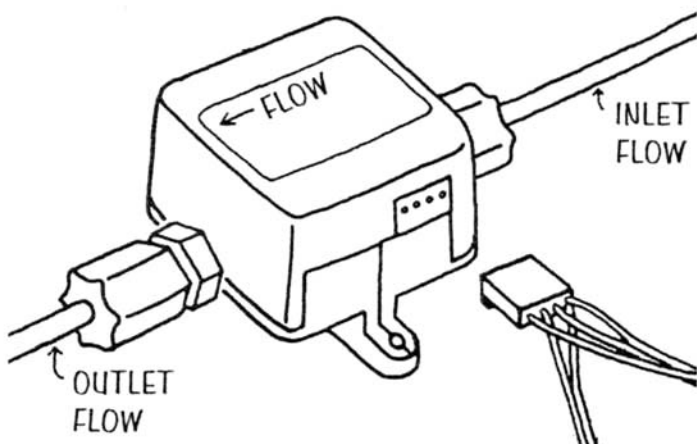




Series TF Flo-Sensors Instruction Manual

IMPORTANT: READ BEFORE OPERATING!!!

U.S.A. Patent 4,467,660
British Patent GB 0163785
German Patent P 3479336.4-08
Other Patents Pending



Sensor shown with optional cable

Printed in U.S.A.

Models TF21xx for GAS Flow Measurement
Models TF10xx for LIQUID Flow Measurement

SAFETY PRECAUTIONS:

Safe operation depends upon you, the operator. Care **MUST** be taken to avoid damage to the FLO-SENSOR which may cause leaking. ALWAYS take care to avoid stressing the device when attaching tubing and when TIGHTENING tube fittings. Use a wrench to hold tube fitting body while tightening the fitting nut with another wrench. Avoid damage from dropping or impact - leaking or bearing damage may result. Always use the specified D.C. Power and attach cable. Operating pressure & temperature should NOT exceed specified maximums. Verify chemical compatibility of sensor materials IN YOUR APPLICATION.

SPECIFICATIONS:

Operating Temperature Range 0 - 50°C

Maximum Operating Pressure -- Derate 1% per °C above 30°C

Model TF21xx (for Gas) is 40 PSI (2.76 Bar) at 20°C

Model TF10xx (for Liquid) is 100 PSI (6.89 Bar) at 20°C

Sensor Materials

Model TF10xx or TF21xx

40% Glass filled polyphenylene sulphide, glass window,
stainless steel bearing support, sapphire bearing, white epoxy paint,
Viton "O" rings (EPDM optional), Acetal tubing fittings standard

SPECIFICATIONS, continued:

Power Requirements:

11.0 to 15.0 VDC at 30 ma. (typical)

Cable Assemblies (Customer provides 12VDC power):

Use TF05 cable for TF10xx Liquid Flo-Sensors

Use TF06 cable for TF21xx Gas Flo-Sensors

Both cables are approximately 36" Long (0.9 m)

Power Adapters (plug-in types (120/240 VAC), no other cable necessary):

Use TF03 USA power adapter for TF21xx (TF04 for Europe)

Use TF01 USA power adapter for TF10xx (TF02 for Europe)

Output Signals:

Voltage Output: 0 to 5.0 VDC, adjustable (+/- 20 % typical)

Minimum load 2.5K ohms

Pulse Output (only on TF10xx): Square Wave (7.5 VDC peak)

0-400 pps (typical), Minimum load 5K ohms

Pulse output varies - data included with Sensor

Applicable (Gases) Model TF21xx:

Standard calibration with air, other gases compatible with Sensor materials may be used

Applicable (Liquids) Model TF10xx:

All units calibrated with water, but other low-viscosity liquids may work.

Opaque liquids must be tested for suitability. Check compatibility with wetted materials.

Temperature Sensitivity: +/- 0.2% / °C

Linearity: +/- 3% of Full Scale

Accuracy: +/- 3% of Full Scale

Repeatability: Model TF10xx +/- 0.2% of Full Scale

(from 20% to 100% of rated flow)

Model TF21xx +/- 0.5% of Full Scale

(from 50% to 100% of rated flow)

GENERAL DESCRIPTION:

All Flo-Sensors use a Pelton type turbine wheel and electro-optical detection to convert flow rates into a linear 0 to 5 VDC signal. Liquid models (TF10xx) also produce a square wave pulse output proportional to the flow rate.

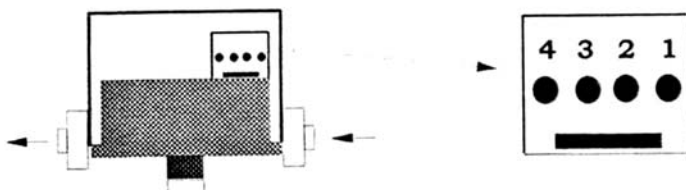
INSTALLATION & OPERATION:

Carefully attach tubing to Flo-Sensor fittings (See SAFETY PRECAUTIONS).

BE SURE flow is connected per FLOW DIRECTION on serial number label.

Two mounting holes for #4 screw are provided. Factory calibration is done with Serial number label on top - a recommended mounting position.

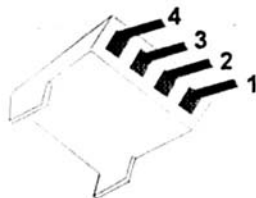
Attach proper power / signal cable to the Flo-Sensor.



