MECHANICAL FUEL METER

FM-100 and FM-200 Series Owner's Manual

To the owner…

Congratulations on receiving your GPI Mechanical Fuel Meter. We at GPI are pleased to provide you with a fuel meter designed to give you maximum reliability and efficiency.

Our business is the design, manufacture, and marketing of liquid handling, agricultural, and recreational products. We succeed in this business because we provide customers with innovative, reliable, safe, timely, and competitively-priced products. We pride ourselves in conducting our business with integrity and professionalism.

We are proud to provide you with a quality product and the support you need to obtain years of safe, dependable service.

Grant Nutter

President
Great Plains Industries, Inc.

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GENERAL INFORMATION

The purpose of this manual is to assist you in operating and maintaining your GPI mechanical fuel meter. This manual is designed and written with you in mind. Please take a few moments to read through this manual before installing and operating your fuel meter.

If you need assistance, contact the dealer from whom you purchased your meter. If you feel you need further assistance, please call the GPI Customer Service Department at:

1-800-835-0113

If You Measure in Litres

The Model FM-100L and FM-200L meters are factory calibrated in litres and the FM-100 and FM-200 in gallons. Model numbers are clearly labeled on the face of the meter. All references to "gallons" in this manual apply equally to "litres" for the FM-100L and FM-200L models.

⚠ This symbol is used throughout this manual to call your attention to safety messages.

⚠ WARNING   **Warnings** alert you to the potential for personal injury.

⚠ CAUTION   **Cautions** call your attention to practices or procedures which may cause damage to your equipment.

Notes give you information that can improve efficiency of operations.

It is your responsibility to insure that all equipment operators have access to adequate instructions concerning safe operation and maintenance.

Read Me!

Below is a list of major warnings and cautions that are given in this manual. Please take a moment to review them now for your future safety.

1. Your meter is designed for use only with thin viscosity petroleum fuels such as diesel fuel, kerosene and gasoline (up to 15% alcohol blends such as E15, M15).

2. Do not use this equipment for dispensing any fluids other than those for which it was designed.

3. Any components added to your meter such as hose, nozzle or pump must be statically-grounded and approved for use with petroleum fuels.

4. Observe precautions against fire or explosion when dispensing fuel.

5. Avoid prolonged skin contact with petroleum fuels.

INTRODUCTION

GPI mechanical fuel meters are designed for the field measurement of thin viscosity petroleum fuels only and are intended for use with pump or gravity feed systems in the 4 to 20 GPM or 15 to 75 LPM flow range. Using mechanical gears, these meters translate flow data from a nutating disc into calibrated units that are indicated on the face of the meter.

BEFORE INSTALLATION

Upon receipt of your meter, examine it to make sure there are no visible signs of damage. If damage is evident, please contact your GPI distributor.

If the meter is located in a rigid piping system where the fluid is trapped (for example, by gravity, valves or nozzles) thermal expansion of the fluid can create

pressure spikes that can damage a meter. Install a thermal relief valve or otherwise allow for thermal expansion of the fluid.

Your system must be mounted to a vented tank. (Figure 1) If the tank is unvented, your GPI distributor can supply a pressure cap.

Figure 1

INSTALLATION

1. Remove protective plugs from meter inlet and outlet ports.

2. Wrap threaded male connections with thread tape or use a pipe sealant compound compatible with petroleum fuels.

3. Install the meter on the pump. The meter's outlet port is marked with a flow arrow.

4. Install other system components on the meter and tighten snugly.

To accommodate various filter positions, the counter assembly of the FM-100 Series meter may be rotated as follows:

1. Pull to remove the reset knob on the side of the meter.

2. Remove the two counter cover screws and the four screws holding the counter assembly against the housing.

3. Rotate the counter assembly to the desired position. (Figure 2) Position the O-ring and align the nutator disc pin with the back of the assembly. Secure the counter assembly to the housing by alternately tightening screws.

Figure 2

4. Replace the counter cover and screws.

5. Position the reset knob and push to install.

Meter Accuracy

The meter has been accurately calibrated at the factory for use with diesel fuel. Due to differences in viscosities and flowrates, calibration may need to be adjusted if other fuels are to be dispensed. Refer to the Repair Section for calibration instructions.

