



FINISH THOMPSON INC.

Drum Pump **Flow Meter**

Model FM1000 Series
Operating Instructions
P/N 106606 R3



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Safety

ALWAYS wear protective clothing, eye protection and follow standard safety procedures when handling corrosive or personally harmful materials.

NEVER use this flow meter with flammable or combustible liquids.

NEVER use this flow meter in a hazardous environment.

ALWAYS verify chemical compatibility with the flow meter and pump materials of construction before operation.

ALWAYS make sure the pump and hose are properly supported.

ALWAYS use a chemically compatible hose rated for the temperature of the product being pumped.

ALWAYS place pump tube in liquid before starting.

Introduction

Thank you for purchasing an FM-1000 Series electronic flow meter. The FM-1000 Series is designed to measure the flow of a fluid being dispensed from Finish Thompson's PFP, PFM, PFV, SFM, SFP, SFV, and SFVV drum pumps. The meter is factory calibrated and displays information on an LCD display. Two AAA batteries power the unit for up to one year. There are two models available with options for materials of construction and measurement units.

FM-1000-T is a totalizer meter – designed to measure and display the total flow.

FM-1000 RT is a rate/totalizer meter – designed to measure and display both the rate of flow and the total flow.

Specifications

| | |
|------------------------------|--|
| Minimum Flow Rate: | 5 gpm (18.9 lpm) |
| Maximum Working Pressure: | 35-62 PSIG (2.4 – 4.3 bar) |
| Maximum Fluid Temperature: | 200° F (93° C) but limited by pump |
| Ambient Temperature Range: | 32° to 110°F / 0° to 43° C |
| Enclosure: | NEMA 4X (IP56) |
| Sensor/Paddle/Axle Material: | PVDF |
| O-ring seals: | FKM |
| Accuracy: | +/-1% of full-scale rate reading |
| Repeatability: | +/-1% of full-scale rate reading |
| Power Requirements: | Two standard AAA alkaline batteries (included) |
| Battery Life Expectancy: | 1 year minimum |
| Maximum Viscosity: | 20 cP/mPas |
| Maximum Specific Gravity: | 1.8 |

Features

- Easy to read .35" high, six digit LCD display
- Installs quickly on PFM, PFP, PFV, SFM, SFP, SFV, SFVV Series pump tubes with supplied fittings
- Factory calibrated –nothing to program
- Minimal maintenance required
- Corrosion resistant PVDF sensor with polypropylene or PVDF body, ABS electronics enclosure
- Weather resistant enclosure
- High accuracy
- Total reset function can be disabled

Kit Contents:

- FM-1000 Series Meter
- Flow meter adapter
- Discharge nut
- 1" NPT coupling
- Hose barb adapter

Section 1 - Installation

NOTE: Avoid exposing the LCD for prolonged periods to direct sunlight or the life of the LCD may be reduced.

NOTE: Item numbers below reference illustration on page 3.

1. Determine which direction the flow meter display is to face. It is bi-directional and can face either to the right or left but must be kept in the upright position.
2. Wrap Teflon tape on threads of both ends of flow meter (Item 1). Screw Hose Barb Adapter (Item 2) onto discharge end of flow meter. Tighten securely by hand or wrench, being very careful not to over-tighten.
3. Screw the 1" NPT coupling (item 3) onto the other end of the flow meter. Tighten securely by hand or wrench, being very careful not to over-tighten.
4. Remove discharge nut, spout and o-ring (items 6, 7, & 8) from pump discharge. Discard the discharge nut and spout (or save for later use if no longer using the pump with a flow meter). Save the o-ring for use in the next step.
5. For SF models, install the o-ring into the o-ring groove of the Flowmeter Adapter (item 5). For all models, place the flow meter adapter (item 5) into the discharge nut (item 4) supplied with the flow meter kit. Threads of the adapter will protrude through the front of the discharge nut. For PF models, place the o-ring (item 6) inside the discharge nut (item 4). Press down on the o-ring to ensure it is seated in the nut.
6. Screw discharge nut/adapter/o-ring assembly onto the discharge of the pump tube. Tighten securely but do not over-tight-en. This step prevents the adapter from rotating when the flow meter is installed.
7. Grasping the flow meter body (being careful not to put pressure on the digital display), screw the flow meter assembly onto the 1" NPT discharge adapter on the pump tube until tight. If the flow meter display is not in the upright position proceed to step 8 for adjustment.
8. Using a wrench, loosen the discharge nut (item 4) on the discharge of the pump tube. Position the flow meter assembly so the display is in the upright position and retighten the discharge nut (while holding the flow meter assembly).
9. Attach 1" ID hose to the hose barb located at the discharge end of the flow meter. Secure with a hose clamp.

