

- **Electromagnetic flowmeter**
- Vortex flowmeter
- Turbine flowmeter
- Ultrasonic flowmeter
- Throttling device
- Rotameter

RSTLD

QINGTIANYIBIAO

Electromagnetic flowmeter

The Specialist for process liquids and slurries
Teflon, PFA, F46, Neoprene, Polyurethane etc
For flowrates up to 380,000 m³/h and more
Meter sizes DN3-DN3000mm

1 Product features

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6 Rate-flow comparison table

1. Products features

1.1 Features

- Size: DN3 ~ DN3000mm
- Accuracy: $\pm 0.5\%$, $\pm 0.3\%$ are selectable
- Flow velocity: 0.1 ~ 15m/s
- Media temperature: -20°C ~ $+160^{\circ}\text{C}$
- Ambient temperature: -25°C ~ 60°C
- Housing material: carbon steel(stainless steel optional) DN3 ~ DN3000mm
- Flange: carbon steel (galvanized or coating), stainless steel optional
- Electrode with shielding case, signal stable
- Electrode material: SUS316, Hastelloy C, Titanium, Tantalum etc
- Electrode type: General type, scraper type and replaceable type
- Liner material: Teflon, PFA, F46, Neoprene, Polyurethan
- Protection class: IP67, IP68 (optional)
- Power supply: 220VAC, 24VDC, 3.6V(battery powered)
- Communication: RS232, RS485 or HART are selectable
- Flow output: Analog output, frequency output, pulse output
- Control output: forward / reverse, high alarm / low alarm etc.
- Control input: external zero return, external totalizer reset, external totalizer stop
- Pulse output: active / passive, frequency and pulse width adjustable
- Test and diagnosis: self – diagnosis, failure record, current output test, control input / output test, emulation test mode etc.
- Others: parameter protection, indication of sensor parameter, span adjustment, zero adjust, small signal cutting, smoothing, access to external memorizer, writing No. etc

1.2 Applications

- Water abstraction
- Water purification and desalination
- Drinking water distribution networks
- Revenue metering or billing
- Leakage detection
- Irrigation
- Industry water
- Cooling water
- Wastewater
- Sewage and sludge
- Sea water

1.3 Options



Remote type electromagnetic flowmeter

QINGTIANYIBIAO

Electromagnetic Flowmeter

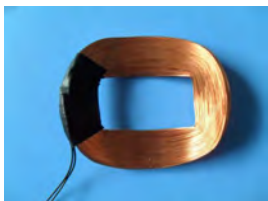
– A reliable "friend" for industrial applications and flow measurements of process liquids & slurries

- **Flange connection version**
For flowrates upto 380, 000m³/h and more.Meter sizes from DN3 to DN300mm
- **Insertion version**
Widely used in the area of large-caliber flowmeter.Simple structure,fast installation and easy maintenance.
- **Battery powered version**
Using internal battery power supply, no need external power supply,battery life more than 5 years.
- **Wafer and tri-clamp(sanitary) version**

1.4 Body structure

Modular design

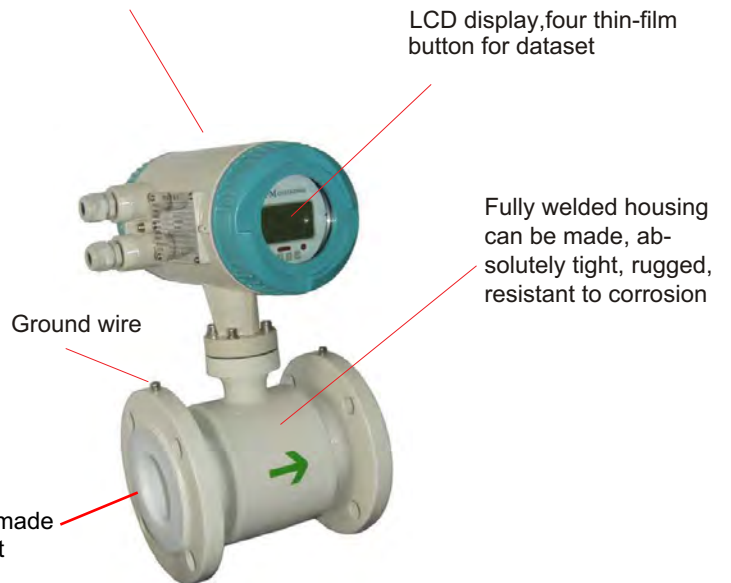
- separate version with connection box signal converter in field housing
- compact version



Our excitation coil adopts Siemens technology



Different types of electrode for ordinary liquid or chemical liquid



LCD display, four thin-film button for dataset

Fully welded housing can be made, absolutely tight, rugged, resistant to corrosion

Ground wire

Special liner material can be made according to your requirement

For flow rates from 0.01m³/h to 380,000 m³/h and more

Meter sizes DN3-DN3000mm

1.5 Principle of Operation

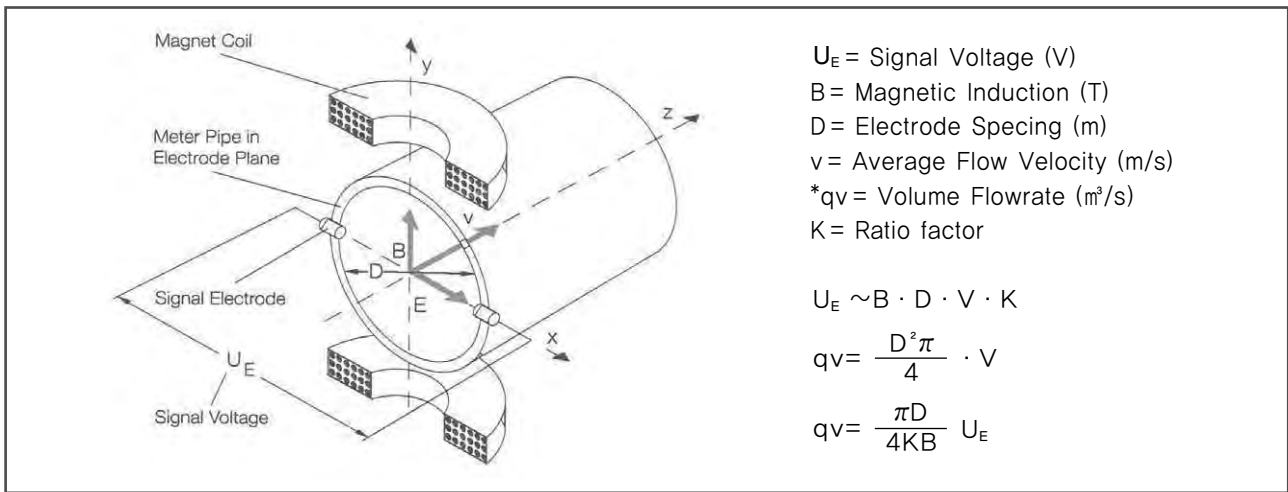
Faraday's Laws of Induction form the basis for the electromagnetic flowmeter which states that a voltage is generated in a conductor as it moves through a magnetic field.

This principle is applied to a conductive fluid which flows through the meter tube perpendicular to the direction of the magnetic field (see Schematic).

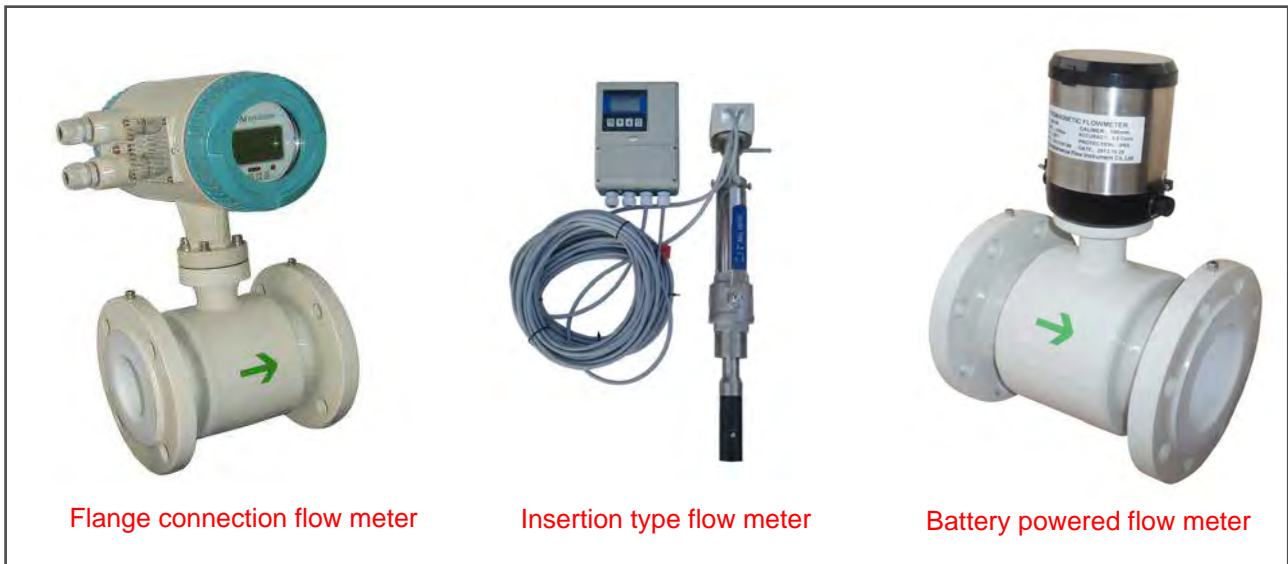
The voltage which is induced in the fluid is measured at two electrodes located diametrically opposite to each other. This signal voltage U_E is proportional to the magnetic induction B , the electrode spacing D and the average fluid velocity v .

