Liquid Turbine Flow meter GTLT

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1. Product Introduction

GTLT series Liquid turbine flow meter is based on torque balance principle and belong to speed flow meters. The flow meter has the characteristics of simple structure, light weight, high precision, good reproducibility, sensitive response, convenient installation, maintenance and use, etc.

It is widely used in petroleum, chemical industry, metallurgy, water supply, papermaking and other industries, and is an ideal instrument for flow measurement and energy saving.

Typical application: water, diesel oil, methanol and other liquids without impurities and strong corrosiveness

2. Main Features

- High accuracy; ±1% of F.S.
- 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.

3. Style of a product

				
Flange connection	Thread connection	Tri-clamp connection	Pulse output No display	Remote type Cable 10m

4. Technical Specification

Display		LCD display for total flow and instantaneous flow.
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
Application		No impurities, no strong corrosive liquids, such as water, diesel, oil, alcohol, etc
Accuracy		1.0% of F.S..
Repeatability		±0.1%
Measuring range		0.04~800m^3/h
Range ability		1:10, 1:15, 1:20
Diameter (mm)		DN4……..DN200
Working condition		Medium Temperature: -20°C~+120°C (Max. Customize to150°C)
		Ambient Temperature: -20°C ~+60°C
		Humidity:5%~95%
		Pressure: 1.6MPa~6.3MPa (Max. Customize to 42MPa)
Connection		Flange/ Thread / Tri-Clamp
Material	**Meter body, Flange**	SUS304, SUS316L
	Bearing, Shaft	Tungsten carbide
Power		DC 24V/3V 10AH lithium battery.
Power consumption		1W.
Output		4-20mA / Pulse /RS485
Digital Communication		RS485-MODBUS, HART, PROFIBUS-DP
Enclosure		IP65
Flange		DIN: standard PN16 (customized: PN25, PN40) ANSI: 150LB, 300LB, 600LB, 900LB JIS:10K, 20K, 30K, 63K
Cable gland		M20X1,5 or NPT1/2”

Material construction accorded by body material.

Body: SUS304 material	
Sensor housing	SUS304
Flange	SUS304
Rotor	
Standard: 2Cr13	EN10088-3 1.4021
	ANSI 420
	BS 420S37
	JIS SUS410J1
Bearing, Shaft	Tungsten carbide
Vane	SUS304

Body: SUS316L material	
Sensor housing	SUS316L
Flange	SUS316L
Rotor	
Dual phase steel	SS329J1
Bearing, Shaft	Tungsten carbide
Vane	SUS304
	SUS316L customized

5. Measuring range and working pressure

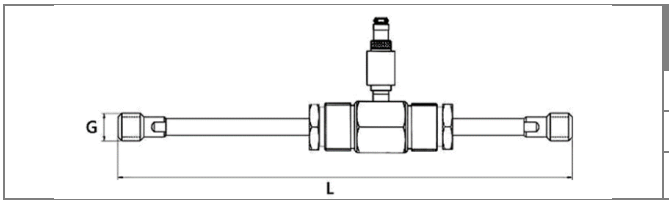
Instrument diameter (mm)	Normal flow range (m^3/h)	Extend flow range (m^3/h)	Ordinary connection type and pressure level	Special pressure level (MPa) (Flange type)
DN4	0.04~0.25	0.04~0.4	Thread connection/ 6.3MPa	
DN6	0.1~0.6	0.06~0.6	Thread connection/ 6.3MPa	
DN10	0.2~1.2	0.15~1.5	Thread connection/ 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

6. Installation size

Small diameter sensor	Clamp sensor
	
Thread sensor	**Flange sensor**
	

6-1. Thread Connection (Installation type)

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

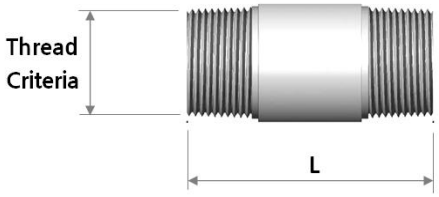


DN (mm)	L (mm)	Thread Criteria
4	225	G1/2”
6	225	G1/2”
10	345	G1/2”

