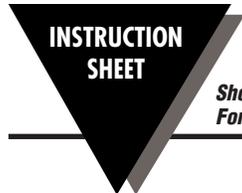




# FTB-30 Series

## Positive Displacement Oil Flow Meters/Totalizers



M0505/0300

Shop online at: [www.omega.com](http://www.omega.com) e-mail: [info@omega.com](mailto:info@omega.com)  
For latest product manuals: [www.omegamanual.info](http://www.omegamanual.info)



### GENERAL DESCRIPTION

The FTB-30 Series Totalizers are used in applications where accurate measurement of heating oil (#2, 4, 6) flow is required. The FTB-30 and FTB-31A are used mainly for light heating oil in small burners. The FTB-32 to FTB-36 are for large flow applications and can be used for all types of oil (2-6) including heavy preheated grades.

Models FTB-32 to FTB-36 feature fully rotatable, easy-to-read faces. The FTB-30 and FTB-31A are shipped with compression fittings, while FTB-32 to FTB-35 are supplied with NPT couplings. All FTB totalizers are non-resettable (counters restart at zero after reaching maximum counting capacity). The FTB-36 has flanges.

The FTB-30 Series meters have an optional reed relay scaled pulse output for remote totalization. This output (option P) must be specified at the time of the order; it is not field installable.

### THEORY OF OPERATION

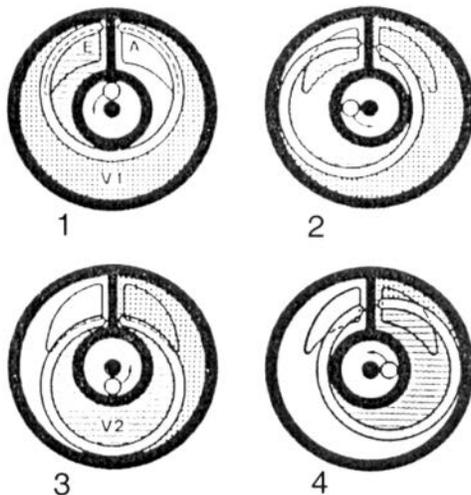
The FTB-30 Series meters come under the category of positive displacement volumetric meters. Their main feature is the division of the measuring chamber into two compartments by the ring piston, which alternately fill and empty. Each cycle thus measures, volumetrically, a definite quantity of liquid. The operation of measurement is thus practically independent of the viscosity and density of the liquid.

Another feature of the volumetric measuring principle of the FTB-30 Series Oil Flowmeter, is the very large measuring range with relatively small metering errors. The range is limited at the highest flows by the maximum permissible cycling speed of the ring piston.

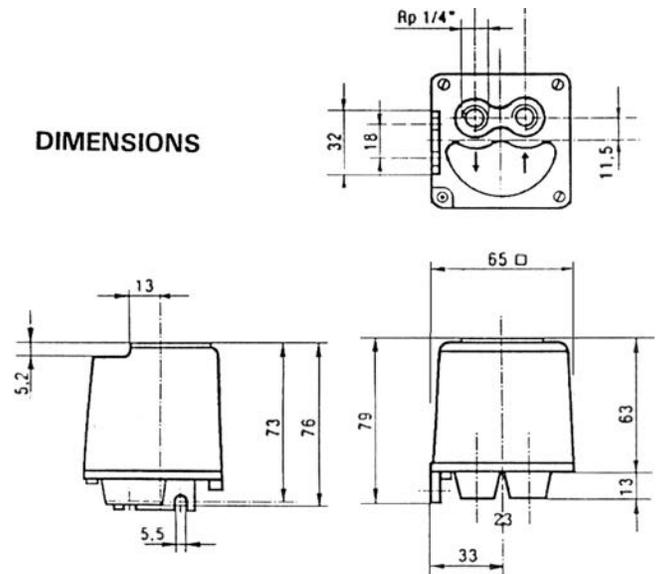
The Construction Diagram shows the measuring chamber with cover removed and the four steps in the metering cycle. In the center of the measuring chamber and top cover lies an annular piston guide. The measuring space is thus a circle, divided by a barrier. The inserted ring piston is guided, on the one hand, by its central spindle following the path of the annular guide; and on the other, by movement of the slit in the piston moving up and down the barrier. The movement is thus oscillatory; the outer diameter of the piston rolling around the inside of the measuring chamber, the inside of the piston around the outer cylindrical face of the annular guide. This creates two measuring chambers, outside (V1) and inside (V2) the piston, the volumes of which change with the piston movement.