DAILY OPERATIONS

1. Before use, visually check the meter to ensure it is securely fitted to other system components and there is no leakage at connections. If leakage is present, refer to the Troubleshooting Section.

2. Follow safety precautions, wiping any spilled fuel from the exterior of the meter and other system components.

Dispense Fuel

1. The large meter display represents the Batch Total for each fuel delivery. Before dispensing fuel, reset the Batch Total to zero by turning the reset knob on the side of the meter counterclockwise. (Figure 3)

Figure 3

NOTE: The small display represents the Cumulative Total of all pump deliveries and cannot be reset.

2. To enhance meter accuracy, dispense fuel using a quick-open and quick-close method. Avoid choking flow as the tank becomes full.

MAINTENANCE

Your mechanical fuel meter is designed for minimum maintenance. Examine the meter and other system components regularly for leakage. Keep the system exterior clean to help identify leaks.

The FM-100 Series has an internal fuel filter. The FM-200 Series is equipped with an internal strainer. Both should be checked annually or whenever low flow is noticed. The meter may also require recalibration if actual fuel delivery differs noticeably from meter readings. Refer to the Repair Section for filter and strainer access and calibration information.

Replace Fuel Filter

1. Remove the four screws holding the filter can to the housing. Remove the can.

2. Unscrew the filter by turning counterclockwise. Dispose of the old filter properly. Replace with a new filter. (Figure 4)

Figure 4

3. Wipe clean the filter can seal, groove and housing. Coat the seal with oil or light grease and install in the filter can groove.

4. Place the filter can over the installed filter. Hold in position and alternately tighten the four screws until the can is firm against the housing.

Clean Strainer

1. Remove the four retaining screws on the strainer coverplate. Remove the coverplate and strainer. (Figure 5)

Figure 5

2. Using a fine brush, clean the strainer and reposition in the housing.

3. Wipe clean the strainer coverplate O-ring, groove, and the housing. Coat the O-ring with oil or light grease and install in the coverplate groove. (Figure 6)
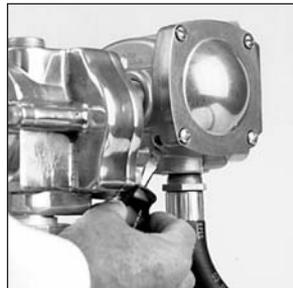
Figure 6

4. Hold the coverplate in position and replace the four screws by alternately tightening screws until the coverplate is firm against the meter housing.

CALIBRATION

The meter is accurately calibrated at the factory for use with diesel fuel. Due to differences in viscosity and flowrates, the meter may require recalibration to measure other fuels or to adjust for inaccuracies.

1. Purge air from the meter and fuel system by dispensing fuel into a container until a full flow occurs. Close the nozzle.

2. Reset the meter counter to zero by turning the reset knob counterclockwise.

3. Fill a graduated calibration container to a specified quantity. For the greatest accuracy, be sure the container is placed on a level surface and a consistent flowrate is used. When topping off the calibration container, use a quick-open and quick-close method until the mark is reached.

4. Compare the meter display to the quantity in the container. If the display does not register the quantity on the container, adjust the meter by performing the following:

   a. Gain access to the recessed calibration screw by turning the calibration screw cover and seal counterclockwise. Remove the cover and seal. (Figure 7)

Figure 7

b. If the meter registered *less* than the quantity in the container, turn the calibration screw *clockwise*. If the meter display read *more* than the amount in the container, turn the screw *counterclockwise*.

5. Empty the calibration container and repeat steps 2 to 4 until the meter registers the quantity in the container.

6. Install the calibration screw cover and seal.

REPAIR

Replace Counter Assembly or Nutator Kit

1. Pull out on the reset knob to remove.

2. Remove the two screws connecting the counter cover to the counter assembly. Remove the counter cover.

3. Remove the four screws securing the counter assembly and gently pull the assembly free. (Figure 8) Replace the counter assembly and O-ring, as required.

