# OMEGA FTB-800 Series Turbine Flow Meter User Guide



Contents



**OMEGA FTB-800 Series Turbine Flow Meter**


## GENERAL DESCRIPTION

**Working Principle**
When liquid flows through the casing of sensor, the impulse of fluid will provide the blade with a rotation moment as there is an angle between the blade of impeller and the flow direction. The blade will rotate as the friction moment and the fluid resistance are overcome and it will reach a stable speed when the moments are at balance. Under certain conditions, the rotation speed of blade will be in direct proportion to the flow velocity. Due to the magnetic conductivity of blade, when located in the magnetic field generated by signal detector (made of permanent magnet steel and coils), the rotating blade will cut the magnetic lines and periodically change the flux through the coil, thereby inducing electrical impulse signals at both ends of the coil. The induced signals, after amplified and rectified by amplifier, will form a continuous rectangular impulse wave with certain amplitude which may be remotely transmitted to display instrument indicating the instant flow and the cumulative flow of fluid. Within a certain range of flow, the impulse frequency f is in direct proportion to the instant flow of fluid flowing through the sensor.

## FEATURES

1. The sensor is of hard alloy bearing thrust type, which may guarantee the precision and improve the wear resistance performance as well.
2. Simple and firm structure, easy for installation and dismantling.
3. Wide range of measuring with very low lower flow velocity limit.
4. Small loss of pressure,fine repeat ability and high precision.
5. High resistance to electromagnetic interference and vibration.

## SPECIFICATIONS

**MATERIALS OF CONSTRUCTION:**
Body: 304 OR 316 Stainless Steel
Rotor: CD4MCU Stainless Steel
Rotor Support and Bearing: 316 Stainless Steel
Rotor Shaft: Tungsten Carbide
**OPERATING LIMITATIONS:**
Temperature: -20°C to +120°C High temperatures will damage the magnetic pick-up, while lower temperatures will limit the rotation of the rotor.
Pressure: Maximum pressure ratings as follows:

913.5 psi — all NPT meters up to 1″
362.5 psi — 1-1/4”,1-1/2”,2″ male NPT
232 psi — 2-1/2”,3”,4” male NPT

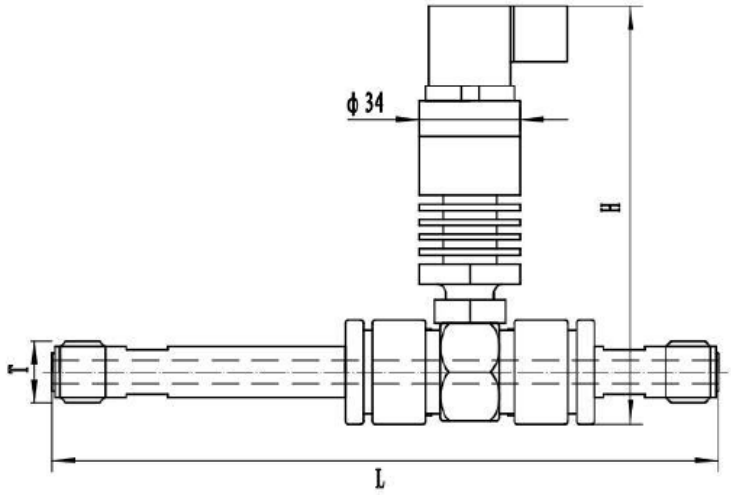
- **Accuracy**: ± 0.5% of reading
- **Repeatability**: ± 0.1%
- **Calibration:** Water (CNAS Traceable Calibration)
- **Corrosion:** All FTB-800 series turbine meters are constructed of stainless steel and CD4MCU. The operator must ensure that the operating fluid is compatible with these materials. Incompatible fluids can cause deterioration of internal components and cause a reduction in meter accuracy.
- **Pulsation and**
- **Vibration:** Severe pulsation and mechanical vibration will affect the accuracy and shorten the life of the meter
- **Filtration:** If small particles are present in the fluid, it is recommended that a strainer be installed upstream of the meter



