

Product introduction



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 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.TH-1203 Submersible level transmitter is the optimal choice to satisfy all of high demand level measuring applications.

Description

Main parameters

| | |
|--------------------|---|
| Pressure types | Gauge pressure |
| Measuring range | 1mH ₂ O - 200mH ₂ O. Please refer to the ordering information chapter |
| Output signal | 4-20mA,4-20mA+HART,0.5-4.5VDC Modbus-RTU/RS485, others |
| Reference accuracy | ±0.2% URL, ±0.5% URL |

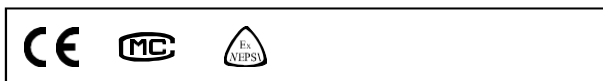
Measuring medium

Water, waste water, oil

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 |

*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 mH₂O@4°C)

The unit of the measuring range above can be converted into mH₂O@4°C, mmH₂O@4°C, inH₂O@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.

Standard specifications and reference conditions

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

Performance specifications

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

Typical accuracy: ±0.2URL (HART output accuracy: ±0.1URL)

Stability: ±0.2% URL/ year

Reference accuracy

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

| Linear output accuracy | Typical | ±0.2%URL (HART output accuracy: ±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 |
| 0.5-4.5VDC | Linearity | Three 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

Startup after power off : ≤3S (HART output time: ≤ 6S)

Normal services after data recovery : ≤4S (HART output time≤31S)

Environment condition

| Items | Operational condition |
|-------------------------|-------------------------|
| Working temperature | -10-70°C |
| Storage temperature | -30-80°C |
| Media temperature | -10-70°C |
| Protection class | IP 68 |
| Dangerous condition | ExiaIICT4(GYB13.1139X)* |
| *Only for 4-20mA output | |

Technical Specifications

| | | | | | |
|-----------------------|-----------------------------|--------------------|---------------------------------|---------------------------------|----------------------------|
| Signal output | 4-20mA | 4-20mA+HART* | 0.5-4.5VDC | 0.5-4.5VDC(proportional output) | RS485 |
| Power supply | 10-30VDC | 10.5/16.5-55VDC | 6-30VDC | 5VDC | 5VDC/9-30VDC |
| Allowed current | ≤20.8mA | | ≤3.5mA | | ≤7mA |
| Load resistance(Ω) | <(U-10)/0.0208 | <(U-10.5)/0.0208** | ≥5k, recommend 100k | | / |
| Transmission distance | <1000m | | <5m | | <1200m |
| Power consumption | ≤500mW(20.8mA output@24VDC) | | ≤17.5mW(0.5-4.5VDC output@5VDC) | | ≤168mW(RS485 output@24VDC) |

*For this output type, the load resistance value in communication is 250Ω

**The load resistance value 0-2119Ω is in nominal working condition, 250-600Ω is for HART communication

EMC environment(except for RS485 signal output)

| 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.

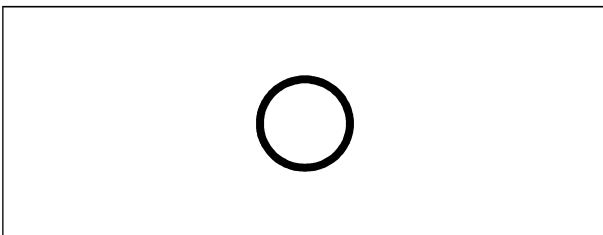
Product selection instruction

Sensor select instruction

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

| Code | Parts | Description |
|------|-------------|--|
| S | Sensor seal | O-ring, FKM (Operating temperature range: -20°C-200°C) |
| F | | Stainless steel welding |

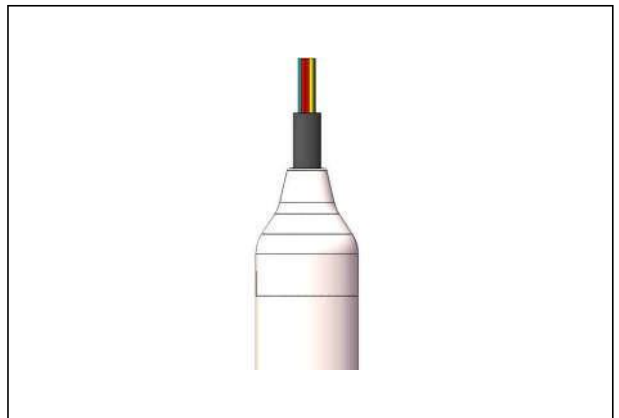
Seal (S)