The entry port E lies in the base of the measuring chamber and to the left of the barrier. The outlet A is on the opposite side of the barrier, either in the cover or the measuring chamber wall. Thus, there is no direct connection between the inlet and outlet ports. The entry port is so shaped that it feeds either the outer or the inner measuring chamber until both chambers contain the maximum possible volume of liquid. When the second is full, the combined chamber moves towards the outlet port. The chamber volume decreases and discharges the liquid. Thus, with each operating cycle of the piston, two defined and constant volumes V1 and V2 are passed from inlet to outlet. The created pressure differential causes the piston movement.

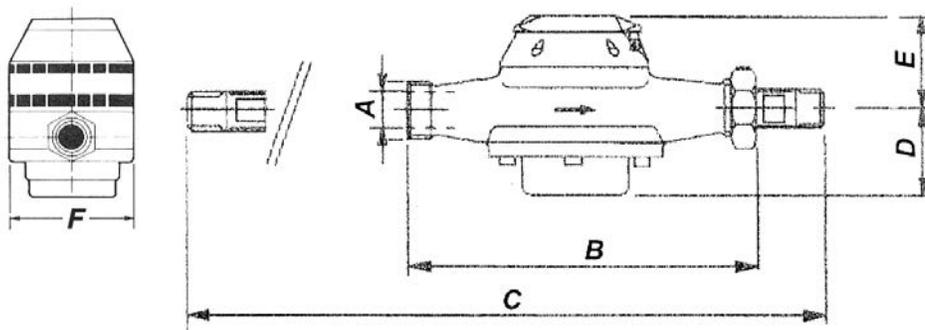
The drive from the piston to the counter is by means of magnetic coupling.



### DIMENSIONS



FTB-30 and FTB-31



	FTB-32	FTB-33	FTB-34	FTB-35	FTB-36
<b>A</b>	3/4"	1/2"	1"	1-1/2"	2" flg
<b>B</b>	6.5"	6.5"	7-1/2"	12"	13-3/4"
<b>C</b>	11"	11-1/4"	12"	17"	—
<b>D</b>	2"	2"	3"	4-1/2"	6-1/2"
<b>E</b>	2-3/8"	2-3/8"	2-1/2"	4-1/2"	4-3/4"
<b>F</b>	4-1/8"	4-1/8"	5-1/8"	8-1/4"	—

Model No. No Output	Model No. Pulse Output	Flowrate Min.	Flowrate Cont.	Flowrate Max.	Conn.	Increment Max. Readings-Gals		Weight Lbs.	Max. Temp CF
FTB-30	FTB-30P	0.25 gal/h	14.0 gal/h	20.0 gal/h	1/4" CF	0.01	100,000	1.1	60 (140)
FTB-31A	FTB-31P	1.0 gal/h	35.0 gal/h	50 gal/h	3/8" CF	0.1	1,000,000	1.1	60 (140)
FTB-32	FTB-32P	8 gal/h	265 gal/h	400 gal/h	3/4" mnpt	0.1	1,000,000	5.5	127 (260)
FTB-33	FTB-33P	2.6 gal/h	105 gal/h	160 gal/h	1/2" mnpt	0.1	1,000,000	4.7	127 (260)
FTB-34	FTB-34P	20 gal/h	528 gal/h	800 gal/h	1" mnpt	1.0	1,000,000	9.3	127 (260)
FTB-35	FTB-35P	60 gal/h	1600 gal/h	2400 gal/h	1-1/2" mnpt	10.0	10,000,000	35	127 (260)
FTB-36	FTB-36P	200 gal/h	5300 gal/h	8000 gal/h	2" Flg	10.0	10,000,000	88	127 (260)

**ACCURACY:** ±1% of reading lot  
FTB-30; FTB-32-FTB-36  
±1/2% of reading for FTB31A

**PULSE OUTPUT**

**MAX. SWITCH LOAD:**

3VA

**MAX. SWITCH CURRENT:**

50mA

**MAX. SWITCH VOLTAGE:**

50 Vac

**OUTPUT FREQUENCY:**

0.1 gal/pulse FTB-30P, FTB-31P, FTB-32P, FTB-33P  
1.0 gal/pulse FTB-34P,  
10.0 gal/pulse FTB-35P, FTB-36P

