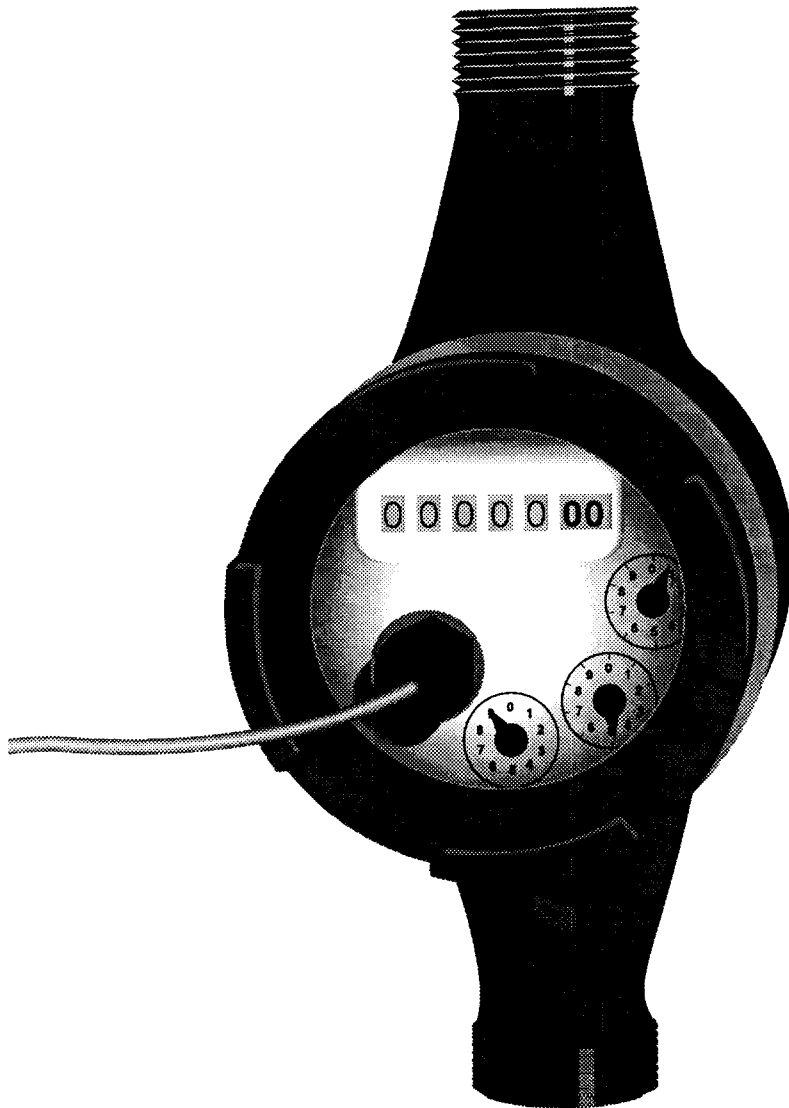


# ® FTB-8000 Series

## ® Water Meters



**Operator's Manual**



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**Multi-Jet Meter for Rate, Total and Pulse Output**

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## Notes

# Chapter 1 Introduction

## 1.1 Unpacking

Remove the Packing List and verify that you have received all equipment, including the following (quantities in parentheses):

Multi-Jet Water Meter for Rate and Total (1) or

Multi-Jet Meter with Pulse Output (1)

Operator's Manual (1)

If you have any questions about the shipment, please call the OMEGA Customer Service Department. When you receive the shipment, inspect the container and equipment for signs of damage. Note any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

### NOTE

The carrier will not honor any claims unless all shipping material is saved for inspection. After examining and removing contents, save packing material and carton in the event reshipment is necessary.

## 1.2 Description

The OMEGA® FTB-8000 Series Water Meter offers a 1.5% of scale accuracy. High quality components ensure long-term performance, and water-lubricated gears and internals provide long life and dependable service. The impeller and register are contained in a cartridge that can be serviced without taking the meter from the line, thus simplifying maintenance and reducing downtime.