Electrical connection

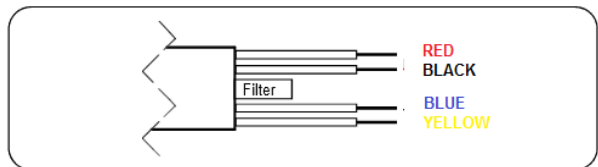
| Code | Item | Description |
|------|-----------------------|-------------------------------------|
| N1 | Electrical connection | Diameter of PUR cable: (7.5±0.2)mm |
| N2 | | Diameter of PTFE cable: (7.5±0.2)mm |

Cable(N1/N2)



Electrical connection

Cable output



| Label | Two wires | Three wires | Four wires | Modbus-RTU/RS485 |
|--------|-----------|-------------|------------|------------------|
| Red | Power+ | Power+ | Power+ | Power+ |
| Black | Power- | Power- | Power- | Power- |
| Blue | | Signal+ | Signal+ | A+ |
| Yellow | | | Signal- | B- |

⚠ The reference pressure of the gauge pressure transmitter is current atmospheric pressure.

Please operate with care, prevent the filter dropping off and keep it dry

Product selection instruction

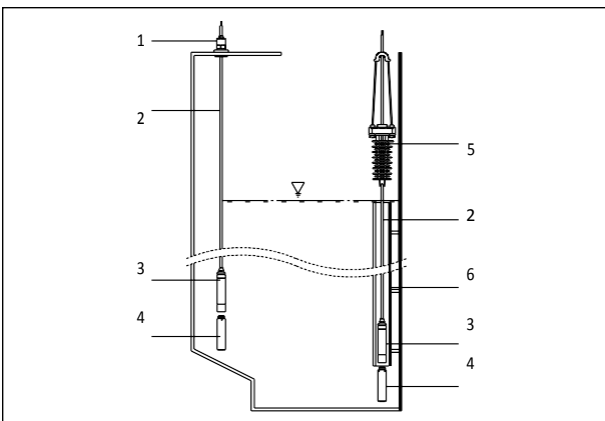
Transmission module

| Code | Description |
|------|--|
| F | 4-20mA two wire, power supply: 10-30VDC |
| H | 4-20mA+HART two wire, power supply: 16.5-55VDC |
| 5 | 0.5-4.5VDC three wire, power supply: 6-30VDC |
| 6 | 0.5-4.5VDC ratiometric output three wire, power supply: 5VDC |
| R | Modbus-RTU/RS485, four wire, power supply: 5VDC/9-30VDC |

Fixed mounting accessory

| Code | Items | Details |
|------|----------------|---|
| P1 | Fixed mounting | Counter weight (To fix products in some areas of fast flow rate or medium with large density) |
| P2 | | Cable clamp (To fix and support the product) |
| P3 | | Threaded connection (To fix the top and support the product) |
| P4 | | Threaded connection (To fix the bottom and support the product) |

Counter weight(P1), Cable clamp(P2), Thread connection(P3)



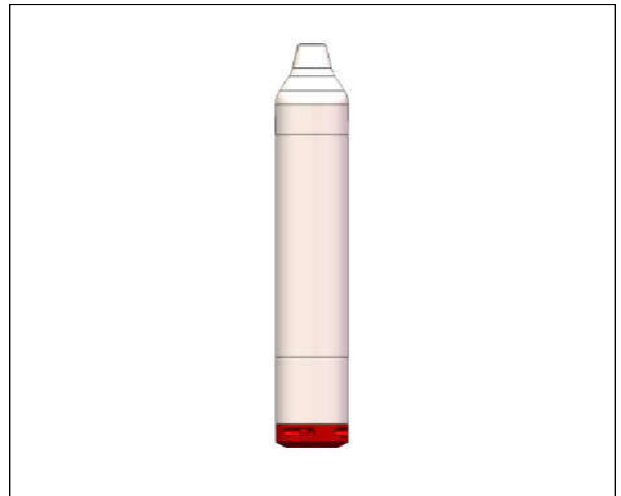
- | | |
|--------------------------|----------------------|
| 1. thread connection(P3) | Counter weight(P1)* |
| 2. Cable | 4. Cable clamp(P2) |
| 3. Level transmitter | 5. Protective sleeve |