Figure 8

4. To remove the nutator disc, loosen the two screws holding the disc in the meter housing and lift the disc and O-ring from the main meter housing. (Figure 9)

Figure 9

NOTE: It may be necessary to place a screwdriver under the edge of the nutator and gently pry free.

5. Replace the nutator disc, as necessary. Make sure the nutator disc pin is secure in the back of the counter assembly before assembling again.

6. To assemble, reverse the above procedure. Make sure that all O-rings are in place and lubricated with oil or light grease.

Replace Calibration Screw and/or O-Ring

1. Remove the calibration screw cover and seal by turning counterclockwise.

2. Remove the calibration screw and O-ring by turning the screw counterclockwise. (Figure 10) While removing, count the number of revolutions required to free the screw.

Figure 10

3. Install the new calibration screw and O-ring, using the same number of rotations needed to remove the old screw. Ensure the O-ring is lubricated and seated properly.

4. Adjust the meter calibration, using Calibration procedures provided.

Remove Meter

Your meter is designed to allow normal maintenance and service without removing the meter from the fuel transfer system. If removal is necessary, use the following procedure:

1. Drain all fuel from the system.

2. Wearing protective clothing, loosen the meter connections from other system components by hand. Do not use a wrench since it could damage the meter housing.

3. Using safety precautions, thoroughly drain excess fuel from the meter.

4. If the meter will not be immediately installed again, insert plastic plugs in the inlet and outlet ports.

TROUBLESHOOTING

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
A. METER COUNTER DOESN'T OPER-ATE (Normal fuel delivery)	1. Broken counter assembly	Replace counter assembly.
	2. Foreign material in counter assembly	Remove and clean counter assembly.
	3. Misaligned nutator disc pin	Disassemble meter and align nutator disc pin with the counter assembly.
	4. Broken nutator disc pin or defective nutator assembly	Disassemble meter and install new nutator assembly.
	5. Missing or jammed counter bevel gear	Contact GPI Customer Service.
B. METER COUNTER DOESN'T OPER-ATE (Little or no fuel flow)	1. Clogged fuel filter or strainer	Replace filter or clean strainer.
C. FUEL LEAKAGE	1. Leakage at counter	Contact GPI Customer Service.
	2. Leakage between counter cover and housing	Remove counter cover and inspect for damaged, missing or incorrectly seated seal. Replace as required.
	3. Leakage at fittings	Disassemble fittings and reseal using thread tape or a pipe thread sealing compound approved for use with flammable liquids.

SPECIFICATIONS

	FM-100	FM-100L	FM-200	FM-200L
Unit of Measure	Gallon	Litre	Gallon	Litre
Flow Range	4 to 20 GPM	15 to 75 LPM	4 to 20 GPM	15 to 75 LPM
Type	Nutating Disc	Nutating Disc	Nutating Disc	Nutating Disc
Housing	Aluminum	Aluminum	Aluminum	Aluminum
Max. Working Pressure	50 PSIG	3.4 bar	50 PSIG	3.4 bar
Inlet / Outlet*	3/4 or 1 in. NPT	3/4 or 1 in. NPT	3/4 or 1 in. NPT	3/4 or 1 in. NPT
Filter or Strainer	Filter	Filter	Strainer	Strainer
Max. Batch Total	999.9	9,999	999.9	9,999
Max. Cumulative Total	99,999	999,999	99,999	999,999
Shipping Weight	5 lbs.	5 lbs./2.3 kg	4 lbs.	4 lbs./1.8 kg
UL Listed	Yes	Yes, NPT only	Yes	Yes, NPT only
Dimensions Width Height Depth	10.5 in. 4.5 in. 5.5 in.	26.6 cm 11.4 cm 13.9 cm	5.5 in. 4.5 in. 5.5 in.	13.9 cm 11.4 cm 13.9 cm

* Litre models are also available in BSPP threads with 3/4 or 1 inch inlet and outlet.

PARTS AND SERVICE

For warranty consideration, parts, or other service information, contact your local distributor. If you need further assistance, please contact the GPI Customer Service Department in Wichita, Kansas during normal business hours.

