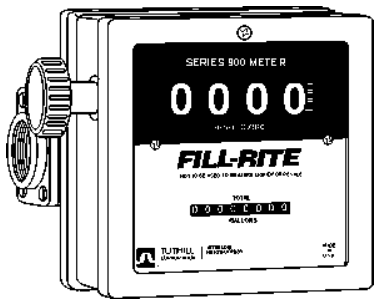
Pump System Technology

FILL-RITE

Owner's Operation & Safety Manual

SERIES 900 METER

For models 901, 901N & 901T



Model 901

OUTSTANDING FEATURES

- **6 to 40 GPM / 23 to 151 LPM flow rate**
- **±2% accuracy**
- **1" or 1-1/2" NPT inlet/outlet ports**
- **Large, easy to read numbers**
- **Quick reset knob**
- **Accumulative totalizer**
- **UL, CSA listed**

TUTHILL
Transfer Systems
8825 Aviation Drive
Fort Wayne, Indiana USA 46809
Tel 219 747-7524 Fax 219 747-3159
www.tuthill.com

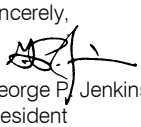
Dear Fill-Rite Customer,

Thank you for buying a Fill-Rite product. We believe that you have bought the best. This piece of literature contains information about your new equipment and its operating and service requirements. Please take a few minutes to read it carefully.

Fill-Rite's products are distributed around the world and are the result of people at Fill-Rite working together to design, manufacture, sell, ship and service products which meet the needs of each and every customer.

If, for any reason, any of our products do not meet your performance expectations, we would like to hear from you. Our best sales force is you, our customer, and we want you to be satisfied. We appreciate your purchase of a Fill-Rite product and look forward to providing your future equipment needs.

Sincerely,



George P. Jenkins
President

SAFETY INSTRUCTIONS

To ensure safe and efficient operation, it is essential to read each of these warnings and precautions, and to carefully follow all instructions listed in this manual.

1. **Improper use or installation of this product can cause serious bodily injury or death.**
2. DO NOT smoke near meter or use meter near an open flame when measuring flammable fluids. Fire could result.
3. Do not exceed 50 PSI / 3.5 BARS line pressure.
4. CAUTION: DO NOT INSTALL ADDITIONAL FOOT VALVE OR CHECK VALVE DURING INSTALLATION WITHOUT PRESSURE RELIEF VALVE. CRACKING MAY RESULT.
5. This product should not be used for fluid transfer into aircraft.
6. This product is not suited for use with fluids for human consumption.

GENERAL DESCRIPTION

The Fill-Rite Series 900 Meter is a nutating disc flow meter. The meter uses wheel counters for registering either U.S. gallons or liters. The U.S. gallon meter has three unit wheels and a tenth wheel which can be reset to zero. It's totalizer has seven unit wheels and a tenth wheel. The liter counter has four unit wheels which can be reset to zero. It's totalizer has eight unit wheels.

SAFETY

The safety of Fill-Rite Series 900 meters is proven by their listing with:

Underwriters Laboratories Inc., a nationally recognized independent organization for testing of products to ensure public safety.

Canadian Standards Association, a Canadian organization for testing of products to ensure public safety.

OPTIONS

- Liter registers
- 1-1/2" NPT inlet/outlet ports
- Teflon or nickel coatings for pumping a variety of fluids
- BSP threads

Northbrook, Illinois • (847) 272-8800
Melville, New York • (516) 271-6200
Santa Clara, California • (408) 985-24(
Research Triangle Park, North Carolina • (919) 549-1400
Camas, Washington • (360) 817-5500

Underwriters Laboratories Inc.®

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FILL-RITE DIV
TUTHILL CORP
MR R NALLENWEG, DIRECTOR OF ENGRG
PO BOX 9100
FT WAYNE IN 46899

Your most recent listing is shown below. Please review this information and report any inaccuracies to the UL Engineering staff member who handled your UL project.

