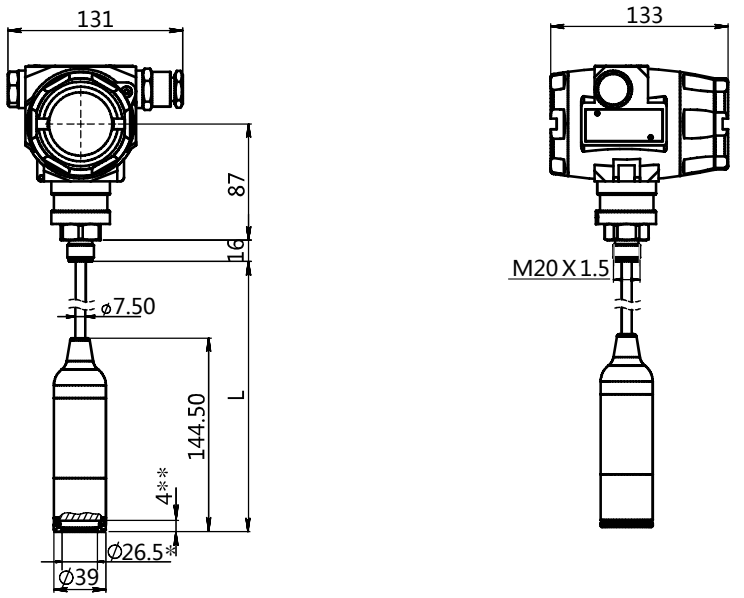
U-shaped braket (B4)

Fixed mounting accessory select instruction

Code	Items	Description
P5/P6	Fixed mounting accessory	Counter weight(to fix products in fast flow rate area/large density medium)

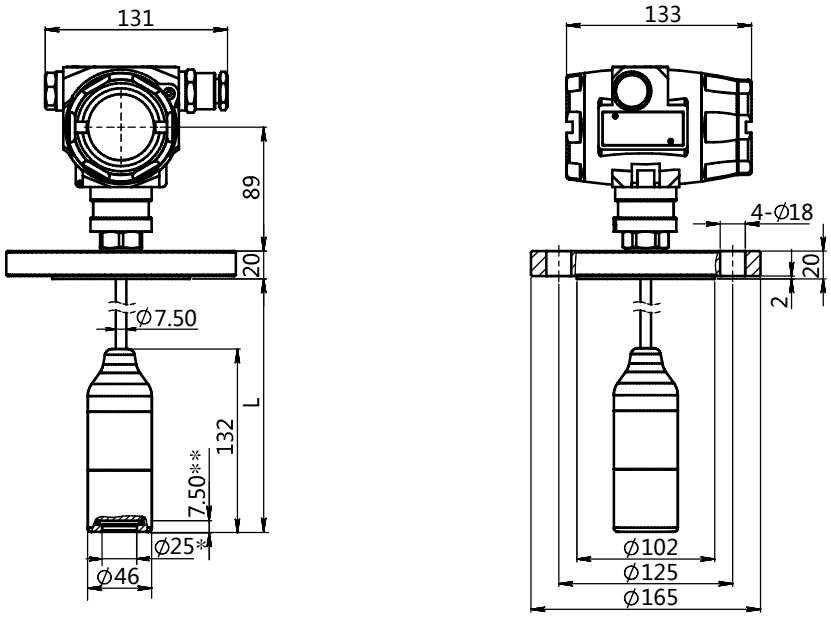
Product drawing and dimension

Standard thread installation drawing and dimension with display(C) (unit:mm)



*Diameter of diaphragm
**Distance from sensing diaphragm to the bottom

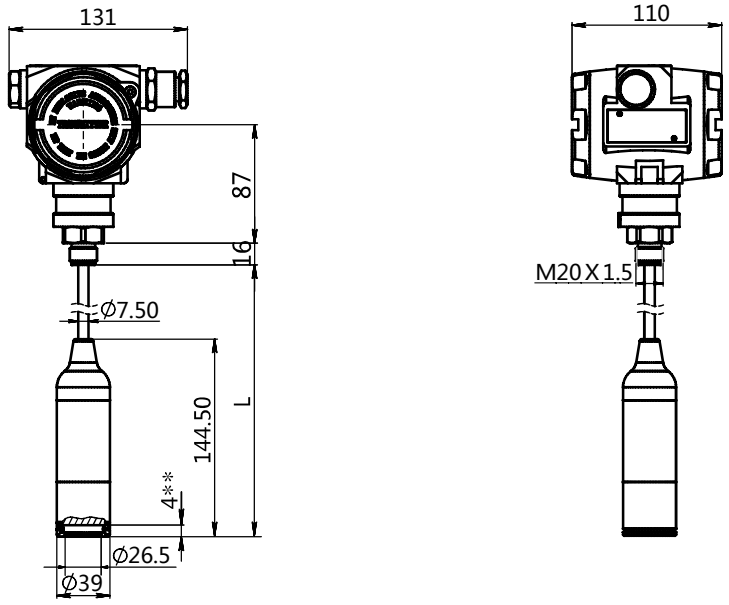
Anti-corrosive flange installation drawing and dimension with display(C) (unit:mm)