**MAX. PRESSURE:** 350 psi for FTB-30 and FTB-31A, 225 psi for FTB-32 thru FTB-34, 150 psi for FTB-35 thru FTB-36

**FILTERING REQUIREMENTS:**

Model No.	Filter Size or Mesh Width (Size of Opening)	
FTB-30	0.002"	0.05mm
FTB-31A	0.002"	0.05mm
FTB-32	0.004"	0.10mm
FTB-33	0.008"	0.20mm
FTB-34	0.010"	0.25mm
FTB-35	0.012"	0.30mm
FTB-36	0.012"	0.30mm

**INSTALLATION AND OPERATION**

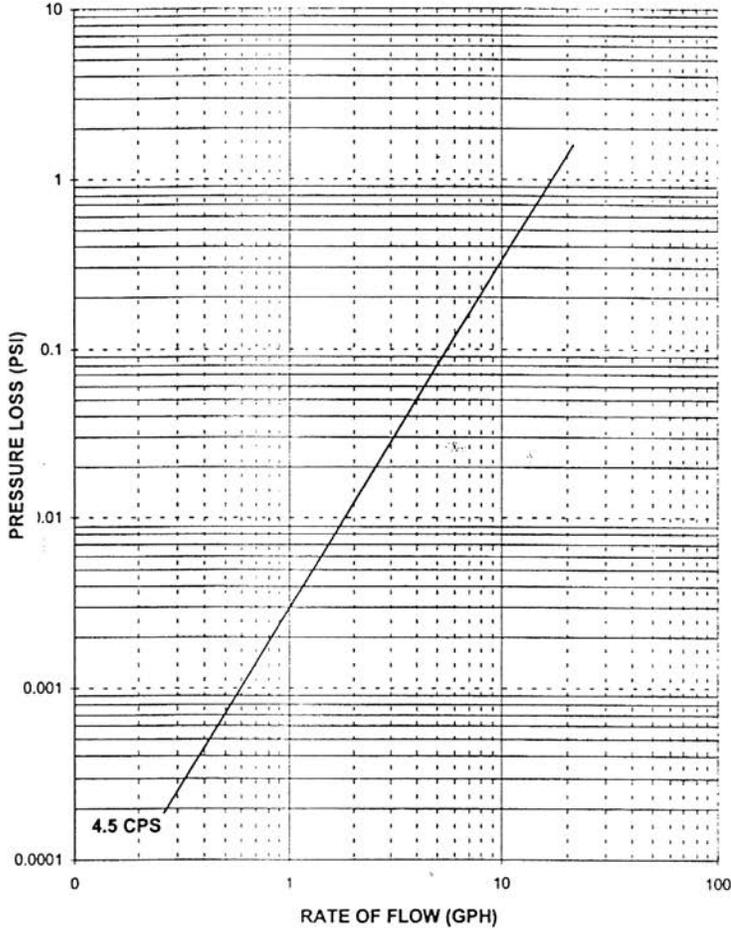
**WARNING**

THE FTB-30 Series Oil Flowmeters have to be protected against sediments. An oil filter or strainer is essential.

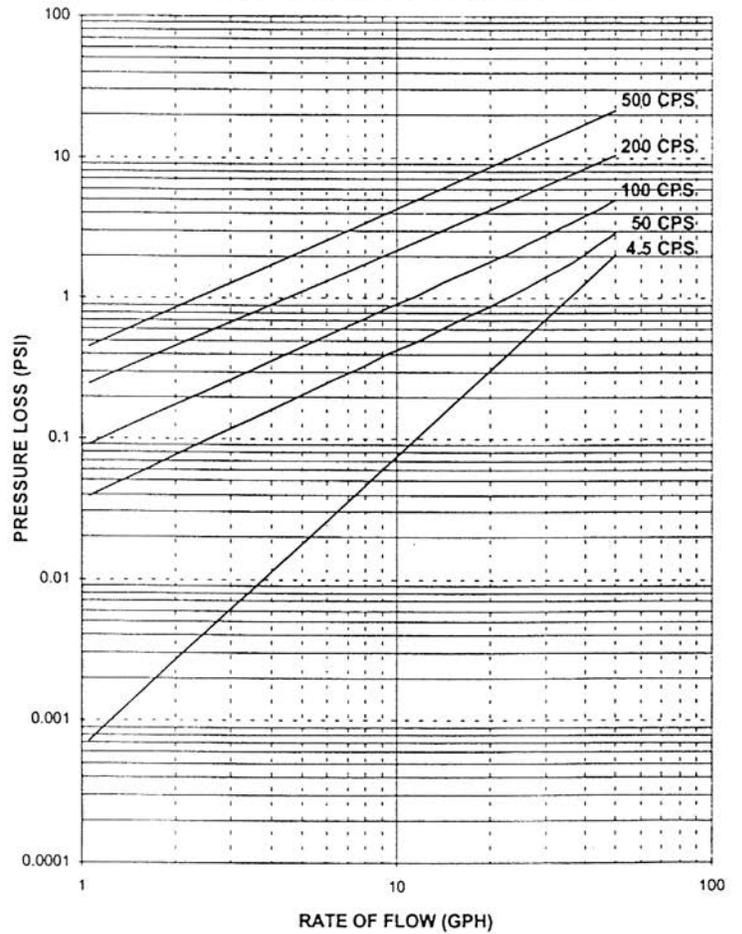
Make sure that the filter is installed upstream of the flowmeter. Remove plastic cover on threads of the flowmeter before installation.