Warning: Use chemically compatible hose rated for the temperature of the product being pumped.



Section 2 - Operation

NOTES:

- Depending on the meter purchased, the FM-1000 is calibrated for and displays either GPM (US gallons per minute) or LPM (liters per minute).
- The meter is shipped from the factory with 2 AAA pre-installed batteries.
- The FM-1000 Series is factory calibrated to $\pm 1\%$ of full-scale rate reading. When measuring total flow, accumulated error over time must be considered. Accuracy is based on laboratory testing using a PF Series pump tube.

Model FM-1000-T: The FM-1000-T provides totalizer function only. The meter will display the total flow amount and can be reset to zero. Pressing and holding the RESET button (located on the front panel) for at least two seconds resets the total to zero. This feature can be disabled. See Figure 1 below.

Model FM-1000-RT: The FM-1000-RT provides both rate and totalizer functions. Pressing the MODE/RESET button (located on the front panel) toggles the display between flow rate and total flow. Pressing and holding the MODE/RESET button for at least two seconds while the total flow value is displayed will reset the total to zero. This feature can be disabled. See Figure 1.

Disabling the Reset Function:

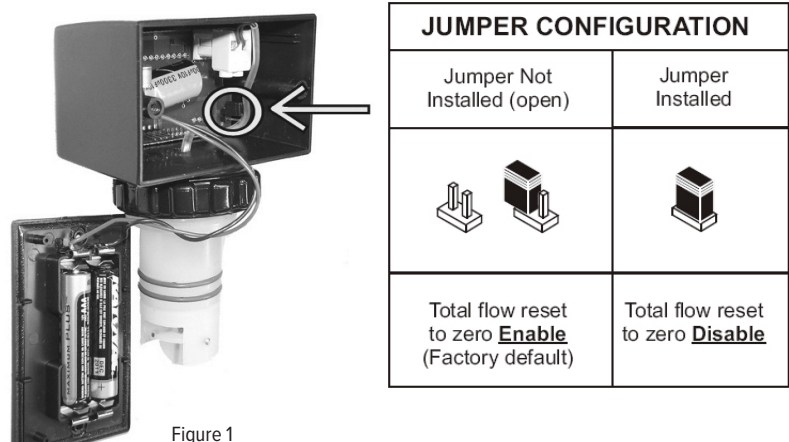


Figure 1

Section 3 - Accuracy

The accuracy of these flow meters is published as Full Scale Accuracy. This means the amount of error is relevant to the Full Scale, which is 50 gpm for the FM1000. For example, if the flow meter is displaying 5 gpm, and you measure the actual flow to be 5.4 gpm, then your full scale accuracy is calculated as $(\text{Measured}-\text{Actual}) / \text{Full Scale}$...or $5 \text{ minus } 5.4 \text{ divided by } 50$ which equals .008 or .8%.

On the other hand, the Actual Accuracy is calculated as $5 \text{ minus } 5.4 \text{ divided by } 5.4$ which equals .074 or 7.4%. Notice this value is nearly 10X higher. As you increase your flow towards the Full Scale value, your Full Scale Accuracy and your Actual Accuracy become the same.

Similarly, when using these flow meters (FM1000) to measure volume, the accuracy is affected by the flow rate. When pumping at low flow rates, Actual Accuracy will be high. Also, small measured batches are sensitive to error incurred from varying setups, such as hose length, valves, head.

More accuracy can be obtained by using an FM2000 or FM3000 flow meter and field calibrating the meter to the specific flow rate and setup.

Section 4 - Maintenance

The FM-1000 Series is engineered for low maintenance; however, some conditions can cause increased wear on the paddle and/or possible damage to the unit. Damage caused by corrosives incompatible with the meter's materials of construction or abrasive fluids is not covered under warranty.

