

**MANUAL****Flow**

# Liquid Turbine Flow Meter

## Model PWF-LTF



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## **Warning**

When the flow meter is installed at explosion hazard field, DON'T remove the COVERPLATE when the meter is powered. Please make parameter settings at safe field prior to installation



## **Special Notices**

Pictures & Description are for your information only, please refer to the actual product. Parameters are subjected to changes without notice

## 1. GENERAL INFORMATION

This manual will assist you in installing, using and maintaining Liquid Turbine Flowmeter. It is your responsibility to make sure that all operators have access to adequate instructions about safe operating and maintenance procedure.



### Warning

For your safety, review the major warnings and cautions below before operating your equipment.

- Use only fluids that are compatible with the housing material and wetted components of your Liquid turbine flow meter.
- When handling hazardous liquids, always follow the liquid manufacturer's safety precautions.
- When measuring flammable liquids, observe precautions against fire or explosion.
- When working in hazardous environments, always exercise appropriate safety precautions.
- Handle the rotor carefully. Even small scratches or nicks can affect accuracy.
- For best results, calibrate the meter at least 1 time per year.
- Do not blow the flow meter with compressed air.
- During flowmeter removal, liquid may spill. Follow liquid manufacturer's safety precautions for clean up of minor spills.

## Product Description

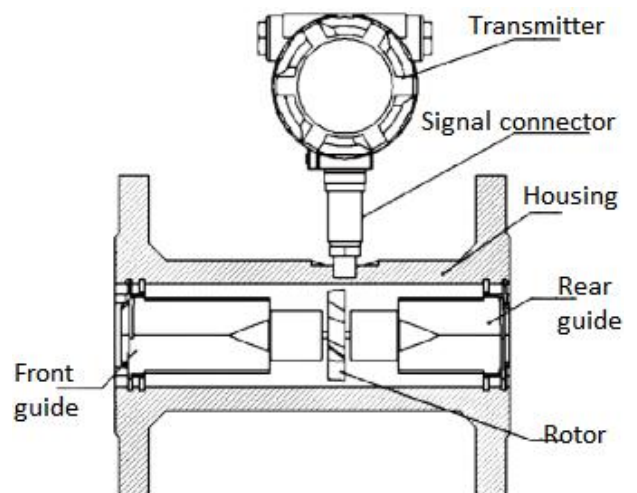
PWF-LTF series turbine flow meter is a precision flow measuring instrument that measures the flow and total volume of impurity-free and non-corrosive liquids. It is widely used in the fields of petroleum, chemical industry, metallurgy, scientific research, etc.

Liquid flows through the turbine housing causing an internal rotor to spin. As the rotor spins, an electrical signal is generated in the pickup coil. This signal is converted into engineering units (liters, cubic meters, gallons etc.) on the local display where is applicable. Optional accessory modules can be used to export the signal to other equipment.

Upon receipt, examine your meter for visible damage. The turbine is a precision measuring instrument and should be handled carefully. Remove the protective plugs and caps for a thorough inspection. If any items are damaged or missing, contact us.

Make sure the turbine flow model meets your specific needs. For your future reference, it might be useful to record this information on nameplate in the manual in case it becomes unreadable on the turbine. Refer to the nameplate for your customized product's specification.

## Product structure



## 2. SPECIFICATION

| Parameters            | Specification                                                                                                                                                                                                     |          |          |              |                                       |          |                     |          |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|--------------|---------------------------------------|----------|---------------------|----------|
| Measuring Medium      | No impurities, low viscosity, no strong corrosive liquid                                                                                                                                                          |          |          |              |                                       |          |                     |          |
| Pipe Size             | DN4～DN200mm                                                                                                                                                                                                       |          |          |              |                                       |          |                     |          |
| Accuracy              | ±1.0%F.S.(Typical); 0.5%F.S. optional                                                                                                                                                                             |          |          |              |                                       |          |                     |          |
| Repeatability         | ±0.2%                                                                                                                                                                                                             |          |          |              |                                       |          |                     |          |
| Range Ratio           | 1:10, 1:15, 1:20                                                                                                                                                                                                  |          |          |              |                                       |          |                     |          |
| Medium Temperature    | -20℃～+80℃ (Typical)<br>-20℃～+120℃ (By customized)<br>-20℃～+150℃ (By customized)                                                                                                                                   |          |          |              |                                       |          |                     |          |
| Working Pressure      | Fluid pressure should be limited according to the rating                                                                                                                                                          |          |          |              |                                       |          |                     |          |
| Operation Conditions  | Medium Temp.: -20℃～+80℃                                                                                                                                                                                           |          |          |              | Relative Humidity: 5% ~ 90%           |          |                     |          |
|                       | Environmental Temp.: -20℃～+60℃                                                                                                                                                                                    |          |          |              | Atmospheric Pressure: 86KPa ~ 106 KPa |          |                     |          |
| Signal Output         | Sensor: Pulse<br>Transmitter: 4-20mA                                                                                                                                                                              |          |          |              |                                       |          |                     |          |
| Communication         | RS485 Modbus RTU, HART                                                                                                                                                                                            |          |          |              |                                       |          |                     |          |
| Power Supply          | 24VDC, 220VAC, 3.6V lithium battery                                                                                                                                                                               |          |          |              |                                       |          |                     |          |
| Material              | Housing                                                                                                                                                                                                           |          | Rotor    |              | Front&Rear Guide                      |          | Flange/Chuck/Clamps |          |
|                       | Standard                                                                                                                                                                                                          | Optional | Standard | Optional     | Standard                              | Optional | Standard            | Optional |
| Thread Connection     | SUS304                                                                                                                                                                                                            | SS316    | 2Cr13    | Duplex steel | SUS304                                | SS316    | -                   | -        |
| Flange Connection     |                                                                                                                                                                                                                   |          |          |              |                                       |          | SUS304              | SS316    |
| Wafer Connection      |                                                                                                                                                                                                                   |          |          |              |                                       |          | Carbon steel        | 304/316  |
| Clamp Connection      |                                                                                                                                                                                                                   |          |          |              |                                       |          | SUS304              | -        |
| Other Materials       | Transmitter enclosure: Die-cast aluminum alloy<br>Signal connector: SUS304<br>Bearings and shaft: carbon steel coated with Tungsten carbide<br>Retaining rings: 316 stainless steel                               |          |          |              |                                       |          |                     |          |
| Connection Method     | Flange connection: DN15-DN200 (Standard DIN, ANSI, JIS, GB/T9113-2000)<br>Thread connection: DN4-DN100 (Female, male, NPT, spherical, GB/T7307-2001)<br>Wafer connection: DN4-DN200<br>Clamp connection: DN4-DN80 |          |          |              |                                       |          |                     |          |
| Protection Level      | IP65                                                                                                                                                                                                              |          |          |              |                                       |          |                     |          |
| Electrical Connection | Hirschmann connector or three core cable<br>M20*1.5 female                                                                                                                                                        |          |          |              |                                       |          |                     |          |
| Explosion Proof       | ExdIICT6 Gb (Optional)                                                                                                                                                                                            |          |          |              |                                       |          |                     |          |

## Measurable Flow Range Table

| Nominal Diameter |        | Standard Flow Range | Extended Flow Range | Starting Flow       | Max Pressure Loss |
|------------------|--------|---------------------|---------------------|---------------------|-------------------|
| (mm)             | (Inch) | (m <sup>3</sup> /h) | (m <sup>3</sup> /h) | (m <sup>3</sup> /h) | (KPa)             |
| 4                | 0.15   | 0.04~0.25           | 0.04~0.4            | 0.02                | 120               |
| 6                | 0.25   | 0.1~0.6             | 0.06~0.6            | 0.05                | 80                |
| 10               | 0.4    | 0.2~1.2             | 0.15~1.5            | 0.07                | 50                |
| 15               | 1/2    | 0.6~3.6             | 0.5~5               | 0.35                | 35                |
| 20               | 3/4    | 0.8~8               | 0.45~9              | 0.3                 | 35                |
| 25               | 1      | 1~10                | 0.5~10              | 0.4                 | 35                |
| 32               | 1-1/4  | 1.5~15              | 0.8~15              | 0.6                 | 35                |
| 40               | 1-1/2  | 2~20                | 1~20                | 0.6                 | 35                |
| 50               | 2      | 4~40                | 2~40                | 1                   | 35                |
| 65               | 2-1/2  | 7~70                | 5~70                | 4                   | 25                |
| 80               | 3      | 10~100              | 7~100               | 5                   | 25                |
| 100              | 4      | 20~200              | 10~200              | 8                   | 25                |
| 125              | 5      | 25~250              | 13~250              | 10                  | 25                |
| 150              | 6      | 30~300              | 15~300              | 12                  | 25                |
| 200              | 8      | 80~800              | 40~800              | 20                  | 25                |
| Accuracy         |        | 0.5%F.S.            | 1.0%F.S.            |                     |                   |

\* Maximum pressure loss is the pressure loss when the flowmeter is operating at the maximum flow point, the medium is water and the temperature is normal.

\* Accuracy 0.2%F.S. needs to be customized, the flow range is smaller than the standard range.