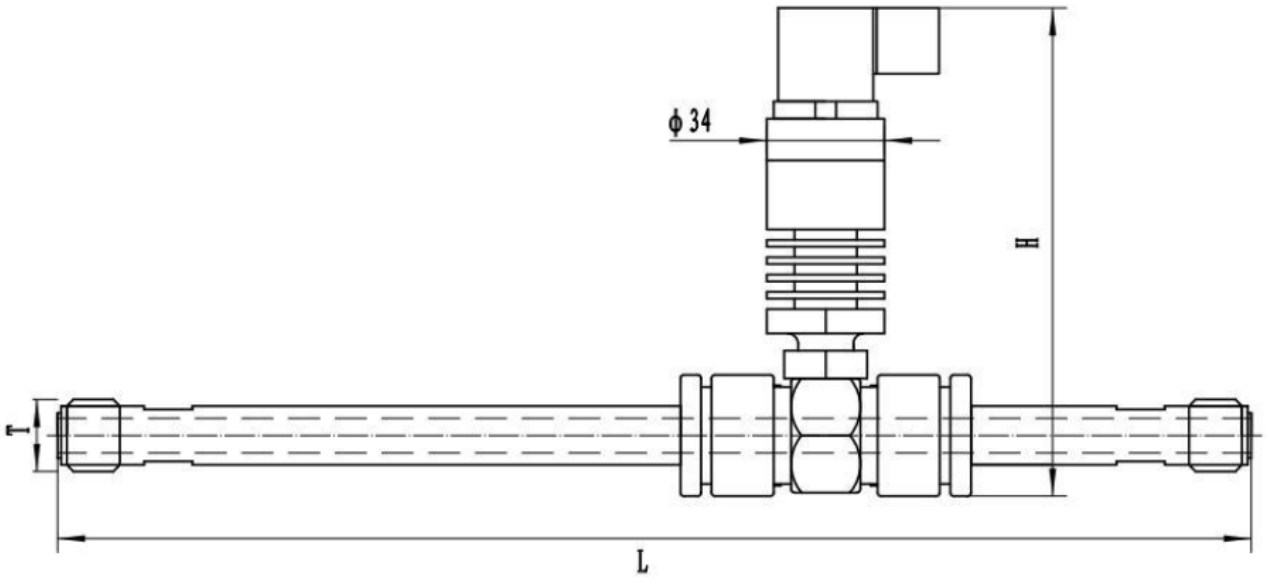
- **Output:** 4 to 20mA output
  Two wires from the flow sensor, 24V+ and 24V-, connect other instrument which can supply 24VDC.