Since the magnetic induction B and the electrode spacing D are constant values, the signal voltage U_E is proportional to the average flow velocity v . The equation for calculating the volumetric flowrate shows that the signal voltage U_E is linear and proportional to the volumetric flowrate.

The induced signal voltage is converted into scaled, analog and digital output signals in the converter.



1. Electromagnetic Flowmeter Schematic



2. Converters and sensors

2.1 Converters and sensors overview



Compact type converter



Battery powered type converter



Remote type converter

Sensors



QTLD Flange connection sensor



QTLD/C Insertion type sensor



QTLD Wafer type sensor



QTLD Tri-clamp type sensor

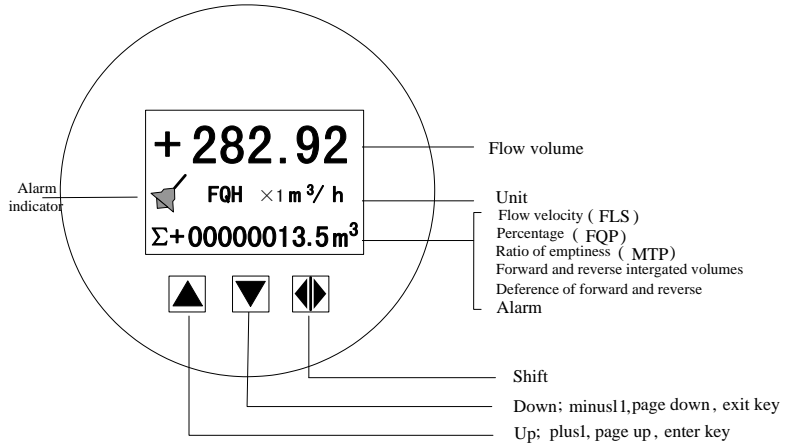
Flowmeters with different converters and sensors



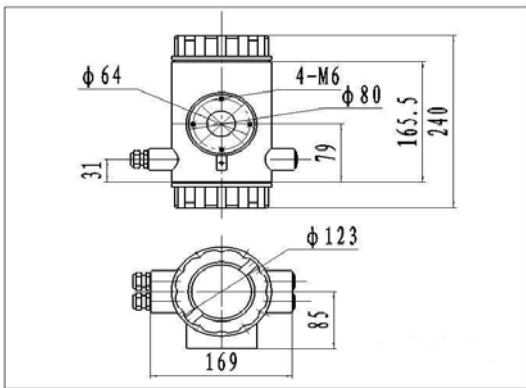
2.2 Converters

2.2.1 QTLD/Z converters drawing and features

Circinal Panel converter

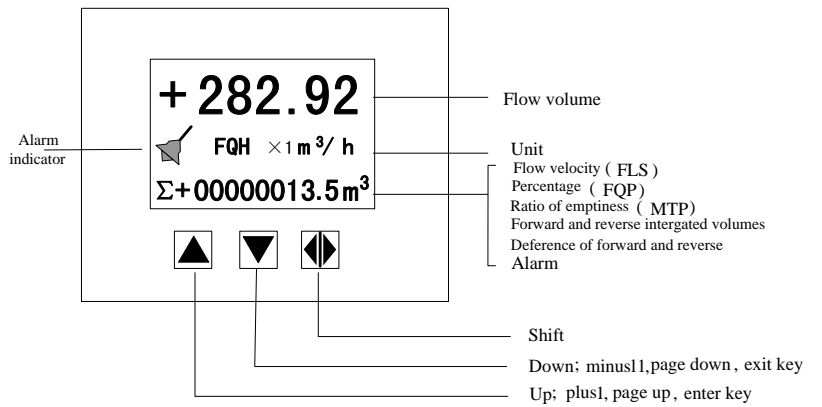


Exterior size of the integrated circinal shells

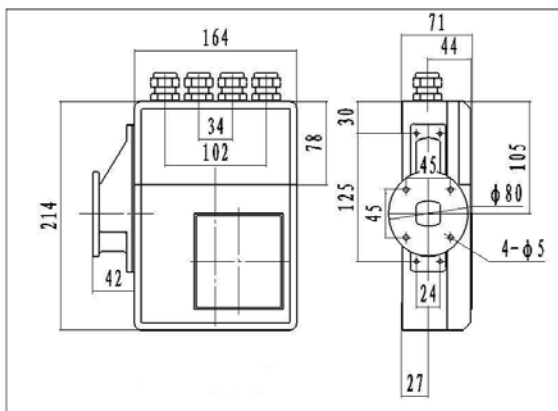


Keys on circinal panel and large LCD display

Squared panel converter



Exterior size of the squared converter shells



Keys on squared panel and large LCD display

1. Basic function

- Low-frequency square-wave exciting, exciting frequency: 1/16 power frequency、1/20power frequency、1/25 power frequency;
- High-frequency square-wave exciting, exciting frequency: 1/2 power frequency (for grouting liquid measure) ;
- Exciting current can be selected for 125mA、187.5mA、250mA、500 mA;
- No need to add empty pipeline measurement, and can measure continuously, alarm by fixed value;
- Current speed range: 0.1 --- 15m/s, current speed resolution: 0.5mm/s;
- AC high-frequency switching power, range of voltage: 85VAC --- 250VAC;
- DC 24V switching power, range of voltage: 20VDC --- 36VDC;
- Network function: MODBUS、GPRS、PROFIBUS 、HARTcommunication interface (choose) ;
- Chinese or English displaying mode, (other languages can be set);
- Three integrator gross inside, respective register: Forward gross, reverse gross and minus value gross.

2. Especial function

- Recording time when power turn-off, to record power broken time of instrument system automatically and recruit to count the missing flux;
- Recording function of hour gross, to record the flux gross by hour, fit for timed measure;
- Infrared handing telecontrol keyboard, all the functions of far-untouched controlling converter.

3. Normal operating conditions

Ambient Temperature Ranges: fission $-10\sim+60^{\circ}\text{C}$;

Relative Humidity: 5%~90%;

Power Supply: 85~250V, 45~63Hz (single-phase AC).

Dissipation Power: <20W (After connecting sensor) .

4. Type of connecting with sensors

- The integrated circinal shells: circinal shells, shells connect with the flange directly, explosion-proof;
- The integrated squared shells: squared shells, shells connect with the flange directly;

- The split squared shells: squared shells (hang on the wall), Signal converters connect with cable of sensor;