## Pressure Rating Table

| Nominal Diameter |        | Connection Method and Pressure Rating                |                                                      |                  |                                    |               |               |
|------------------|--------|------------------------------------------------------|------------------------------------------------------|------------------|------------------------------------|---------------|---------------|
| (mm)             | (Inch) | Thread Connection                                    | Flange Connection                                    | Clamp Connection | Wafer Connection<br>(By customize) |               |               |
| 4                | 0.15   | <b>6.3MPa</b><br>(Can customize for higher pressure) | /                                                    | <b>1.0MPa</b>    | <b>≤42MPa</b>                      |               |               |
| 6                | 0.25   |                                                      |                                                      |                  |                                    |               |               |
| 10               | 0.4    |                                                      |                                                      |                  |                                    |               |               |
| 15               | 1/2    |                                                      |                                                      |                  |                                    |               |               |
| 20               | 3/4    |                                                      |                                                      |                  |                                    |               |               |
| 25               | 1      |                                                      |                                                      |                  |                                    |               |               |
| 32               | 1-1/4  | <b>2.5MPa</b><br>(Can customize for higher pressure) | <b>2.5MPa</b><br>(Can customize for higher pressure) |                  | <b>1.0MPa</b>                      | <b>≤42MPa</b> |               |
| 40               | 1-1/2  |                                                      |                                                      |                  |                                    |               |               |
| 50               | 2      |                                                      |                                                      |                  |                                    |               |               |
| 65               | 2-1/2  | <b>1.6MPa</b><br>(Can customize for higher pressure) | <b>1.6MPa</b><br>(Can customize for higher pressure) | <b>1.0MPa</b>    |                                    | <b>≤26MPa</b> |               |
| 80               | 3      |                                                      |                                                      |                  |                                    |               |               |
| 100              | 4      |                                                      |                                                      |                  |                                    |               |               |
| 125              | 5      | /                                                    | <b>1.6MPa</b><br>(Can customize for higher pressure) |                  |                                    | <b>1.0MPa</b> | <b>≤15MPa</b> |
| 150              | 6      |                                                      |                                                      |                  |                                    |               |               |
| 200              | 8      |                                                      |                                                      |                  |                                    |               |               |
|                  |        |                                                      |                                                      |                  |                                    |               |               |

### 3. Part Selection Table

| Model No.                          |                          |                          |                          |                          |                          |                          |                          |                          |                          | Definition                                                                             |
|------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------|
| PWF-LTF                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                                                                                        |
| Nominal Diameter (mm)              | 4                        |                          |                          |                          |                          |                          |                          |                          |                          | DN4                                                                                    |
|                                    | 6                        |                          |                          |                          |                          |                          |                          |                          |                          | DN6                                                                                    |
|                                    | 10                       |                          |                          |                          |                          |                          |                          |                          |                          | DN10                                                                                   |
|                                    | 15                       |                          |                          |                          |                          |                          |                          |                          |                          | DN15                                                                                   |
|                                    | 20                       |                          |                          |                          |                          |                          |                          |                          |                          | DN20                                                                                   |
|                                    | 25                       |                          |                          |                          |                          |                          |                          |                          |                          | DN25                                                                                   |
|                                    | 32                       |                          |                          |                          |                          |                          |                          |                          |                          | DN32                                                                                   |
|                                    | 40                       |                          |                          |                          |                          |                          |                          |                          |                          | DN40                                                                                   |
|                                    | 50                       |                          |                          |                          |                          |                          |                          |                          |                          | DN50                                                                                   |
|                                    | 65                       |                          |                          |                          |                          |                          |                          |                          |                          | DN65                                                                                   |
|                                    | 80                       |                          |                          |                          |                          |                          |                          |                          |                          | DN80                                                                                   |
|                                    | 100                      |                          |                          |                          |                          |                          |                          |                          |                          | DN100                                                                                  |
|                                    | 125                      |                          |                          |                          |                          |                          |                          |                          |                          | DN125                                                                                  |
|                                    | 150                      |                          |                          |                          |                          |                          |                          |                          |                          | DN150                                                                                  |
|                                    | 200                      |                          |                          |                          |                          |                          |                          |                          |                          | DN200                                                                                  |
| Connection                         | FL                       |                          |                          |                          |                          |                          |                          |                          |                          | Flanged                                                                                |
|                                    | TH                       |                          |                          |                          |                          |                          |                          |                          |                          | Threaded                                                                               |
|                                    | CL                       |                          |                          |                          |                          |                          |                          |                          |                          | Clamped                                                                                |
|                                    | WA                       |                          |                          |                          |                          |                          |                          |                          |                          | Wafer                                                                                  |
| Meter Type                         |                          | N                        |                          |                          |                          |                          |                          |                          |                          | 24VDC supply, no field display, pulse output                                           |
|                                    |                          | A                        |                          |                          |                          |                          |                          |                          |                          | 24VDC supply, field display, 4-20mA output                                             |
|                                    |                          | G1                       |                          |                          |                          |                          |                          |                          |                          | Battery powered, field display, no output                                              |
|                                    |                          | GX                       |                          |                          |                          |                          |                          |                          |                          | External power supply, field display, RS485/4-20mA/pulse output                        |
|                                    |                          | E1                       |                          |                          |                          |                          |                          |                          |                          | (Explosion-proof type) Battery powered, field display, no output                       |
|                                    |                          | EX                       |                          |                          |                          |                          |                          |                          |                          | (Explosion-proof type) External power supply, field display, RS485/4-20mA/pulse output |
| Flow Range Type                    |                          | S                        |                          |                          |                          |                          |                          |                          |                          | Standard range                                                                         |
|                                    |                          | W                        |                          |                          |                          |                          |                          |                          |                          | Extended range                                                                         |
|                                    |                          | Z                        |                          |                          |                          |                          |                          |                          |                          | Special range                                                                          |
| Accuracy                           |                          |                          |                          |                          |                          | 05                       |                          |                          |                          | 0.5%F.S.                                                                               |
|                                    |                          |                          |                          |                          |                          | 10                       |                          |                          |                          | 1.0%F.S.                                                                               |
|                                    |                          |                          |                          |                          |                          | 02                       |                          |                          |                          | 0.2%F.S.(By customized, longer lead time)                                              |
| Housing Material                   |                          |                          |                          |                          |                          |                          | S                        |                          |                          | SUS304                                                                                 |
|                                    |                          |                          |                          |                          |                          |                          | L                        |                          |                          | SS316L                                                                                 |
| Impeller Material                  |                          |                          |                          |                          |                          |                          |                          | S                        |                          | 2Cr13                                                                                  |
|                                    |                          |                          |                          |                          |                          |                          |                          | L                        |                          | Duplex steel                                                                           |
| Explosion-proof Grade              |                          |                          |                          |                          |                          |                          |                          | N                        |                          | None-explosion proof                                                                   |
|                                    |                          |                          |                          |                          |                          |                          |                          | E                        |                          | Exd II BT6 Gb                                                                          |
| Temperature and Pressure Resistant |                          |                          |                          |                          |                          |                          |                          | N                        |                          | Standard                                                                               |
|                                    |                          |                          |                          |                          |                          |                          |                          | H(x)                     |                          | High Temperature and high pressure                                                     |

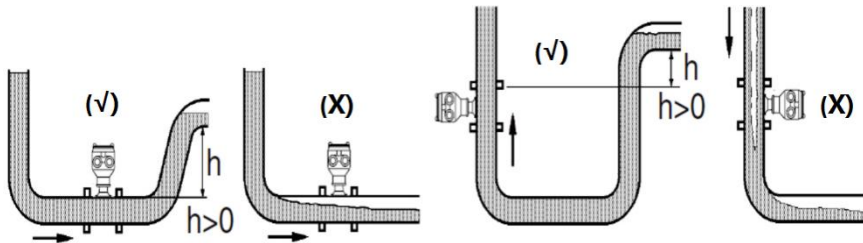
Notes: DN20, DN32, DN65, DN125 are sizes by customization.

## 4. CAUTIONS FOR INSTALLATION

### Mounting Positions

Turbine flowmeter should be installed at the place in compliance with the requirements as below, otherwise flow rate indications may be affected and measurement errors maybe caused.

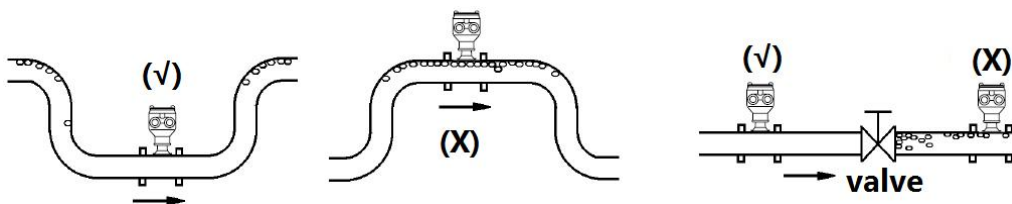
★ Pipes must be fully filled with liquids at all times.



**Warning:**

**Precaution for direct sunshine and rain when the meter is installed outside.**

★ Avoid Air Bubbles in the measurement pipe.