PLRZ July 25, 1997
Flammable Liquid Meters

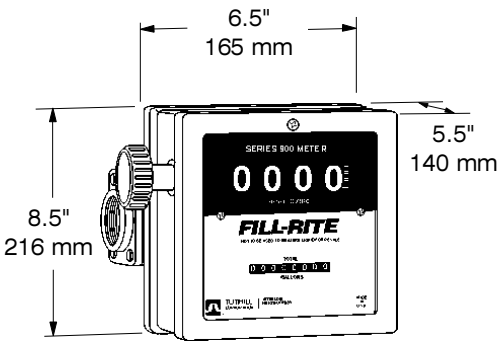
FILL-RITE DIV TUTHILL CORP MH8290 (N)
8825 AVIATION DR, FT WAYNE IN 46809
Models 806B, 806C, 807B, 807C, 886, 887; Series 900.
LOOK FOR LISTING MARK ON PRODUCT

TECHNICAL INFORMATION

Design Features:

- 1" NPT female inlet and outlet ports
- 6 to 40 GPM / 23 to 151 LPM flow rate
- ±2% accuracy
- 50 PSI maximum pressure
- Measures fluids with temperatures from -15°F (-26°C) to 150°F (66°C)
- Weatherproof, corrosion resistant
- Large 11/16" figures with zero reset
- Measures flow to 1,000 gallons in 1/10 increments
- Easy to read totalizer registers to 1,000,000 gallons
- Compact design: 8 1/2" x 6 1/2" x 5 1/2" (22 cm x 17 cm x 14 cm)
- Large reset knob
- Self-lubricating
- Not for resale use
- Maximum viscosity of fluid: diesel fuel
- Pressure drop* through meter:
  - 10 GPM (38 LPM) -- 1 psid (0.07 bar)
  - 20 GPM (76 LPM) -- 2.5 psid (0.17 bar)
  - 40 GPM (151 LPM) -- 9 psid (0.61 bar)

*Nominal data based on mineral spriits. Actual pressure drop may vary.



Fluid Compatibility

The 900 is compatible with the following fluids:

- Diesel Fuel, Gasoline, Kerosene, Mineral Spirits, Heptane, and Hexane

The 900 is NOT compatible with the following fluids:

- Bleach, Hydrochloric Acid, Ink, Sulfuric Acid, and Salt Water

If in doubt about compatibility of a specific fluid, contact supplier of fluid to check for any adverse reactions to the wetted materials shown on the parts list.

INSTALLATION

Meters are furnished for horizontal piping; left to right flow unless otherwise specified. Flow ports can be changed to any of four positions for horizontal or vertical piping and for either direction of flow.

1. Determine direction for fluid to flow.
2. Install meter observing directional arrow on casting.
3. Remove four screws (item 28).
4. Rotate meter cover assembly (item 37) to desired orientation.
5. Replace four screws.

ASSEMBLY & DISASSEMBLY

Meter consists of a chamber housing, measuring chamber, gear train, counter assembly and cover. Meter can be completely disassembled without disturbing piping, or meter can be partially disassembled as required.

Counter Assembly

For access to counter assembly, remove reset knob (item 15) by grasping edges and pulling firmly. Knob is held in place by a spring clip. Loosen two screws (item 14) and lift bezel (item 11) off. Remove two screws (item 12) to detach counter face (item 13). Remove two screws (item 9) to extract counter (item 10). Reassemble by reversing procedure.

Meter Chamber Assembly

To expose meter chamber assembly, gear train and seal, remove four screws (item 28). Meter chamber assembly consists of upper and lower chambers, a nutating disc and four screws. Meter chamber assembly (item 3) can be dislodged by removing four screws (item 5). Reassemble by reversing procedure.

If replacement of any components of the meter chamber assembly is required, the complete assembly must be replaced due to the precise method of its construction. This assures a proper fit and a correctly operating chamber.

Gear Train and Seal

To disassemble gear train and seal, remove two screws (item 8) and gear frame (item 6). Remove cluster gear (item 18), washer (item 19), and shaft (item 17). Remove drive gear (item 24) and washers (item 23) by rotating and pulling drive gear. Remove O-ring seal (item 25).

When reassembling seal, lubricate O-ring with oil or petroleum jelly and replace in cover. Place washer on drive gear shaft. Rotate and push shaft through O-ring and cover carefully to prevent damage to O-ring. Shaft must then be guided into pinion bevel (item 27) if counter has not been removed. Replace remaining parts to complete assembly by reversing disassembly procedure.

