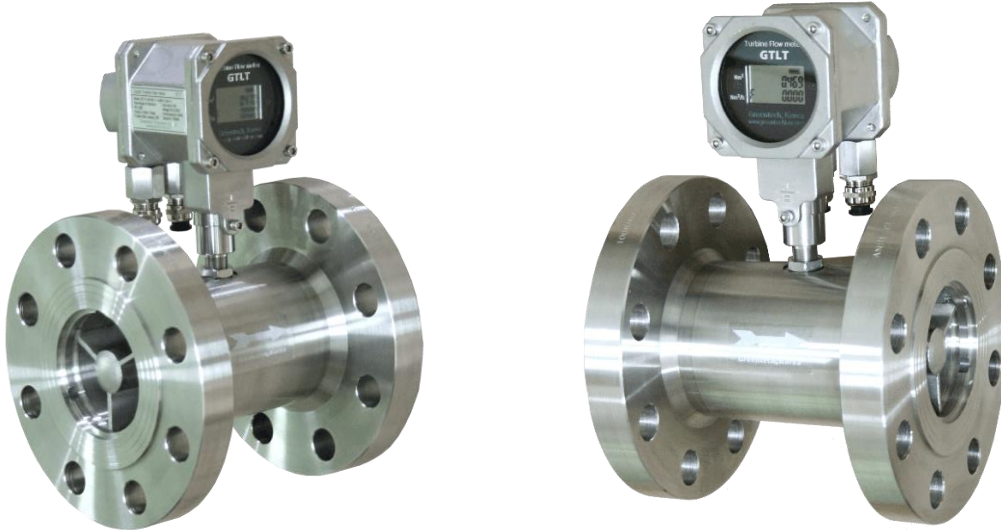


Stainless Housing Liquid Turbine Flow meter GTLT

Typical Application: liquid with no impurities and no corrosion, such as water, diesel, methanol.



1. Overview

GTLT series turbine flow meters has its simple structure, light weight, high accuracy, perfect repeatability, sensitivity, easy maintenance and use. It is widely used to measure liquid which has no chemical corrosive reaction with stainless steel 1Cr18Ni8Ti, 2Cr13, corundum Al₂O₃ and cemented carbide.

This kind of measured liquid has no impurities such as fiber and particles. The movement viscosity is lower than $5 \times 10^{-6} \text{m}^2/\text{s}$ at working temperature.

If the viscosity is higher than $5 \times 10^{-6} \text{m}^2/\text{s}$, the flow meter should be calibrated in the liquid before use.

It can finish amount control, excess alert and etc, if matched with special functional displaying meter. It is the ideal meter for flow measuring and energy saving

2. Product characteristics

- High accuracy; $\pm 1\%$ of rate
- Excellent repeatability, repeatability in a short time can reach to 0.05%~0.2%, Because of excellent repeatability, customers can have extremely high accuracy if they often calibrate or calibrate on-line. It is preferred in trade settlement.
- Output with pulse frequency signal, suitable total flow measuring and computer connection.
- No zero drift and strong ability in anti-noise.
- Can acquire very high frequency signal (3~4 KHz), strong signal resolution.
- Wide range: middle and large diameter can reach to 1:20, small diameter can reach 1:10.
- Compact and light structure, convenience in installation and maintenance, ability of large flow.
- Suitable to measure in high pressure. No need to open aperture on the meter, so it is easy to make high pressure meter.
- Many models of dedicated sensors. Can design dedicated sensors of special requirements for customer, such as low temperature type, two-way type, pump type, sand specific type.
- Can make plug-in type, suitable to large diameter measuring, little pressure loss, low price, can get out without flow cut off. Convenient in installing and maintaining.
- Stainless housing of signal converter