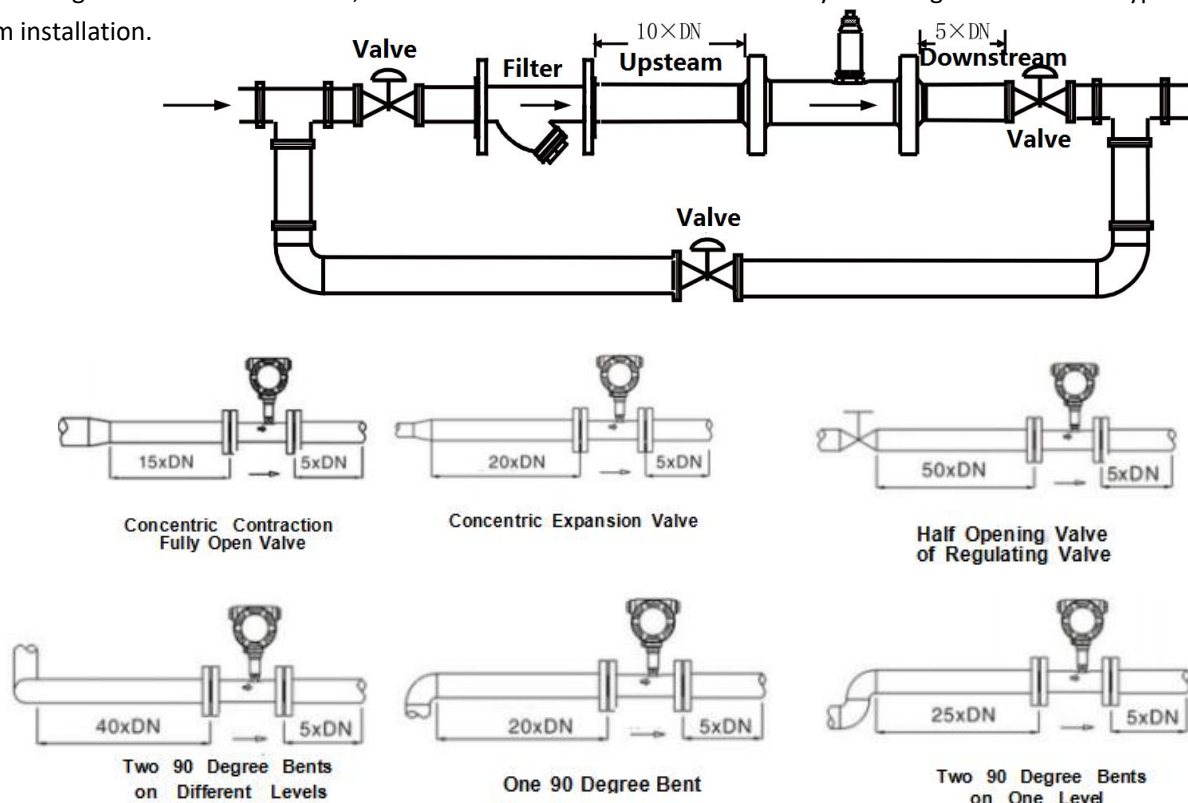
★ Avoid all pipe locations where the flow is pulsating, such as in the outlet side of piston or diaphragm pumps.

★ Avoid locations near equipment producing electrical interference such as electric motors, transformers, variable frequency, etc.

★ Install the meter with enough room for future access for maintenance purposes.

### Required Lengths of Straight Pipe

Flow altering device such as elbows, valves and reducers can affect accuracy. See diagram below for typical flow meter system installation.



The recommended guidelines are given to enhance accuracy and maximize performance. Distance given here are minimum requirements; Double them for desired straight pipe lengths.

★ Upstream: Allow a minimum straight pipe length at least 10 times the internal diameter of the pipe. For example, with the 50mm pipe, there should be 500mm of straight pipe for upstream. Desired upstream straight pipe length is 1000mm.

★ Downstream: Allow a minimum straight pipe length at least 5 times the internal diameter of the pipe. For example, with the 50mm pipe, there should be 250mm of straight pipe for downstream. Desired downstream straight pipe length is 500mm.

## Anti-Cavitation

Cavitation can be caused by entrained air. An amount higher than about 100 mg/l of entrained air or gas can produce error. In addition, cavitation can be caused by too little back pressure on the flow meter. For our turbine flow meters, you should provide a back pressure(downstream pressure) of at least 1.25 times the vapor pressure, plus 2 times the pressure drop through the flow meter. See formula 1.

$$\text{Formula 1: } P_b \geq 1.25 \times P_v + 2 \times (P_{in} - P_{out})$$

In formula 1: (P<sub>b</sub>: Back pressure; P<sub>v</sub>: Vapor Pressure; P<sub>in</sub>: Inlet Pressure; P<sub>out</sub>: Outlet Pressure)

Create back pressure by installing a control valve on the downstream side of the meter at the proper distance detailed above.



### Special Notice

- ★ External material in the liquid being measured can clog the meter's rotor and adversely affect accuracy. If this problem is anticipated or experienced, install screens to filter impurities from incoming liquids.
- ★ To ensure accurate measurement, drain all air from the system before use.
- ★ **When the meter contains removable coverplates. Leave the coverplate installed unless accessory modules specify removal. Don't remove the coverplates when the meter is powered, or electrical shock and explosion hazard can be caused.**

## 5.CONNECTION AND DIMENSIONS

### Thread Connection

1. To protect against leakage, seal all threads with an appropriate sealing compound. Make the sealing compound does not intrude into the flow path.
2. Make the arrow on the outlet is pointed in the direction of the flow.
3. Tighten the turbine onto the fittings. Use a wrench only on wrench flats.

### Flange Connections

**For standard product, the flange follows GB/T 9119-2000 (ISO 7005-1) RF (Raised Face).**

Note: flange can be customized following other standards.

Use a gasket between the meter flange and mating flange. Determine the material of the gasket based on the operating conditions and type of fluid.

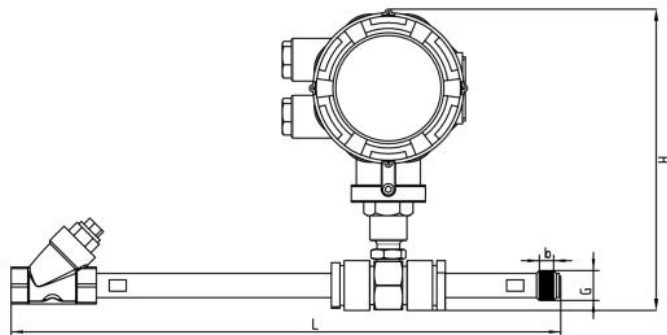
**Note:** Do not over tighten the flange bolts. This may cause the gasket to be compressed into the flow stream and may decrease the accuracy of the meter.



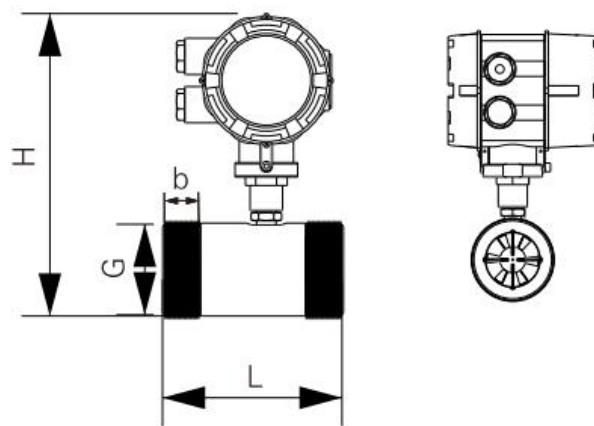
## DIMENSIONS

| Liquid Turbine Flow Meter |                                |                                                                                   |                    |                                                                                     |
|---------------------------|--------------------------------|-----------------------------------------------------------------------------------|--------------------|-------------------------------------------------------------------------------------|
| Reference Pictures        | N1(Pulse)                      |  | G(Intelligent)     |  |
|                           | N2(Pulse+4-20mA)<br>/A(4-20mA) |  | E(Explosion-proof) |  |

Male Thread Connection Dimension Table

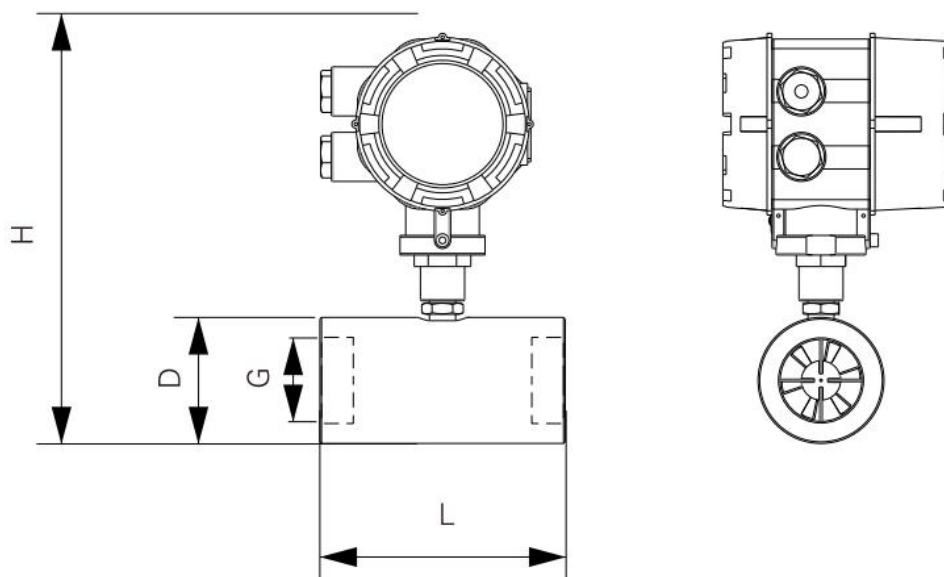


DN4-DN10 male threaded connection  
(Straight pipe section is included)

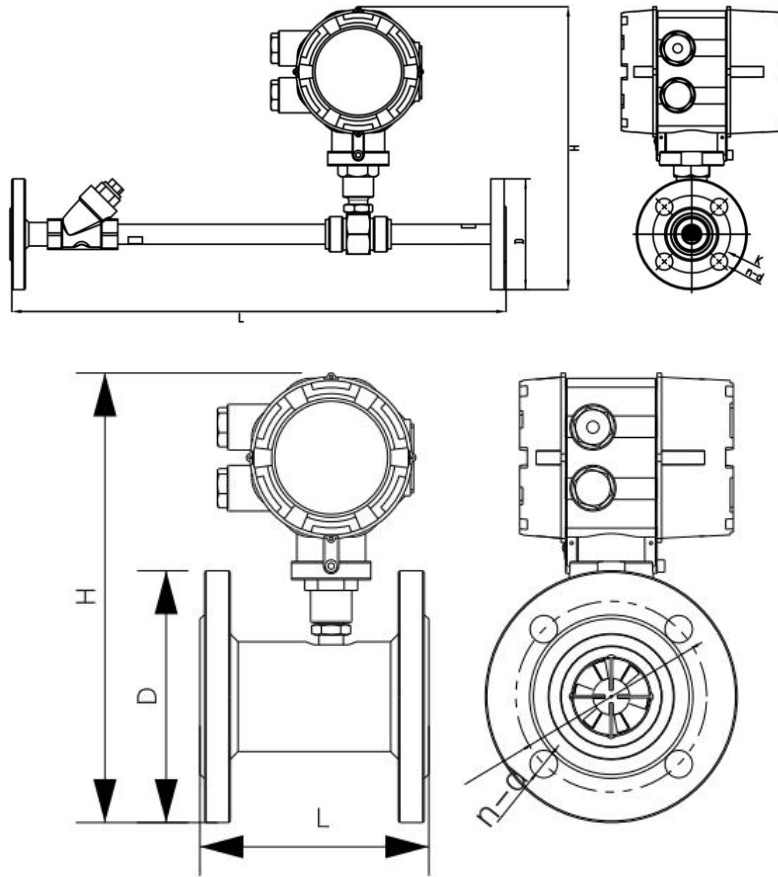


DN15-DN100 male thread connection  
(Straight pipe section is excluded but optional)