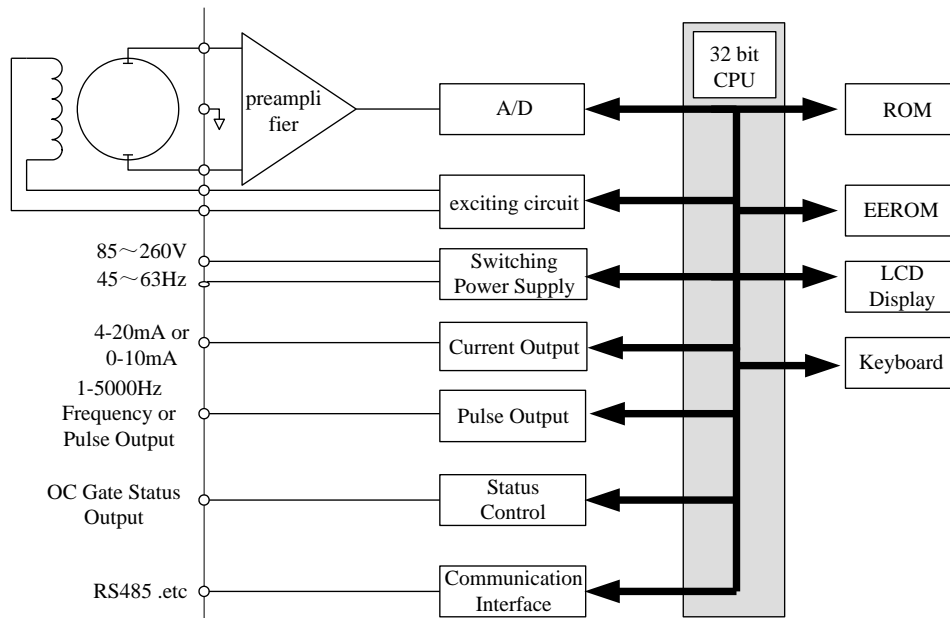


Circular Panel converter with flange connection sensor



Squared panel converter with flange connection sensor

5. Basic circuit of converter



Structure Of Converter's Circuit

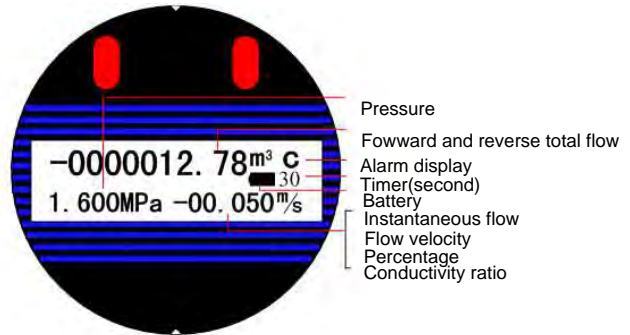
The converter can supply exciting current to the coil in the sensor of electronic flowmeters, the head amplifier amplifies the electromotive force from the sensor and converts it into standard signals of current or frequency so that the signals can be used for displaying, controlling and processing. See structure of converter circuit shown above.

2.2.1 QTLD/D converters drawing and features

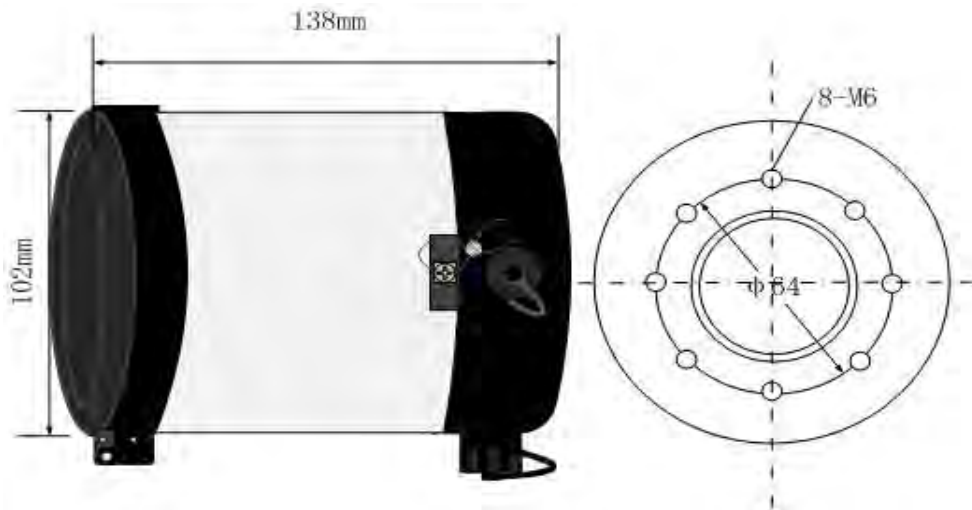
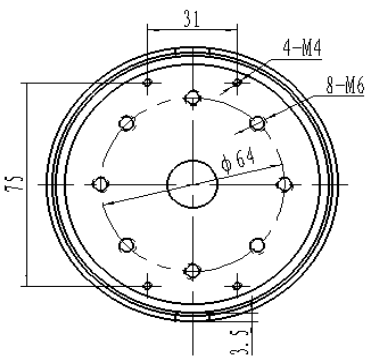
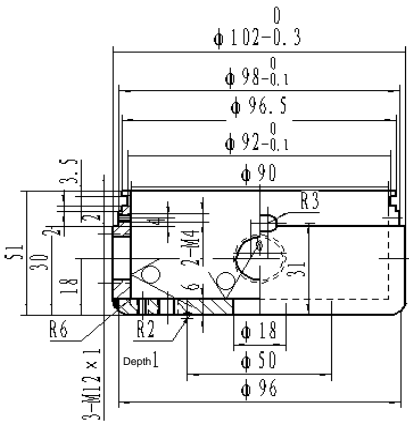
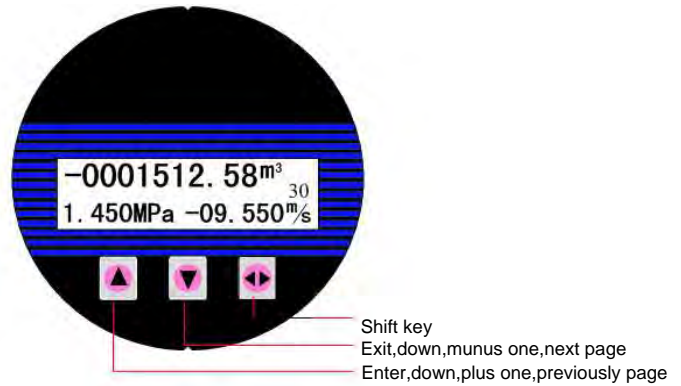
Battery powered converter



Display panel



Hand -operated controller



Basic parameters

- Working temperature: -20 °C -50 °C
- Operating humidity: \leq 95%
- Protection class: IP68
- Flow rate measuring range: 0 --- 15 m / s
- Medium conductivity: clean water > 20 μ s / cm
- For measuring diameter: DN10 --- DN800
- Supporting Accuracy class: 0.5
- Measurement parameters: instantaneous flow, instantaneous flow rate
- Record parameters: Flow cumulative total
- Detection and alarm parameters: Fluid empty pipe detection alarm, the excitation current detection alarm
- Scaled output signal: Unit volume flow pulse
- Communication: RS485 (modbus protocol), GPRS

Battery life(month)

| Measuring cycle | 50mA excitation | 20mA excitation |
|-----------------|-----------------|-----------------|
| 30S | 120 | 200 |
| 15S | 60 | 100 |
| 14S | 56 | 93 |
| 13S | 52 | 86 |
| 12S | 48 | 79 |
| 11S | 44 | 73 |
| 10S | 40 | 66 |
| 9S | 36 | 59 |
| 8S | 32 | 53 |
| 7S | 28 | 46 |
| 6S | 24 | 39 |
| 5S | 20 | 33 |
| 4S | 16 | 26 |
| 3S | 12 | 19 |

Battery powered converter with flange connection sensor



DN3~DN600

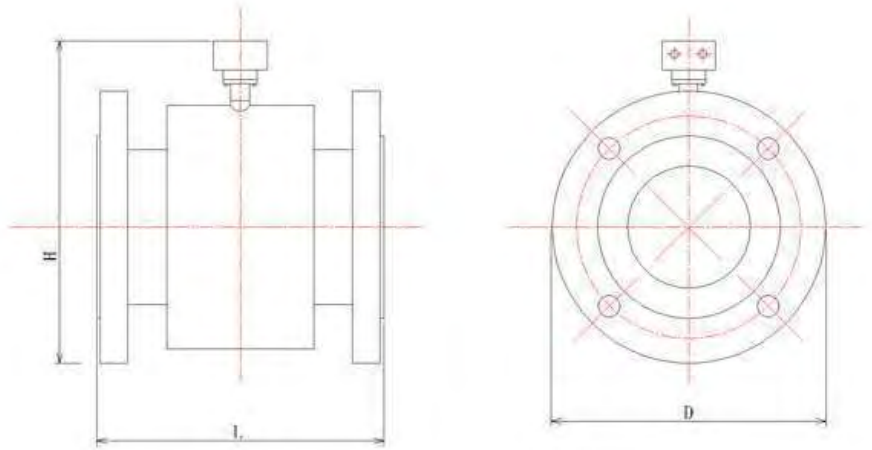
2.2 Converters

2.2.1 Flange connection sensor features and drawing



Basic parameters

| | |
|---------------------|---|
| Caliver | DN3~DN3000mm |
| Nominal Pressure | 0.6~4.0MPa(special pressure can be made to) |
| Accuracy | ±0.5%, ±0.3%or±0.2% are selectable |
| Liner material | Teflon,pfa,f46,Neoprene,POLY |
| Electrode Type | General type ,scraper type and replaceable type |
| Electrode material | Stainless steel SUS316,Hastelloy C,Titanium,Tantalum Platinum-iridium,etc |
| Ambient Temperature | 25℃below zero to 60℃ |
| Ambient Humidity | 5~100%RH(relative humidity) |
| Measuring Range | 1500:1,flow rate<15m/s |
| Structure type | Integral type,remote type,submersible type,ex-proof type |
| Protection Class | IP65,IP68(optional) |
| Ex-proof Mark | Exmd II T4 |
| Product Standard | JB/T 9248-1999Electormagnetic Flowmeter |