*Diameter of diaphragm
**Distance from sensing diaphragm to the bottom

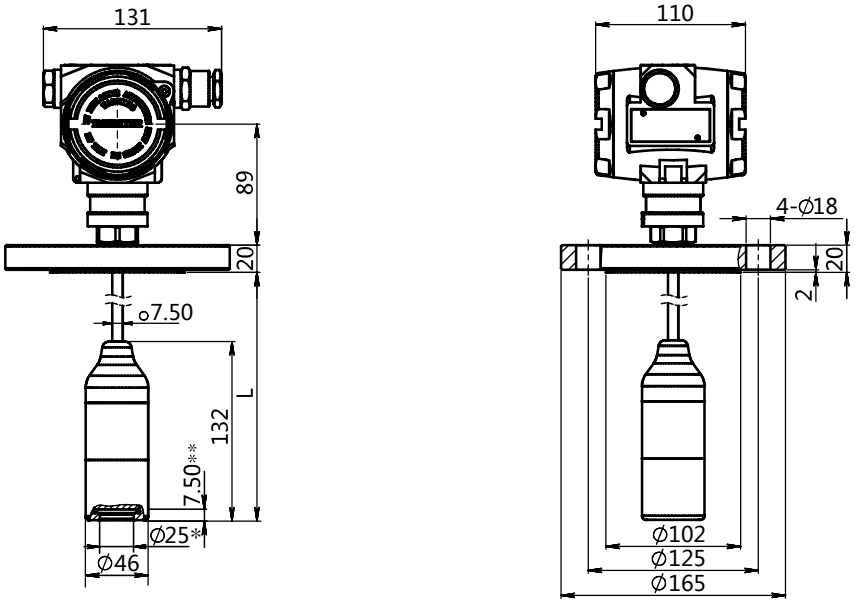
Product drawing and dimension

Standard thread installation drawing and dimension without display(A) (unit:mm)



*Diameter of diaphragm
**Distance from sensing diaphragm to the bottom

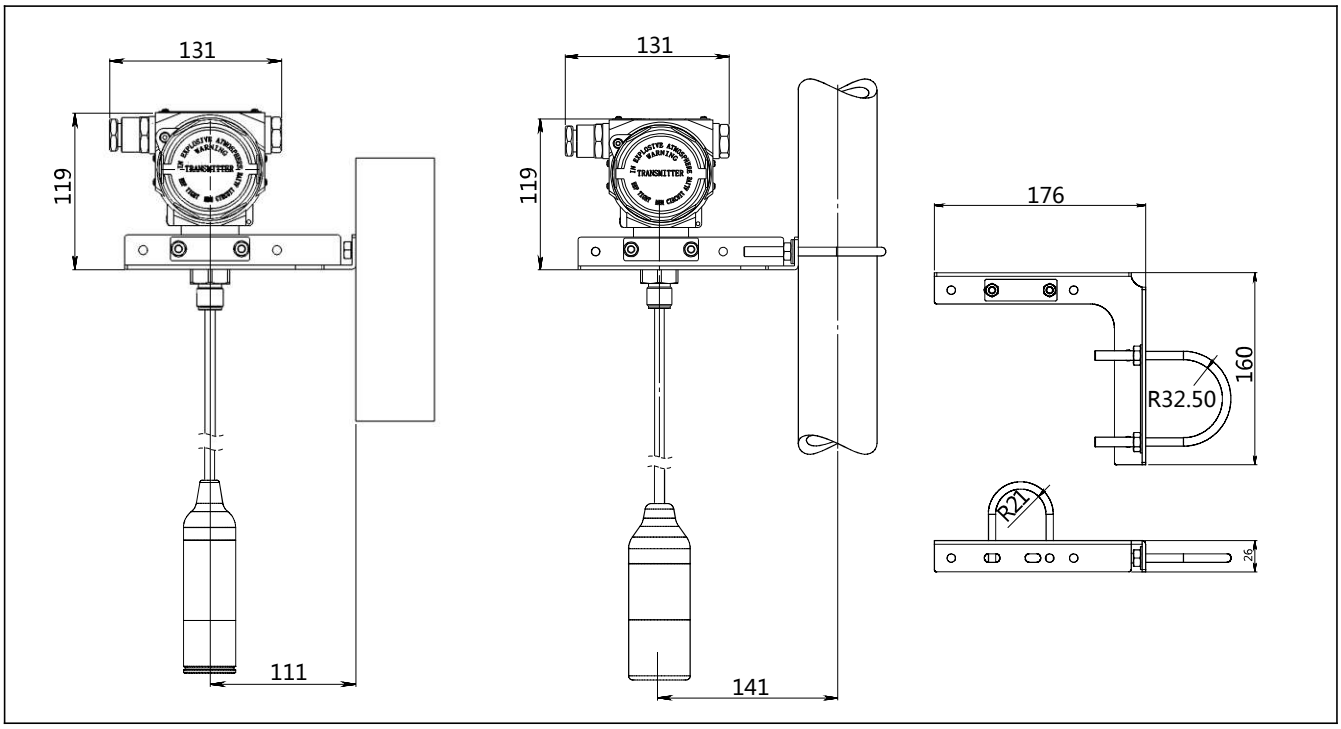
Anti-corrosive flange installation drawing and dimension without display(A) (unit:mm)