**PRESSURE LOSS CHART FOR POSITIVE DISPLACEMENT  
METER MODEL #FTB-30 AND FTB-31A**

**1/8" OIL METER #FTB-30**

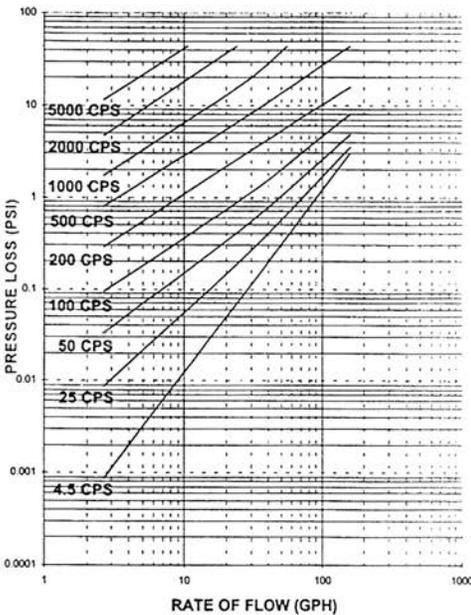


**1/4" OIL METER #FTB-31A**

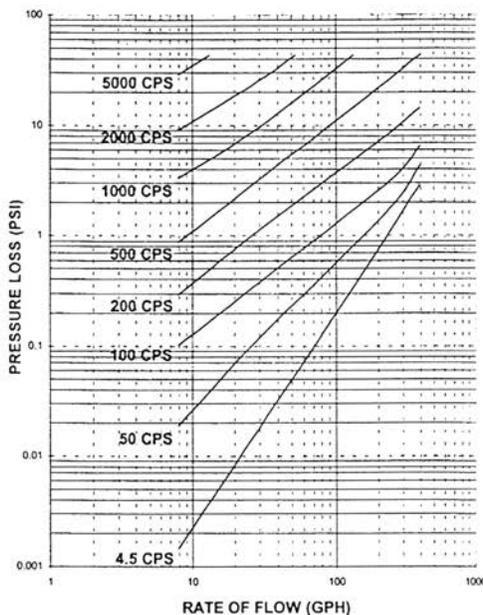


**PRESSURE LOSS CHART FOR POSITIVE DISPLACEMENT  
METER MODEL #FTB-33, FTB-32 AND FTB-34**

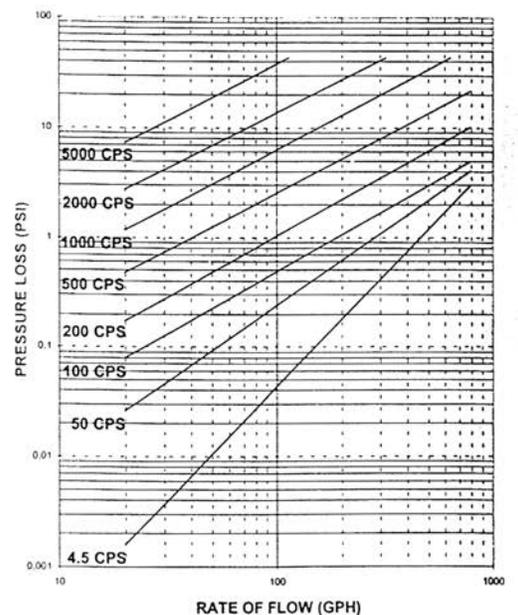
**1/2" OIL METER #FTB-33**



**3/4" OIL METER #FTB-32**

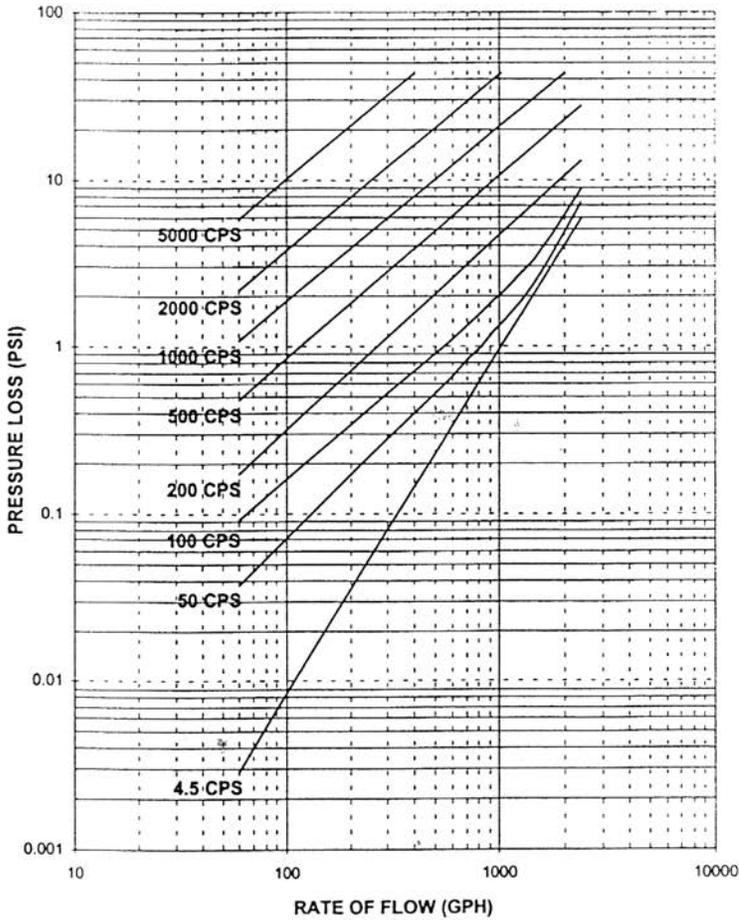


**1" OIL METER #FTB-34**

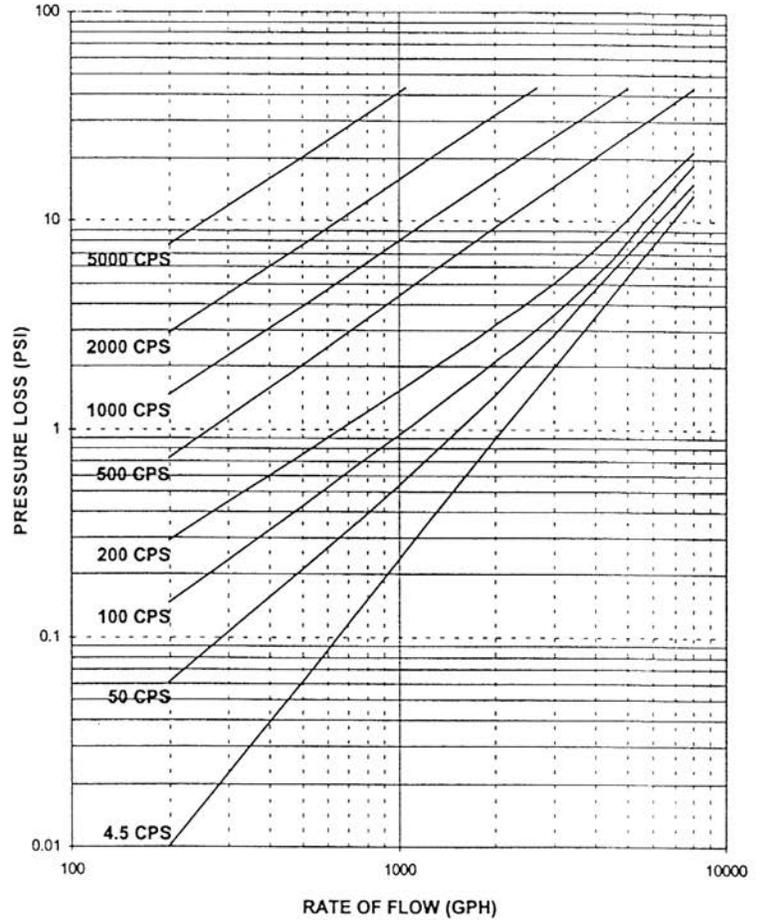


# PRESSURE LOSS CHART FOR POSITIVE DISPLACEMENT METER MODEL #FTB-35 AND FTB-36

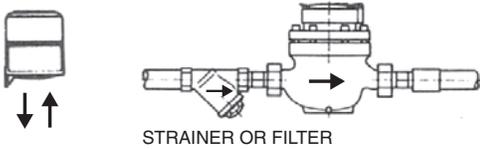
## 1-1/2" OIL METER #FTB-35



## 2" OIL METER #FTB-36



### OBSERVE DIRECTION FLOW (ARROW):

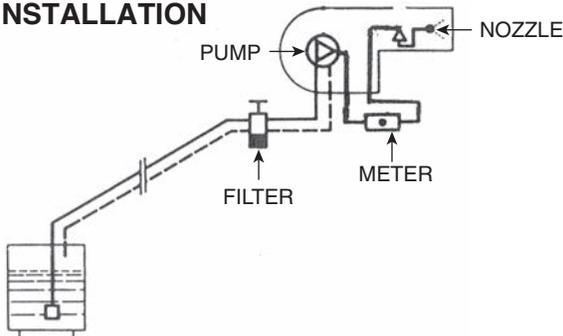


Meter should always be in lower position than the nozzle to prevent the oil from flowing out of the meter.

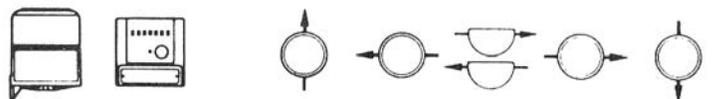