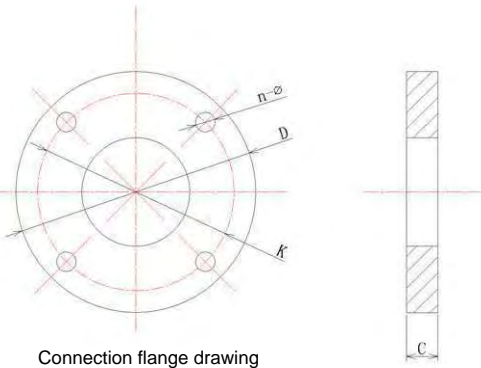
DN3-DN3000 the external drawing of flange electromagnetic flow sensor

flange dimension

Connecting flange and installing dimension see picture
executive standard of connection flange:

- 4.0MPa(DN3-DN150) GB/T9119-200C
- 1.6MPa(DN200-DN600) GB/T9119-2000
- 1.0MPa(DN700-DN1000) GB/T9115-2000
- 0.6MPa(DN1200-DN3000) GB/T9115-2000

(Special flange standard can be made to)



Connection flange drawing

External and installing dimension

| Nominal diameter | Nominal pressure | External dimension | | | | reference weight | |
|------------------|------------------|--------------------|---------------------|------|------|------------------|----|
| | | L of PTFE liner | L of Neoprene liner | D | H | | |
| 3 | 4.0 | 200(PFA) | | 90 | 220 | 4 | |
| 6 | | 200(PFA) | | 90 | 220 | 5 | |
| 10 | | 200 | / | 90 | 220 | 6 | |
| 15 | | 200 | / | 95 | 220 | 8 | |
| 20 | | 200 | / | 105 | 220 | 10 | |
| 25 | | 200 | / | 115 | 223 | 12 | |
| 32 | | 200 | / | 140 | 240 | 13 | |
| 40 | | 200 | 200 | 150 | 250 | 14 | |
| 50 | | 200 | 200 | 165 | 263 | 15 | |
| 65 | | 200 | 200 | 185 | 283 | 18 | |
| 80 | | 200 | 200 | 200 | 290 | 20 | |
| 100 | | 250 | 250 | 235 | 318 | 25 | |
| 125 | | 250 | 250 | 270 | 350 | 28 | |
| 150 | | 300 | 300 | 300 | 380 | 30 | |
| 200 | | 1.6 | 350 | 350 | 340 | 430 | 50 |
| 250 | | | 450 | 450 | 405 | 495 | 70 |
| 300 | 500 | | 500 | 460 | 547 | 95 | |
| 350 | 550 | | 550 | 520 | 602 | 120 | |
| 400 | 600 | | 600 | 580 | 665 | 140 | |
| 450 | 600 | | 600 | 640 | 720 | 160 | |
| 500 | 600 | | 600 | 715 | 783 | 200 | |
| 600 | 600 | | 600 | 840 | 897 | 280 | |
| 700 | 1.0 | 700 | 700 | 895 | 982 | 350 | |
| 800 | | 800 | 800 | 1015 | 1092 | 400 | |
| 900 | | 900 | 900 | 1115 | 1192 | 480 | |
| 1000 | | 1000 | 1000 | 1230 | 1299 | 550 | |
| 1200 | 0.6 | 1200 | 1200 | 1405 | 1488 | 660 | |
| 1400 | | 1400 | 1400 | 1630 | 1700 | 750 | |
| 1600 | | 1600 | 1600 | 1830 | 1924 | 850 | |
| 1800 | | 1800 | 1800 | 2045 | 2134 | 980 | |
| 2000 | | 2000 | 2000 | 2265 | 2344 | 1200 | |
| 2200 | | 2200 | 2200 | 2475 | 2549 | 1600 | |
| 2400 | | 2400 | 2400 | 2685 | 2754 | 2000 | |
| 2600 | | 2600 | 2600 | 2905 | 3169 | 2400 | |
| 2800 | | 2800 | 2800 | 2905 | 3169 | 2700 | |
| 3000 | | 3000 | 3000 | 3315 | 3369 | 2900 | |

Flange dimension

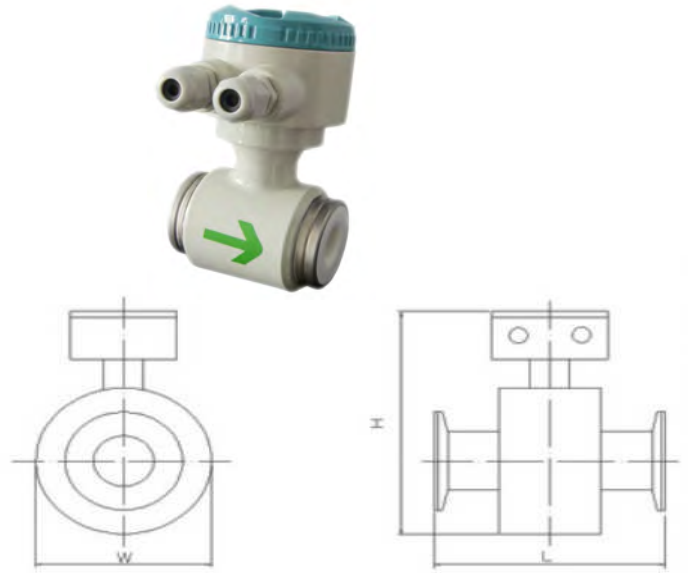
| Nominal pressure | Caliber | D | K | Φ | n | C |
|------------------|---------|------|------|----|----|----|
| 4.0 | 3 | 90 | 60 | 14 | 4 | 14 |
| | 6 | 90 | 60 | 14 | 4 | 14 |
| | 10 | 90 | 60 | 14 | 4 | 14 |
| | 15 | 95 | 65 | 14 | 4 | 14 |
| | 20 | 105 | 75 | 14 | 4 | 16 |
| | 25 | 115 | 85 | 14 | 4 | 16 |
| | 32 | 140 | 100 | 18 | 4 | 18 |
| | 40 | 150 | 110 | 18 | 4 | 18 |
| | 50 | 165 | 125 | 18 | 4 | 20 |
| | 65 | 185 | 145 | 18 | 8 | 22 |
| | 80 | 200 | 160 | 18 | 8 | 24 |
| | 100 | 235 | 190 | 22 | 8 | 26 |
| | 125 | 270 | 220 | 26 | 8 | 28 |
| | 150 | 300 | 250 | 26 | 8 | 30 |
| 1.6 | 200 | 340 | 295 | 22 | 12 | 26 |
| | 250 | 405 | 355 | 26 | 12 | 28 |
| | 300 | 460 | 410 | 26 | 12 | 32 |
| | 350 | 520 | 470 | 26 | 16 | 35 |
| | 400 | 580 | 525 | 30 | 16 | 38 |
| | 450 | 640 | 585 | 30 | 20 | 42 |
| | 500 | 715 | 650 | 33 | 20 | 46 |
| | 600 | 840 | 770 | 36 | 20 | 52 |
| 1.0 | 700 | 895 | 840 | 30 | 24 | 30 |
| | 800 | 1015 | 950 | 33 | 24 | 32 |
| | 900 | 1115 | 1050 | 33 | 28 | 34 |
| | 1000 | 1230 | 1160 | 36 | 28 | 34 |
| 0.6 | 1200 | 1405 | 1340 | 33 | 32 | 28 |
| | 1400 | 1630 | 1560 | 36 | 36 | 32 |
| | 1600 | 1830 | 1760 | 36 | 40 | 34 |
| | 1800 | 2045 | 1970 | 39 | 44 | 36 |
| | 2000 | 2265 | 2180 | 42 | 48 | 38 |
| | 2200 | 2475 | 2390 | 42 | 52 | 42 |
| | 2400 | 2685 | 2600 | 42 | 56 | 44 |
| | 2600 | 2905 | 2810 | 48 | 60 | 46 |
| | 2800 | 3115 | 3020 | 48 | 64 | 48 |
| | 3000 | 3315 | 3220 | 48 | 68 | 50 |