CAUTION:

**OBSERVE POWER
INPUT POLARITY!**

PIN #	Description	Color on TF01/TF03	Color on TF02/TF04	Color on TF05/TF06
Pin #1	Power & Signal Ground	White	Black	Black
Pin #2	0-5VDC Output	Yellow	Black/White Stripe	White
Pin #3	12VDC Power In	Provided	Provided	Red
Pin #4	Pulse Out (only on TF10xx)	Green (only on TF01)	Green (only on TF02)	Green (only on TF05)



STANDARD FLOW RANGES:
Gas Models:

<i>Model #</i>	<i>Flow Range</i>	<i>Tubing I.D./O.D.</i>	<i>Typical Max. Pressure Drop</i>
TF2110	2.0 to 10.0 L/min	.187" / .250"	1.0" of Water
TF2120	4.0 to 20.0 L/min	.250" / .375"	2.0" of Water
TF2130	10.0 to 50.0 L/min	.250" / .375"	6.0" of Water
TF2140	20.0 to 100.0 L/min	.375" / .500"	5.0" of Water

Liquid Models:

<i>Model #</i>	<i>Flow Range</i>	<i>Tubing I.D./O.D.</i>	<i>Typical Max. Pressure Drop</i>
TF1032	0.1 to 2.0 L/min	.187" / .250"	6 PSI
TF1053	1.0 to 10.0 L/min	.250" / .375"	10 PSI
TF1062	1.0 to 10.0 GPH	.187" / .250"	6 PSI
TF1072	4.0 to 100.0 GPH	.250" / .375"	6 PSI

NOTE: Maximum pressure drop occurs at maximum flow.

OPERATION (continued):

Particles which may impair rotation of the turbine wheel must be prevented from entering the FLO-SENSOR. Use a filter to protect the FLO-SENSOR if required (10 micron recommended).

Liquid FLO-SENSORS may have impaired operation if air (or gas) becomes trapped inside. Avoid exceeding flow rates specified (ALL FLO-SENSORS). Operation at excessive turbine speeds can damage sapphire bearings.

CALIBRATION Adjustments:

If a small change in calibration is needed, turn the small 3/4 turn trimpot on side of FLO-SENSOR opposite the power connector. This adjustment will change the 0 - 5 VDC Output calibration.

Pulse Output is NOT adjustable.

MAINTENANCE:

These FLO-SENSORS require no maintenance other than periodic replacement of protective filters. Disassembly is not recommended.

Damage due to dropping, repairs or abuse will void warranty.

If a problem is encountered please contact:



Customer Service Department

Dwyer Instruments, Inc.

Jct. IN 212 & US 12

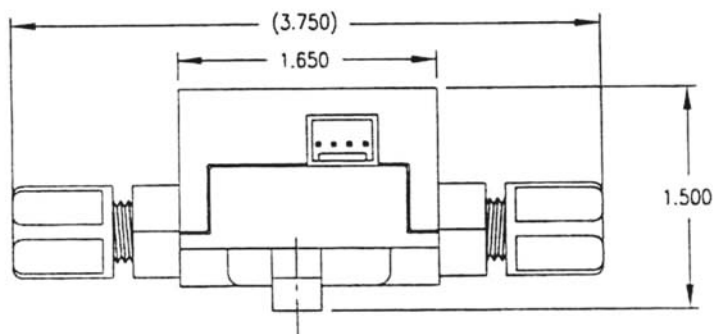
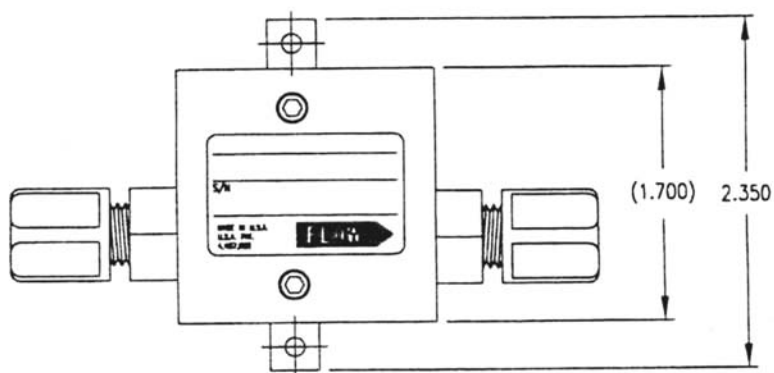
P.O. Box 373

Michigan City, IN 46360 USA

GUARANTEES:

If at anytime within 1 year after shipment, but not thereafter, it is proved that any part of the equipment furnished by us was defective when shipped by us, we will replace or repair the same free of charge, F.O.B. our factory. Notice of this claim must be made to us within one year after delivery. Our liability is limited to replacement of such defective parts or equipment. There are no guarantees or warranty expressed or implied other than those herein specifically mentioned.

Dwyer Instruments, Inc. shall herein not in any event be liable for any consequential damages, secondary charges, expenses for erection or disconnecting, or losses resulting from any alleged defect in the apparatus. Corrosion or erosion of materials is not covered by our guarantee.



Consult factory for dimensions on higher flow units.



"The low pressure people"