3. Technical parameters

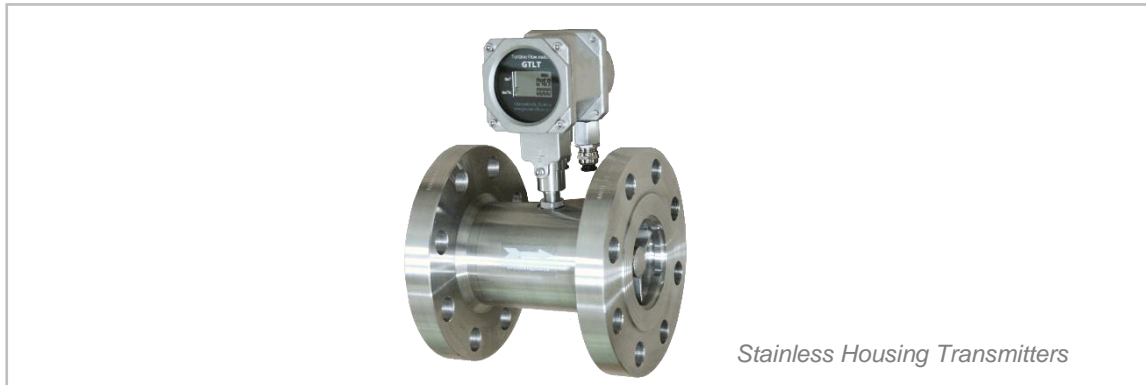
3-1. Basic parameters

Nominal Diameter (mm) & Connection method	Thread connection: 4, 6, 10, 15, 20, 25, 32mm Thread and flange connection: 40mm Flange connection: 50, 65, 80, 100, 125, 150, 200mm
Accuracy Class	±1.0% of rate
Measurement Range Rate	1:10 1:15 1:20
Instrument material	304 Stainless steel; 316L Stainless steel; etc.
Medium Temperature (°C)	-20°C ~+ 80°C
Ambient Conditions	Temperature: -10°C ~+60°C Relative Humidity: 5%~90% Atmosphere Pressure: 86~106Kpa
Storage temperature	-20°C ~+70°C
Housing material of converter	Stainless
Signal Output	Sensor: pulse frequency signal Low level ≤0.8V High level ≥8V Transmitter: Current signal 4~20mA DC two wires/ RS 485, Pulse.
Supply Power	Sensor: +12V DC, +24V DC (Option) Transducer: +24V DC Scene display type meter: 3.2V Lithium cell
Signal Transmission Line	STVPV 3×0.3 (Three wires), 2×0.3 (Two wires)
Transmission Distance	≤1000m
Signal Line Interface	Internal thread M20×1.5
Explode-proof Class	Exd IIB T6
Protection Class	IP65

3-2. Measuring range and working pressure

Instrument diameter (mm)	Normal flow range (m ³ /h)	Extend flow range (m ³ /h)	Ordinary connection type and pressure level	Special pressure level (MPa) (Flange type)
DN4	0.04~0.25	0.04~0.4	Thread connection/ 6.3MPa	
DN6	0.1~0.6	0.06~0.6	Thread connection/ 6.3MPa	
DN10	0.2~1.2	0.15~1.5	Thread connection/ 6.3MPa	
DN15	0.6~6	0.4~8	Thread / 6.3MPa, Flange / 2.5MPa	4.0, 6.3, 12, 16, 25
DN20	0.8~8	0.45~9	Thread / 6.3MPa, Flange / 2.5MPa	4.0, 6.3, 12, 16, 25
DN25	1~10	0.5~10	Thread / 6.3MPa, Flange / 2.5MPa	4.0, 6.3, 12, 16, 25
DN32	1.5~15	0.8~15	Thread / 6.3MPa, Flange / 2.5MPa	4.0, 6.3, 12, 16, 25
DN40	2~20	1~20	Thread / 6.3MPa, Flange / 2.5MPa	4.0, 6.3, 12, 16, 25
DN50	4~40	2~40	Flange connection/ 2.5MPa	4.0, 6.3, 12, 16, 25
DN65	7~70	4~70	Flange connection/ 2.5MPa	4.0, 6.3, 12, 16, 25
DN80	10~100	5~100	Flange connection/ 2.5MPa	4.0, 6.3, 12, 16, 25
DN100	20~200	10~200	Flange connection/ 2.5MPa	4.0, 6.3, 12, 16, 25
DN125	25~250	13~250	Flange connection/ 1.6MPa	2.5, 4.0, 6.3, 12, 16
DN150	30~300	15~300	Flange connection/ 1.6MPa	2.5, 4.0, 6.3, 12, 16
DN200	80~800	40~800	Flange connection/ 1.6MPa	2.5, 4.0, 6.3, 12, 16

4. Instrument division



4-1. According to the function of the meters

GTLT series turbine flow meters can be divided into 2 categories, they are:

- Turbine flow sensor/transmitter
- Intelligent integrated turbine flow meter

4-2. Function explanation

- **Turbine Flow sensor/ transmitter**

This kind of products have no scene display function, only produce signals to transmit output to far distance.