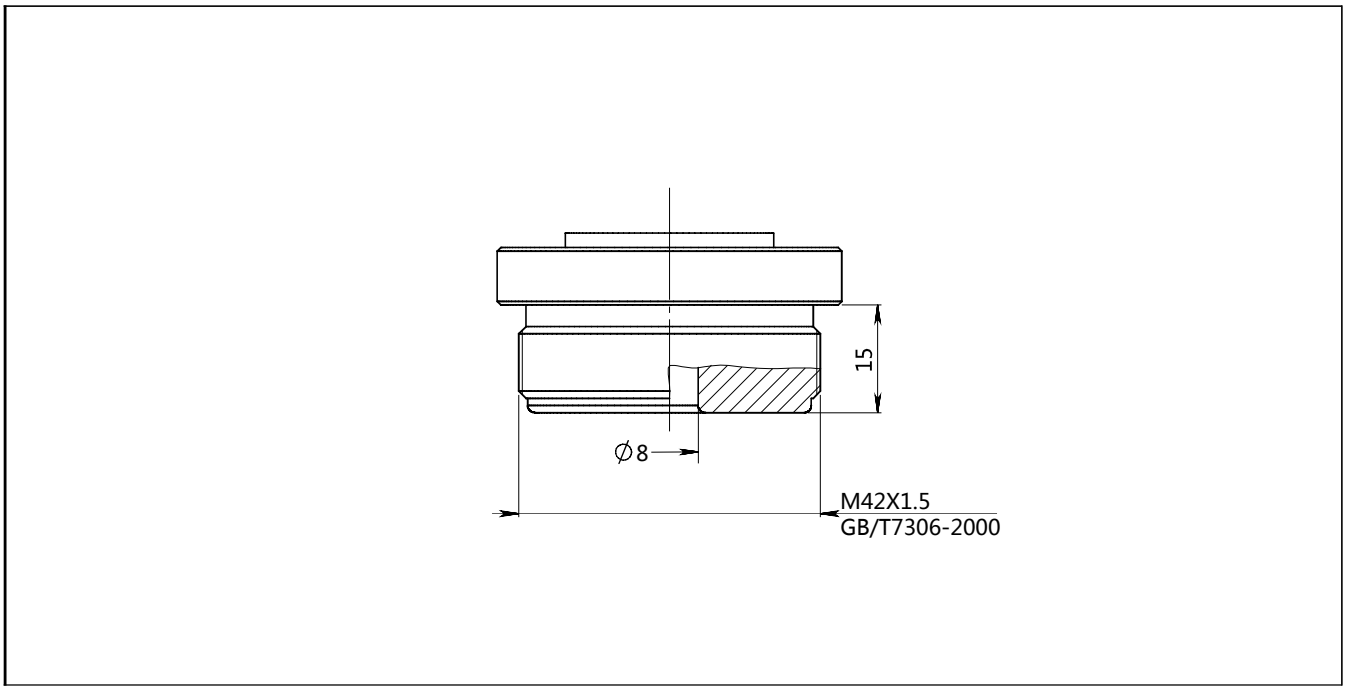
*Diameter of diaphragm
**Distance from sensing diaphragm to the bottom