## Overall Dimension

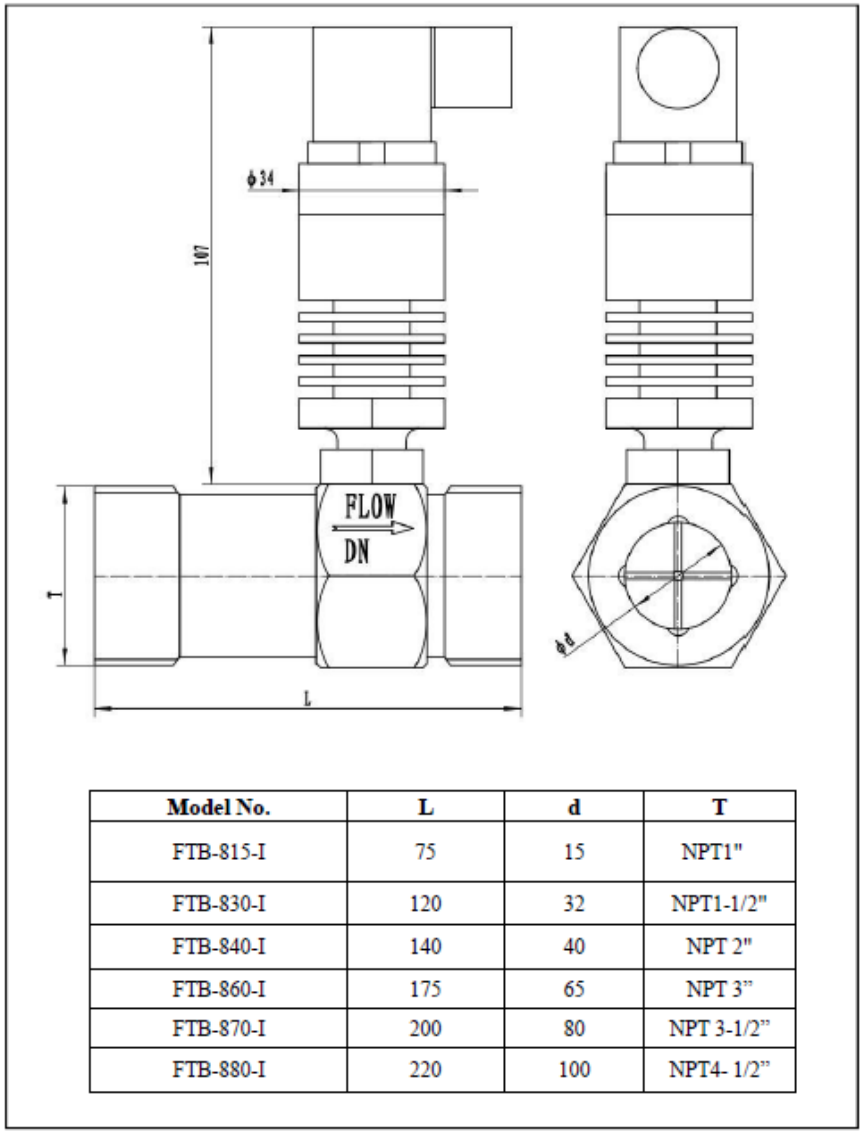
Turbine Flow sensor Dimensions: mm




| Model No. | L | H | T |
|---|---|---|---|
| FTD-804-I | 225 | 141 | NPT 1/2" |
| FTB-806-I | 225 | 141 | NPT 1/2" |



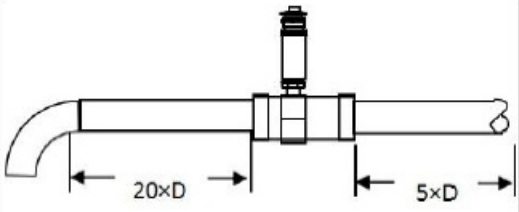
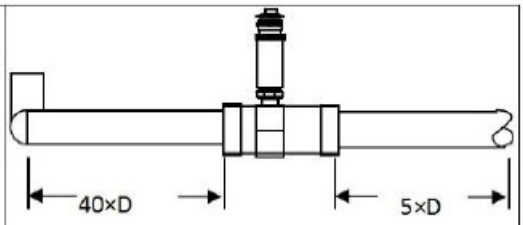
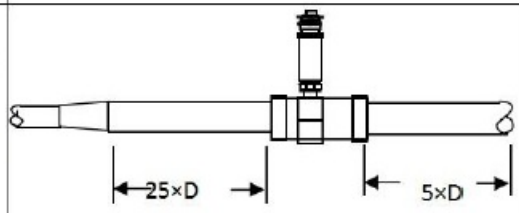
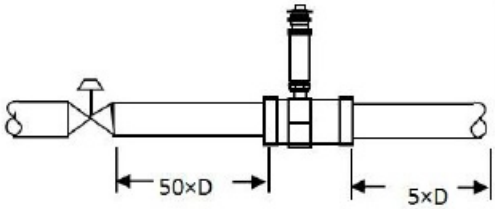
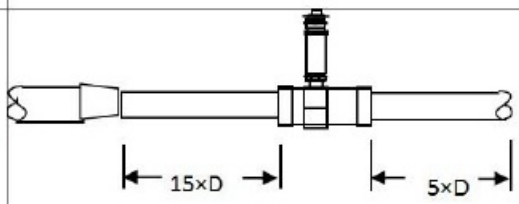
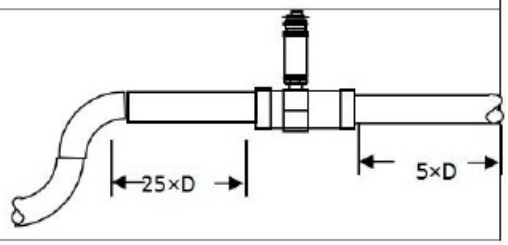

| Model No. | L | H | T |
|---|---|---|---|
| FTD-810-I | 345 | 141 | NPT 1/2" |




| Model No. | L | d | T |
|---|---|---|---|
| FTB-815-I | 75 | 15 | NPT1" |
| FTB-830-I | 120 | 32 | NPT1-1/2" |
| FTB-840-I | 140 | 40 | NPT 2" |
| FTB-860-I | 175 | 65 | NPT 3" |
| FTB-870-I | 200 | 80 | NPT 3-1/2" |
| FTB-880-I | 220 | 100 | NPT4- 1/2" |