CALIBRATION

The Fill-Rite Series 900 meters can be calibrated for either U.S. gallons or liters. Calibration is required upon installation, after disassembly, after significant wear or when metering a different viscosity fluid. Depending on the model, Series 900 meters are calibrated at the factory metering gasoline in either U.S. gallons or liters.
Calibration must be done between 6 and 40 GPM (23 and 151 LPM).

Meter calibration can be easily changed by following the calibration procedure listed below. A proving container or a container of KNOWN volume will be needed for the calibration procedure. It is recommended that the container's volume be at least five times larger than the unit of calibration. For example, a five gallon container should be used when calibrating for gallons.

Procedure for Calibration:

1. Fill container to a known volume.
2. If meter amount is incorrect, turn calibration screw (item 31) counterclockwise for less liquid, or clockwise for more liquid.
3. Repeat step 2 until calibration is acceptable.

OPERATING INSTRUCTIONS

For accurate measurement and to prevent meter damage, meter and piping must always be filled with liquid and free of air. Meter should be calibrated per instructions in this manual prior to its use.

1. Reset meter to “0”.
2. Meter is ready for use.

MAINTENANCE

Meter should operate maintenance free. However, certain liquids can dry out while in meter housing, causing the meter to stop. If this happens, meter should be thoroughly cleaned (see instructions below).

900 SERIES METER PARTS LIST

ITM. NO.	PART NO.	DESCRIPTION	MATERIAL OF CONSTR.	QTY.
1	900F8051	Meter Housing	Aluminum	1
	900F8102	Meter Housing-Nickel Plated	Aluminum, Nickel	Opt.
	900F8101	Meter Housing-Teflon® Coated	Aluminum, Teflon®	Opt.
2	300F7744	Inlet/Outlet Gasket	Buna-N	2
	300F7788	Inlet/Outlet Gasket	Fluorocarbon	Opt.
3	900F8087	Meter Chamber Assembly	Polyester	1
4	900F8067	Cover Gasket	Buna-N	1
	900F8068	Cover Gasket	Fluorocarbon	Opt.
5	900F4017	#10-32 x 1/2 PHMS, ACR II, T	Stainless steel	4
6	900F8066	Gear Frame	Polyester	1
7	900F8053	Meter Cover (Includes Item 20)	Aluminum	1
	900F8104	Meter Cover - Nickel Plated	Aluminum, Nickel	Opt.
	900F8103	Meter Cover - Teflon® Coated	Aluminum, Teflon®	Opt.
8	900F8132	#12-1/2 PHMS, Type AB	Stainless steel	2
9	900F4007	#8-32 x 5/16 PHMS, ACR II, TT		2
10	900F8070	Counter Assembly - U.S. Gallon		1
	900F8071	Counter Assembly - Liter		Opt.
11	900F8069	Bezel		1
12	800F4020	#4-40 x 1/4 PHMS		2
13	900F8073	Counter Face		1
	900F8099	Counter Face - Litre		Opt.
14	900F3410	#8 x 1/2 OHMS - Type B		2
15	800F4261	Knob		1
17	800F3820	Shaft - Cluster Gear	Stainless steel	1
18	800F3841	Cluster Gear - U.S. Gallon	Ryton	1
	800F3843	Cluster Gear - Liter	Ryton	Opt.
19	800F3830	Washer		1
20	900F8063	Driver Pinion Shaft (Included with Item 7)	Stainless steel	1
21	900F8065	Retaining Ring	Zinc plated steel	1
22	900F8064	Driver Pinion	Polyester	1
23	800F3980	Washer	Stainless steel	3
24	800F3845	Drive Gear - U.S. Gallon	Ryton	1
	800F3846	Drive Gear - Liter	Ryton	Opt.
25	800F4191	O-Ring (5-106)	Fluorocarbon	1
27	800F3959	Pinion Bevel		1
28	700F2810	5/16-18 x 7/8 HHCS		4
29	900F8158	Seal Screw	Stainless steel	1
30	800F4449	O-Ring (-012)	Fluorocarbon	1
31	900F8160	Adjustment Screw (Includes Item 32)	Stainless steel	1
32	900F8159	O-Ring (-010)	Fluorocarbon	1
33	1200F6721	1/4-20 x 3/4 HHCS (1" meters)		8
34	900F8076	1" Meter Flange	Aluminum	2
	900F8106	1" Meter Flange - Nickel Plated	Aluminum, Nickel	Opt.
	900F8105	1" Meter Flange - Teflon Coated	Aluminum, Teflon®	Opt.
35	900F8092	1-1/2" Meter Flange	Aluminum	Opt.
	900F8110	1-1/2" Meter Flange Nickel Plated	Aluminum, Nickel	Opt.
	900F8109	1-1/2" Meter Flange Teflon Coated	Aluminum, Teflon®	Opt.
36	900F8091	1/4-20 x 1-1/2 HHCS (1-1/2" meters)		Opt.
37	900F8045	Meter Cover Assembly U.S. Gallon		1
	900F8047	Meter Cover Assy-U.S. Gallon Nickel Plated		Opt.
	900F8046	Meter Cover Assy-U.S. Gallon Teflon Coated		Opt.
	900F8048	Meter Cover Assembly - Liter		Opt.
	900F8050	Meter Cover Assy - Liter Nickel Plated		Opt.
	900F8049	Meter Cover Assy - Liter Teflon Coated		Opt.