The flow signals can be divided into pulse.

This instrument has low price, high assemble, small size, so can be applicable to match second displayer, PLC, DCS so on computer control system to use. According to different signal outputs, it can be divided into GTLT-DNP type.

** **GTLT-DNP** : 12~24VDC power supply, 3-wire pulse output, high level $\geq 8V$ and low level $\leq 0.8V$, signal transmitting distance $\leq 1000m$

- **Intelligent integrated turbine flow meter**

It adopts an advanced super-low power consumption single-chip microprocessor technology to make up of new intelligent flow meter with turbine flow sensor and accumulative calculation displayer integration. It has many obvious advantages which are double-row LCD display at the scene, compact structure, direct and clear reading, high reliability, anti-interference from outside power, anti-thunder attack, and low cost, etc. It has the instrument factors' three points rectified, non-linear intelligently compensated, and revision at the scene.

High clear LCD display simultaneously shows both instant flow rate (four valid figures) and accumulative flow rate (eight valid figures, and accumulative flow rate (eight valid figures with reset). All valid data can be kept for ten years. This kind of turbine flow meters all are explosion-proof products and the explosion-proof class is ExdIIB6. This type of turbine flow meters can be divided into type GTLT-BDN and GTLT-DDF in terms of supply power and the remote signal transmitting methods.

** **GTLT -BDN** : Supply power 3.2V 10AH (Lithium battery) can continuously run more than four years, but no signal output.

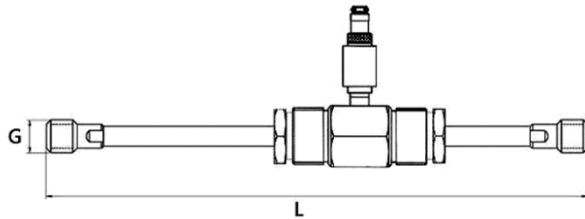
** **GTLT -DDF** : Supply power 24VDC outside, output normal two wires current signal (4-20mA), and can add RS485 or HART communication according to different scene demand.

5. Installation size

5-1. Thread Connection (Installation type)

DN4~DN10

Thread connection type turbine flow sensor (including direct pipe section) size figure



Nominal Diameter (mm)	L (mm)	Thread Criteria
4	295	G1/2"
6	330	G1/2"
10	450	G1/2"

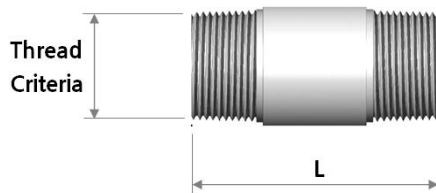
5-2. Thread Connection

Note: Default Thread is Male G Thread, other thread are available on request.

For example: Female NPT Thread, Male NPT Thread; Consult us for more information

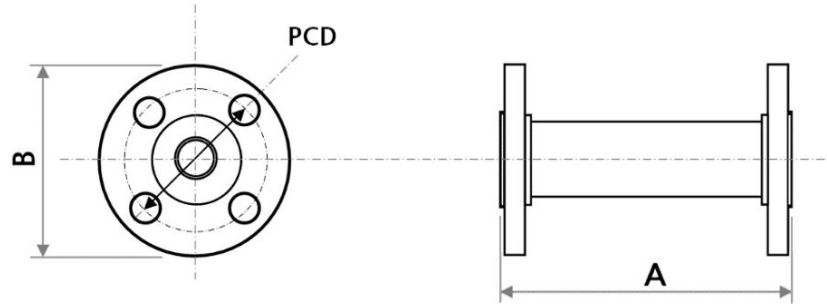
DN4...DN10: Straight runs and filter are included in the length for DN4 to DN10

DN15...DN50: Straight runs are optional on request.



