AirDog® HEAVY DUTY DIESEL FUEL SYSTEMS

# INDUSTRIAL
## Fuel Air Separation System

# INSTALLATION MANUAL

### UNIVERSAL DIESEL ENGINE APPLICATIONS

### AIRDOG® FPII-125

Revised 5/06/2024

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AirDog® HEAVY DUTY DIESEL FUEL SYSTEMS by PureFlow® Technologies, Inc.

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***Providing "Test Cell Performance" in "Real World Conditions" Since 1993***

PATENT

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# AirDog® INDUSTRIAL
## Fuel Air Separation System

**THE RIGHT CHOICE FOR YOUR DIESEL ENGINE**


# SMALL and COMPACT
# 7” Long x 3.2” Wide x 10” Tall

HEAVY DUTY & INDUSTRIAL
Fuel Systems
PureFlow Technologies, Inc.

AirDog HEAVY DUTY DIESEL FUEL SYSTEMS

## SYSTEM OVERVIEW

Welcome to the **AirDog® Heavy Duty FPII-125**
Fuel Air Separation System

**The AirDog® FPII-125 with ADVANCED FUEL AIR SEPARATION, DEMAND FLOW, ADJUSTABLE REGULATOR, LOW PRESSURE SENSOR with LED INDICATOR LIGHT and the 4G-HD FUEL PUMP, is a premium fuel filtration and delivery system for the diesel engine.**

**The AirDog® FPII-125 removes water, particulates and the air that becomes entrained in diesel fuel from sloshing and agitation from the fuel flow to the engine. The entrained air and vapor separated from the fuel is returned to the fuel tank through a small return line. The fuel flow to the engine's transfer pump is at a *NET POSITIVE PRESSURE HEAD* preventing cavitation and the formation of vapor thus overcoming the performance related problems from plugged fuel filters, high altitude operation and torque loss at higher engine RPM's.**

**Air and vapor are compressible. When Air/Vapor is present in a fuel injection system, the pressure buildup and injection of fuel is delayed while the air/vapor is being compressed. This delays the injection timing causing a shorter power stroke and low power, increased fuel consumption and increased exhaust emissions. Preventing the formation of vapor from pump cavitation and removing entrained air from the fuel flow to the injectors restores *Correct Injection Timing*. Diesel engines equipped with the AirDog® can now perform as designed, delivering "test cell" performance while in "real world" use!**

All AirDog® products are manufactured with a personal touch, unsurpassed attention to detail and the most stringent quality assurance.

## TYPICAL INSTALLATION LAYOUT


The AirDog® FPII-125 returns entrained air and vapor (foam) with very little fuel flow back to the tank and requires **only one small return line to only one tank for quick and easy installations.**

## QUICK CONNECT COMPONENT OVERVIEW

Provided in this kit is an OE style quick connection system. This system works to allow for a quick, clean, and professional install.

### SAE J2044 Quick Connect System

The SAE J2044 quick connect system is the most commonly used system in the automotive industry. The images below show the formation of the SAE J2044 connection. To connect the assemblies, simply insert the male end form into the mating female connector. Push firmly until you hear it “click” into place. To disconnect the fittings, press down and hold the tabs on the female connector while you firmly pull the assembly apart.

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## INSTALLATION PROCEDURES



## MAINTENANCE

# INSTALLATION GUIDELINES

The installation of your **AirDog®** FPII-125 can be made relatively easy by following the steps outlined in this manual, and:

1. Inventory the package components. Immediately notify PureFlow® Technologies, Inc. of any missing or damaged parts.

2. Read the installation manual completely. Understand how the system operates and the installation recommendations before beginning.

3. Proper location of the AirDog® FPII-125 on the vehicle is essential. Consider hazards presented to the equipment by road debris and the elements.

4. The installation recommendations and guidelines contained herein are suggestions only. Individual installations may vary.