## 1.3 Features

The FTB-8000 Series Water Meters have the following features:

- Flow rates from 0.25 to 130 GPM
- 150 PSI maximum operating pressure
- 50°C (125°F) maximum operating temperature
- Also available for hot water applications, 120°C (250°F)

## 1.4 Available Models

OMEGA Engineering, Inc. has the following models with the following characteristics:

Part Number Rate Total	Size	Max. Flow GPM	Part Number Pulse Output	Pulses/ Gallon
<b>Cold Water Models</b>				
FTB-8007	¾"	0.25 to 20	FTB-8007-PR	95
FTB-8010	1"	0.75 to 50	FTB-8010-PR	52
FTB-8015	1½"	1.5 to 100	FTB-8015-PR	20
FTB-8020	2"	2.0 to 130	FTB-8020-PR	20
<b>Hot Water Models</b>				
FTB-8507	¾"	0.25 to 20	FTB-8507-PT	4
FTB-8510	1"	0.3 to 50	FTB-8510-PT	4
FTB-8515	1½"	0.5 to 100	FTB-8515-PT	4
FTB-8520	2"	1.0 to 130	FTB-8520-PT	4

## 1.5 Typical Applications

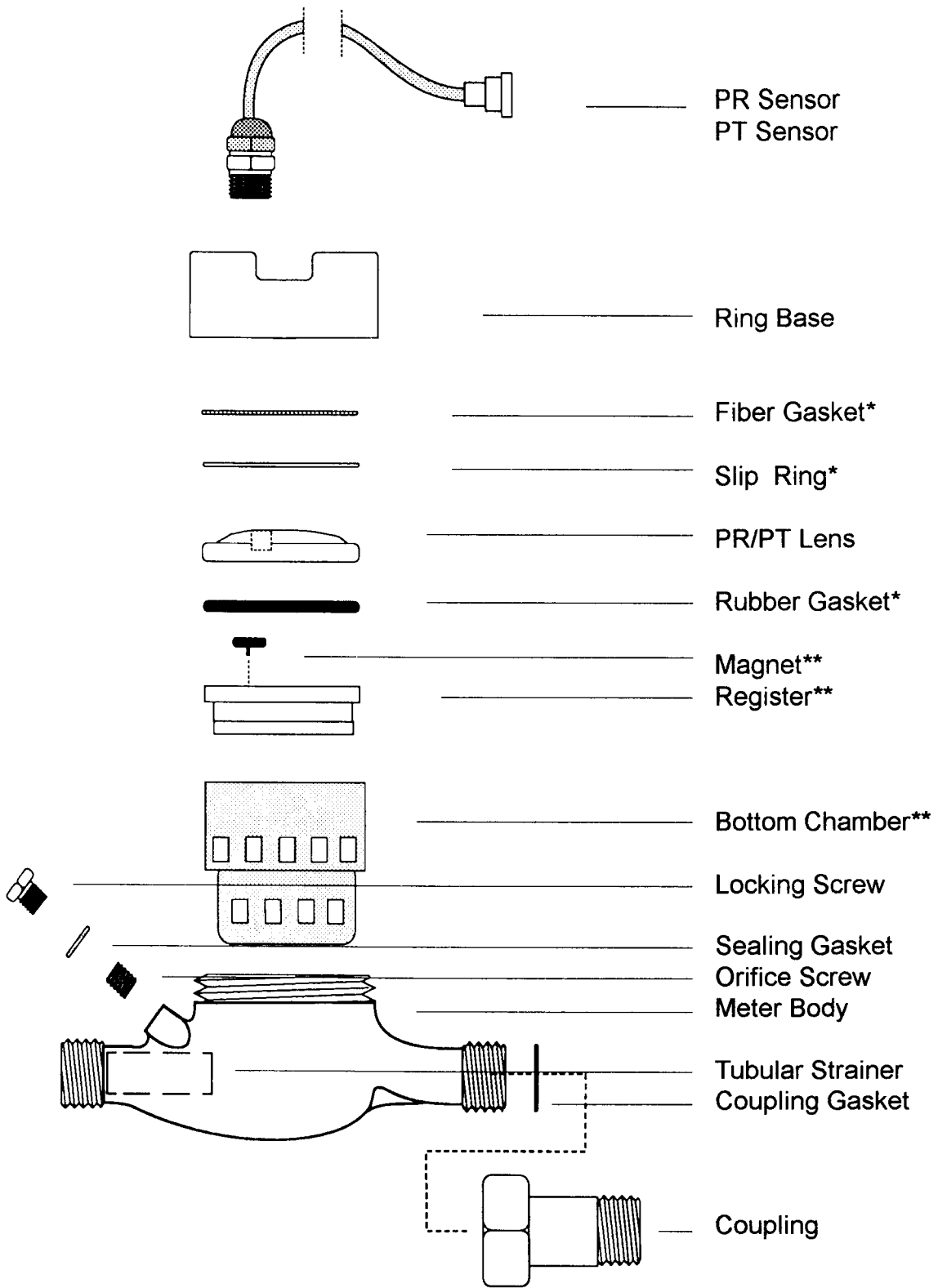
Cold Water:

- Cooling Tower Treatment
- Boiler Water Treatment
- Proportional Feed
- Remote Totalizing
- Metering Pump Pacing
- Water Conservation
- Automatic Regeneration

Hot Water:

- Boiler Water Treatment
- Proportional Feed
- Remote Totalizing

# Chapter 2 Parts of the Water Meter



PR Sensor  
PT Sensor

Ring Base

Fiber Gasket\*

Slip Ring\*

PR/PT Lens

Rubber Gasket\*

Magnet\*\*  
Register\*\*

Bottom Chamber\*\*

Locking Screw

Sealing Gasket  
Orifice Screw  
Meter Body

Tubular Strainer  
Coupling Gasket

Coupling

\* Denotes part of Gasket Set  
\*\* Denotes part of Internal Meter Assembly

## Chapter 3 Installation

### 3.1 Location

FTB-8000 Series meters should be installed in a horizontal position with the register on top. The meter will operate in a vertical position, but will tend to indicate less than actual flow, and bearing life will be shortened.

#### CAUTION

FTB-8000 Series meters are intended for use with water and non-hazardous water-based fluids only.

### 3.2 Couplings

FTB-8000 Series meters are installed with meter couplings, and they are supplied with the meter unless it is ordered otherwise. The meter thread is IPS (same as pipe threads, except straight) one size larger than the meter. For example, the thread on a  $\frac{3}{4}$ " meter is 1" IPS. Standard pipe couplings are sometimes threaded onto the meter, but this is not recommended, since the meter thread is for mechanical connection only, and sealing is done by the gasket in the meter coupling.

#### NOTE

When installing meter couplings, check to be sure that the gasket is in place between the coupling and the meter.

The advantage of meter couplings is that they act as unions for the easy removal of the meter from the line. Meter couplings provide standard male NPT threads the same nominal size as the meter for easy connection to the system. The "Dimensions" table in Chapter 8 gives overall lengths.

### 3.3 Inlet Disturbance

FTB-8000 meters are less sensitive to turbulence than some other types of flowmeters, but five diameters of upstream straight pipe are recommended. All FTB-8000 Series meters have built-in inlet strainers. In installations with a high degree of suspended solids, an in-line strainer upstream of the meter is a worthwhile precaution.

### 3.4 Air Bleed

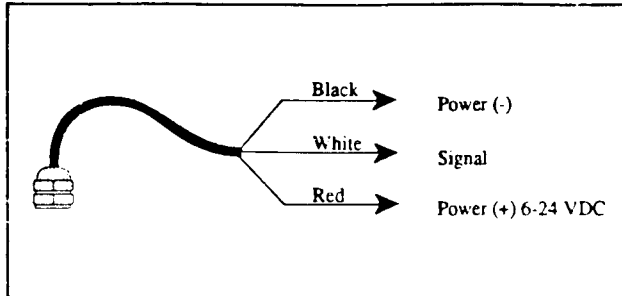
When the meter is first installed, trapped air should be removed if present in the meter. To do this, loosen meter couplings slightly and rotate the meter to an inverted position. Allow water to flow through the meter, then rotate it back to an upright position and retighten.



### 3.5 Electrical Connections

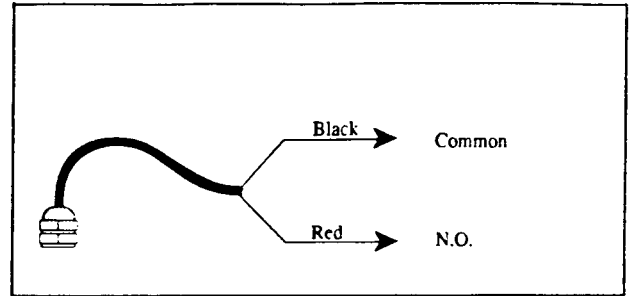
PR and PT meters are supplied standard with a twelve foot cable attached to the sensor. The PT cable has two conductors and the PR cable has three (see the figures below for the correct connections).