Nominal Diameter (mm)	L (mm)	Thread Criteria
4	226	G 1/2"
6	226	G 1/2"
10	345	G 1/2"
15	75	G 1"
20	85	G 1"
25	100	G 1 1/4"
32	140	G 1 1/2"
40	140	G 2"
50	150	G 2 1/4"

5-3. Flange Connection




ANSI Flange Meter Dimensions							
Size Code		A (mm)	ANSI Flange Rating Class	Flange Diameter (B) (mm)	Bolt Hole Diameter (mm)	Bolt Circle Diameter (PCD) (mm)	Bolt Hole Quantity
(Inch)	(mm)						
1/2"	15	200	150	89	15.7	60.5	4
3/4"	20	210	150	98	15.7	70.0	4
1"	25	260	150	108	15.7	79.5	4
1-1/4"	32	140	150	117	15.7	89.0	4
1-1/2"	40	140	150	127	15.7	98.5	4
2"	50	150	150	152	19	120.5	4
2-1/2"	65	180	150	178	19	139.5	4
3"	80	200	150	190	19	152.5	4
4"	100	220	150	228	19	190.5	8
5"	125	250	150	254	22.4	216.0	8
6"	150	300	150	279	22.4	241.5	8
8"	200	360	150	343	22.4	298.5	8

DIN Flange Meter Dimensions							
Size Code		A (mm)	DIN Flange Rating Class (MPa)	Flange Diameter (B)(mm)	Bolt Hole Diameter (mm)	Bolt Circle Diameter (PCD) (mm)	Bolt Hole Quantity
(Inch)	(mm)						
1/2"	15	200	2.5	95	14	65	4
3/4"	20	210	2.5	105	14	75	4
1"	25	260	2.5	115	14	85	4
1-1/4"	32	140	2.5	140	18	100	4
1-1/2"	40	140	2.5	150	18	110	4
2"	50	150	2.5	165	18	125	4
2-1/2"	65	180	1.6	185	18	145	4
3"	80	200	1.6	200	18	160	8
4"	100	220	1.6	220	18	180	8
5"	125	250	1.6	250	18	210	8
6"	150	300	1.6	285	22	240	8
8"	200	360	1.6	340	22	295	12

6. Electrical Wiring.

GTLT –DDF

Terminal Symbols	Description
PO	Original Pulse Output
PIN	Flow Signal Input
GND	Flow Signal GND
VCC	Flow Signal Power
4-20mA	Current Output
GND	External Power Source GND
24V IN	External Voltage Positive
Battery Switch	

GTLT -BDN

Terminal Symbols	Description
PN	Impulse Correction Output
IC	IC Card Signal Output
A	RS485 A
B	RS485 B
GND	IC Card GND
24V OUT	
-	GND
+	Battery Positive

7. Notes about the installation of the flow meter

7-1. Installation size

Sensors should be installed at the sites where are convenient for maintaining, no pipe vibration, no strong electric-magnetic interference and no thermal radiation. The typical installation of pipe system for turbine flow meter is shown in Figure 1.

All the components depend on measured medium and are not exactly necessary. Turbine flow meter is sensitive to distortion of velocity distribution and rotating flow in the pipe, so it should fully develop pipe flow when entering sensor. As a result, match relative direct pipe section and flow regulator according to the model of the matched spoiler piece in the upstream of the sensor, as it shown in Chart

If the spoiler in the upstream is unclear, the direct pipe section in the upstream is no led than 20D and that in the downstream is no less than 5D. If the space can not meet the requirement above, install flow regulator between spoiler and sensor. When installed outside, sensors should be protected against from sunshine and rain.

- 1-entrance
- 2-valve
- 3-filter
- 4-getter device
- 5-front direct pipe section
- 6-sensor
- 7-back direct pipe section
- 8-bypass

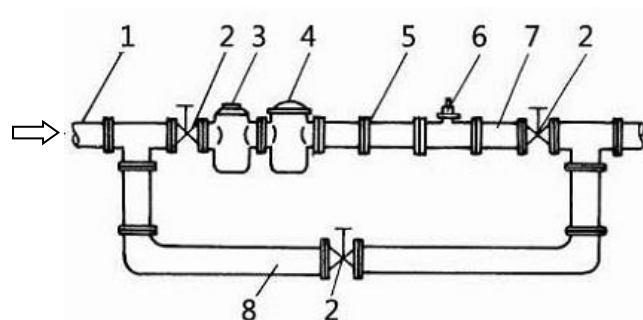
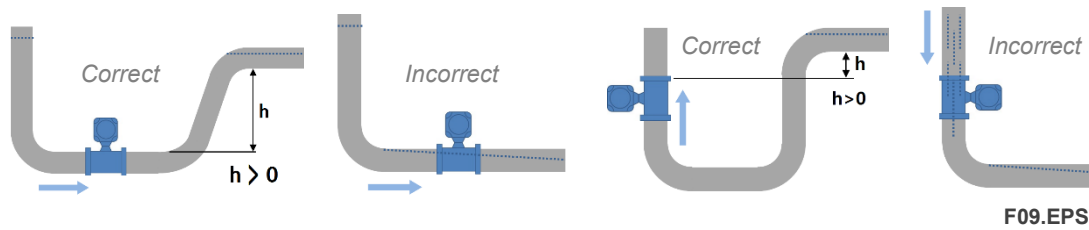


Figure 1. Schematic picture of installing sensor.