5. Use diesel compatible thread sealer when installing fittings with NPT threads. (Loctite® 545 Thread Sealer is diesel compatible)

# SAFETY GUIDELINES

**CAUTION:** Chock the vehicle's tires to prevent rolling.

**CAUTION:** Disconnect the battery cables before proceeding with the AirDog® installation.

**CAUTION:** Wear safety glasses when operating power tools, such as drills and grinders, or when using a punch or chisel.

**CAUTION:** Do not drill into or weld the top of the frame rail or within 1-½" of the frame rail flange on the side of the frame rail.

**CAUTION:** Route the fuel lines and electrical harnesses keeping them away from hot exhaust components and/or moving parts. Properly secure the fuel lines and electrical harnesses to prevent chafing using zip ties included in installation kit.

**CAUTION:** Do not subject the AirDog® system directly to high-pressure wash systems. Doing so may damage seals and electrical components, and such damage is NOT covered under warranty.

**If you are uncertain of any installation procedure, please call PureFlow® Technologies, Inc. at 877-463-4373 for technical assistance.**

**NOTE: The pictures used in this manual are for example only and may not depict the exact components as found on your vehicle.**

# Installation Parts List

| QTY | Description | Part Number | Image |
|---|---|---|---|
| 1 | **AirDog® FPII-125** Fuel Filter FF100-2 Water Separator WS100 | FPII-125 |  |
| 1 | **AirDog® FPII-125 Bracket** | 001-3C-0004-PC |  |
| 1 | **Frame Brackets** | 010-3C-0002PC<br>010-3C-0001PC |  |
| 1 | **Wire Harness w/ Indicator Light & Dash Plate**<br>Includes: 1 ea Indicator Light (5G-1-1-47674)<br>1 ea Dash Plate (201-3-0004-S-M716) | 5E-2-010<br>908-5G-1-1-47674 |  |
| 1 | **1/2" General Purpose Hose (Fuel Line) - 30 ft Section** | 4C-1-02-08-004-030 |  |