**Cold Water (Hall Effect)**



**Figure 3-1. PR Sensor Connection**

**Hot Water (Reed Switch)**



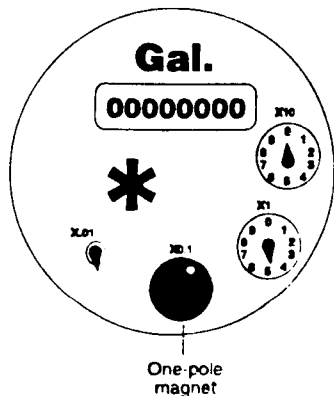
**Figure 3-2. PT Sensor Connection**

### 3.6 Pulse Contact

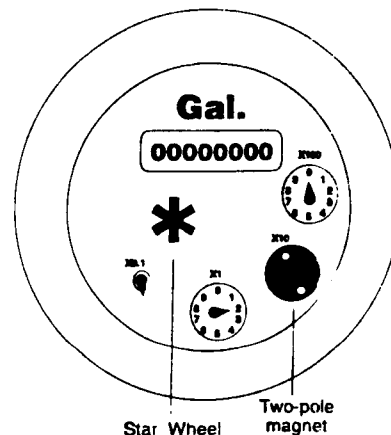
Both PR and PT meter sensors respond to a magnet which is turning on the face of the meter under the lens. The sensors give one output "pulse" (on/off) each time a magnet pole passes. The magnets have one or two poles. The white dots on the magnet indicate the number of poles. For instructions on changing pulse rate, see Chapter 6, Maintenance. The sensors are designed for electronic control loads. They should not be used to switch power loads such as motors or lights, and they should not be connected to 110 Vac (see Chapter 8, Specifications for maximum load ratings).

## Chapter 4 Operation

FTB-8000 Series Meters are not as sensitive to turbulence as other styles. Five diameters of upstream straight pipe are recommended for optimum results. Using meter couplings to insure a union, the meter is ready for flow. The pulse output ordered will give the desired resolution. However, pulse rates can be changed in the field by moving magnets to a different indicator. (See chart in Section 6.4).



**Figure 4-1. 1 G/P (3/4" or 1" meter)**



**Figure 4-2. 50 G/P (1½" or 2" meter)**

## Chapter 5 Troubleshooting Guide

PROBLEM	PROBABLE CAUSE	TO CHECK	TO REPAIR
No pulse signal	Meter not operational	Foreign matter restricting meter movement	Remove obstruction
	Incorrect wiring connections	PR Series Meters (check polarity) black: -12 Vdc, white: input signal, red: +12 Vdc PT Series Meters (non polar connection) -12 Vdc, input signal	Make proper connections
	Non-functional sensor	PR Series meters - check for +12 VDC PT Series meters - check continuity	Contact OMEGA
Meter runs in reverse	Meter improperly installed. Flow in wrong direction	Be certain arrow on meter body is in direction of flow	Install meter in proper direction
Inaccurate metering	Not enough straight pipe between meter and flow disturbance	Check distance of straight upstream piping. Should be a minimum of 5 pipe diameters	Re-install at proper distance
Water visible in meter	This is normal (it is a wet dial meter)		
Air bubble in meter	Air trapped during installation		Invert meter. Allow water to flow through meter. Rotate meter to original position. Resume operation

## **Chapter 6 Maintenance**

### **6.1 Inlet Strainer Cleaning**

Do this yearly, or as required. Remove the meter and gently backflush it to loosen particles trapped by the strainer.

### **6.2 Calibration Testing**

Meters being used for billing or for billing-exemption may be regulated by state agencies or by water or sewer utilities. New FTB-8000 Series meters meet the American Water Works Association C708 Multi-Jet Meter specifications. Some states require tests at intervals of eight years for ¾" meters, six for 1", and four for 1½" and 2". Testing can usually be done by local meter repair facilities authorized for this purpose. Meters used for control should be checked every 5-10 years.

### **6.3 Replacement of Internal Parts**

All of the moving parts inside the FTB-8000 Series meter can be replaced by removing the meter top. For most applications, this should not be required for a number of years. Breakage in a relatively new meter, is probably the result of excessive flow. Compare flow with the meter maximum to determine if a larger meter should be used.