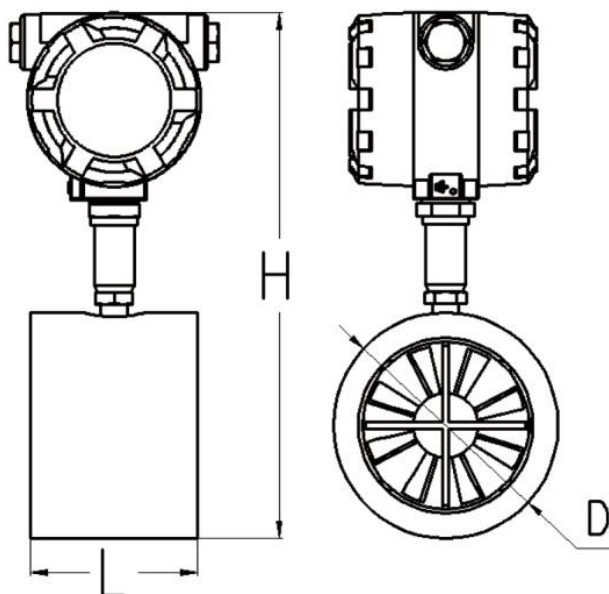
| MALE THREAD |       |           |                                 |                                       |               |        |
|-------------|-------|-----------|---------------------------------|---------------------------------------|---------------|--------|
| DN(mm)      | L(mm) | H(mm)     |                                 |                                       | G male thread | b (mm) |
|             |       | N1(Pulse) | N2((Pulse+4-20mA)<br>/A(4-20mA) | G(Intelligent)/<br>E(Explosion-proof) |               |        |
| 4           | 267   | 145       | 151                             | 218                                   | G 1/2         | 13     |
| 6           | 267   | 145       | 151                             | 218                                   | G 1/2         | 13     |
| 10          | 387   | 147       | 153                             | 220                                   | G 1/2         | 13     |
| 15          | 75    | 150       | 156                             | 223                                   | G1            | 15     |
| 20          | 85    | 155       | 161                             | 228                                   | G1            | 13     |
| 25          | 100   | 159       | 165                             | 232                                   | G1-1/4        | 15     |
| 32          | 140   | 166       | 172                             | 239                                   | G2            | 20     |
| 40          | 140   | 176       | 182                             | 249                                   | G2            | 20     |
| 50          | 150   | 190       | 196                             | 263                                   | G2-1/2        | 30     |
| 65          | 170   | 202       | 208                             | 275                                   | G3            | 35     |
| 80          | 200   | 216       | 222                             | 289                                   | G4            | 40     |

**Female Thread Connection Dimension Table**


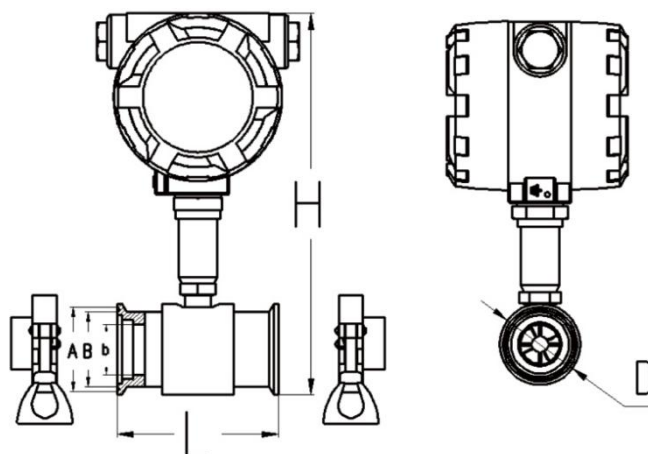
| FEMALE THREAD |       |           |                                 |                |                        |                 |       |
|---------------|-------|-----------|---------------------------------|----------------|------------------------|-----------------|-------|
| DN(mm)        | L(mm) | H(mm)     |                                 |                |                        | G female thread | D(mm) |
|               |       | N1(Pulse) | N2((Pulse+4-20mA)<br>/A(4-20mA) | G(Intelligent) | E(Explosion<br>-proof) |                 |       |
| 4             | 75    | 149       | 155                             | 197            | 222                    | G 3/8           | 42    |
| 6             | 75    | 149       | 155                             | 197            | 222                    | G 3/8           | 42    |
| 10            | 75    | 151       | 157                             | 199            | 224                    | G 1/2           | 42    |
| 15            | 100   | 155       | 161                             | 203            | 228                    | G 1/2           | 44    |
| 20            | 120   | 157       | 163                             | 205            | 230                    | G 3/4           | 43    |
| 25            | 120   | 163       | 169                             | 211            | 236                    | G1              | 49    |
| 32            | 120   | 170       | 176                             | 218            | 243                    | G1-1/4          | 56    |
| 40            | 120   | 176       | 182                             | 224            | 249                    | G1-1/2          | 60    |
| 50            | 120   | 187       | 193                             | 235            | 260                    | G2              | 72    |

**Flange Connection Dimension Table**


| FLANGE CONNECTION |           |           |           |               |                                |                |                        |           |                     |
|-------------------|-----------|-----------|-----------|---------------|--------------------------------|----------------|------------------------|-----------|---------------------|
| DN<br>(mm)        | L<br>(mm) | D<br>(mm) | K<br>(mm) | H(mm)         |                                |                |                        | d<br>(mm) | n<br>(qty of holes) |
|                   |           |           |           | N1<br>(Pulse) | N2((Pulse+4-20m)<br>/A(4-20mA) | G(Intelligent) | E(Explosion<br>-proof) |           |                     |
| 4                 | 296       | 90        | 65        | 168           | 152                            | 230            | 230                    | 14        | 4                   |
| 6                 | 296       | 90        | 65        | 168           | 152                            | 230            | 230                    | 14        | 4                   |
| 10                | 413       | 90        | 65        | 178           | 152                            | 230            | 230                    | 14        | 4                   |
| 15                | 75        | 94        | 65        | 180           | 186                            | 253            | 253                    | 14        | 4                   |
| 20                | 85        | 104       | 75        | 188           | 194                            | 260.5          | 260.5                  | 14        | 4                   |
| 25                | 100       | 114       | 85        | 195           | 201                            | 268            | 268                    | 14        | 4                   |
| 32                | 140       | 139       | 100       | 211           | 217                            | 284            | 284                    | 18        | 4                   |
| 40                | 140       | 149       | 110       | 220           | 226                            | 293            | 293                    | 18        | 4                   |
| 50                | 150       | 164       | 125       | 234           | 240                            | 305.5          | 305.5                  | 18        | 4                   |
| 65                | 170       | 184       | 145       | 250           | 256                            | 323            | 323                    | 18        | 8                   |
| 80                | 200       | 198       | 160       | 265           | 271                            | 337.5          | 337.5                  | 18        | 8                   |
| 100               | 220       | 218       | 180       | 285           | 291                            | 357.5          | 357.5                  | 18        | 8                   |
| 125               | 250       | 248       | 210       | 312           | 318                            | 385            | 385                    | 18        | 8                   |
| 150               | 300       | 283       | 240       | 342           | 348                            | 415            | 415                    | 22        | 8                   |
| 200               | 350       | 337       | 295       | 395           | 401                            | 467            | 467                    | 22        | 12                  |
| 250               | 400       | 402       | 355       | 451           | 457                            | 524.5          | 524.5                  | 26        | 12                  |
| 300               | 350       | 457       | 410       | 504           | 510                            | 577            | 577                    | 26        | 12                  |

**Wafer Connection Dimension Table**


| WAFER CONNECTION |           |           |               |                                |                |                        |
|------------------|-----------|-----------|---------------|--------------------------------|----------------|------------------------|
| DN<br>(mm)       | L<br>(mm) | D<br>(mm) | H(mm)         |                                |                |                        |
|                  |           |           | N1<br>(Pulse) | N2((Pulse+4-20m)<br>/A(4-20mA) | G(Intelligent) | E(Explosion<br>-proof) |
| 4                | 50        | 38        | -             | -                              | -              | -                      |
| 6                | 50        | 38        | -             | -                              | -              | -                      |
| 10               | 50        | 38        | -             | -                              | -              | -                      |
| 15               | 55        | 47        | 161           | 167                            | 209            | 234                    |
| 20               | 60        | 53        | 163           | 169                            | 211            | 236                    |
| 25               | 60        | 58        | 168           | 174                            | 216            | 241                    |
| 32               | 70        | 66        | 176           | 182                            | 224            | 249                    |
| 40               | 70        | 72        | 183           | 189                            | 231            | 256                    |
| 50               | 70        | 92        | 198           | 204                            | 246            | 271                    |
| 65               | 80        | 100       | 209           | 215                            | 257            | 282                    |
| 80               | 90        | 112       | 223           | 229                            | 271            | 296                    |
| 100              | 100       | 137       | 245           | 251                            | 293            | 318                    |
| 125              | 120       | 165       | 272           | 278                            | 320            | 345                    |
| 150              | 150       | 190       | 297           | 303                            | 345            | 370                    |
| 200              | 150       | 242       | 348           | 354                            | 396            | 421                    |