2.3.2 Wafer and tri-clamp(sanitary) connection sensor features and drawing

External and installing dimension

Tri-clamp(sanitary)type sensor

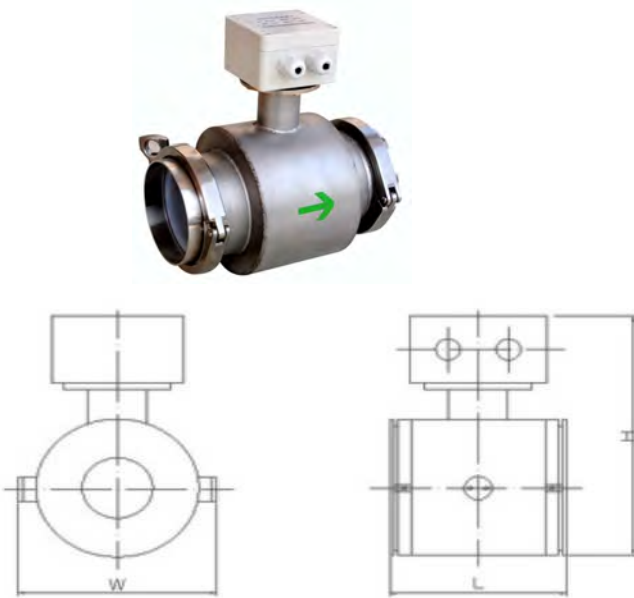
| Norminal Diameter(mm) | External Dimension | | | Reference weight |
|-----------------------|--------------------|-----|-----|------------------|
| | H | W | L | |
| 10 | 179 | 70 | 172 | 2.5 |
| 15 | 179 | 70 | 172 | 2.5 |
| 20 | 179 | 70 | 172 | 2.6 |
| 25 | 189 | 83 | 172 | 2.6 |
| 40 | 196 | 95 | 172 | 3 |
| 50 | 214 | 105 | 172 | 3.6 |
| 65 | 220 | 115 | 172 | 4.5 |
| 80 | 240 | 135 | 200 | 5.2 |
| 100 | 252 | 146 | 200 | 7 |
| 125 | 276 | 170 | 200 | 9.6 |
| 150 | 310 | 204 | 256 | 12.8 |
| 200 | 336 | 230 | 256 | 22 |



External drawing of tri-clamp(sanitary) sensor

Tri-clamp(sanitary) type sensor

| Norminal Diameter(mm) | External Dimension | | | Reference weight |
|-----------------------|--------------------|-----|-----|------------------|
| | H | W | L | |
| 10 | 200 | 98 | 80 | 2.5 |
| 15 | 200 | 98 | 80 | 2.5 |
| 20 | 169 | 98 | 80 | 2.6 |
| 25 | 179 | 106 | 80 | 2.6 |
| 40 | 198 | 125 | 80 | 3 |
| 50 | 213 | 135 | 120 | 3.6 |
| 65 | 229 | 148 | 120 | 4.5 |
| 80 | 244 | 164 | 120 | 5.2 |
| 100 | 265 | 189 | 120 | 7 |
| 125 | 298 | 214 | 140 | 9.6 |
| 150 | 328 | 240 | 160 | 12.8 |
| 200 | 376 | 290 | 220 | 22 |



External drawing of clamp(wafer) sensor

Clamped/sanitary type electromagnetic Flow sensor

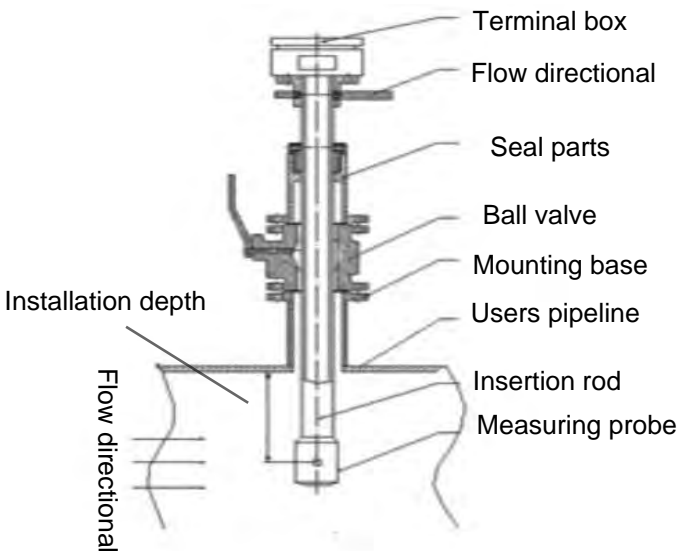
| | |
|---------------------|---|
| Caliber | DN3~DN200mm |
| Nominal Pressure | 0.6~1.6MPa |
| Accuracy | ±0.5 of the value displayed,±0.3% or ±0.2% are selectable |
| Electrode Type | conventionak electrode,electrode can be teardown |
| Electrode material | Stainless steel SUS316,Hastelloy C,Titanium,Tantalum Platinum-iridium,etc |
| Ambient Temperature | 25°C below zero to 60°C |
| Structure type | Integral type ,remote type,submersible type,ex-proof type |
| Protection Class | IP65,IP68(optional) |
| Ex-proof Mark | Exmd II T4 |
| Product Standard | JB/T 9248-1999Electormagnetic Flowmeter |

2.3.3 Insertion type sensor features and drawing

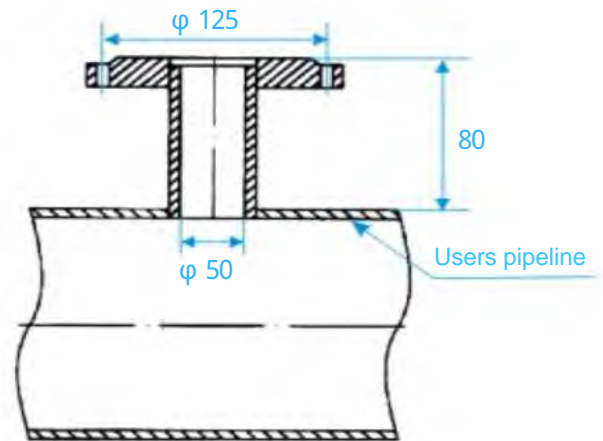


Insertion type electromagnetic flow sensor

| | |
|----------------------------------|---|
| Caliver | DN100~DN3000mm |
| Nominal Pressure | 1.6MPa |
| Material of the sensor measuring | ABS,POLY |
| Measuring pipe material | Carbon steel,stainless steel |
| Accuracy | Flow rate $\leq 0.5/s, \pm 0.5\%$, flow rate of full range $> 1m/s, \pm 1.0\%$. |
| Medium Temperature | Plus 80°C |
| Electrode material | Stainless steel SUS316,Hastelloy C,Hastelloy B |
| Environment temperature | 25°C below zero to plus 60°C |
| Length of straight pipe | Upstream 15D,Downstream 10D |
| Atmosphere pressure | 86~106kPa |
| Protection class | IP65,IP68(optional) |
| Ex-proof Mark | Exmd II T4 |
| Connection mode | Flange type,thread type |



External drawing of insertion type sensor



Installation size

3. Selection code table

3.1 QTLD SELECTION TABLE

| QTLD | | selection | | | | | | |
|--------------------------|---|-----------|---|---|---|---|---|---|
| | | XXX | X | X | X | X | X | X |
| Caliber (mm) | DN3-DN3000 3-digit code, seeing caliber code table 12 | | | | | | | |
| Nominal pressure | 0.6MPa | 1 | | | | | | |
| | 1.0MPa | 2 | | | | | | |
| | 1.6MPa | 3 | | | | | | |
| | 4.0MPa | 4 | | | | | | |
| | Others | 5 | | | | | | |
| Connection mode | Flange connection | | 1 | | | | | |
| | Clamp connection | | 2 | | | | | |
| | Sanitary connection | | 3 | | | | | |
| liner material | PTFE | | | 1 | | | | |
| | PFA | | | 2 | | | | |
| | F46 | | | 3 | | | | |
| | Neoprene | | | 4 | | | | |
| | Polyurethane | | | 5 | | | | |
| Electrode material | Contain molybdenum stainless steel | | | | 1 | | | |
| | Hastelloy B | | | | 2 | | | |
| | Hastelloy C | | | | 3 | | | |
| | Titanium | | | | 4 | | | |
| | Platinum-iridium | | | | 5 | | | |
| | Tantalum | | | | 6 | | | |
| | Stainless steel covered with tungsten carbide | | | | 7 | | | |
| Structure Type | Integral type | | | | | 1 | | |
| | Remote type | | | | | 2 | | |
| | Remote type immerse | | | | | 3 | | |
| | Integral type EX-proof | | | | | 4 | | |
| | Remote type EX-proof | | | | | 5 | | |
| power | 220VAC50HZ | | | | | | E | |
| | 24VDC | | | | | | G | |
| Optput/ communication | A.Flow volume 4~20mADC/pulse | | | | | | | A |
| | B.Flow volume 4~20mADC/RS232C Communcion | | | | | | | B |
| | C.Flow volume 4~20mADC/RS485 Communication | | | | | | | C |
| | D.Flow volume HART output/with communication | | | | | | | D |
| Converter figure | Square | | | | | | | A |
| | Circular | | | | | | | B |