6-2. Thread Connection

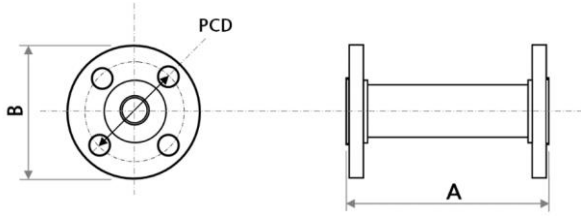
DN4…DN10: Straight runs and filter are included in the length for DN4 to DN10

DN15…DN50: Straight runs are optional on request.



DN (mm)	L (mm)	Thread Criteria
4	50	G 1/2”
6	50	G 1/2”
10	50	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 1/2”

6-3. Flange / Clamp Connection: (DIN)



DN (mm)	**A** (mm)	Rating Class	**B** (mm)	**PCD** (mm)	Bolt Hole
15 (1/2")	75	2.5 MPa	95	65	4-Ø14
20 (3/4")	85		105	75	4-Ø14
25 (1")	100		115	85	4-Ø14
32 (1-1/4")	140		140	100	4-Ø18
40 (1-1/2")	140		150	110	4-Ø18
50 (2")	150		165	125	4-Ø18
65 (2-1/2")	180	1.6 MPa	185	145	4-Ø18
80 (3")	200		200	160	8-Ø18
100 (4")	220		220	180	8-Ø18
125 (5")	250		250	210	8-Ø18
150 (6")	300		285	240	8-Ø22
200 (8")	360		340	295	12-Ø22

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

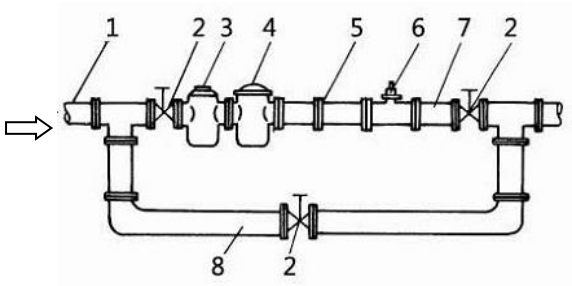
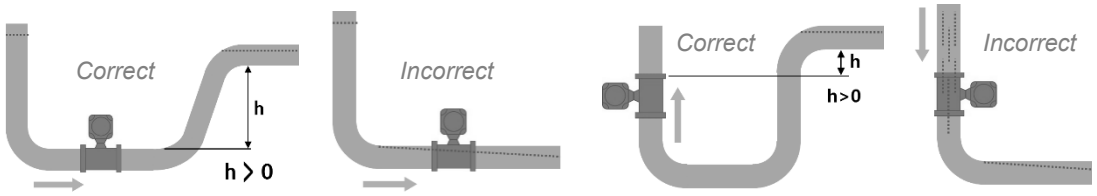


Figure 1. Schematic picture of installing sensor.

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

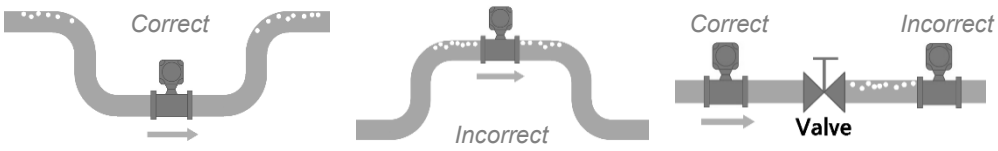
7-2. Mounting Positions

- 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.