**Clamp Connection Dimension Table**


| DN<br>(mm) | L<br>(mm) | D<br>(mm) | A<br>(mm) | B<br>(mm) | b<br>(mm) | H(mm)         |                                |                |                        |
|------------|-----------|-----------|-----------|-----------|-----------|---------------|--------------------------------|----------------|------------------------|
|            |           |           |           |           |           | N1<br>(Pulse) | N2((Pulse+4-20m)<br>/A(4-20mA) | G(Intelligent) | E(Explosion<br>-proof) |
| 4          | 50        | 50.5      | 46        | 40.5      | 4         | 153           | 159                            | 201            | 226                    |
| 6          |           |           |           |           | 6         | 153           | 159                            | 201            | 226                    |
| 10         |           |           |           |           | 10        | 155           | 161                            | 203            | 228                    |
| 15         | 100       |           |           |           | 15        | 159           | 165                            | 207            | 232                    |
| 20         |           |           |           |           | 20        | 162           | 168                            | 210            | 235                    |
| 25         |           |           |           |           | 25        | 165           | 171                            | 213            | 238                    |
| 32         | 120       |           |           |           | 32        | 169           | 175                            | 217            | 242                    |
| 40         | 140       | 64        | 59        | 53.5      | 40        | 179           | 185                            | 227            | 252                    |
| 50         | 150       | 78        | 73.5      | 68        | 50        | 190           | 196                            | 238            | 263                    |
| 65         | 170       | 91        | 86        | 80.5      | 65        | 204           | 210                            | 252            | 277                    |
| 80         | 200       | 106       | 100.5     | 94        | 80        | 219           | 225                            | 267            | 292                    |
| 100        | 220       | 119       | 113       | 106       | 100       | 240           | 246                            | 288            | 313                    |

Note: 1. The product is subject to the actual supply.

2. Above dimensions are standard pressure-resistant dimensions.

## 6.ELECTRICAL WIRING



Warning: Electrical Harzard.

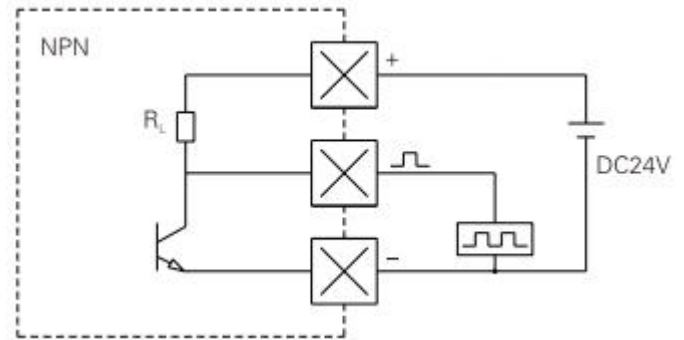
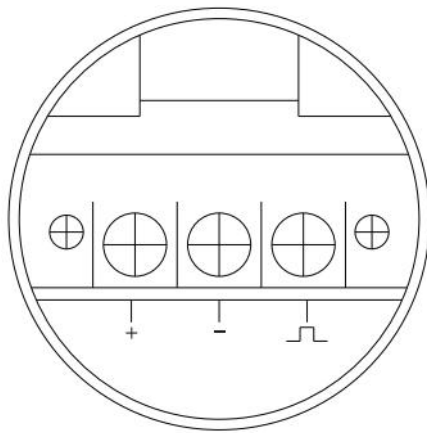
Disconnect power before the beginning of installation

**Turbine FLOW Sensor/Transmitter**

### ➤ 1. N1 Type(Pulse Type without Explosion Proof)

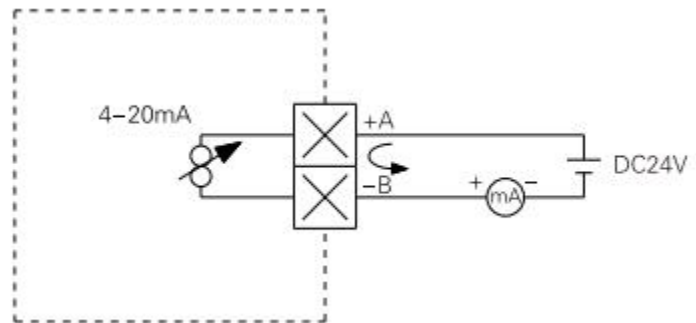
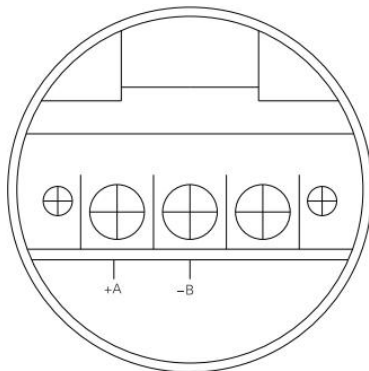
| Cable Color | Terminal Symbols | Description         |
|-------------|------------------|---------------------|
| Red Wire    | 24V+             | Power supply "24V+" |
| Black Wire  | 24V-             | Power supply "24V-" |
| Blue Wire   | Pulse            | Pulse output        |

➤ **2. N2 Type(Pulse with explosion proof)**



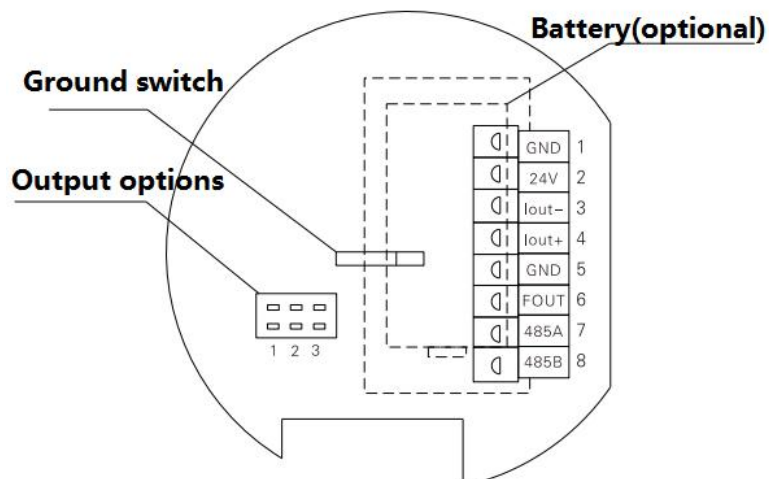
Notice: (1) High level amplitude  $>22V$   
 (2) Low level amplitude  $<0.8V$   
 (3) Load capacity  $>1100\Omega$   
 (4) Pulse frequency  $\leq 3000Hz$

➤ **3. 4-20mA Output with Explosion proof type**



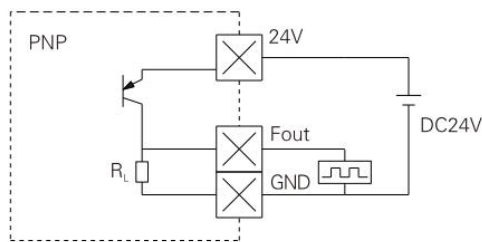
Notice: Current load resistor is  $<500\Omega$

➤ **4.1 Intelligent transmitter -24VDC Power Supply**



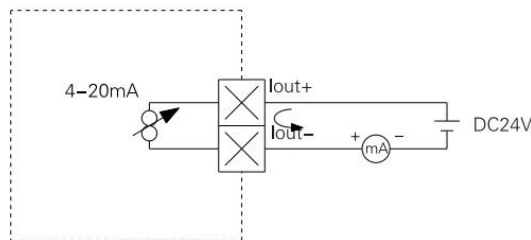
| 24VDC Power Supply G Type transmitter Terminals |                  |                   |                                                                                                                    |
|-------------------------------------------------|------------------|-------------------|--------------------------------------------------------------------------------------------------------------------|
| Terminal No.                                    | Terminal Symbols | Description       | Remarks                                                                                                            |
| 1                                               | GND              | 24V- power supply | /                                                                                                                  |
| 2                                               | 24V              | 24V+ power supply | /                                                                                                                  |
| 3                                               | Iout-            | Current output    | 2/3 wires 4-20mA output and 3-wire 0-20mA function, please refer to wiring definition                              |
| 4                                               | Iout+            | Current output    |                                                                                                                    |
| 5                                               | GND              | 24V- power supply | /                                                                                                                  |
| 6                                               | FOUT             | Pulse output      | Pulse or scaled pulse output is related to the status of the dip switch. For details, see "Dip Switch Description" |
| 7                                               | 485A             | RS485A            | /                                                                                                                  |
| 8                                               | 485B             | RS485B            | /                                                                                                                  |

#### 4.1.1 Pulse/Scaled pulse output- 24VDC



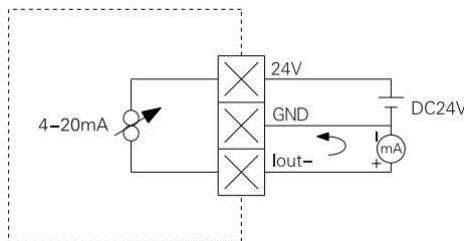
Notice: (1) High level amplitude  $>22V$   
 (2) Low level amplitude  $<0.8V$   
 (3) Load capacity  $>1100\Omega$   
 (3) Pulse frequency  $\leq 3000Hz$