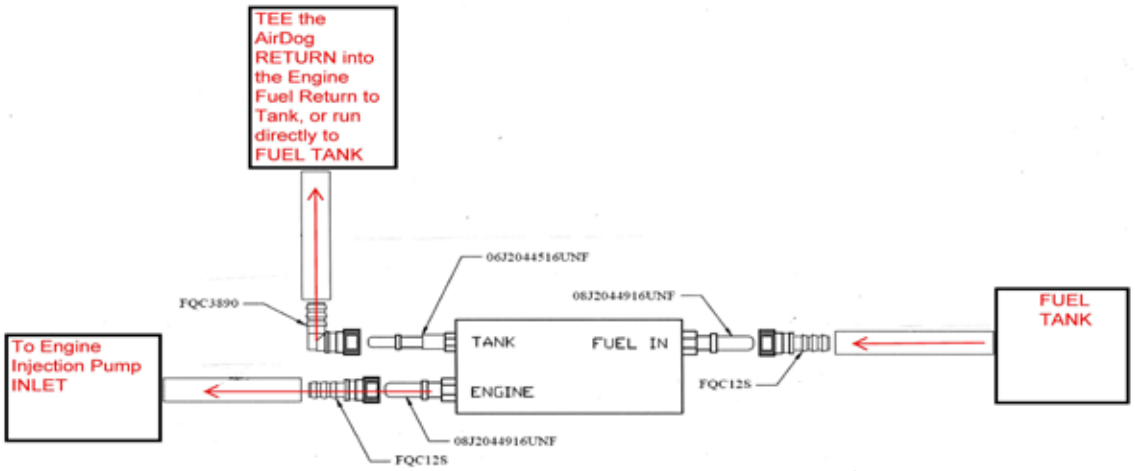
## ADFK-460 Installation Kit

| | | | |
|---|---|---|---|
| 1 | **Fuel Pressure Sensor** | 908-5C-9-007-SC-06 ***or*** 908-5C-9-0010 |  |
| 1 | **Spacer** | 010-3C-0003A-P |  |
| 1 | **Zip Tie Bundle** | 5H-2-1-06/12B |  |
| 1 | **Mounting Hardware Kit Includes:**<br>**(1) Nut Packet** 908-61-0125-N<br>**(1) Washer Packet** 908-61-0125-W<br>**1/4-20 x 1-1/4 SHCS** (4) 1L-A20SZ<br>**5/16-18 x 2-3/4 FHSCS** (4) 1M-B44SZ<br>**3/8-16 x 4-1/2 HHCS** (3) 1J-1-C72SZ | 901-61-0125 |  |

## 908-01-0460-QC Fitting Kit

| | | | |
|---|---|---|---|
| 1 | **3/8 ID 7/8 OD Rubber Grommet** | 5J-1-1-04-2758 |  |
| 2 | **1/2 F 90° Hose Quick Connect Fitting** | 4A-9-FQC1290 |  |
| 2 | **1/2 F Straight Hose Quick Connect Fitting** | 4A-9-FQC12S |  |
| 1 | **3/8 F 90° Hose Quick Connect Fitting** | 4A-9-FQC3890 |  |
| 2 | **1/2 M J2044 Quick Connect x 9/16 UNF** | 4A-9-08J2044916UNF |  |
| 1 | **3/8 M J2044 Quick Connect x 5/16 UNF** | 4A-9-06J2044516UNF |  |
| 3 | **#8F JICX x 1/2 Push-lock Hose Barb** | 4A-1-09-08-08-B |  |
| 2 | **#8M JIC x 3/8 M ORB Straight Connector** | 4A-1-01-08-06-S |  |
| 1 | **3/8-18 M NPTF x 3/8-18 F NPTF x 3/8-18 F NPTF Tee** | 4A-4-01-06-S |  |
| 1 | **#8M JIC x 3/8 M NPTF Straight Connector** | 4A-1-02-08-06-SZ |  |

# Illustration of Quick Connect Components



# Installing the J2044 Quick Connect Fittings & Pressure Sensor into the AirDog® FPII-125 Filter Base

4-1. Dip the threaded end of the **1/2" M J2044 quick connect x 9/16" UNF (4A-9-08J2044916UNF)** fittings into clean motor oil and hand-thread into the "ENGINE"and "FUEL IN" ports of the AirDog® FPII-125 filter base as illustrated in Figures 1, 2, and 3. Using a 3/4" deep socket, torque the fittings to 120in-lb or 10ft-lb. **Do NOT overtighten the fittings or damage may occur.**

4-2. Dip the threaded end of the **3/8" M J2044 quick connect x 5/16" UNF (4A-9-06J2044516UNF)** fitting into clean motor oil and hand-thread into the return port of the AirDog® FPII-125 filter base as illustrated in Figures 1 and 4. Using a 5/8" deep socket, torque the fitting to 60in-lb or 5ft-lb. **Do NOT overtighten the fittings or damage may occur.**

4-3. **Remove the 1/8" NPT plug in the 45° elbow**. Install the pressure sensor into the elbow.