#### 1. Location of Flowmeter

Because the OMEGA® Oil Flowmeters have high pressure and temperature ratings, they can be installed directly into the nozzle line.

### TYPICAL INSTALLATION



Model	PSI Rating	Temp. Rating
FTB-30	350	140F
FTB-31A	350	140F
FTB-32	225	260F
FTB-33	225	260F
FTB-34	225	260F
FTB-35	150	260F
FTB-36	150	260F



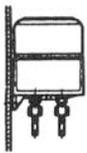
2. Installation Instructions

3. Flushing of Pipes

Make sure all pipes are flushed before installing the FTB-30 Series Flowmeter.

4. Securing Meter

The FTB-30 and FTB-31A should be additionally secured when installed in copper pipes. Use the two openings on the mounting frame.



5. Pressure Fittings & NPT Coupling Pieces

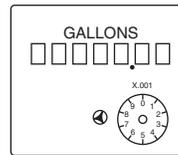
Use the pressure fittings provided for the FTB-30.

Model FTB-30 uses pressure fittings for 1/4" pipe size; the Model FTB-31A uses pressure fittings for 3/8" pipe size. Model FTB-32 - FTB-35 uses NPT fittings. Model FTB-36 has 2" flange (ANSI).

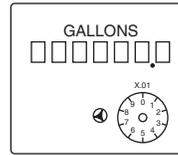
uses NPT fittings. Model FTB-36 has 2" flange (ANSI).

6. Start-up Operation

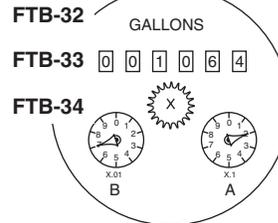
Slowly fill pipe system and carefully vent air in the line. Air trapped in pipes causes incorrect measurements and may damage the meter. Never allow the meter to run dry.



FTB-30



FTB-31A



DIAL #FTB-32-FTB-34

Example: Top numbers read

0 0 1 0 6 4

Dial "A" reads 2 = .2

0 0 1 0 6 4. 2

The red dial "B" reads 7 = .07

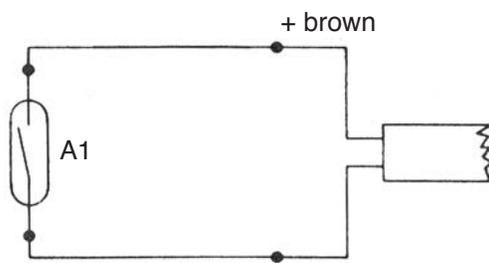
0 0 1 0 6 4. 2 7 = Total reading

OPTIONAL REED RELAY SCALED PULSE OUTPUT

It is often necessary to transmit measurement parameters from a meter to a distant position. These parameters may also be used as manipulated variable in a regulating or control circuit. In such cases, an electric signal is necessary, which represents the parameter. Ideally this signal will be an impulse that occurs at a given quantity.

