

# Parker Fuel Polishing Module FPM-050



## Installation, Operating & Maintenance Manual



ENGINEERING YOUR SUCCESS.

## WARNING - USER RESPONSIBILITY



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## DESCRIPTION

The marine Fuel Polishing Module (FPM-050) is a modular, low power pumping system used to enhance the effectiveness of existing diesel fuel filters by circulating diesel fuel through the filters to remove water and sediment. *Note that the FPM-050 is for use with diesel fuel only—it is not suitable for use in gasoline systems.* The FPM-050 is rated to circulate up to 50 gallons of diesel fuel per day.<sup>1</sup>

The FPM-050 should be installed so that the outlet side of the fuel filter feeds directly into the inlet of the module. The FPM-050 requires a 12 VDC/2 W power source in order to run. The electrical circuit should include a properly rated switch or the optional programmable controller to supply power. Refer to the installation instructions, plumbing schematics, and electrical schematics for further installation information.

## INSTALLATION INSTRUCTIONS

### Preparation

Before starting installation, read the entire manual to familiarize yourself with the proper installation and operation of the FPM-050.

Prior to installation, it is recommended you verify that other parts of the fuel system (hoses, fittings, electrical connections, etc.) fit with the FPM-050 and that all hoses and wires can be routed as necessary to make the required connections. Be sure to allow sufficient room so that fuel lines do not kink and that electrical leads are properly routed. Laying out the installation before beginning will also help identify other items that will be needed during installation, such as absorbent material to mitigate spilled fuel, Teflon<sup>®</sup> tape<sup>2</sup> for pipe fittings, wire ties to retain

<sup>1</sup> Typical flow rating – the actual flow rate produced by the FPM-050 may vary from the rated flow due to the characteristics of each fuel system.

<sup>2</sup> Teflon<sup>®</sup> is a registered trademark of E. I. du Pont de Nemours and Company

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electrical leads, wire loom to protect leads from moisture, hose clamps, and hose fittings to name a few items.

In order to properly install the FPM-050 into a typical fuel system, the following tools are recommended. As fuel systems vary widely, additional tools may be required in some cases. Ensure that each of these tools is available prior to beginning installation.

### **Required Parts and Tools**

Flat head screw driver

Drill

2 adjustable wrenches

Razor to cut fuel lines

Teflon® pipe tape

Pipe fittings

#10 screws, washers, and nuts

Absorbent material to address spilled fuel

2 pairs of needle nose vice grips

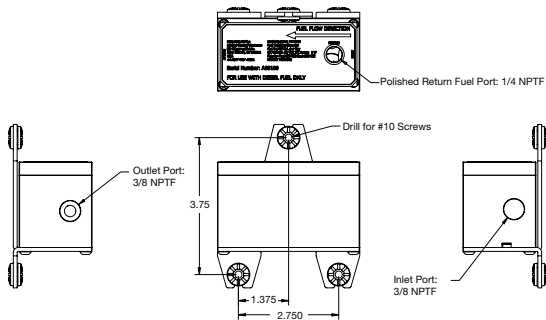
Cable ties

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### **Mounting**

The FPM-050 should be mounted using the three mounting holes found on the bracket and three stainless steel #10 screws, #10 washers, and #10 nuts (if necessary). Note that hardware is not included. The FPM-050 should not be supported solely by the connected fuel lines.

Use a drill to make holes for the #10 screws. If using self-tapping wood screws, it will not be necessary to drill pilot holes. The two holes for the bottom of the mounting bracket should be separated by 2.75" in the horizontal direction. The third mounting hole should be 3.75" above the two top mounting holes in the vertical direction; the third mounting hole should be halfway between the two bottom holes in the horizontal direction. *Refer to Figure 1.*



**Figure 1: Mounting hole locations**

When installing the FPM-050, allow adequate room so that the module can be removed from the system as needed.

## Plumbing

The FPM-050 may be plumbed into the fuel system in one of two ways—either in the main fuel line or in a dedicated fuel polishing loop.

Fittings are not included with the FPM-050. The inlet and outlet fittings on either end of the FPM-050 require 3/8 NPTF fittings; the polished fuel return outlet on top of the FPM-050 requires a 1/4 NPTF fitting. NPTF fittings should be carefully wrapped with Teflon<sup>®</sup> pipe tape to ensure that the connection is leak free. Take care to wrap the fittings with a single layer of tape and to remove any excess strands that could break free once the fitting is tightened into place. Loose strands of Teflon<sup>®</sup> tape can block the FPM-050 and prevent it from functioning properly.