Upstream component types	Single 90° angle bend	Double 90° angle bends at the same level	Double 90° angle bends at the different level	Concentric reducing pipe	Open whole valve	Open half valve	Downstream side length
L/ DN	20	25	40	15	20	50	5

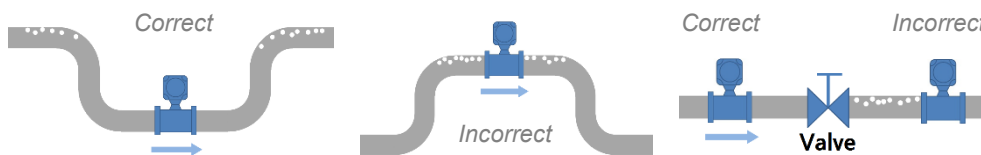
7-2. Mounting Positions

- Pipes must be fully filled with liquids. It is essential that pipes remain fully filled at all times, otherwise flow rate indications may be affected and measurement errors may be caused.



Mounting Positions

- Avoid Air Bubbles. If air bubbles enter a measurement pipe, flow rate indications may be affected and measurement errors may be caused.



Avoiding Air Bubbles

- 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.

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

7-3. Required Lengths of Straight Runs

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

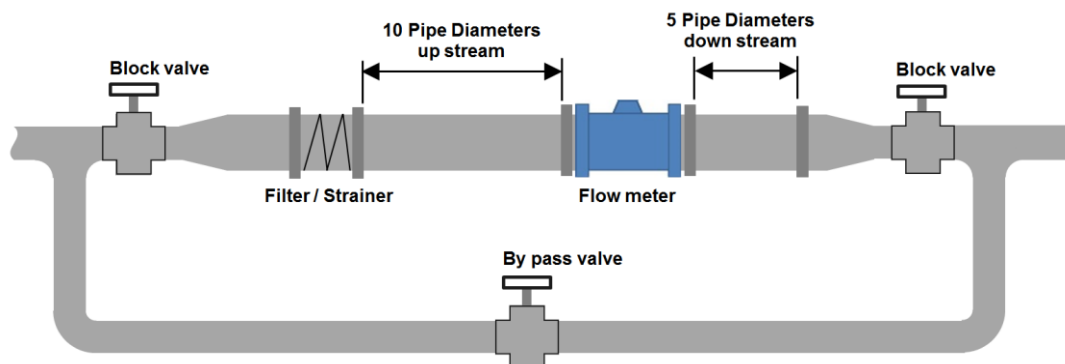
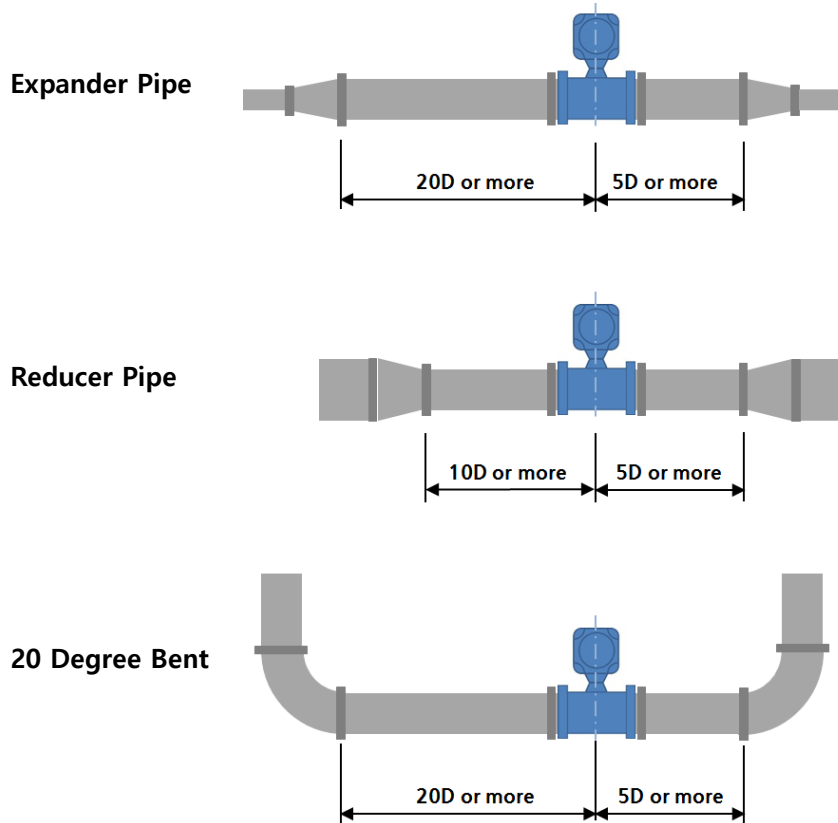