1-800-835-0113

To obtain prompt, efficient service, always be prepared with the following information:

1. The model number of your meter.

2. Date of manufacture.

3. Specific information about part numbers and descriptions obtained from the appropriate Illustrated Parts List.

For warranty work always be prepared with your original sales slip or other evidence of purchase date.
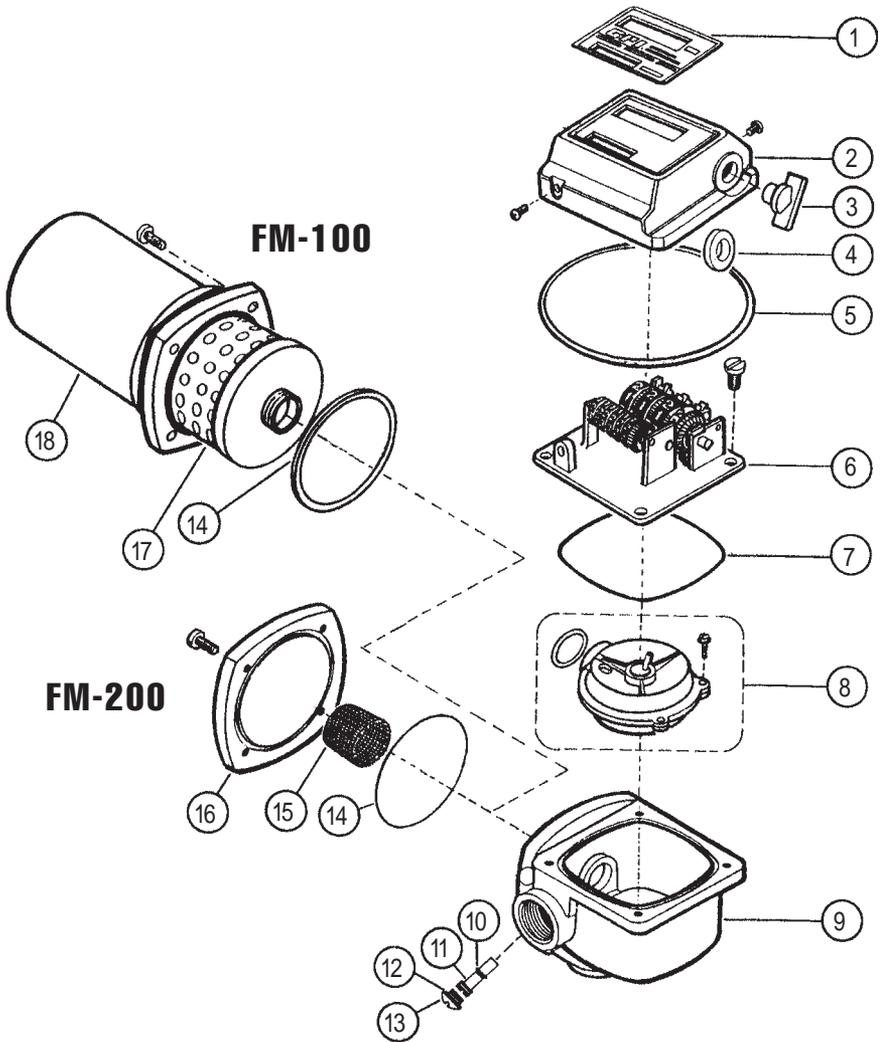
Please contact GPI before returning any parts. It may be possible to diagnose the trouble and identify needed parts in a telephone call or letter. GPI can also inform you of any special handling requirements you will need to follow covering the transportation and handling of equipment which has been used to transfer fuel.

Before packing for shipment, make sure the meter is thoroughly drained and free of fuel and vapors. Drain the meter using procedures in the Repair Section.

⚠ WARNING

Do not return meters or parts without specific authority from the GPI Customer Service Department. Due to strict regulations governing shipment of flammable liquids, meters may be refused and returned to the sender if sent without authorization.