Figure 1

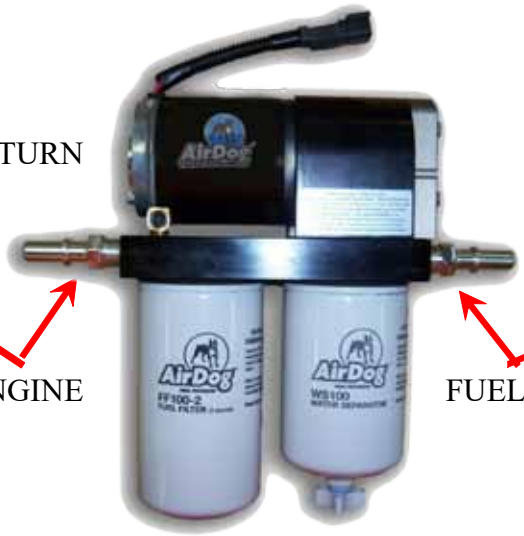



Figure 2


Figure 3


Figure 4

4-4. Assemble the AirDog® **mounting bracket (PN 001-3C-0004-PC)** to the **frame bracket (PN 010-3C-0001PC)** using the **spacer (PN 010-3C-0003A-P)** as shown in Figure 5 using the four bolts, lock washers, and nuts included in the **mounting bracket hardware kit (PN 901-61-0125)** shown in Figure 6. Properly torque all fasteners. You will need a 3/16" allen and a 1/2" wrench. The bracket assembly should look like Figure 7.

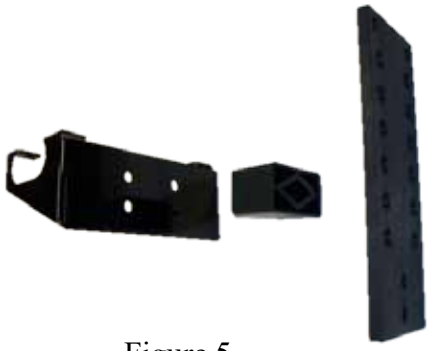


Figure 5

Figure 6

Figure 7

4-5. Attach the AirDog® FPII-125 to the frame bracket assembly as shown in Figure 8 using the supplied hardware in the mounting bracket hardware kit.

Figure 8

**NOTE:** We recommend installing the AirDog® on the inside of the frame rail, but we understand some applications don't have room. The photos in this manual may not be the same as your application.

4-6. Be sure to tuck the AirDog® FPII-125 as far up as possible without it rubbing on anything to prevent damage from road debris. The bracket assembly is adjustable to achieve this.

**NOTE:** Some frame rails have a bracket that is used to support the frame during the manufacturing process. If this bracket is on your frame rail and obstructs the proper positioning of the AirDog® FPII-125 mounting bracket, you may remove part or all of it, as needed. Be very careful not to damage the frame flange.

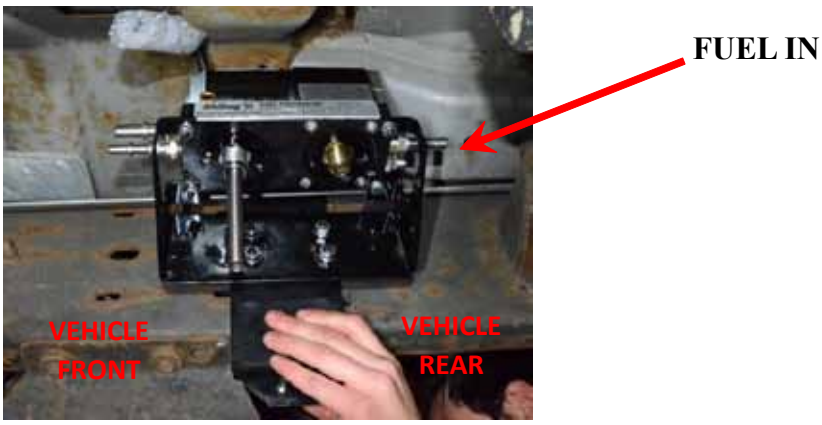
Figure 9

Figure 10

4-7. Clamp the frame between the AirDog® bracket assembly and the **backing plate (PN 010-3C-0002PC)** (Figure 11) using the 3/8" bolts, lock washers, and nuts included in the kit. You will need two 9/16" wrenches. Properly tighten all fasteners. **BE SURE** to mount the AirDog® FPII-125 with the "FUEL IN" port toward the rear of the vehicle (Figure 12).

Figure 11

Figure 12



# Assembling the Fuel Lines

**Assemble the fuel lines and fuel line ends as you install them. It is not recommended to pre-cut fuel lines, as pre-cut lengths may not be accurate.**

5-1. Take the fuel line end and lubricate the barbed end with clean motor oil (Figure 13) and press it into the fuel line until all three barbs are covered (Figure 14). The fuel line end should look like Figure 15.