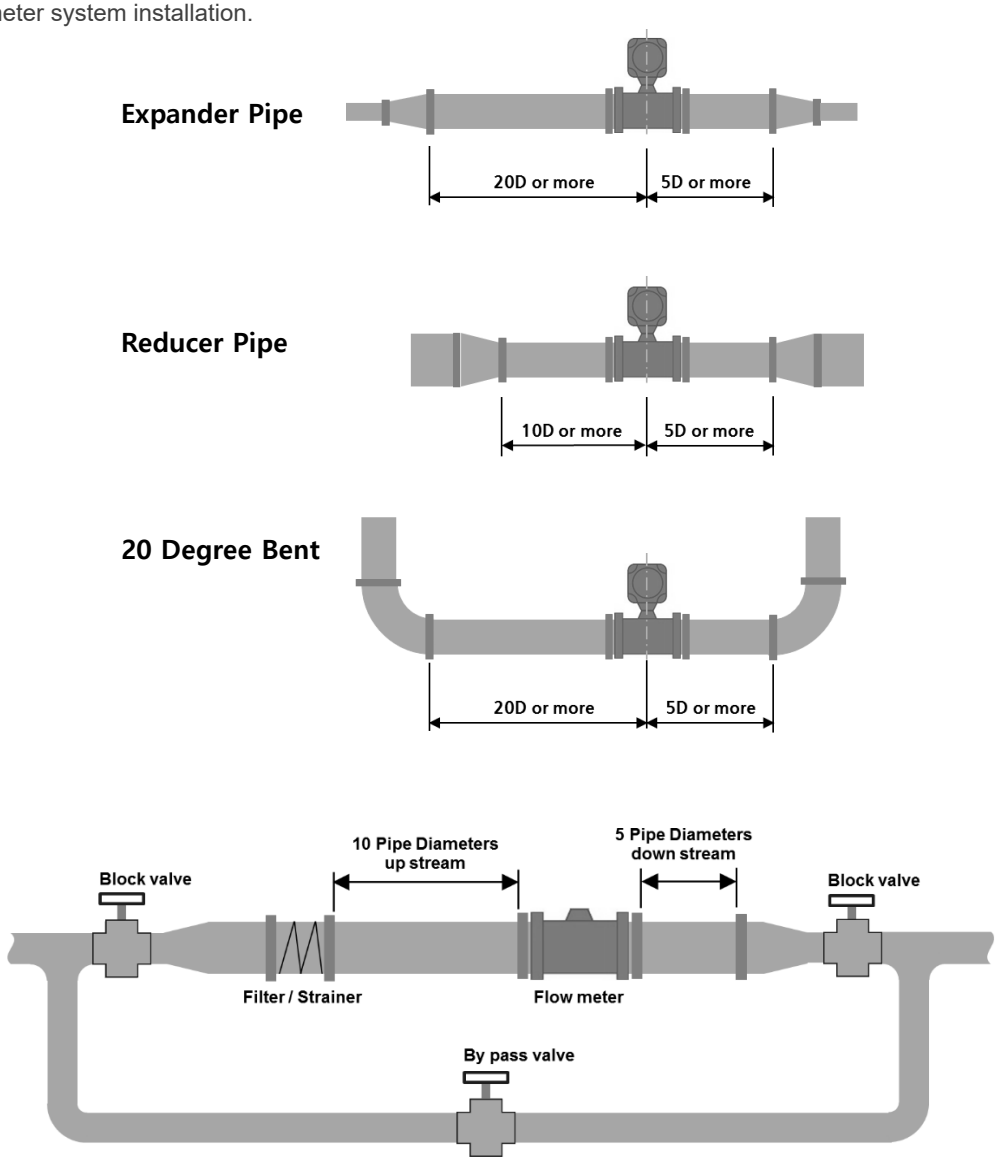


Diagram. Typical flow meter system installation

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.

Formula 1: Pb ≥ 1.25 × Pv + 2 × (Pin – Pout)

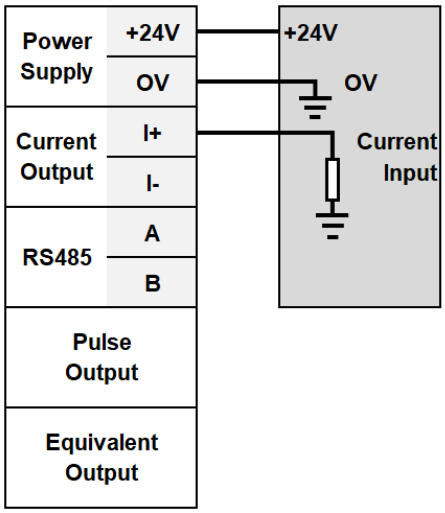
In formula 1: (**Pb**: Back pressure; **Pv**: Vapor Pressure; **Pin**: Inlet Pressure; **Pout**: Outlet Pressure)