#### 4.1.2 (2-wire) 4-20mA output- 24VDC



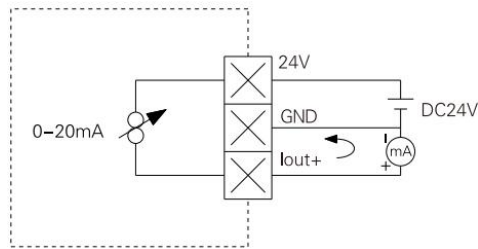
Notice: Current load resistor  $\leq 500\Omega$

#### 4.1.3 (3-wire) 4-20mA output- 24VDC



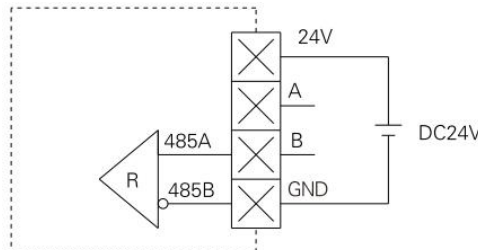
Notice: Current load resistor  $\leq 500\Omega$

#### 4.1.4 (3-wire) 0-20mA output- 24VDC



Notice: Current load resistor  $\leq 500\Omega$

#### 4.1.5 RS485 Communication- 24VDC



Notice: Communication protocol is RS485 Modbus RTU

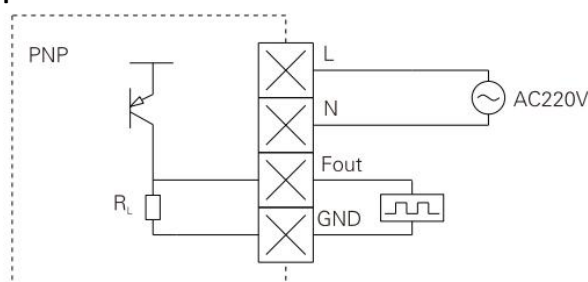
#### ➤ 4.2 G Type(Intelligent transmitter) -220VAC Power Supply

| 24VDC Power Supply G Type transmitter Terminals |                  |                                |                                                                                                                    |
|-------------------------------------------------|------------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Terminal No.                                    | Terminal Symbols | Description                    | Remarks                                                                                                            |
| 1                                               | L                | 24V+ power supply              | /                                                                                                                  |
| 2                                               | N                | 24V- power supply              | /                                                                                                                  |
| 3                                               | Iout-            | Current output                 | 4-wire 4-20mA output and 4-wire 0-20mA function, please refer to wiring definition                                 |
| 4                                               | Iout+            | Current output                 |                                                                                                                    |
| 5                                               | GND              | Ground of Current/pulse output | /                                                                                                                  |
| 6                                               | FOUT             | Pulse output                   | Pulse or scaled pulse output is related to the status of the DIP switch. For details, see "Jumper Cap Description" |
| 7                                               | 485A             | RS485A                         | /                                                                                                                  |
| 8                                               | 485B             | RS485B                         | /                                                                                                                  |

#### Jumper Cap Description

|                                                            |
|------------------------------------------------------------|
| "1-ON; 2-OFF; 3-OFF": Pulse output                         |
| "1-OFF; 2-ON; 3-OFF": Scaled Pulse output                  |
| "1-OFF; 2-OFF; 3-ON": Reserve                              |
| Jumper Cap corresponds to the pulse output interface FOUT. |

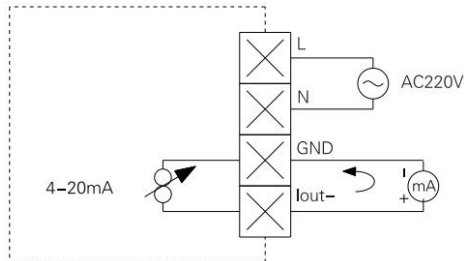
#### 4.2.1 Pulse/Scaled Pulse output-220VAC





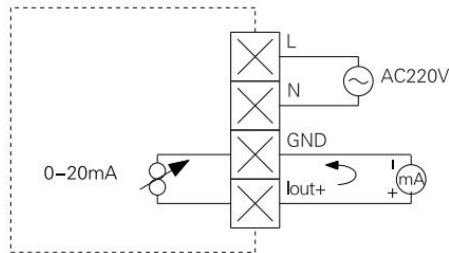
Notice: (1) High level amplitude  $>22V$   
 (2) Low level amplitude  $<0.8V$   
 (3) Load capacity  $>1100\Omega$   
 (4) Pulse frequency  $\leq 3000Hz$

#### 4.2.2 (4-wire) 4-20mA output-220VAC



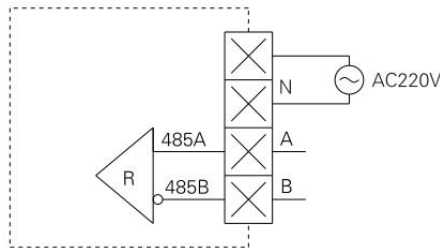
Notice: Current load resistor  $\leq 500\Omega$

#### 4.2.3 (4-wire) 0-20mA output-220VAC



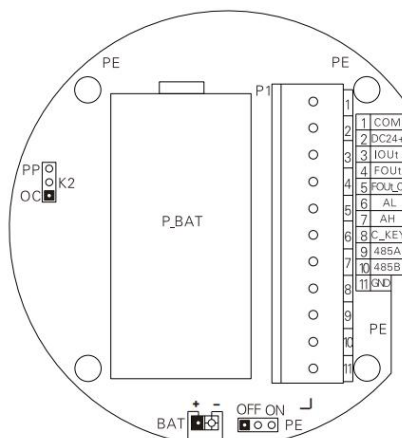
Notice: Current load resistor  $\leq 500\Omega$

#### 4.2.4 RS485 Output-220VAC



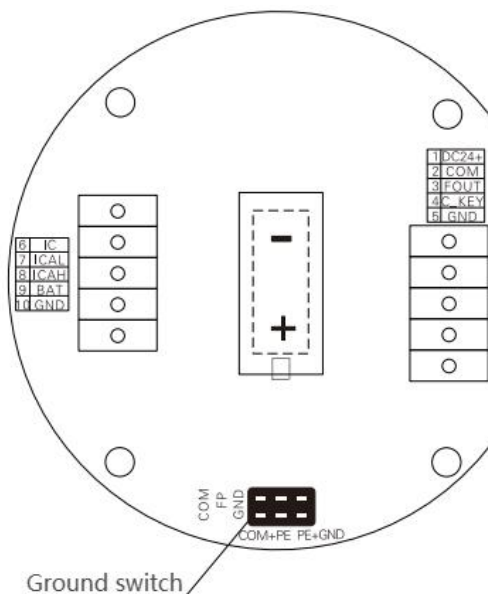
Notice: Communication protocol is RS485 Modbus RTU

#### ➤ 4.3.1 Explosion-proof transmitter -24VDC Power Supply



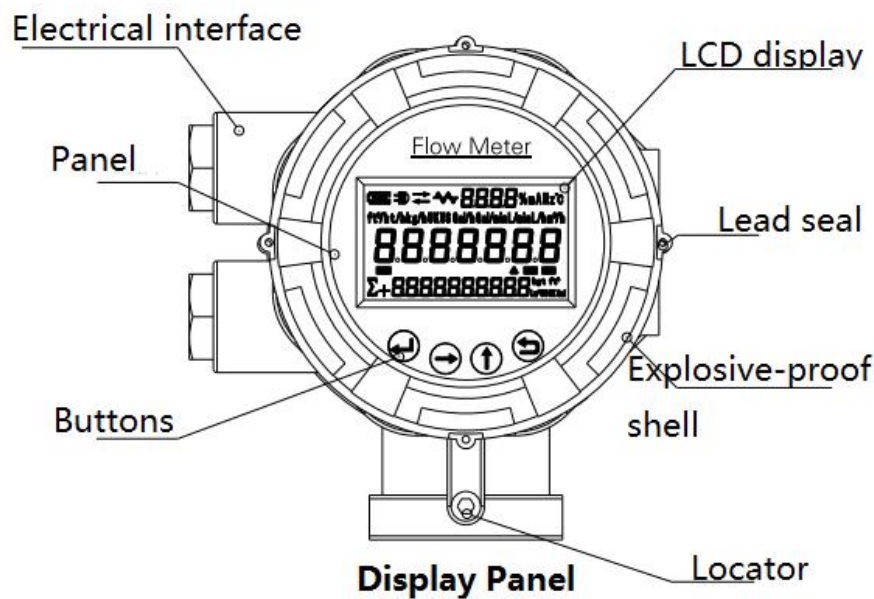
| Explosion-proof transmitter Terminal -24VDC Power Supply |                  |                                      |                                                      |
|----------------------------------------------------------|------------------|--------------------------------------|------------------------------------------------------|
| Terminal No.                                             | Terminal Symbols | Description                          | Remarks                                              |
| 1                                                        | COM              | 24VDC-                               | /                                                    |
| 2                                                        | DC24+            | 24VDC+                               | Loop Power+                                          |
| 3                                                        | Iout             | Current output                       | Loop Power-                                          |
| 4                                                        | Fout             | Calibration pulse output             | Only for calibration use                             |
| 5                                                        | Fout_C           | Pulse or Scaled Pulse output         | Parameter function code P7 screen select output mode |
| 6                                                        | AL               | Instantaneous flow lower limit alarm | /                                                    |
| 7                                                        | AH               | Instantaneous flow upper limit alarm | /                                                    |
| 8                                                        | C_KEY            | External button terminal +           | /                                                    |
| 9                                                        | 485A             | RS485A                               | To be used with GND                                  |
| 10                                                       | 485B             | RS485B                               | /                                                    |
| 11                                                       | GND              | External button terminal -           | To be used with C_KEY                                |