Product drawing and dimension

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

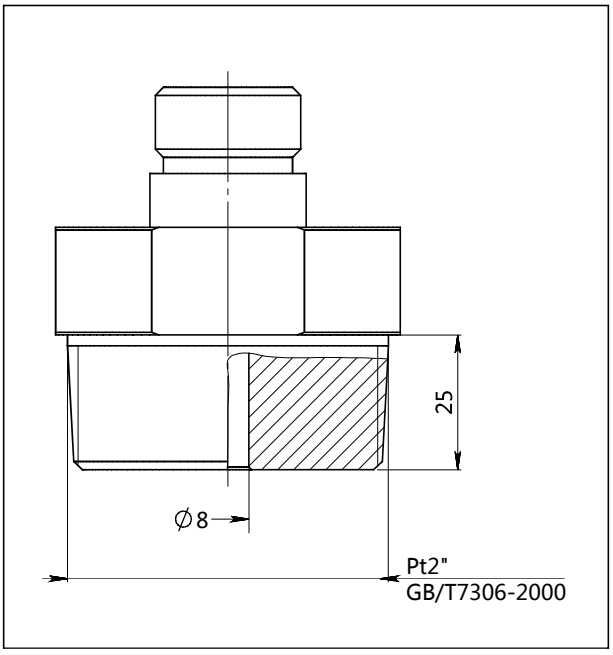


Process connection (M06) (unit: mm)

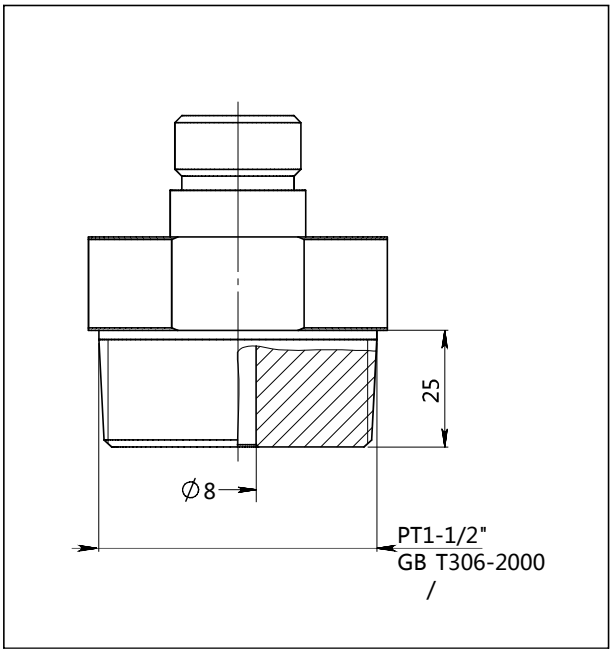


Product drawing and dimension

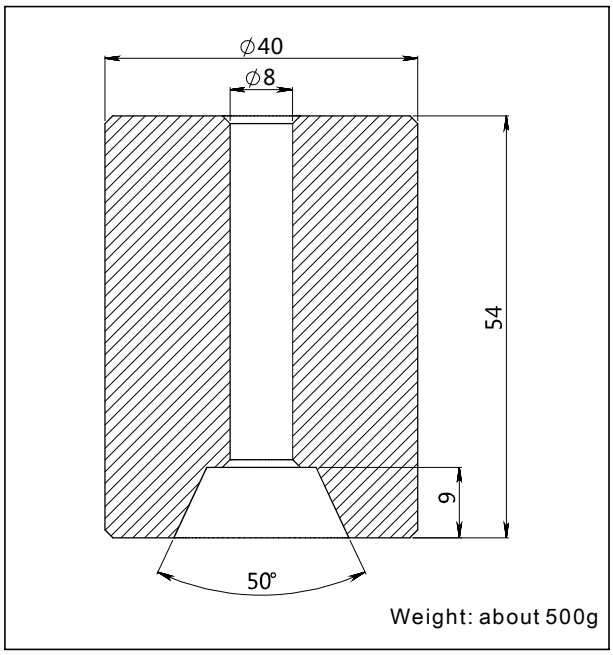
Process connection (R08) (unit: mm)



Process connection (R09) (unit: mm)