To remove the meter top, carefully loosen by putting a bar through the slots on the meter top and then unscrew it. Remove the lens (it sometimes needs gentle prying with a small screwdriver) and then lift out the internal assembly. (If necessary, loosen by rocking it slightly from side to side.) The internal assembly pieces - bottom chamber, top chamber and register, are friction fitted and can be separated by hand.

To replace or move the magnet on the register face, pull gently on the magnet with fingers. It is lightly press-fitted to the shaft. To install it on another shaft, put it on and press down until it bottoms.

### **6.4 Changing Pulse Rates**

Remove the meter top as described in Section 6.3. See Table on next page for proper magnet and positioning.

## Pulse Rates

Size	Pulse Rate	Magnet Position	Magnet Poles
3/4"	20 P/G	X.01	2
	10 P/G	X.01	1
	2 P/G	X0.1	2
	1 P/G	X0.1	1
	5 G/P	X1	2
	10 G/P	X1	1
	50 G/P	X10	2
	100 G/P	X10	1
1"	26 P/G	*	2
	13 P/G	*	1
	2 P/G	X0.1	2
	1 P/G	X0.1	1
	5 G/P	X1	2
	10 G/P	X1	1
	50 G/P	X10	2
	100 G/P	X10	1

Size	Pulse Rate	Magnet Position	Magnet Poles
1-1/2"	10 P/G	*	2
	5 P/G	*	1
	2 P/G	X0.1	2
	1 P/G	X0.1	1
	5 G/P	X1	2
	10 G/P	X1	1
	50 G/P	X10	2
	100 G/P	X10	1
	500 G/P	X100	2
	1000 G/P	X100	1
2"	10 P/G	*	2
	5 P/G	*	1
	2 P/G	X0.1	2
	1 P/G	X0.1	1
	5 G/P	X1	2
	10 G/P	X1	1
	50 G/P	X10	2
	100 G/P	X10	1
	500 G/P	X100	2
	1000 G/P	X100	1

\* Star wheel position

Note: G/P = Gallons per pulse  
P/G = Pulses per gallon

## 6.5 Changing Meter Sensor

The meter sensors are threaded hand tight into the lens. To remove a sensor, unscrew it by hand. Screw the replacement sensor in until it bottoms. PR and PT sensors have the same housing and are interchangeable.

## Chapter 7 Spare Parts List

PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
87666	Ring Base-¾"	86631	Locking Screw-¾"-1"
87667	Ring Base-1"	86667	Locking Screw-1½"-2"
87668	Ring Base-1½"-2"		
		86633	Sealing Gasket-¾"-1"
15815	Gasket Set-¾"	86668	Sealing Gasket-1½"-2"
15816	Gasket Set-1"		
15817	Gasket Set-1½"-2"	87506	Orifice Screw-¾"-1"
		86666	Orifice Screw-1½"-2"
76635	PR/PT Lens-¾"		
76653	PR/PT Lens-1"	86634	Tubular Strainer-¾"
76674	PR/PT Lens-1½"-2"	86652	Tubular Strainer-1"
		86665	Tubular Strainer-1½"
Consult	Register-¾"	86675	Tubular Strainer-2"
OMEGA	Register-1"		
	Register-1½"-2"	83564	Coupling Gasket-½"
		82997	Coupling Gasket-¾"
87812	Bottom Chamber-¾"	80226	Coupling Gasket-1"
8665701	Bottom Chamber-1"	80749	Coupling Gasket-1½"
8666901	Bottom Chamber-1½"-2"	80750	Coupling Gasket-2"
		11001	Coupling-½"
		11723	Coupling-¾"
		11724	Coupling -1"
		11004	Coupling-1½"
		11005	Coupling-2"
			Internal Meter Assy-¾"
		Consult	Internal Meter Assy-1"
		OMEGA	Internal Meter Assy-1½"
			Internal Meter Assy-2"

## Chapter 8 Specifications

### Materials

Body:	Bronze
Rotor and Gear Train:	Thermoplastic
Magnet:	Ceramic, permanent

### Maximum Temperature

Cold Water:	125°F (50°C)
Hot Water:	250°F (120°C)