*The measurement results should consider the height error of counter weight and sensing diaphragm to the bottom of measured medium

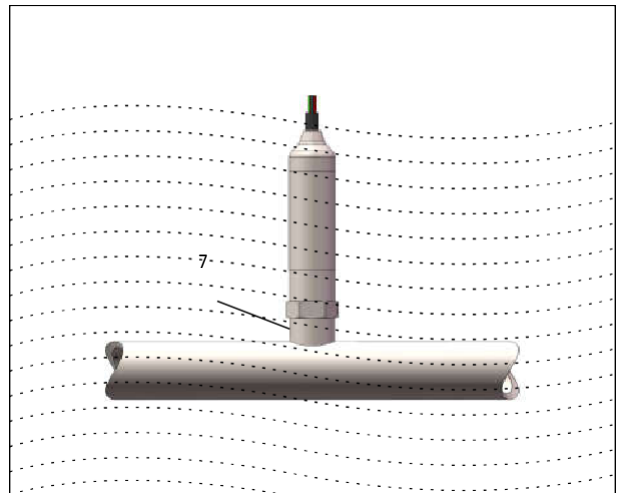
Electrical connection

| Code | Item | Description |
|------|---------------|-------------------------------------|
| 4 | Material | SUS304 stainless steel |
| 6 | | SUS316 stainless steel |
| H28 | Specification | Diameter of submersible probe: 28mm |

Probe diagram(H28)



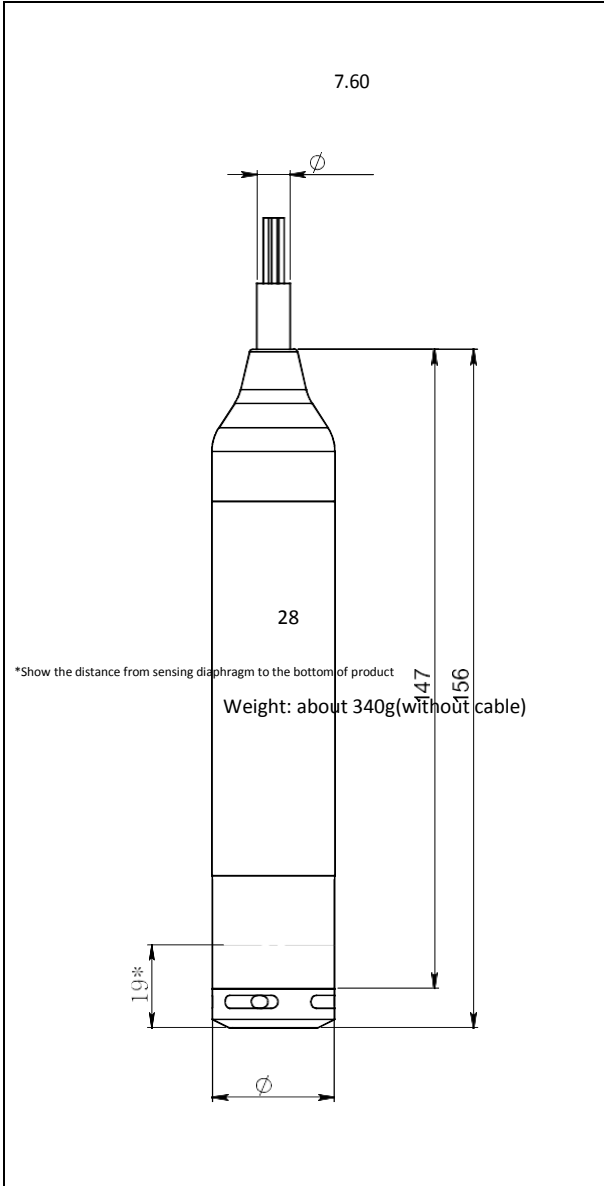
Threaded connection(P4)