Figure 13

Figure 14

Figure 15

**NOTE:** Hose clamps are not needed for these push-lock connectors.

**When installing the AirDog® fuel system, it is recommended to bypass the factory filter canister for optimum engine performance.**

5-2. Remove the original factory fuel supply line at the fuel inlet port of the injection pump (Figure 16).

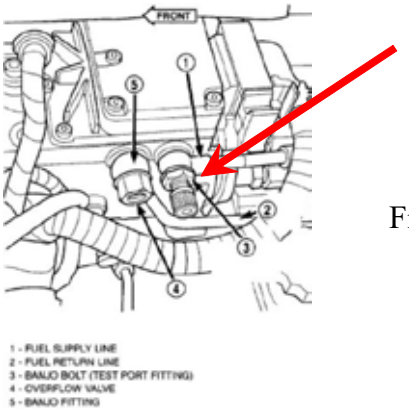



Figure 16

5-3. Assemble one end of the 1/2" fuel line (reference Section 5) using a **#8 F JIC Swivel x 1/2" Pushlock Hose Barb (PN 4A-1-09-08-08-B)** (Figure 17). Then connect the swivel end to the fuel inlet of the injection pump. A #**8 M JIC x 3/8 M ORB Adapter (PN 4A-1-01-08-06-S)** has been supplied in this kit; however, you may need to adapt as necessary for your specific engine application.


Figure 17

5-4. Run the fuel line along the frame away from any hot or moving parts, such as exhaust or driveshaft, to the "Engine" port in the AirDog®. Cut the fuel line to length and insert fuel line end **FQC12S** (Figure 18) or **FQC1290** per step 5-1. Once the connector is installed, connect it to the male **J2044** fitting in the "Engine" port in the AirDog®. A "click" will be heard once properly connected.

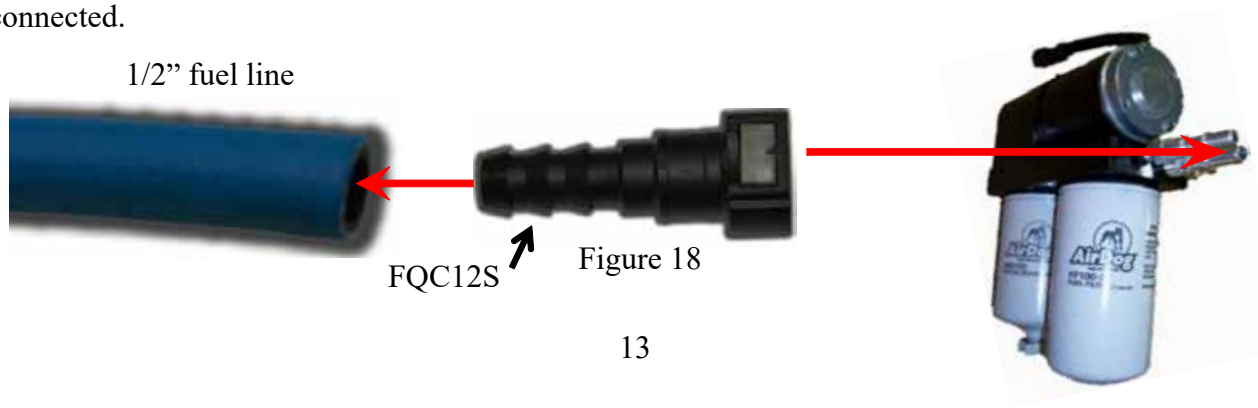



Figure 18

5-5. It is advised to remove the factory supply lines between the tank and the filter canister, if equipped. Also, remove the factory supply line between the filter canister and the injection pump. Then plug the ports on the filter canister (Figure 19). This will prevent fuel spillage.