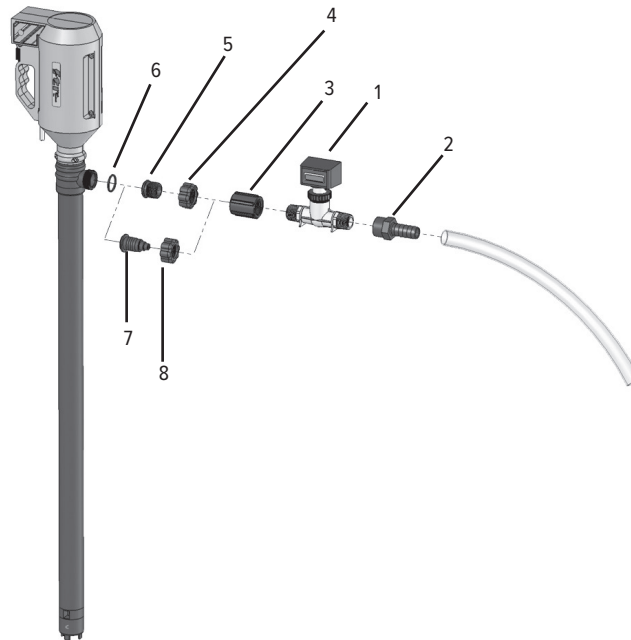
- Periodically remove the sensor from the molded in-line body and inspect for signs of wear and obstructions. Clean the paddle of any foreign material. Inspect the o-rings for any sign of wear, swelling, cracking or discoloration. Replace if necessary.
- The meter is designed to withstand minor condensation inside the enclosure. Prolonged excessive moisture inside the enclosure, due to high humidity conditions, may damage the meter. Reduce the humidity or move the meter to a cool, dry location.
- Replace the two AAA batteries every 12 months. The program memory is "non-volatile" and will not erase when replacing the batteries. To replace the batteries, open the rear panel of the enclosure by removing the two Phillips screws. After replacing the batteries, be sure the foam insert is in the place and the panel gasket seal is in good condition, before closing the rear panel.

Section 5 - Warranty

Finish Thompson, Inc (manufacturer) warrants this product to be free of defects in materials and workmanship for a period of one year from date of purchase by original purchaser. If a warranted defect, which is determined by manufacturer's inspection, occurs within this period, it will be repaired or replaced at the manufacturer's option, provided (1) the product is submitted with proof of purchase date and (2) transportation charges are prepaid to the manufacturer. Liability under this warranty is expressly limited to repairing or replacing the product or parts thereof and is in lieu of any other warranties, either expressed or implied. This warranty does apply only to normal wear of the product or components. This warranty does not apply to products or parts broken due to, in whole or in part, accident, overload, abuse, chemical attack, tampering, or alteration. The manufacturer accepts no responsibility for product damage or personal injuries sustained when the product is modified in any way. If this warranty does not apply, the purchaser shall bear all cost for labor, material and transportation.

Manufacturer shall not be liable for incidental or consequential damages including, but not limited to process down time, transportation costs, costs associated with replacement or substitution products, labor costs, product installation or removal costs, or loss of profit. In any and all events, manufacturer's liability shall not exceed the purchase price of the product and/or accessories

Section 5 - Spare Parts



| Item Number | Qty. | Description | PF Series Part Number | SF Series Part Number |
|-------------|------|--|-----------------------|-----------------------|
| 1 | 1 | Flow Meter | N/A | N/A |
| 2 | 1 | Hose Barb Adapter-PP-1"FNPT x 1"Barb | 106601 | 106601 |
| | 1 | Hose Barb Adapter-PVDF-1"FNPT x 1"Barb | 106601-1 | 106601-1 |
| 3 | 1 | Coupling-PP-1"FNPT x 1"FNPT | 106600 | 106600 |
| | 1 | Coupling-PVDF-1"FNPT x 1"FNPT | 106610 | 106610 |
| 4 | 1 | Flow Meter Discharge Nut-PP | 106622 | 111258-1 |
| | 1 | Flow Meter Discharge Nut-PVDF | 106622-1 | 111258-2 |
| 5 | 1 | Flow Meter Adapter-PP-1"MNPT | 106599 | 111257-1 |
| | 1 | Flow Meter Adapter-PVDF-1"MNPT | 106599-1 | 111257-2 |
| 6 | 1 | O-ring- FKM | J100991 | 109526 |
| 7 | 1 | Hose Barb-Standard-PP | M100028-1 | 111204-1 |
| | 1 | Hose Barb-Standard-PVDF | M100028-2 | 111204-2 |
| 8 | 1 | Discharge Nut-Standard-PP | M101610-1 | 111205-1 |
| | 1 | Discharge Nut-Standard-PVDF | M101610-2 | 111205-2 |



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