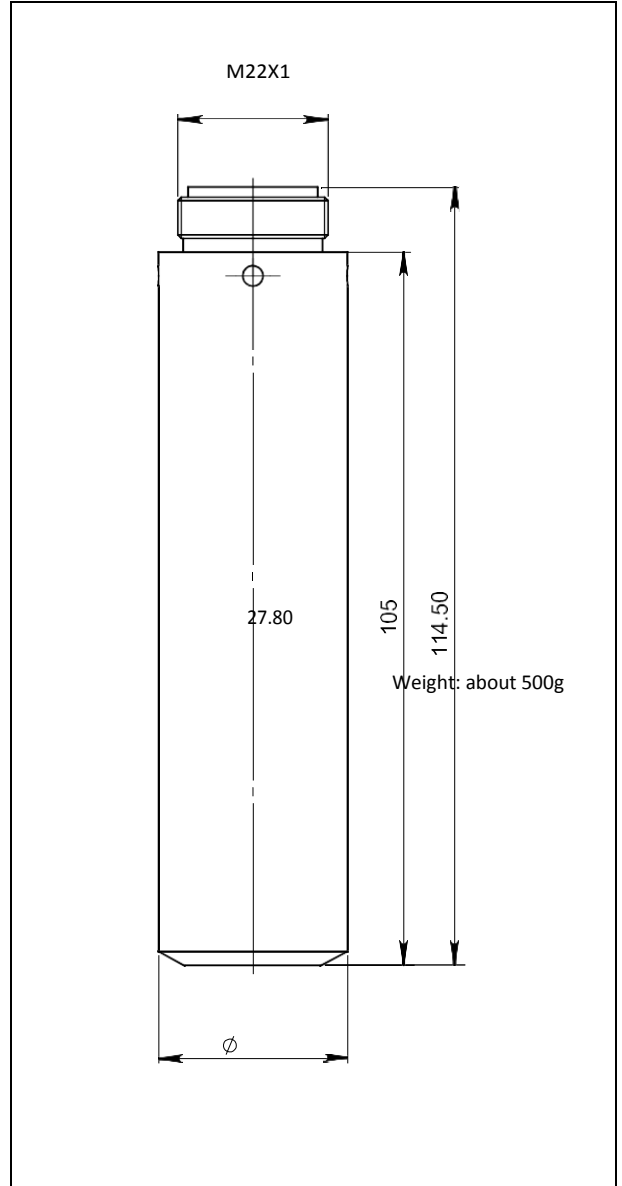
Threaded connection(P4)

Product drawing and dimension

Drawing and dimension (unit:mm)



Counter weight drawing and dimension(P1)(unit:mm)



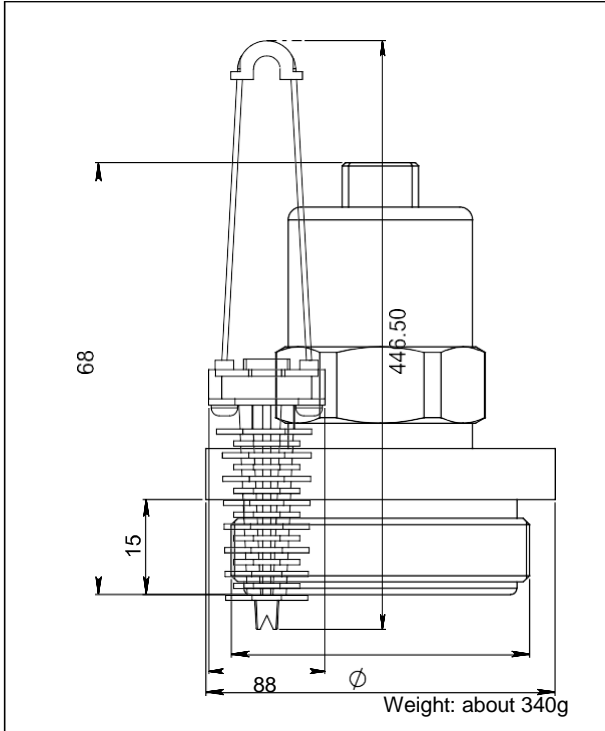
Cable Weight Table

| Cable material | Weight/5m(kg) |
|------------------------------|---------------|
| Polyurethane(PUR) | 0.32 |
| Polytetrafluoroethylen(PTFE) | 0.41 |