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Use the maximum size fuel line where possible to reduce potential fuel line restrictions. Do not make sharp bends with the flexible fuel line as kinks may occur. In cases where a turn must be made over a short distance, add a service loop to the hose to prevent kinks in the line. When routing the fuel hose, avoid moving surfaces, sharp edges, and hot surfaces (e.g. exhaust piping). Do not install the unit near hot surfaces.

**Note:** Refer to the appropriate plumbing schematics when installing the module.

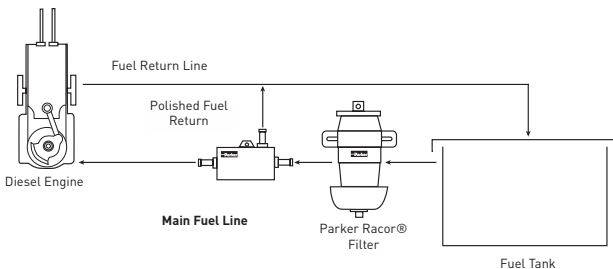
#### **i. Installation in Main Fuel Line**

If installed in the main fuel line, the FPM-050 should be installed on the suction side of the fuel pump immediately downstream of the fuel filter/water separator. Connect the outlet of the fuel filter/water separator to the inlet of the FPM-050. The outlet of the FPM-050 should in turn lead to the main fuel pump. Splice the polished fuel return port into the fuel return line. *Refer to Figure 2.*

When installed on the main fuel line, the FPM-050 may be operated only when the engine is not running. If it is necessary to turn on the engine, simply shut off the power to the FPM-050 and the auto-diverter valve will bypass the polishing line and allow fuel to flow to the engine.

When installing the FPM-050 into the main fuel line, Parker recommends that two pairs of vice grips be used to clamp off the main line prior to cutting the line. Place one pair of vice grips on each side of the cut; this will minimize the amount of diesel fuel that leaks when the line is cut. CLEAN ANY SPILLED FUEL IMMEDIATELY.

After cutting the main fuel line, connect the cut ends to the FPM-050, using hose clamps to retain the fuel line. Once you have connected the inlet and outlet of the FPM-050, connect the polished fuel outlet port to the return fuel line. Splice the polished fuel line into the return line using the same process that was used in splicing into the main fuel line. After making all connections, clean up any remaining spilled fuel.



**Figure 2: Main fuel installation**

After plumbing the FPM-050 into the fuel system, you must prime the system. Follow the priming instructions provided by the boat or engine manufacturer to complete the bleeding procedure.

## ii. Installation in Dedicated Fuel Polishing Line

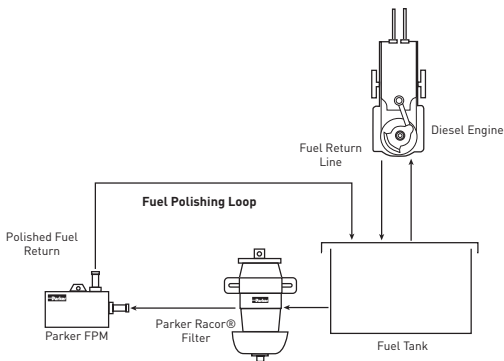
The FPM-050 can also be installed in a dedicated fuel polishing line run off of a fuel tank. The dedicated polishing line is independent of the main fuel line and, therefore, requires a separate fuel filter/water separator unit from the main line. A separate line from the tank should be run to the inlet of the dedicated filter/separator. Install the fuel filter/water separator as close as possible to the fuel tank. The outlet of the filter/separator should feed into the inlet of the FPM-050; the FPM-050 should be located as close to the outlet as is possible. Plug the outlet port of the FPM-050 using a standard 3/8 NPTF plug fitting. Plumb the polished fuel return port into a priming pump. The outlet of the priming pump should feed directly back into the fuel tank. After all fuel line connections have been made, use the priming pump to bring fuel through the FPM-050 module. *Refer to Figure 3.*

To install the FPM-050 into an existing fuel recirculation loop, use the process recommended for installation in the main fuel line with regard to the use of vice grips and other suggested means to minimize fuel spills.

For installation in a new fuel recirculation line, simply cut an appropriate length of dry fuel line to connect to the inlet fitting of the FPM-050. Similarly, cut appropriate lengths of fuel line to connect the FPM-050 to the priming pump and to connect the outlet of the priming pump to the tank return port.

After completing the fuel line connections, use the priming pump or priming bulb to fill the recirculation loop with fuel. Then thoroughly inspect the fuel polishing loop for leaks. As necessary, tighten hoses, fittings and hose clamps to eliminate the leaks.