#### 4.3.2 Battery powered transmitter



| Battery Powered Transmitter Terminals |                  |                            |                                                                                                                                                        |
|---------------------------------------|------------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Terminal No.                          | Terminal Symbols | Description                | Remarks                                                                                                                                                |
| 1                                     | DC24+            | 24VDC+                     | /                                                                                                                                                      |
| 2                                     | COM              | 24VDC-                     | Only for calibration use                                                                                                                               |
| 3                                     | FOUT             | Calibration pulse output   | /                                                                                                                                                      |
| 4                                     | C_KEY            | External button terminal + | Connect external button, short press to display the software version no. and communication parameters, long press (>5s) to clear the cumulative amount |
| 5                                     | GND              | External button terminal - | To be used with C_KEY                                                                                                                                  |
| 6                                     | IC               | /                          | Reserve                                                                                                                                                |
| 7                                     | ICAL             | /                          | Reserve                                                                                                                                                |
| 8                                     | ICAH             | /                          | Reserve                                                                                                                                                |
| 9                                     | BAT              | /                          | Reserve                                                                                                                                                |
| 10                                    | GND              | External button terminal - | To be used with C_KEY                                                                                                                                  |

## 7. PARAMETERS SETTING



### 7.1 There are 4 keys: “Enter”, “→”, “↑”, “Esc”

| KEYS                                                                                      | Description                                |
|-------------------------------------------------------------------------------------------|--------------------------------------------|
| Enter  | Save the value and advance to next menu    |
| →                                                                                         | For numerical values, move cursor position |
| ↑                                                                                         | Main value increase/Turn to previous page  |
| Esc    | Exit(Don't reserve the changes)            |

Note: To hold Esc for 5 seconds to turn off the back-light if the back-light is on and vice-versa.

### 7.2 Password and function

| Type                    | Password | Note                                                                                                                                        |
|-------------------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------|
| User password           | 1234     | To modify the P1-P14 parameters; After entering the correct password, press “Enter” button to the parameter setting                         |
| Engineer password       | 1010     | To modify the P16-P26 parameters; After entering the correct password, press “Enter” button to the parameter setting                        |
| Cumulative flow reset   | 5555     | After entering the correct password, press “Enter” button for Reset Prompt Screen and then press “Enter” button back to measuring interface |
| Cumulative flow setting | 9999     | After entering the correct password, press “Enter” button to the Cumulative flow interface                                                  |

Note: It will display “0000” before entering password. If the password is incorrect, it will go to P1-P26 menu automatically under un-settable status.

### 7.3 Description of menu

| Menu | Parameter                          | Setting Method   | Grade | Description                                                                                                                                                                                                                                                       |                                                                |                                          |
|------|------------------------------------|------------------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|------------------------------------------|
| P-1  | Unit                               | Select parameter | User  | Value                                                                                                                                                                                                                                                             | Instantaneous Flow Unit                                        | Cumulative Flow Unit                     |
|      |                                    |                  |       | 0                                                                                                                                                                                                                                                                 | m3/h                                                           | m3                                       |
|      |                                    |                  |       | 1                                                                                                                                                                                                                                                                 | L/h                                                            | L                                        |
|      |                                    |                  |       | 2                                                                                                                                                                                                                                                                 | L/min                                                          | L                                        |
|      |                                    |                  |       | 3                                                                                                                                                                                                                                                                 | US Gal/min                                                     | US Gal                                   |
|      |                                    |                  |       | 4                                                                                                                                                                                                                                                                 | UK Gal/min                                                     | UK Gal                                   |
|      |                                    |                  |       | 5                                                                                                                                                                                                                                                                 | US Gal/h                                                       | US Gal                                   |
|      |                                    |                  |       | 6                                                                                                                                                                                                                                                                 | UK Gal/h                                                       | UK Gal                                   |
|      |                                    |                  |       | 7                                                                                                                                                                                                                                                                 | Kg/h                                                           | kg                                       |
|      |                                    |                  |       | 8                                                                                                                                                                                                                                                                 | t/h                                                            | t                                        |
|      |                                    |                  |       | 9                                                                                                                                                                                                                                                                 | ft3/h                                                          | ft3                                      |
|      |                                    |                  |       | 10                                                                                                                                                                                                                                                                | US bPd                                                         | US bPd(won't display on the main screen) |
| P-2  | Damping time                       | Input value      | User  | Value: 0~99s; Unit: Second                                                                                                                                                                                                                                        |                                                                |                                          |
| P-3  | Max flow rate                      | Input value      | User  | Full scale value for 20mA; Unit is same as P-1                                                                                                                                                                                                                    |                                                                |                                          |
| P-4  | Min flow cut-off function          | Input value      | User  | When the flow rate lower than min flow rate, the flow rate will display 0; Unit is same as P-1                                                                                                                                                                    |                                                                |                                          |
| P-5  | Max input frequency                | Input value      | User  | When the frequency value exceeds the upper limit, it is equal to the upper limit frequency value; Unit is same as P-1                                                                                                                                             |                                                                |                                          |
| P-6  | Density                            | Input value      | User  | When need to display mass unit, it needs to input the density of liquid; Unit of density is g/cm3                                                                                                                                                                 |                                                                |                                          |
| P-7  | Pulse output mode                  | Select parameter | User  | 0: Close pulse output<br>1: Output corrected pulse<br>2: Output scaled pulse(Fout_C)                                                                                                                                                                              |                                                                |                                          |
| P-8  | Scaled pulse (Unit is same as P-1) | Select parameter | User  | 0.001: every 0.001 unit volume/ pulse<br>0.01: every 0.01 unit volume/ pulse<br>0.1: every 0.1 unit volume/ pulse<br>1: every 1 unit volume/ pulse<br>10: every 10 unit volume/ pulse<br>100: every 100 unit volume/ pulse<br>1000: every 1000 unit volume/ pulse |                                                                |                                          |
| P-9  | Scaled pluse width                 | Input value      | User  | The scaled pulse width should between 1~200, unit is ms                                                                                                                                                                                                           |                                                                |                                          |
| P-10 | Communication                      | Select parameter | User  | 0: RS485 Modbus<br>1: HART                                                                                                                                                                                                                                        |                                                                |                                          |
| P-11 | Communication Parameters           | Select parameter | User  | RS485                                                                                                                                                                                                                                                             | Address: 1-255                                                 |                                          |
|      |                                    |                  |       |                                                                                                                                                                                                                                                                   | Baud rate: 1200,2400,4800,9600,19200                           |                                          |
|      |                                    |                  |       |                                                                                                                                                                                                                                                                   | Parity check:<br>n: No parity<br>o: Odd check<br>E: Even check |                                          |
|      |                                    |                  |       |                                                                                                                                                                                                                                                                   | Data length: 7, 8                                              |                                          |
|      |                                    |                  |       |                                                                                                                                                                                                                                                                   | Stop bit length: 1, 2                                          |                                          |

|             |                                        |                  |              | HART                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Can set communication address |
|-------------|----------------------------------------|------------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| P-12        | Higher Alarm                           | Select parameter | User         | Yes/No: Open/Close this function<br>1%-100%: Percentage setting relative to the traffic limit                                                                                                                                                                                                                                                                                                                                                                                |                               |
| P-13        | Lower Alarm                            | Select parameter | User         | Same as “Higher alarm settings”                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |
| P-14        | Backlight                              | Select parameter | User         | 0: Backlight is normally closed at any power supply method<br>1: When battery-powered, the backlight automatically turns on; only turns on when a key is pressed, and automatically turns off after 20 seconds without a key pressed; when 2-wire powered, the backlight is always off; when 3-wire powered, it is always on.<br>2: When battery-powered, the backlight is always on; when 2-wire powered, the backlight is always off; when 3-wire powered, it is always on |                               |
| P-15        | Cumulative Flow                        | Select parameter | User         | It could be modified with correct password                                                                                                                                                                                                                                                                                                                                                                                                                                   |                               |
| P-16<br>F-1 | 1st point of meter factor compensation | Input value      | Factory only | First Row: 1 <sup>st</sup> point Corrected frequency without decimal, F1<br>Second Row: 1 <sup>st</sup> point Coefficient error with 4 decimals, K1                                                                                                                                                                                                                                                                                                                          |                               |
| P-17<br>F-2 | 2nd point of meter factor compensation | Input value      | Factory only | First Row: 2nd point Corrected frequency without decimal, F2<br>Second Row: 2 <sup>nd</sup> point Coefficient error with 4 decimals, K2                                                                                                                                                                                                                                                                                                                                      |                               |
| P-18<br>F-3 | 3rd point of meter factor compensation | Input value      | Factory only | First Row: 3rd point Corrected frequency without decimal, F3<br>Second Row: 3 <sup>rd</sup> point Coefficient error with 4 decimals, K3                                                                                                                                                                                                                                                                                                                                      |                               |
| P-19<br>F-4 | 4th point of meter factor compensation | Input value      | Factory only | First Row: 4th point Corrected frequency without decimal, F4<br>Second Row: 1 <sup>st</sup> point Coefficient error with 4 decimals, K4                                                                                                                                                                                                                                                                                                                                      |                               |
| P-20<br>F-5 | 5th point of meter factor compensation | Input value      | Factory only | First Row: 5th point Corrected frequency without decimal, F5<br>Second Row: 5 <sup>th</sup> point Coefficient error with 4 decimals, K5                                                                                                                                                                                                                                                                                                                                      |                               |
| P-21<br>F-6 | 6th point of meter factor compensation | Input value      | Factory only | First Row: 6th point Corrected frequency without decimal, F6<br>Second Row: 6 <sup>th</sup> point Coefficient error with 4 decimals, K6                                                                                                                                                                                                                                                                                                                                      |                               |
| P-22<br>F-7 | 7th point of meter factor compensation | Input value      | Factory only | First Row: 7th point Corrected frequency without decimal, F7<br>Second Row: 7 <sup>th</sup> point Coefficient error with 4 decimals, K7                                                                                                                                                                                                                                                                                                                                      |                               |
| P-23<br>F-8 | 8th point of meter factor compensation | Input value      | Factory only | First Row: 8th point Corrected frequency without decimal, F8<br>Second Row: 8 <sup>th</sup> point Coefficient error with 4 decimals, K8                                                                                                                                                                                                                                                                                                                                      |                               |
| P-24<br>F   | K- Factor                              | Input value      | Factory only | First Row: Display Corrected frequency, can't be revised<br>Second Row: Display Coefficient; Unit can refer to P-26                                                                                                                                                                                                                                                                                                                                                          |                               |
| P-25        | Parameters Setting Screen              | Input value      | Factory only | This screen is reserved                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                               |
| P-26        | K-Factor unit                          | Select parameter | User         | 0:P/L; 1:P/m <sup>3</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                               |

Note: To turn on/off the back light by longer pressing on “Esc” button for 5 seconds.