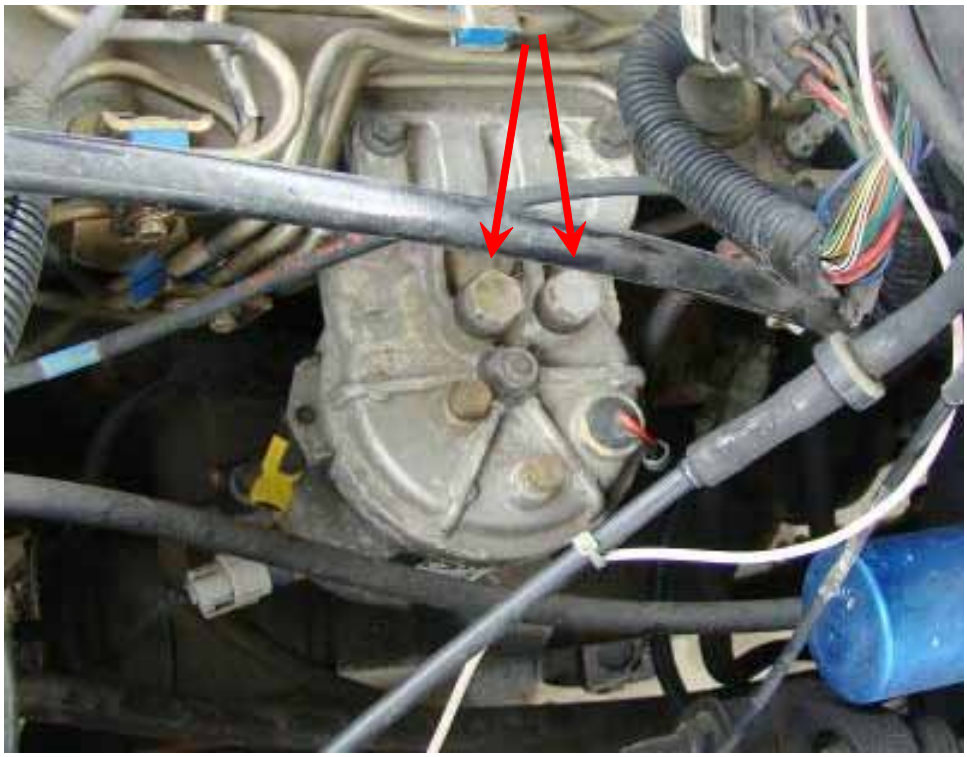


Figure 19

**NOTE:** Be sure to keep the ORIGINAL ENGINE RETURN LINE connected as it is from the factory. In many cases, the return runs through the flange of the filter canister.

5-6. Assemble one end of the 1/2” fuel return line (reference Section 5) using fuel line end **FQC3890** and plug it into the “Return” J2044 fitting installed in the AirDog® (Figure 20). A “click” will be heard once the fitting is properly connected.