Optional selection

| X | |
|---|----------------------------|
| 1 | Grounding electrode |
| 2 | Coupled flange |
| 3 | Entrance protection flange |
| 4 | Scraper type electrode |
| 5 | Others |

Table 12 Caliber code table

| Caliber(mm) | Code |
|-------------|------|
| 3 | 030 |
| 6 | 060 |
| 10 | 100 |
| 15 | 150 |
| 20 | 200 |
| 25 | 250 |
| 32 | 320 |
| 40 | 400 |
| 50 | 500 |
| 65 | 650 |
| 80 | 800 |
| 100 | 101 |
| 125 | 125 |
| 150 | 151 |
| 200 | 201 |
| 250 | 251 |
| 300 | 301 |
| 350 | 351 |
| 400 | 401 |
| 450 | 451 |
| 500 | 501 |
| 600 | 601 |
| 700 | 701 |
| 800 | 801 |
| 900 | 901 |
| 1000 | 102 |
| 1100 | 112 |
| 1200 | 122 |
| 1400 | 142 |
| 1500 | 152 |
| 1600 | 162 |
| 1800 | 182 |
| 2000 | 202 |
| 2200 | 222 |
| 2400 | 242 |
| 2600 | 262 |
| 2800 | 282 |
| 3000 | 302 |

3.2 QTLD/D SELECTION TABLE

| QTLD/D | | Selection | | | | | | | Optional selection | |
|--------------------|---|-----------|---|---|---|---|---|---|--------------------|---|
| | | XXX | X | X | X | X | X | X | X | X |
| Caliber(mm) | DN3-DN800 seeing caliber code table 13 | | | | | | | | | |
| Nominal pressure | 0.6MPa | 1 | | | | | | | | |
| | 1.0MPa | 2 | | | | | | | | |
| | 1.6MPa | 3 | | | | | | | | |
| | 4.0MPa | 4 | | | | | | | | |
| | Others | 5 | | | | | | | | |
| Connection mode | Flange connection | 1 | | | | | | | | |
| | Clamp connection | 2 | | | | | | | | |
| | Sanitary connection | 3 | | | | | | | | |
| liner material | PTFE | 1 | | | | | | | | |
| | PFA | 2 | | | | | | | | |
| | F46 | 3 | | | | | | | | |
| | Neoprene | 4 | | | | | | | | |
| | Polyurethane | 5 | | | | | | | | |
| Electrode material | Contain molybdenum stainless steel | 1 | | | | | | | | |
| | Hastelloy B | 2 | | | | | | | | |
| | Hastelloy C | 3 | | | | | | | | |
| | Titanium | 4 | | | | | | | | |
| | Platinum-iridium | 5 | | | | | | | | |
| | Tantalum | 6 | | | | | | | | |
| | Stainless steel covered with tungsten carbide | 7 | | | | | | | | |
| Structure Type | Integral type | 1 | | | | | | | | |
| | Remote type | 2 | | | | | | | | |
| | Remote type immerse | 3 | | | | | | | | |
| | Integral type EX-proof | 4 | | | | | | | | |
| | Remote type EX-proof | 5 | | | | | | | | |
| Power | 3.6V internal power supply | | | | | | | A | | |
| output | Rs485output | | | | | | | | A | |
| | pulse output | | | | | | | | B | |
| Converter figure | Square | | | | | | | | | A |
| | Circular | | | | | | | | | B |

| Optional selection | |
|--------------------|----------------------------|
| X | |
| 1 | Grounding electrode |
| 2 | Coupled flange |
| 3 | Entrance protection flange |
| 4 | Scraper type electrode |
| 5 | Others |

Table13 Caliber code table

| Caliber(mm) | Code |
|-------------|------|
| 3 | 030 |
| 6 | 060 |
| 10 | 100 |
| 15 | 150 |
| 20 | 200 |
| 25 | 250 |
| 32 | 320 |
| 40 | 400 |
| 50 | 500 |
| 65 | 650 |
| 80 | 800 |
| 100 | 101 |
| 125 | 125 |
| 150 | 151 |
| 200 | 201 |
| 250 | 251 |
| 300 | 301 |
| 350 | 351 |
| 400 | 401 |
| 450 | 451 |
| 500 | 501 |
| 600 | 601 |
| 700 | 701 |
| 800 | 801 |
| 900 | 901 |
| 1000 | 102 |
| 1100 | 112 |

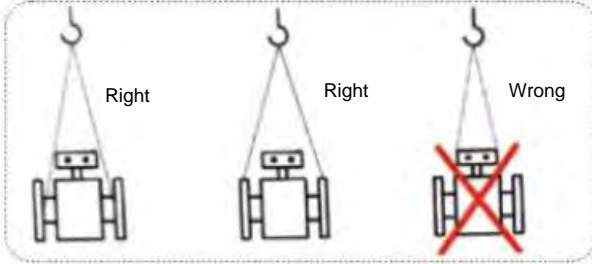
3.3 QTLD/C SELECTION TABLE

| QTLD/C | | Selection | | | | | | |
|-------------------------|---|-----------|---|---|---|---|---|---|
| | | XXX | X | X | X | X | X | X |
| Caliber(mm) | DN3-DN3000 3-digit code, seeing caliber code table 14 | | | | | | | |
| Nominal pressure | 0.6MPa | 3 | | | | | | |
| | 4.0MPa | 5 | | | | | | |
| Connection mode | With measuring pipe | 1 | | | | | | |
| | Without measuring pipe | 2 | | | | | | |
| Measuring pipe material | Carbon steel | 1 | | | | | | |
| | 304 stainless steel | 2 | | | | | | |
| | Without measuring pipe | 3 | | | | | | |
| Electrode material | Contain molybdenum stainless steel | 1 | | | | | | |
| | Hastelloy B | 2 | | | | | | |
| | Hastelloy C | 3 | | | | | | |
| | Titanium | 4 | | | | | | |
| | Platinum-iridium | 5 | | | | | | |
| | Tantalum | 6 | | | | | | |
| Structure Type | 1.Integral type | 1 | | | | | | |
| | 2.Remote type | 2 | | | | | | |
| | 3.Remote type immerse | 3 | | | | | | |
| | 4.Integral type EX-proof | 4 | | | | | | |
| | 5.Remote type EX-proof | 5 | | | | | | |
| Power | 220VAC 50Hz | E | | | | | | |
| | 24VDC | G | | | | | | |
| Output/communication | A.Flow volume 4~20m ADC/pulse | A | | | | | | |
| | B.Flow volume 4~20m ADC/RS232C Communication | B | | | | | | |
| | C.Flow volume 4~20m ADC/RS485 Communication | C | | | | | | |
| | D.Flow volume HART output/with communication | D | | | | | | |
| Converter figure | Square | A | | | | | | |
| | Circular | B | | | | | | |