## 8. ERR ANALYSIS

| Display | Description                          | Solutions                                                                                   |
|---------|--------------------------------------|---------------------------------------------------------------------------------------------|
| Err0    | Data storage in error                | A new PC board need to be replaced                                                          |
| Err1    | Low battery                          | Change new Batteries                                                                        |
| Err2    | Data stored in error and low battery | Change new batteries, if the error is still existing, the new PC board need to be replaced. |

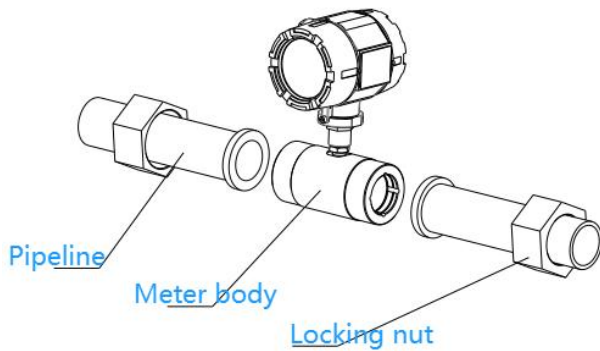
## 9. TROUBLESHOOTING

### Common faults and solutions

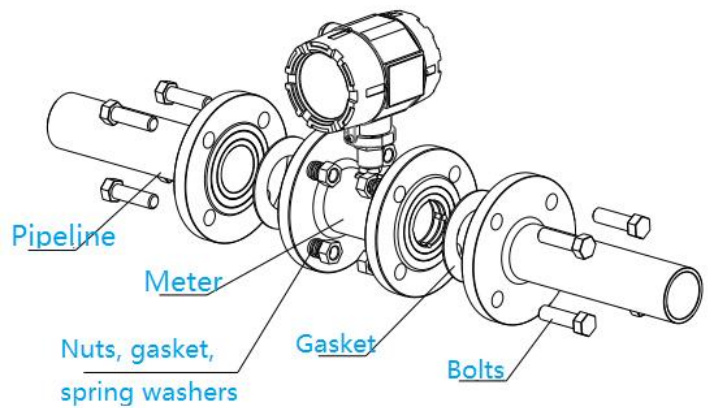
| Faults                                                                         | Possible Cause                                                                                                                              | Solution                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| There is flow passing, but the instantaneous flow of turbine flowmeter is zero | 1. Internal parameters of the instrument have been modified                                                                                 | Please check whether the instrument parameters are normal according to the calibration certificate. If the parameters are wrong, please enter the correct parameters.                                                                           |
|                                                                                | 2. The signal acquisition coil is damaged                                                                                                   | Use a magnetic screwdriver to slide the outer wall of the signal collection coil. If there is still no flow display, the signal collection coil needs to be replaced.                                                                           |
|                                                                                | 3. The impeller is stuck                                                                                                                    | Remove the flowmeter and blow the impeller with mouth. If the impeller cannot rotate normally, then take off the impeller and clean it. It is recommended to install a filter on the pipeline and clean it regularly.                           |
|                                                                                | 4. The impeller shaft is damaged                                                                                                            | After cleaning the impeller, if it still cannot rotate normally then can consider the impeller shaft is damaged and needs to be returned to the factory for repair                                                                              |
| There is no flow through the meter, but the meter displays instantaneous flow  | 1. The stop valve of the pipeline is not completely closed                                                                                  | Check the valve                                                                                                                                                                                                                                 |
|                                                                                | 2. There is violent vibration of pipeline                                                                                                   | To reduce the vibration                                                                                                                                                                                                                         |
|                                                                                | 3. The meter is not well grounded                                                                                                           | Check the grounding                                                                                                                                                                                                                             |
|                                                                                | 4. There is strong electromagnetic interference on site, too close to high-power equipment such as inverters, motors, solenoid valves, etc. | By judging whether the instantaneous flow value is the value of electromagnetic interference, it can be judged whether the instrument is affected by power frequency interference. If so, it is recommended to change the installation location |
| The meter is measuring normally, but the measured value is inaccurate          | 1. There is some problem for internal parameters of meter                                                                                   | Please check whether the instrument parameters are normal according to the calibration certificate. If the parameters are wrong, please enter the correct parameters.                                                                           |
|                                                                                | 2. The rotor is damaged                                                                                                                     | Remove the flowmeter and blow the impeller with mouth. If the impeller cannot rotate normally, it needs to be returned to the factory for repair                                                                                                |

|                                                                                          |                                    |                                                                                                                                                                                                                                                                                                                       |
|------------------------------------------------------------------------------------------|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The meter is measuring normally, display is normal, but the current output is incorrect. | 1. The wiring connection is wrong  | If no current output, please check if the wiring connection is correct.                                                                                                                                                                                                                                               |
|                                                                                          | 2. Range setting of meter is wrong | If there is current output, but the current value is incorrect, check whether the upper limit value in the instrument parameters is the same as the upper limit of the range marked on the instrument nameplate. If they are different, change the parameter to the upper limit of the range marked on the nameplate. |

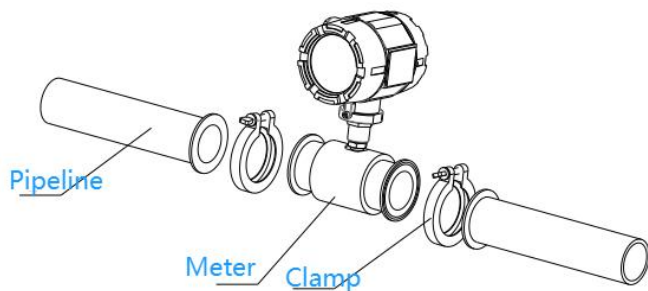
## 10. METER CONSTRUCTION



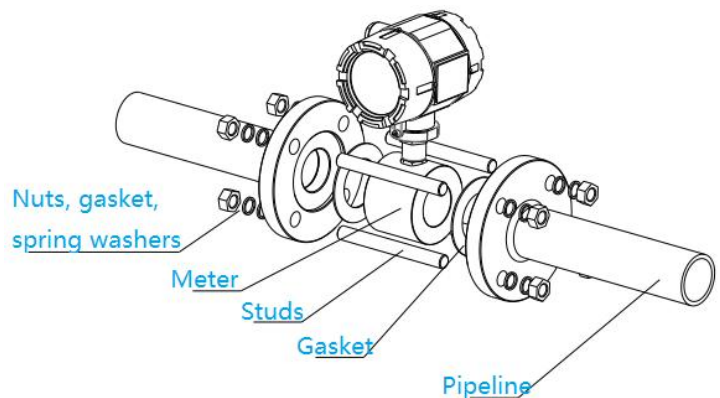
**Thread Connection Meter**



**Flange Connection Meter**



**Clamp Connection Meter**



**Wafer Connection Meter**



## Limited Warranty Policy

Hereby provides a limited warranty against defects in materials and workmanship. This product includes a one-year warranty. The warranty period shall begin on the date of the original new equipment purchase. Warrantor's obligation hereunder shall be limited to repairing defective workmanship or replacing or repairing any defective parts.

In the event Purchaser believes the product is defective, the product must be returned to, transportation prepaid by Purchaser, within the appropriate warranty period relative to the product. If the inspection determines the workmanship or materials are defective and the required maintenance has been performed and has been properly installed and operated, the product will be either repaired or replaced, at the sole determination, free of additional charge, and the goods will be returned, transportation paid by, using a transportation method selected by Supplier.

Prior to returning the product to, Purchaser must obtain a Returned Material Authorization(RMA) Number from Customer Service Department within 30 days after discovery of a purported breach of warranty, but not later than the warranty period; otherwise, such claims shall be deemed waived.

If the inspection reveals the product to be free of defects in material and workmanship or such inspection reveals the goods were improperly used, improperly installed, and/or improperly selected for service intended, will notify the purchaser in writing and will deliver the goods back to Purchaser upon receipt of Purchaser's written instructions and agreement to pay the cost of transportation. If Purchaser does not respond within thirty (30) days after notice from , the goods will be disposed of in discretion.

does not warrant the product to meet the requirements of any safety code or other jurisdiction, and Purchaser assumes all risk and liability whatsoever resulting from the use thereof, whether used singly or in combination with other machines or apparatus.

This warranty shall not apply to any product or parts thereof, which have been repaired outside 's factory or altered in any way, or have been subject to misuse, negligence, or accident, or have not been operated in accordance with the printed instructions or have been operated under conditions more severe than, or otherwise exceeding, those set in the specifications.

FOR NON- WARRANTY REPAIRS OR CALIBRATIONS, consult for current re pair/calibration charges. Have the following information available BEFORE contacting :

1. P.O.number to cover the COST of the repair/calibration
2. Model and serial number of the product,
3. Repair instructions and/or specific problems relative to the product.