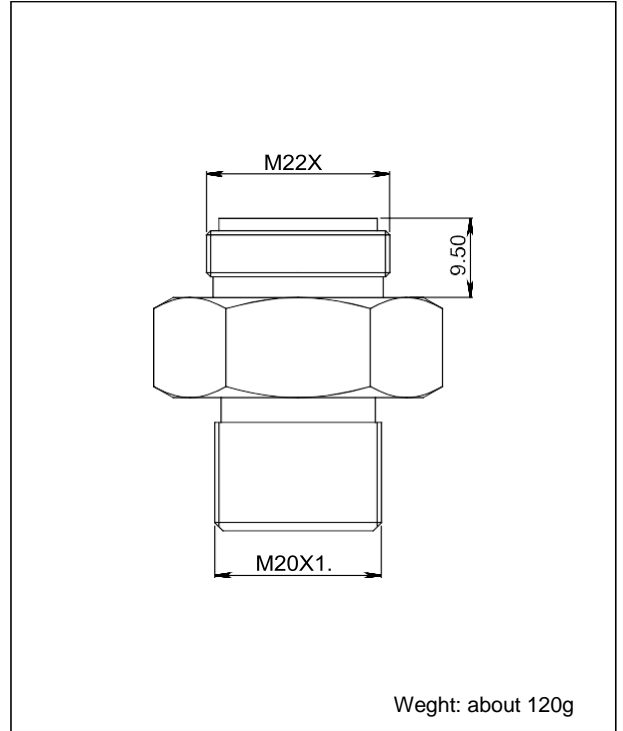
In order to prevent measurement errors caused by sideways movement of product and ensure accuracy, you can add additional counter weights by screwing together and then connecting directly to the product. Each product can add three weights at the most.

Product drawing and dimension

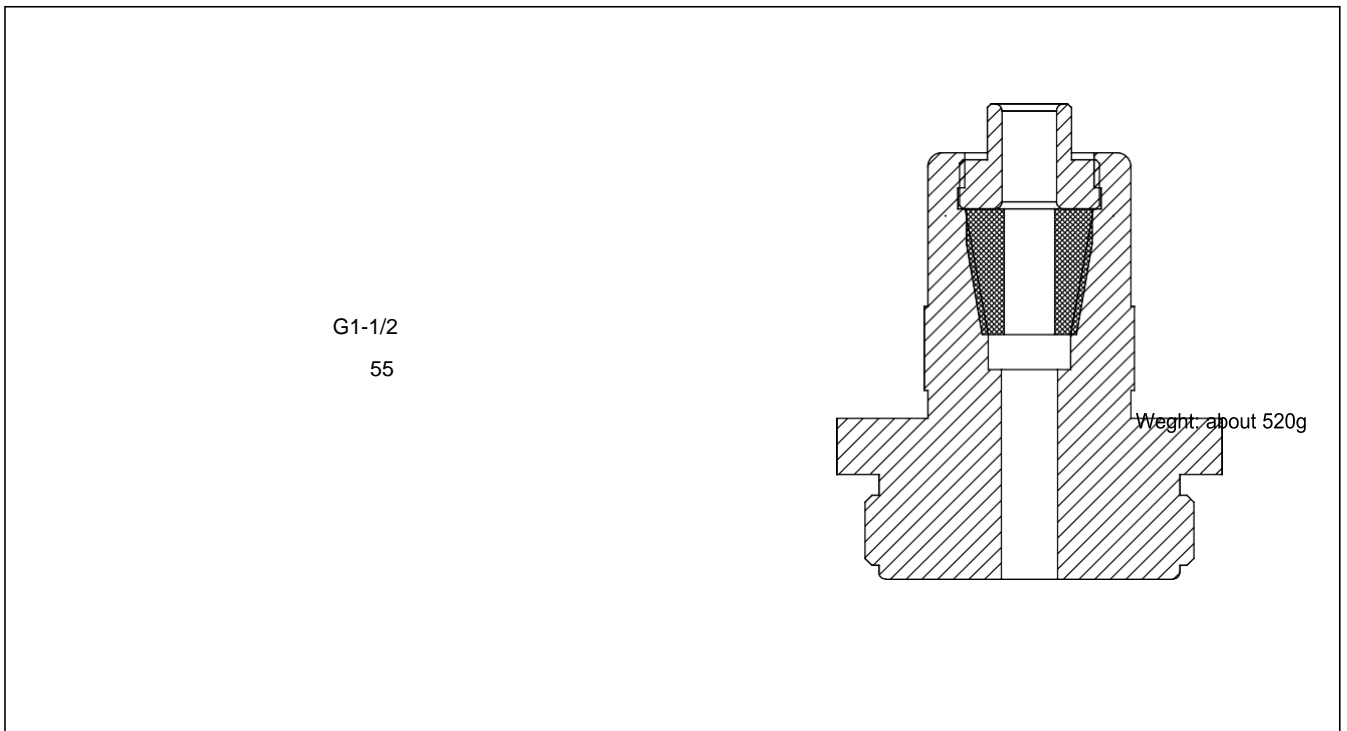
Cable clamp(P2) drawing and dimension (Unit:mm)