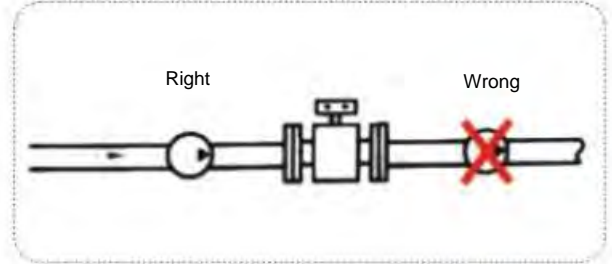
4. Installation and grounding

4.1 Installation

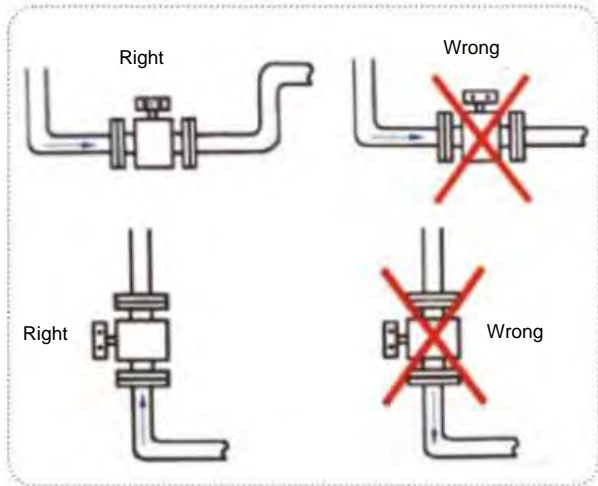
PIPE MUST BE FULL OF MEDIUM



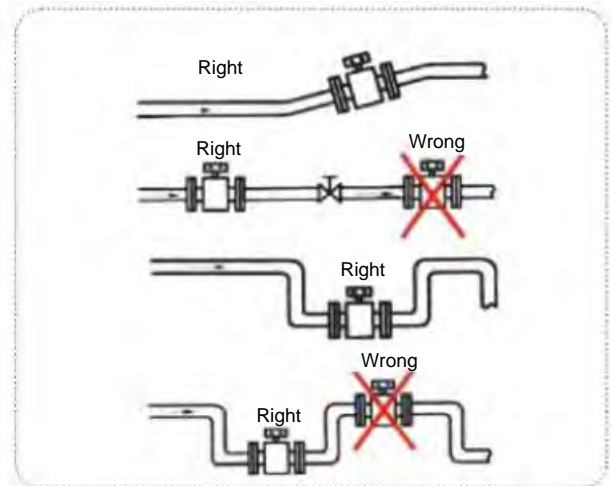
INSTALLATION BEHIND A PUMP



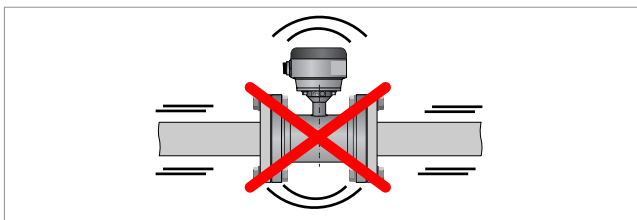
PIPE MUST BE FULL OF MEDIUM



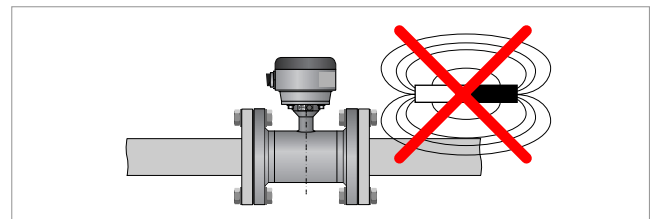
AVOID AIR BLADDER



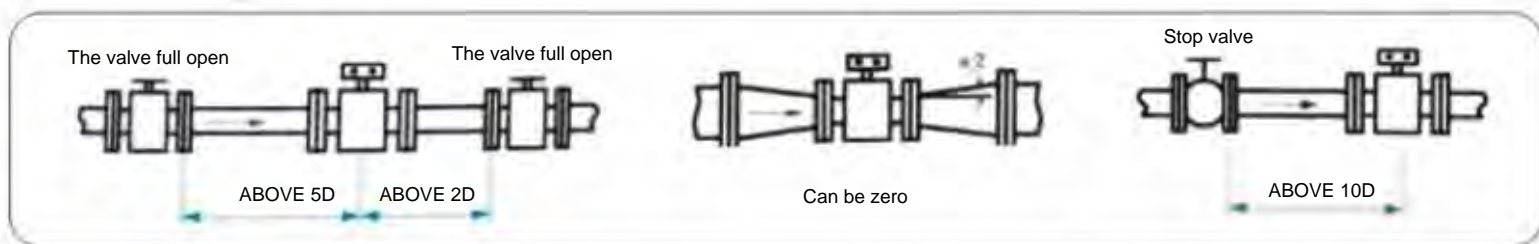
AVOID VIBRATIONS



AVOID MAGNETIC FIELD

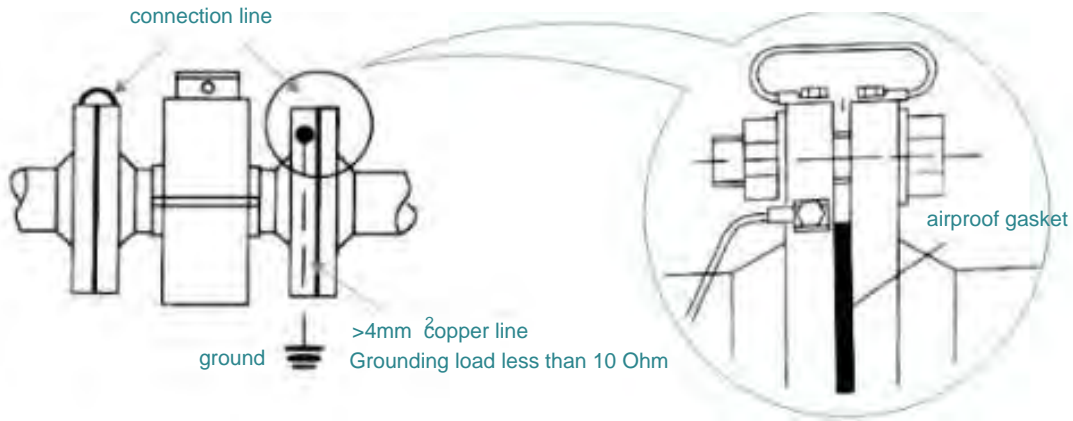


STRAIGHT PIPE REQUIREMENT

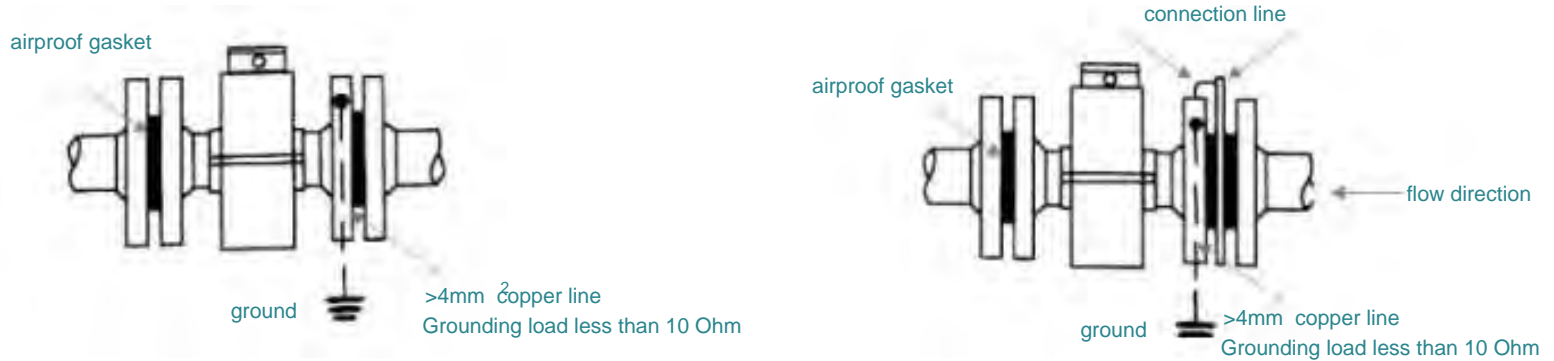


5.2 Grounding

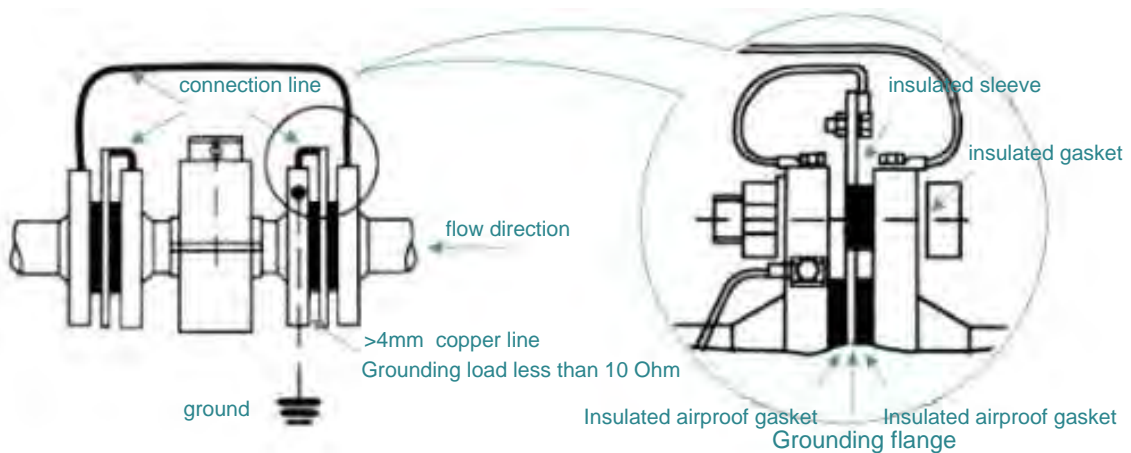
CONNECTION AND GROUNDING BETWEEN THE SENSOR AND PIPE



Metal pipe



Nonmetal pipe, sensor with grounding electrode



Pipe with cathode protection

5. Features of the liner material and electrode material

5.1 Main Performances Of The Liner Materials

Teflon

- 1.The most steady material in plastics which is resistibal to boiling hydrochloric acid,vitriolandqua fortis as well as strong alkali and organic impregnates.
- 2.Not be perfect in abrasion resistance.
Apply in strong corrosive mediums such as strong acid and alkali.