Cleaning Instructions:

Run a flushing fluid through meter. For a more thorough cleaning, disassemble meter per "ASSEMBLY/ DISASSEMBLY" section, "Meter Chamber Assembly" subsection. Rinse all meter components. Recalibrate meter following calibration instructions above.

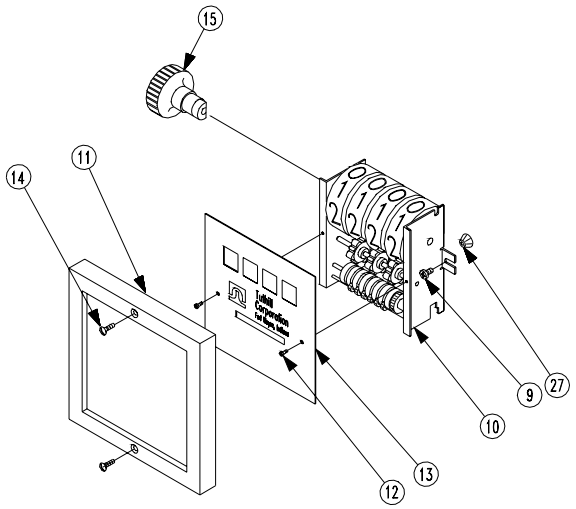
Storage:

If meter is to be stored for a period of time, clean thoroughly. This will help protect meter from damage.