Maximum Operating Pressure: 150 PSI

Accuracy: ± 2% of reading

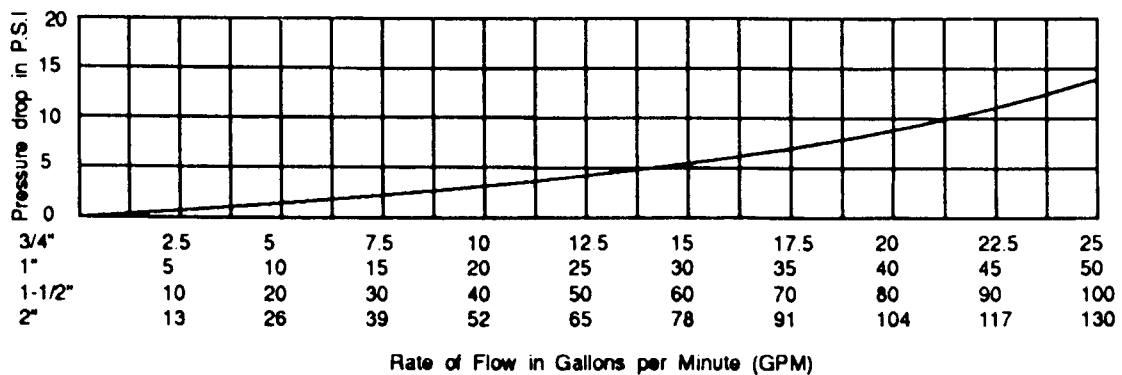
### Sensor

PR: Solid state Hall-effect,  
6-24 Vdc, 20 mA max.  
current sinking output

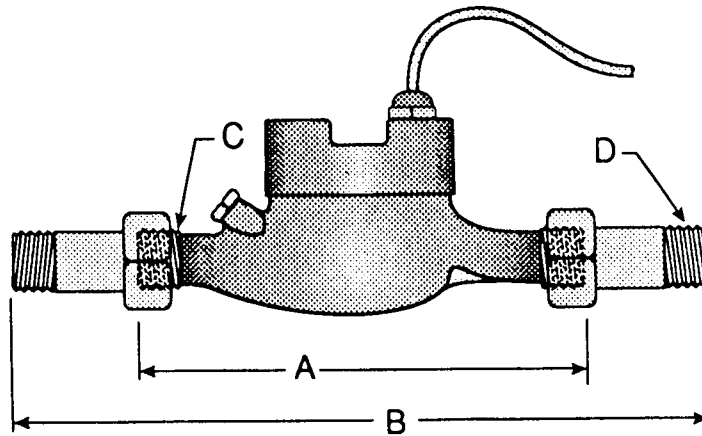
PT: Reed switch, dry contact  
closure, 100 mA at 24 V max.

Cable Length: 12 ft.

### Typical Pressure Drop Curve:



Dimensions:



Dimensions	3/4"	1"	1-1/2"	2"
A Meter - Straight Male Iron Pipe Threads	7-1/2"	10-3/4"	12-5/8"	10-5/8"
B with Couplings (MNPT)	12-5/8"	16-1/8"	18-1/2"	16-7/8"
Thread Size	3/4"	1"	1-1/2"	2"
C Meter - Straight Male Iron Pipe Threads	1"	1-1/4"	2"	2-1/2"
D With Couplings (MNPT)	3/4"	1"	1-1/2"	2"

Weight (approximate):

FTB-8007, FTB-8007-PR:	4 lbs. (1.8 kg.)
FTB-8010, FTB-8010-PR:	7 lbs. (3.2 kg.)
FTB-8015, FTB-8015-PR:	15 lbs. (6.8 kg.)
FTB-8020, FTB-8020-PR:	17 lbs. (7.7 kg.)
FTB-8507, FTB-8507-PT:	4 lbs. (1.8 kg.)
FTB-8510, FTB-8510-PT:	7 lbs. (3.2 kg.)
FTB-8515, FTB-8515-PT:	15 lbs. (6.8 kg.)
FTB-8520, FTB-8520-PT:	17 lbs. (7.7 kg.)

## Notes



## Notes

## Notes



## WARRANTY

OMEGA warrants this unit to be free of defects in materials and workmanship and to give satisfactory service for a period of **13 months** from date of purchase. OMEGA 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 should malfunction, 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. However, this WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of being 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 which wear or which are damaged by misuse are not warranted. These include contact points, fuses, and triacs.

**OMEGA is glad to offer suggestions on the use of its various products. Nevertheless, OMEGA only warrants that the parts manufactured by it will be as specified and free of defects.**

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1. P.O. 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 OR **CALIBRATION**, consult OMEGA for current repair/calibration charges. Have the following information available **BEFORE** contacting OMEGA:

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2. Model and serial number of product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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