To maximize removal of sediment and water, position the filter/water separator and FPM-050 up to six inches below the fuel tank if possible. You should also run the fuel line from the tank to the filter/water separator from the lowest possible point on the fuel tank. This will ensure that sediment built up on the bottom of the tank is filtered out by the polishing system.



**Figure 3: Dedicated fuel polishing line installation**



### CAUTION

- 1. NEVER WORK ON THE ELECTRICAL SYSTEM WHILE IT IS ENERGIZED.**
- 2. DO NOT INSTALL ELECTRICAL COMPONENTS THAT EXCEED THE RATED CURRENT (AMPERAGE) OF THE CIRCUIT.**

A 12 VDC source is required to power the FPM-050. The source may be switched using a standard marine rated switch or using the optional Programmable Controller (*Part Number FPM-PTC-12*). Instructions for installing both a common switch and the FPM-PTC-12 are included below.

The electrical supply used must conform to the nameplate rating listed on the FPM-050. Wiring must be 18 AWG minimum. The module is internally fused; an external fuse, if used, should not exceed 1 A. Connect the FPM-050 to the electrical circuit using standard electrical practices in accordance with all local, state and federal laws.

The FPM-050 is internally grounded. Connect the black (negative) lead of the FPM-050 to the negative side of the ship's DC panel. Ensure that the DC panel is properly grounded in accordance with standard practices.

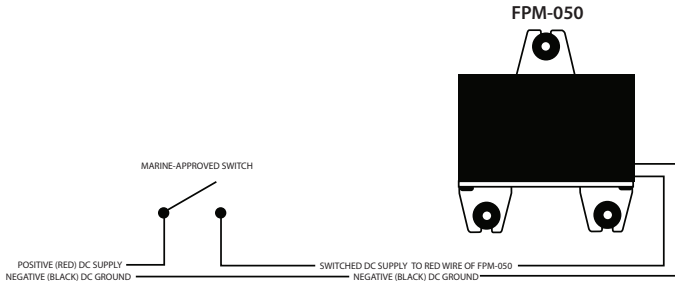
Pigtail connections are provided for the FPM-050 and for the electrical accessory products. Make connections between these and any other electrical components using connectors approved for use by relevant industry and governmental bodies. Wire nuts should *never* be used to make electrical connections onboard the boat. It is recommended that unsheathed pigtails be covered by split wire loom and held in position using wire ties to secure the line against the bulkhead. The wire loom will help to protect the leads from wear and exposure to corrosive fluids.

The FPM-050 must be connected to the 12 VDC power supply with the correct polarity. The red wire must be connected to the positive 12 VDC source and the black wire must be connected to the DC return (negative). Reversing polarity of the electrical connection will void all warranties and potentially render the FPM-050 inoperable.

It is often convenient to connect the FPM-050 to an existing 12 V circuit such as a 12 V appliance outlet. In order for the fuel polisher to operate while the vessel is unattended, the circuit to which the FPM-050 is connected must remain on when the boat is unattended.

#### i. Using a 12 VDC Manual Switch

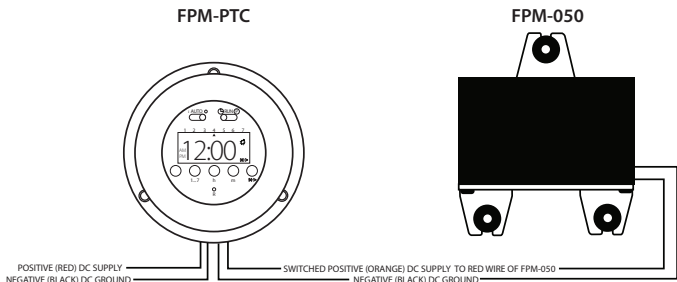
The FPM-050 can be controlled via a simple 12 VDC switch installed at the helm or other convenient location. Install the switch on the DC positive lead. The switch must be suitable for marine use and be of an appropriate power/current rating. Refer to Figure 4.



**Figure 4: 12 VDC Manual Switch**

## ii. Using the Optional Programmable Controller

The optional Programmable Controller (*FPM-PTC-12*) can be used to enable fuel polishing at predetermined intervals. This 7-day digital programmable timer must be installed as shown on the diagram below, with positive and negative lines from the DC panel and a 12 V signal line to the FPM-050. Refer to *Figure 5*.