REPAIR

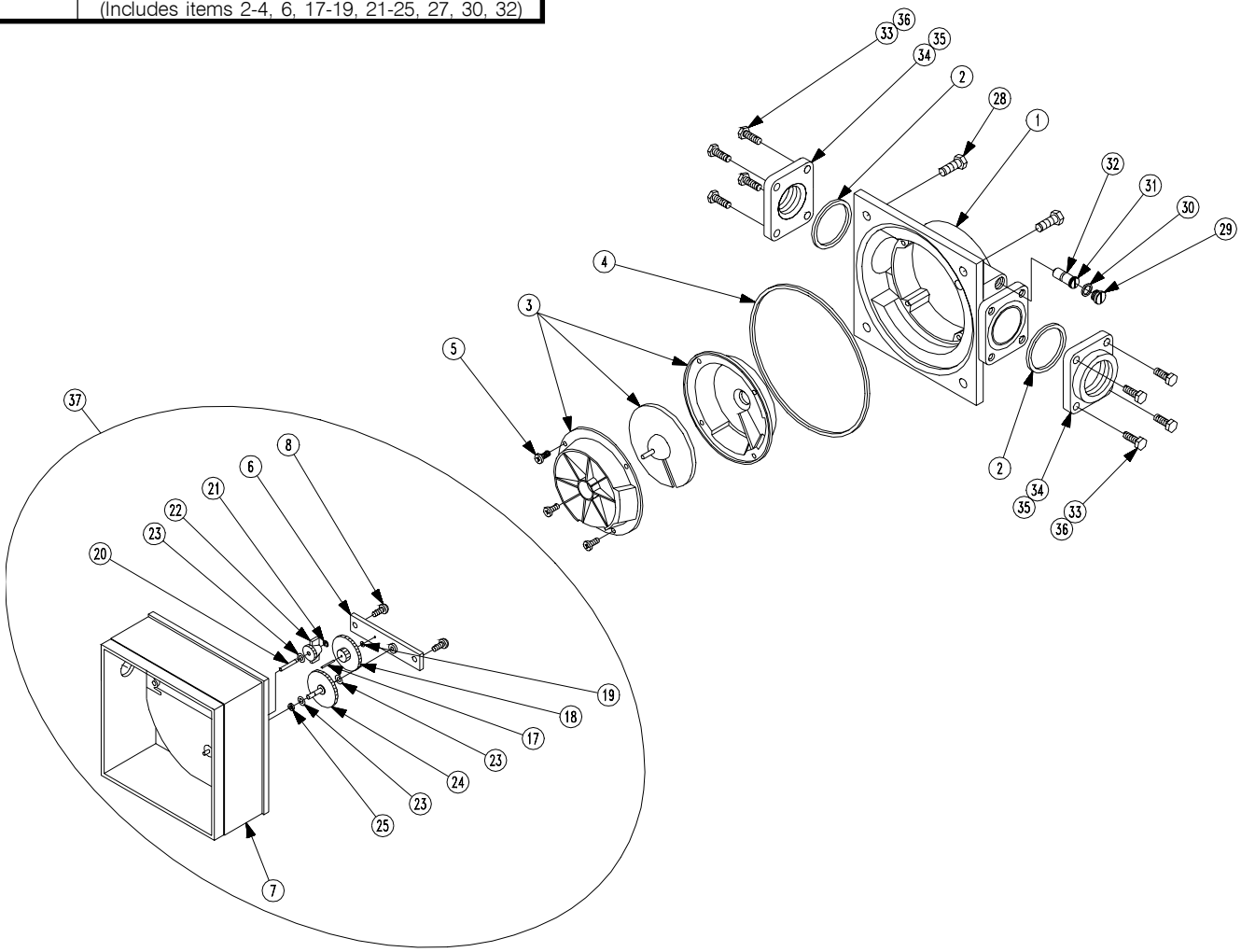
Meters needing repair should be taken to an authorized repair shop or returned to factory for service. Meters must be thoroughly triple-rinsed before being taken in for repair.

PRIOR TO SERVICE, ADHERE TO FOLLOWING INSTRUCTIONS:
If meter was used for a fluid other than a petroleum product, it must be triple-rinsed and accompanied by a note indicating the chemicals which have been pumped through the unit. Meters not adhering to these specifications may be refused service at either the repair shop or at the factory.



WHEN ORDERING REPAIR PARTS, BE SURE TO GIVE REPLACEMENT PART NUMBER, DATE OF MANUFACTURE AND METER SERIES NUMBER. THIS WILL ENSURE THAT THE CORRECT REPLACEMENT PART IS SUPPLIED.
TOLL FREE CUSTOMER CARE NUMBER
800 634 2695

900 SERIES REPAIR PARTS KITS	
900KTF8119	Meter Repair Kit, U.S. Gallon (Standard Seals) (Includes items 2-4, 6, 17-19, 21-25, 27, 30, 32)
900KTF8120	Meter Repair Kit, U.S. Gallon (Fluorocarbon Seals) (Includes items 2-4, 6, 17-19, 21-25, 27, 30, 32)
900KTF8121	Meter Repair Kit, Liter (Standard Seals) (Includes items 2-4, 6, 17-19, 21-25, 27, 30, 32)
900KTF8123	Meter Repair Kit, Liter (Fluorocarbon Seals) (Includes items 2-4, 6, 17-19, 21-25, 27, 30, 32)



TROUBLESHOOTING GUIDE		
PROBLEM	POSSIBLE CAUSE	SOLUTION
Counter reading high or low	• Calibration off	• Recalibrate meter.
	• Air in product	• Find and repair air leaks in system.
	• Measuring chamber or gears sticking	• Clean or replace internal metering components.
Shaft seal leakage	• Dirty seal	• Clean O-ring seal and seat area.
	• Bad seal	• Replace seal.
Gasket leakage	• Loose joints	• Tighten joints.
	• Dirty gasket	• Clean gasket and seat area.
	• Bad gasket	• Replace gasket.
Low flow capacity	• Clogged meter chamber	• Clean meter chamber.