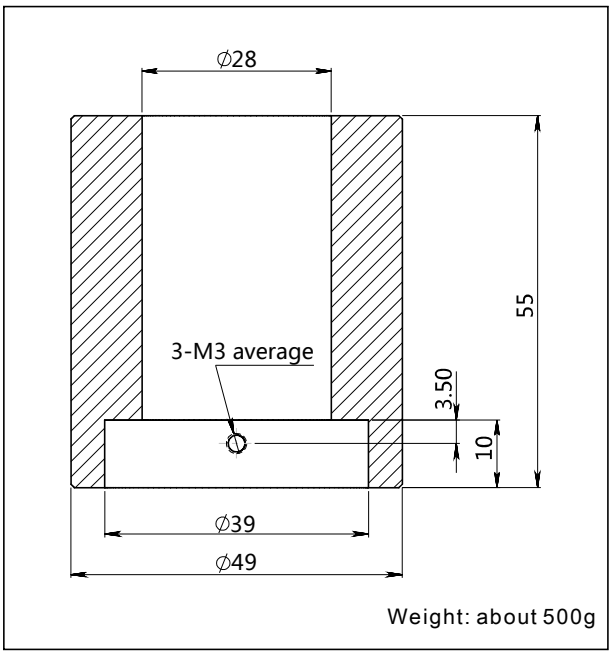


Counter weight (P5) (unit: mm)



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.

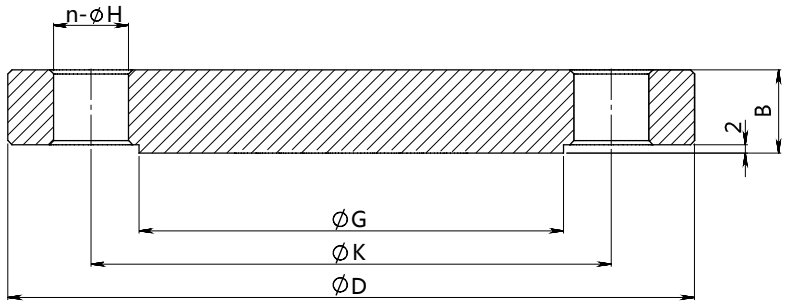
Counter weight (P6) (unit: mm)



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.

Product drawing and dimension

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



Standard	Specification	Outer diameter(ΦD)	Thickness(B)
HG/T20592-2009	DN50PN10-PN40	165	20
HG/T20592-2009	DN25PN10-PN40	115	16
Hole circle(ΦK)	Raised-face diameter(ΦG)	Hole diameter(ΦH)	Number(N)
125	102	18	4
85	68	14	4

Ordering information chapter

Item	Parameters	Code	Instruction	(*)fast delivery available
	Model	633PI-TCB	Capacitive ceramic submersible gauge pressure transmitter	
Sensor	Separator	-	Detailed specifications as following	
	Pressure range code	C203G	Nominal value(URL): 20kPa	
		C403G	Nominal value(URL): 40kPa	
		C104G	Nominal value(URL): 100kPa	*
		C204G	Nominal value(URL): 200kPa	*
		C404G	Nominal value(URL): 400kPa	*
		C105G	Nominal value(URL): 1MPa	*
		C205G	Nominal value(URL): 2MPa	*
	Diaphragm material	C	Ceramic (AL2O3, content 99.9%)	*
	Filling fluid	N	None	*
	Sensor seal	S	O-ring, FKM (temperature range: -20-200℃)	*
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 connector material	4	Stainless steel, SUS304	*
		6	Stainless steel, SUS316	
	Specification	M06	M42*1.5 male thread, pylome φ8, fixed outer diameter 8mm cable, GB/T193-2003, ISO261	*
		H01	HG/T 20592-2009 DN50PN10 flange	
		H02	HG/T 20592-2009 DN25PN10 flange	

Ordering information chapter

		R08	2"PT male thread, pylome φ8, fixed outer diameter 8mm cable	
		R09	1-1/2"PT male thread, pylome φ8, fixed outer diameter 8mm cable	
Probe	Separator	-	Detailed specifications as following	
	Material	2	PP(maximum measuring range 2MPa)	
		5	PVDF(maximum measuring range 2MPa)	*
		6	SUS316(maximum measuring range 2MPa)	*
	Specification	H39	Submersible probe outer diameter 39mm(only suitable for SUS316)	*
		H46	Submersible probe outer diameter 46mm(only suitable for PP, PVDF)	*
Cable	Separator	-	Detailed specifications as following	
	Specification	N1	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	
	Cable length	Ln	0 ≥ n ≤ 200, Eg.4.5 m=L4.5, 10m = L10,100m=L100, allowed error range: 0-0.2m.	*
Additional options	Separator	-	Detailed specifications as following	
	Fixed mounting accessory	/P5	Counter weight(to fix products in fast flow rate area/large density medium)	
		/P6	Counter weight(to fix products in fast flow rate area/large density medium)	
	Calibration report	/Q1	Calibration report provided by our company	*
	Approvals	/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	LMP633 submersible pressure transmitter
Mark	CE
EMC instruction	2014/30/EU
Standard	EN61326-1: 2013
Registration number	IT021353LG161207

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