**Figure 5: Optional Programmable Controller**

## Final Installation Steps

After connecting all fuel lines and electrical lines to the FPM-050, priming the unit, and checking for leaks in the system, activate the polisher to verify that it is operating properly. Note that the engine must be turned off at this time. If properly primed, fuel should quickly begin to flow through the polished fuel line back to the tank.

## OPERATING INSTRUCTIONS

Before operating the FPM-050, it is important that the pump be primed. If the FPM-050 has not been primed during the installation process, please refer to the priming instructions provided in the installation section of this manual.

### **i. For installations in Main Fuel Line**

When you install the FPM-050 on the main fuel line, you can only operate in polishing mode when the engine is not in use. After shutting down the engine, engage the FPM-050 by supplying 12 VDC with a standard switch or by using the optional Programmable Controller as directed in the installation section. The FPM-050 will continuously pull diesel fuel through the installed filter/water separator until power to the FPM-050 is turned off.

If the engine is needed, turn off power to the FPM-050 prior to starting the engine.

You can operate the FPM-050, installed in the main fuel line, at any time while the boat is attended and the engine is not running. If the optional Programmable Controller is installed, the FPM-050 may be programmed to run while the boat is unattended.

### **ii. For installations in Dedicated Fuel Polishing Line**

After you prime the dedicated fuel polishing loop, you can use the FPM-050 at any time. Installation on a dedicated loop is the most effective way to remove water and sediment from the fuel system. Operating the FPM-050 while underway allows for contaminants stirred up by the motion of the boat to be removed before they can reach the main fuel line.

An FPM-050 installed in a dedicated polishing line may be operated at any time while the boat is attended. If you have installed the optional Programmable Controller, the FPM-050 may be programmed to run while the boat is unattended.

## MAINTENANCE

Parker designed the FPM-050 to be maintenance free. If your FPM-050 malfunctions or you believe it requires service, please contact your retailer.

Under no circumstances should the system be disassembled—doing so will void any and all warranties.

## PRODUCT TECHNICAL DATA

### a. FPM-050-050 Product Specifications

- |                                   |   |
|-----------------------------------|---|
| 1. Rated fuel polishing capacity: | 50 gal./day*  |
| 2. Maximum pressure head evolved: | 5 psid  |
| 3. Maximum dry suction lift:      | Not rated - Unit not intended for priming fuel system |

\*Note: Actual fuel polishing rate is system dependent and will vary from the maximum stated value based upon the flow impedance in a given fuel system

### b. Environmental

- |                                 |                                |
|---------------------------------|--------------------------------|
| i. Operating Temperature Range: | -30°C to 80°C (-20°F to 176°F) |
| ii. Humidity:                   | 0% to 95% RH                   |

### c. Electrical

- |                          |   |
|--------------------------|---|
| i. Power Requirement:    | 10 – 16 V DC, 12 V DC nominal           |
| ii. Current Requirement: | 0.15 A nominal, internally fused to 1 A |
| iii. Adjustments:        | No user accessible adjustments          |

### d. Fluidic

- |                              |                                   |
|------------------------------|-----------------------------------|
| i. Working fluids:           | Diesel fuel, bio-diesel, kerosene |
| ii. Filtration requirements: | 40 micron or finer                |

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**e. Design & Construction**

**i. Fluidic Connection**

1. Inlet and Through-Flow Outlet: 3/8 NPTF female threads
2. Polished Fuel Return Outlet: 1/4 NPFT female threads

**ii. Electrical Connection**

1. 18 AWG flying leads are provided.
2. The red lead is the +12 VDC connection; the black lead provided is to be connected to the DC ground.
3. It is important that you do not reverse the polarity of the electrical connection. Reversing the polarity of the electrical connection can irreversibly damage the unit and will void any warranties.

**f. Weight**

Approximately 2 lbs.

**g. Max. Dimensions (L x H x D):**

Body:	3.87" x 2.47" x 2.14"
Including Bracket:	3.87" x 4.48" x 2.14"

**h. Wetted Materials**

Anodized Aluminum  
Spring steel  
FKM  
Stainless steel (301/302 series)  
Acetal

## TROUBLESHOOTING

<b>Problem</b>	<b>Possible Cause</b>	<b>Remedy</b>
<b>Fuel Leakage</b>	Incorrect fitting or fuel hose used	Install properly sized fitting/hose
	Loose fitting/fuel hose	Tighten fitting
		Use hose clamps to retain hose
<b>No Flow</b>	No power to FPM-050	Connect 12 VDC source; ensure any installed switches are in the 'on' position
	Air entrained in FPM-050	Prime the system with a manual priming pump as explained in the installation instructions

## FOR TECHNICAL SUPPORT

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