PFA

- 1.Having the same abrasion resistance with PTFE.
- 2.Having strong ability of load pressure resistance.
Applicable in state of load pressure.

F46

- 1.Have the same abrasion resistance with PTFE.
- 2.Resistable for low abrasion.
- 3.Having strong resistance to load pressure.
Have the same application with PTFE. Applicable in mediums of low abrasion.

Neoprene

- 1.Be of good elasticity,retractility and abrasion resistance.
- 2.Be resistant to low acid,alkali and salt but not for oxidation mediums.
Apply in water,sewage treatment and slurry,mineral serosity of low abrasion.

Polyurethane

- 1.Be of good abrasion resistibility.
- 2.Not be perfect in acid/alkali resitance.
- 3.Can't be used for water mixed with organic impregnants.
Applicable in mineral serosity,slurry and coal slurry of high abrasion.

5.2 Main Performances Of electrode materials

Stainless steel SUS316

Applicable in water, sewage and corrosive mediums. Widely used in industries of petrol, chemistry, carbamide, etc

Stainless steel covered with tungsten carbid

Applicable in mediums of no corrosive and low abrasion.

Hastelloy B(HB)

Having strong resistance to hydrochloric acid of any consistence which is below boiling point.
Also resistable against vitriol, phosphate, hydrofluoric acid, organic acid etc, which are oxidable acid, alkali and non-oxidable salt.

Hastelloy C(HC)

Be resistant to oxidable acid such as nitric acid, mixed acid as well as oxidable salt such as Fe^{+++} , Cu^{++} and sea water

Titanium

Applicable in seawater, and kinds of chloride, hypochlorite salt, oxidable acid (including fuming nitric acid), organic acid, alkali etc. Not resistant to a pure reducing acid (such as sulphuric acid, hydrochloric acid) corrosion.
But if acid contains antioxidant (such as Fe^{+++} , Cu^{++}) will greatly reduce corrosion.

Tantalum

Having strong resistance to corrosive mediums that is similar with glass. Almost applicable in all chemical mediums. Except for hydrofluoric acid, oleum and alkali.

Platinum-iridium

Almost be applicable in all chemical mediums except for aqua fortis, ammonium salt.

6. Rate-flow Comparison

| Rate-Flow comparison | | | | | | | |
|--|------------|------------|------------|------------|-------------|-------------|-------------|
| $\frac{m^3/h}{mm} \backslash \frac{m/s}{mm}$ | 0.5 | 1 | 2 | 3 | 4 | 5 | 15 (max) |
| 10 | 0.1414 | 0.2827 | 0.5654 | 0.8482 | 1.1309 | 1.4137 | 4.2411 |
| 15 | 0.3481 | 0.6362 | 1.2723 | 1.9085 | 2.5447 | 3.1809 | 9.5426 |
| 20 | 0.5655 | 1.1310 | 2.2619 | 3.3929 | 4.5239 | 5.6549 | 16.9646 |
| 25 | 0.8836 | 1.7671 | 3.5343 | 5.3014 | 7.0686 | 8.8357 | 26.5072 |
| 32 | 1.4476 | 2.8953 | 5.7906 | 8.6859 | 11.5812 | 14.4765 | 43.4294 |
| 40 | 2.2619 | 4.5239 | 9.0478 | 13.5717 | 18.0956 | 22.6195 | 67.8584 |
| 50 | 3.5343 | 7.0686 | 14.1372 | 21.2058 | 28.2743 | 35.3429 | 106.0288 |
| 65 | 5.9730 | 11.9459 | 23.8918 | 35.8377 | 47.7836 | 59.7295 | 179.1886 |
| 80 | 9.0478 | 18.0956 | 36.1911 | 54.2867 | 72.3823 | 92.4779 | 271.4336 |
| 100 | 14.1372 | 28.2743 | 56.5487 | 84.8230 | 113.0973 | 141.3717 | 424.1150 |
| 125 | 22.0893 | 44.1786 | 88.3573 | 132.5359 | 176.7146 | 220.8932 | 662.6797 |
| 150 | 31.8086 | 63.6173 | 127.2345 | 190.8518 | 254.4690 | 318.0863 | 954.2588 |
| 200 | 56.5787 | 113.0973 | 226.1947 | 339.2920 | 452.3893 | 565.4867 | 1696.4600 |
| 250 | 88.3573 | 176.7146 | 353.4292 | 530.1438 | 706.8583 | 833.5729 | 2650.7188 |
| 300 | 127.2345 | 254.4690 | 508.9380 | 763.4070 | 1017.8760 | 1272.3450 | 3817.0351 |
| 350 | 173.1803 | 346.3606 | 692.7212 | 1039.0818 | 1385.4424 | 1731.8030 | 5195.4089 |
| 400 | 226.1947 | 452.3893 | 904.7787 | 1357.1680 | 1809.5574 | 2261.9467 | 6785.8401 |
| 450 | 286.2776 | 572.5553 | 1145.1105 | 1717.6658 | 2290.2210 | 2862.7763 | 8588.3289 |
| 500 | 353.4292 | 706.8583 | 1413.7167 | 2120.5750 | 2827.4334 | 3534.2917 | 10608.7520 |
| 600 | 508.9380 | 1017.8760 | 2035.7520 | 3053.6281 | 4071.5041 | 5089.3801 | 15268.1403 |
| 700 | 692.7212 | 1385.4424 | 2770.8847 | 4156.3271 | 5541.7694 | 6927.2118 | 20781.6354 |
| 800 | 904.7787 | 1809.5574 | 3619.1147 | 5428.6721 | 7238.2295 | 9047.7868 | 27143.3605 |
| 900 | 1145.1105 | 2290.2210 | 4580.4421 | 6870.6631 | 9047.7868 | 11451.1052 | 34353.3157 |
| 1000 | 1413.7167 | 2827.4334 | 5654.8668 | 8482.3002 | 11309.7336 | 14137.1669 | 42411.5008 |
| 1200 | 2035.7520 | 4071.5041 | 8143.0082 | 12214.5122 | 16286.0163 | 20357.5204 | 61072.5612 |
| 1400 | 2770.8847 | 5541.7694 | 11083.5389 | 16625.3083 | 22167.0778 | 27708.8472 | 83126.5416 |
| 1600 | 3619.1147 | 7238.2295 | 14476.4589 | 21714.6884 | 28952.9179 | 36191.1474 | 108573.4421 |
| 1800 | 4580.4420 | 9160.8842 | 18321.7684 | 27482.6526 | 36643.5367 | 45804.4209 | 137413.2627 |
| 2000 | 5654.8667 | 11309.7336 | 22619.4671 | 33929.2007 | 45238.9342 | 56548.6678 | 169646.0033 |
| 2200 | 6842.3887 | 13684.7776 | 27369.5552 | 41054.3328 | 54739.1104 | 68423.8880 | 205217.6640 |
| 2400 | 8143.0080 | 16286.0163 | 32572.0326 | 48858.0490 | 65144.0653 | 81430.0816 | 244290.2448 |
| 2600 | 9556.7247 | 19113.4268 | 38226.8536 | 57340.2804 | 76453.7072 | 95567.1340 | 286701.4020 |
| 2800 | 11083.5387 | 22167.0774 | 44334.1548 | 66501.2322 | 88668.3095 | 110835.3869 | 332506.1608 |
| 3000 | 12723.4500 | 25446.9001 | 50893.8001 | 76340.7002 | 101787.6002 | 127234.5003 | 381703.5009 |
| 3 | 0.013 | 0.025 | | | 0.102 | | 0.382 |
| 6 | 0.051 | 0.102 | | | 0.407 | | 1.526 |