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

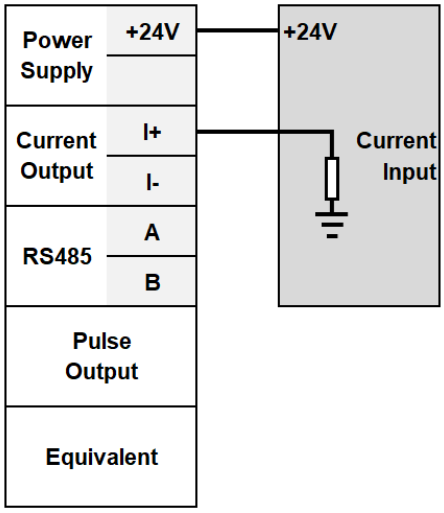
Note:
- ♦ Foreign material in the liquid being measured can clog the meter's rotor and adversely affect accuracy. If this problem is anticipated or experienced, install screens to filter impurities from incoming liquids.
- ♦ To ensure accurate measurement, drain all air from the system before use.
- ♦ 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. Outputs Connection

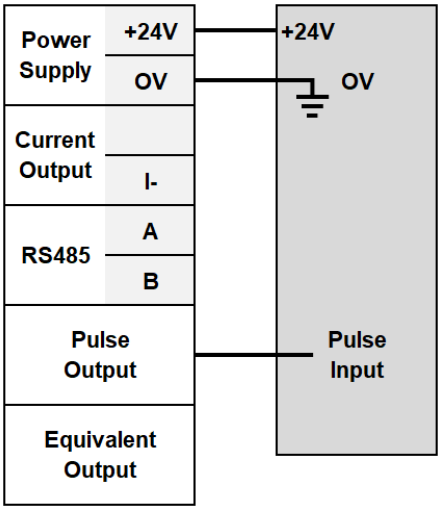
1. Three-Wire Current Output Wiring



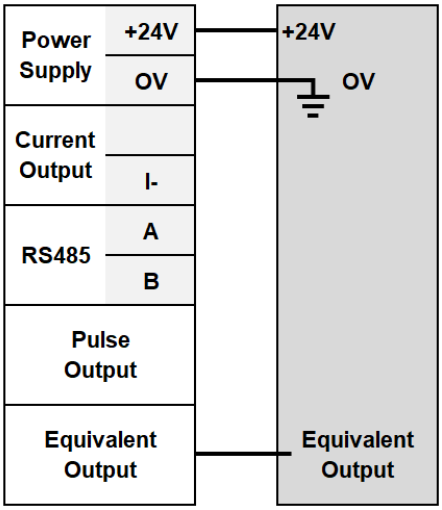
2. Two-Wire Current Output Wiring



3. Three-Wire Pulse Output Wiring
(Flow rate)



4. Three-Wire Equivalent Output Wiring
(Total flow)



9. Model selection

Model: **GTLT**		
Nominal diameter	**4…..200**	DN4…….. DN200
LCD display	**Y**	With LCD display
	N	NO display
Type	**I**	Integral type
	R	Remote type
Connection type	**F**	Flange
	T	Thread
	C	Tri-clamp
	9	Customization
Process Connection	**-N**	NPT
	-B	BSP
	-C	Clamp
	-D ( )	DIN: PN 1.6, 2.5, 4.0MPa
	-A ( )	ANSI: CL150, CL300
	-J ( )	JIS: 10K, 20K, 30K
Measurement range	**S**	Standard range
	W	Wide extended range
Signal output	**I**	4-20mA
	P	Pulse
	R	RS485 (Modbus)
Material	**S04**	SUS304
	S16	SUS316L
Cable gland	**M**	M20X1,5 (SUS304)
	N	NPT1/2” (SUS304)
	O	Others