Thread connection P4 drawing and dimension (Unit:mm)



Thread connection mounting(P3) drawing and dimension (Unit:mm)



Ordering information chapter

| Item | Parameters | Code | Instruction | (*) fast delivery available |
|----------------------|--------------------------|-------------------------|--|------------------------------|
| | Model | THL1203 | 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): 1000kPa | * |
| | | L175G | Nominal value(URL): 1700kPa | * |
| | | L355G | Nominal value(URL): 3.5MPa | |
| | Seal material | S | O-ring, FKM: -10°C-120°C | * |
| F | | Stainless steel welding | | |
| Electrical connetion | Separator | - | Detailed specifications as following | |
| | Electrical connetion | N1 | PUR cable diameter(7.5±0.2)mm | * |
| | | N2 | PTFE cable diameter(7.5±0.2)mm | |
| Output | Separator | - | Detailed specifications as following | |
| | Output signal | F | 4-20mA two wire, power supply: 10-30VDC | * |
| | | H | 4-20mA+HART two wire, power supply:16.5-55VDC | * |
| | | 5 | 0.5-4.5VDC three wire, power supply:6-30VDC | |
| | | 6 | 0.5-4.5VDC ratiometric output three wire, power supply:5VDC | * |
| | | R | Modbus-RTU/RS485, four wire ,power suply:5VDC/9-30VDC | |
| Probe | Separator | - | Detailed specifications as following | |
| | Material | 4 | SUS304 Stainless steel | * |
| | | 6 | SUS316 Stainless steel | * |
| | Specification | H28 | Submersible probe diameter 28mm | * |
| Cable | Separator | - | Detailed specifications as following | |
| | Cable length | LXXX | XXX Range:000-200, Eg, 5m express as L005, 10m express as L010, 100m express L100, cable length allowed error rang: 0-0.2m | * |
| additional options | Separator | - | Detailed specifications as following | |
| | Fixed mounting accessory | /P1 | Counter weight (To fix products in some areas of fast flow rate or medium with large density) | * |
| | | /P2 | Cable clamp (To fix and support the product) | |
| | | /P3 | Threaded connection (To fix the top and support the product) | * |
| | | /P4 | Threaded connection (To fix the bottom and support the product) | * |
| | Calibration report | /Q1 | According to user requirements | * |

Ordering information chapter

| | | | |
|---------------------------------|-----|--|---|
| Product certification standards | /E1 | Flame-proof certificate, ExdIICT6, NEPSI | |
| | /I1 | Intrinsic safety certificate, ExialICT4, NEPSI | * |
| | /F3 | CE certificate | * |

Approvals

Factory certificate

| | |
|----------------------------|---|
| Certification organization | UNICERT |
| Quality management system | ISO9001-2015 |
| Scope of certification | Design and production of pressure transmitter |
| Certificate number | QMS-0917-007671 |

CE

| | |
|-------------------|----------------------|
| Licence scope | PRESSURE TRANSMITTER |
| Standard | EN61000-6-2 : 2005 |
| | EN61000-6-4 : 2007 |
| Registered number | AC/0100708 |

Intrinsic safety certificate

| | |
|--|--|
| Certification organization name | NEPSI |
| Licenses range | THL series pressure transmitter |
| Explosion-proof mark | ExialICT4 |
| Ambient temperature | -25-+60°C |
| Medium maximum temperature | +80°C |
| Registration number | GYB13.1139X |
| Intrinsically safe parameter description | Maximum input voltage:28VDC |
| | Maximum input current:93mA |
| | Maximum input power:0.66w |
| | Maximum internal equivalent parametersCi(nF):0.035 |
| | Maximum internal equivalent parametersLi(mH):≈0 |

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