## Installation Requirements

Flowmeter may be installed horizontally or vertically. In the latter case, the fluid shall be flowing from downward and fulfill the pipe to avoid bubbles; the flowing direction of liquid shall be consistent with the direction indicated by the arrow on casing of the sensor; as far as the front and rear straight pipe sections are concerned (see Fig. 6), at upstream there shall be front straight pipe section at least 10 times of nominal drift diameter in length and at downstream no less than 5 times of nominal drift diameter in length. The internal wall of pipe sections shall be smooth and clean, free of defects such as indent, fouling and peeling. The pipe axis of the sensor shall be aligned with that of the neighboring pipe and the washers used for connection and sealing may not be embedded into depth of the pipe cavity; the sensors shall be kept away from the foreign electric field and magnetic field, effective shielding measures shall be taken in case of necessity to avoid external interference.
In order that the normal transfer of liquid will not be affected by maintenance, it is recommended that bypass pipes be installed at the position of sensor.
In case of open-air installation, waterproof measures shall be taken for purpose of amplifier and plug of the sensor. The wiring between sensor and display instrument is shown in Fig. 5.
When fluid contains impurities, filter shall be additionally installed. The number of filter screen meshes is determined in accordance with the flow and impurity, normally 20 to 60 meshes. When fluid is mixed with free gases, gas eliminator shall be additionally installed. The complete pipe system shall be well sealed. The user shall fully understand the erosion nature of the measured medium to protect the sensor from being eroded.
Fig. 6 Requirements on straight pipe section for installation of flow meter

| | | | |
|---|---|---|---|
| One 90° elbow |  | Two 90° elbows for two planes |  |
| Concentric expander |  | Control valve half-open |  |
| Concentric shrinkage wide open valve |  | Two 90° elbows for one plane |  |

## Operation

- When sensor is used, the liquid to be measured shall be clean and free of impurities such as fiber and granules.
- When sensor is used, it shall be at first slowly filled with liquid, then open the outlet valve (which should be installed behind the flow meter). It is prohibited to render the sensor under impact of high-velocity fluid when it is not filled with liquid.
- The maintenance interval for sensor is in general half a year. In case of maintenance and cleaning, attention shall be paid not to damage the parts in the measuring cavity, particularly the impeller. During assembly, watch carefully the positional relation between guide part and impeller.
- When the sensor will be out of service for a long time, the internal liquid shall be cleaned. After dried, the sensor shall be provided with protection sleeves at both ends to protect against dust and it shall be placed in dry conditions for storage.
- The associated filter shall be cleaned on regular basis and the internal liquid shall be cleaned when it is out of service for a long time. Similar to sensor, the filter shall also be provided with dust protection and stored in dry conditions.
- The transmission wire of sensor may be overhead or buried (iron bushing shall be provided in the latter case).
- Prior to installation of sensor, the connection thereof with display instrument or oscilloscope shall be finished. Then switch on the power, blow the impeller or move the im eller with hand to make it rotate uickl , see if there is an readin . Install the sensor if there is reading. In case of no reading, the related sections shall be inspected to eliminate any fault.

## WARRANTY/DISCLAIMER

**OMEGA ENGINEERING**, INC. warrants this unit to be free of defects in materials and workmanship for a period of 13 months from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal one (1) year product warranty to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

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## RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

**FOR WARRANTY RETURNS**, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

**FOR NON-WARRANTY REPAIRS,** consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

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

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## Documents / Resources

| | |
|---|---|
|  | OMEGA FTB-800 Series Turbine Flow Meter [pdf] User Guide<br>FTB-800 Series Turbine Flow Meter, FTB-800 Series, Turbine Flow Meter |

## References

- Omega Engineering | Sensing, Monitoring and Control Solutions
- Product Manuals | Omega Engineering