FM-100

FM-200

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Item No.	Part No.	Description	No. Req'd.
1	111099-8	Decal, Gallon (FM-200)	1
	111099-9	Decal, Litre (FM-200)	1
	111012-8	Decal, Gallon (FM-100)	1
	111012-9	Decal, Litre (FM-100)	1
2	111006-1	Counter Cover, Gallon	1
	111006-2	Counter Cover, Litre	1
3	111028-1	Reset Knob	1
4	111107-1	Knob Seal	1
5	111024-1	Cover O-Ring	1
6	111047-3	Counter Assembly, Gallon	1
	111047-5	Counter Assembly, Litre	1
7	110026-1	Housing O-Ring	1
8	111509-1	Nutator Kit	1
9	111021-3	Housing, 1-inch NPT	1
	111021-4	Housing, 1-inch BSPP	1
	111021-5	Housing, 3/4-inch NPT	1
	111021-7	Housing, 3/4-inch BSPP	1
10	111026-1	Calibration Screw Seal	1
11	111014-3	Calibration Screw	1
12	904006-16	Flat Washer	1
13	111039-2	Calibration Cover Screw	1
14	901001-77	Seal, Filter Can & Strainer Coverplate	1
15	111032-2	Strainer (FM-200)	1
16	111029-1	Strainer Coverplate (FM-200)	1
17	111010-1	Filter (FM-100)	1
18	111020-3	Filter Can (FM-100)	1

Pre-Mfg. 2300 on FM-100

111022-1   Filter Seal (FM-100).

111023-1   Filter Can Seal (FM-100).

111506-1   FM-100 Overhaul Kit includes replacement seals, O-Rings and nutator disc.

Replacement Kits

111506-2   FM-200 Overhaul Kit includes seals, O-Rings and nutator disc assembly.

111506-3   FM-100 Overhaul Kit includes seals, O-Rings and nutator disc assembly.

Limited Warranty Policy

Great Plains Industries, Inc. 5252 E. 36th Street North, Wichita, KS USA 67220-3205, hereby provides a limited warranty against defects in material and workmanship on all products manufactured by Great Plains Industries, Inc. This product includes a 2 year warranty. Manufacturer's sole obligation under the foregoing warranties will be limited to either, at Manufacturer's option, replacing or repairing defective Goods (subject to limitations hereinafter provided) or refunding the purchase price for such Goods theretofore paid by the Buyer, and Buyer's exclusive remedy for breach of any such warranties will be enforcement of such obligations of Manufacturer. The warranty shall extend to the purchaser of this product and to any person to whom such product is transferred during the warranty period.

The warranty period shall begin on the date of manufacture or on the date of purchase with an original sales receipt. This warranty shall not apply if:

A. the product has been altered or modified outside the warrantor's duly appointed representative;
B. the product has been subjected to neglect, misuse, abuse or damage or has been installed or operated other than in accordance with the manufacturer's operating instructions.

To make a claim against this warranty, contact the GPI Customer Service Department at 316-686-7361 or 800-835-0113. Or by mail at:

Great Plains Industries, Inc.
5252 E. 36th St. North
Wichita, KS, USA 67220-3205

The company shall, notify the customer to either send the product, transportation prepaid, to the company at its office in Wichita, Kansas, or to a duly authorized service center. The company shall perform all obligations imposed on it by the terms of this warranty within 60 days of receipt of the defective product.

GREAT PLAINS INDUSTRIES, INC., EXCLUDES LIABILITY UNDER THIS WARRANTY FOR DIRECT, INDIRECT, INCIDENTAL AND CONSEQUENTIAL DAMAGES INCURRED IN THE USE OR LOSS OF USE OF THE PRODUCT WARRANTED HEREUNDER.

The company herewith expressly disclaims any warranty of merchantability or fitness for any particular purpose other than for which it was designed.

This warranty gives you specific rights and you may also have other rights which vary from U.S. state to U.S. state.

Note: In compliance with MAGNUSON MOSS CONSUMER WARRANTY ACT – Part 702 (governs the resale availability of the warranty terms).

GPI®

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GREAT PLAINS INDUSTRIES, INC.

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