The Reed Relay Scaled Pulse Output incorporates a sensing unit. Like the standard counter capsule, it is vacuum sealed and thus protected from all possible foreign matter. One of the pointers is fitted with a small magnet which operates a reed contact inside the sensing unit once per revolution. This establishes an impulse in the control circuit.

WIRING DIAGRAM FOR REED RELAY SCALED PULSE OUTPUT



HOW TO READ OIL FLOWMETERS IN U.S. GALLONS

The FTB-30 has five black numbers which represent complete gallons. The last two numbers are red and represent decimals of gallons.

Example: 0 0 3 6 2. 7 5 = 362.75 Gallons  
The round dial in right corner represents 1/1000th of a gallon.

The FTB-31A has six black numbers representing gallons. The last red number indicates 1/10th of a gallon and the dial represents 1/100th of a gallon.

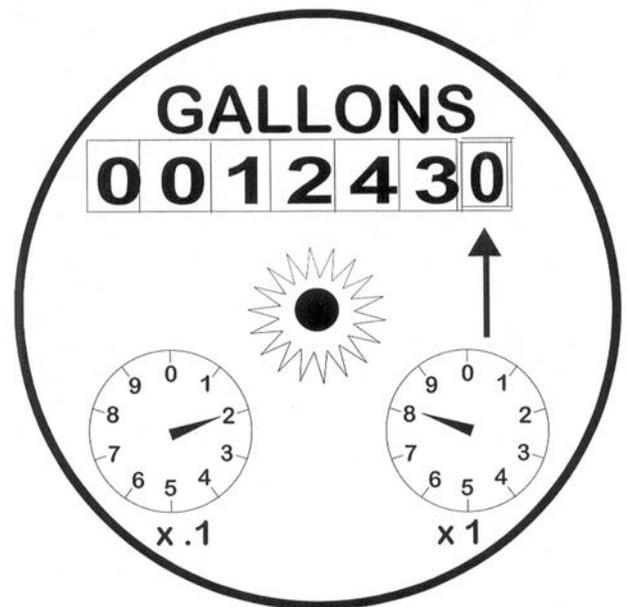
The entire counter unit of the FTB-32-FTB-36 can be rotated 360° to facilitate the reading. The counter FTB-32-FTB-34 has six black numbers representing U. S. gallons.

Dial "A" counts 1/10th of a gallon  
Dial "B" counts 1/100th of a gallon

TRICKLE FLOW INDICATOR

All flowmeters can indicate even the smallest liquid movements with this indicator. (X)

How to read the oil meter FTB-35 (1-1/2") and FTB-36 (2")



The sample meter reading is 12438.2 gallons. The single gallon counter is on the right hand corner (small dial) and shows indication x1. The fraction of gallons is indicated on the left side of the dial indication that each number adds .1 gallon.

The counter is non-resettable and counts to 9 999 990 before it restarts to count up from zero.



omega.com info@omega.com

### Servicing North America:

U.S.A.:

Omega Engineering, Inc., One Omega Drive, P.O. Box 4047  
Stamford, CT 06907-0047 USA

Toll-Free: 1-800-826-6342 (USA & Canada only)

Customer Service: 1-800-622-2378 (USA & Canada only)

Engineering Service: 1-800-872-9436 (USA & Canada only)

Tel: (203) 359-1660

Fax: (203) 359-7700

e-mail: info@omega.com

### For Other Locations Visit [omega.com/worldwide](http://omega.com/worldwide)

The information contained in this document is believed to be correct, but OMEGA accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

**WARNING:** These products are not designed for use in, and should not be used for, human applications.



### 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.

**OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by the company will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.**

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

### 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.

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. OMEGA is a registered trademark of OMEGA ENGINEERING, INC.

© Copyright 2013 OMEGA ENGINEERING, INC. All rights reserved. This document may not be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine-readable form, in whole or in part, without the prior written consent of OMEGA ENGINEERING, INC.