Diagram. Typical flow meter system installation

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 immediately 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 immediately upstream. Desired upstream straight pipe length is 500mm.

7-4. Anti-Cavitation

Cavitation can be caused by entrained air, and it can seriously damage the rotor on a turbine flow meter.

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 backpressure on the flow meter.

For turbine flow meters, you should provide a backpressure (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_b**: Back pressure; **P_v**: Vapor Pressure; **P_{in}**: Inlet Pressure; **P_{out}**: Outlet Pressure)

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

- Note:**
- ◆ Foreign 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 cover plates. Leave the cover plate installed unless accessory modules specify removal. Don't remove the cover plates when the meter is powered, or electrical shock and explosion hazard can be caused.

8. Ordering code

GTLT-		Description
		Standard version, Explosion proof construction (Eex d IIB T6)
Nominal Diameter (mm)	4	4mm, normal flow range 0.04-0.25m ³ /h, wide flow range 0.04-0.4m ³ /h
	6	6mm, normal flow range 0.1-0.6m ³ /h, wide flow range 0.06-0.6m ³ /h
	10	10mm, normal flow range 0.2-1.2m ³ /h, wide flow range 0.15-1.5m ³ /h
	15	15mm, normal flow range 0.6-6m ³ /h, wide flow range 0.4-8m ³ /h
	20	20mm, normal flow range 0.8-8m ³ /h, wide flow range 0.4-8m ³ /h
	25	25mm, normal flow range 1-10m ³ /h, wide flow range 0.5-10m ³ /h
	32	32mm, normal flow range 1.5-15m ³ /h /h, wide flow range 0.8-15m ³ /h
	40	40mm, normal flow range 2-20m ³ /h, wide flow range 1-20m ³ /h
	50	50mm, normal flow range 4-40m ³ /h, wide flow range 2-40m ³ /h
	65	65mm, normal flow range 7-70m ³ /h, wide flow range 4-70m ³ /h
	80	80mm, normal flow range 10-100m ³ /h, wide flow range 5-100m ³ /h
	100	100mm, normal flow range 20-200m ³ /h, wide flow range 10-200m ³ /h
	125	125mm, normal flow range 25-250m ³ /h, wide flow range 13-250m ³ /h
	150	150mm, normal flow range 30-300m ³ /h, wide flow range 15-300m ³ /h
200	200mm, normal flow range 80-800m ³ /h, wide flow range 40-800m ³ /h	
Type	DNP	Pulse output without local display, 12-24VDC supply
	BDN	Local display without signal output, Battery supply
	DDF	Local display with 4-20mA output, RS485, 24VDC supply
Connection type	F	Flange connection
	T	Thread connection
	S	Sanitary
	9	Customization
Process Connection	-N	NPT
	-B	BSP
	-C	Clamp
	-G ()	DIN PN 1.6, 2.5, 4.0MPa
	-A ()	ANSI CL150, CL300
	-J ()	JIS 10K, 20K, 30K
Measurement range mark	S	Standard measurement range turbine
	W	Wide flow range turbine
Flow Tube Material	S04	304 Stainless steel
	S16	316 (L) Stainless steel
	9	Customization
Conduit connection	B	BSP1/2" FM
	M	M20X1.5 FM
	N	NPT 1/2" FM

Note: DN15~DN40 need thread connection regularly, but can be made into flange connection through adding the "FL" to the nominal diameter at its end.