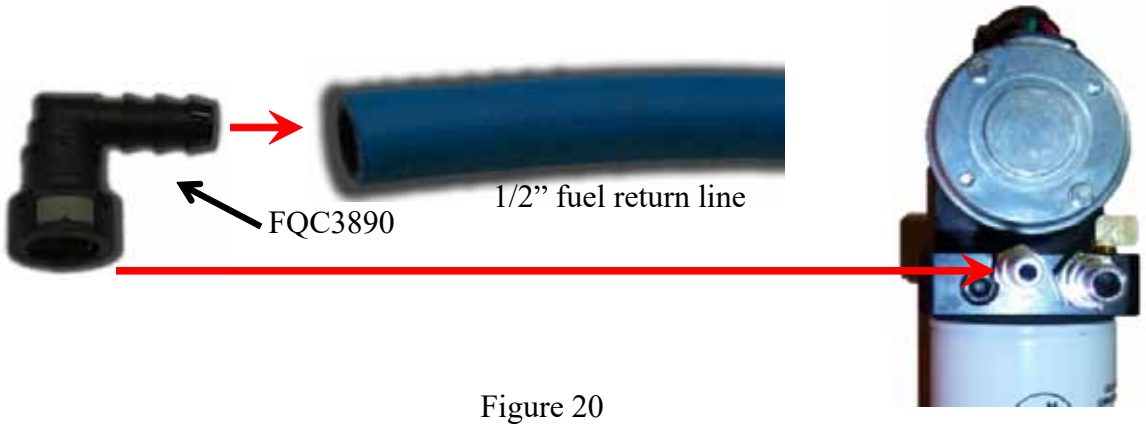



Figure 20

5-7. Run the fuel return line along the frame away from any hot or moving parts, such as exhaust or driveshaft, to the tank. Cut the fuel return line to length and insert a **#8 F JIC Swivel x 1/2” Pushlock Hose Barb (PN 4A-1-09-08-08-B)** (Figure 21) and connect to return to tank, after regulator, if equipped, and before splitter, if equipped with dual tanks. For single tank application, you may connect the return directly to the tank. If available, an open auxiliary port is an option for the return connection


Figure 21

**NOTE:** For the return to tank connections, a **3/8" NPT Tee (PN 4A-4-01-06-S)** and **#8 M JIC x 3/8" M NPT Adapter (PN 4A-1-02-08-06-SZ)** have been included in this kit, and are adaptable to most applications. As an example, Figure 22 shows the 3/8" NPT Tee used to Tee the AirDog® return with the engine fuel return connected to a port on top of the fuel tank. Additional or replacement fittings may be required to adapt to your specific application.

Figure 22

# Fuel Suction Line

## Connecting the Fuel Supply Line from the Tank to the AirDog® FPII-125

5-8. Remove the original fuel suction line fitting from fuel tank. The original suction line can be tied out of the way or removed.

5-9. Assemble one end of the 1/2" fuel line (reference section 5) using required fittings. A **#8 F JIC Swivel x 1/2" Pushlock Hose Barb (PN 4A-1-09-08-08-B)** (Figure 23) has been supplied in this kit; however, you may need to adapt as necessary for your specific engine application. Attach to the connection where the factory suction line was just removed in the previous step. A **#8 M JIC x 3/8 M ORB Adapter (PN 4A-1-01-08-06-S)** has been supplied in this kit; however, you may need to adapt as necessary for your specific engine application.


Figure 23

5-10. Run the fuel line along the frame away from any hot or moving parts, such as exhaust or driveshaft, to the AirDog® "Fuel In" port. Cut the fuel line to length and insert fuel line end **FQC12S** or **FQC1290** per step 5-1. Once the fuel line end is pressed in, connect it to the male **J2044** fitting in the AirDog® "Fuel In" port (Figure 24). A "click" will be heard once properly connected.


Figure 24

## Wire Harness

***VERY IMPORTANT: The AirDog® electrical harness requires a 15 amp fuse.**

The AirDog® wire harness has a low pressure sensor and an amber LED indicator light as standard equipment. The indicator light will illuminate at start-up, remain on for a few seconds, then go off, and should remain off unless pressure flow to the engine drops below minimum requirements.

## TheAirDog® Wire Harness


Relay
(6-1)

AirDog® Pump Motor Lead (6-2)

Fuel Pressure Sensor Lead (6-3)

Indicator Light & Dash Plate (6-9)

Battery Positive Lead - Red (6-11 & 6-12)

Battery Negative Lead - Green (6-11)

Indicator Light Lead (6-5 & 6-9)

Relay Trigger Lead (No Connector/Plug) (6-5 & 6-6)

## Securing the AirDog® Wire Harness Relay to the Vehicle

6-1. Secure the AirDog® wire harness relay to the vehicle. This picture shows the relay mounted on the firewall.


6-2. Route the AirDog® wire harness pump motor lead and the fuel pressure sensor lead to the AirDog® unit. Connect the wire harness pump motor lead (labeled “Attach to Motor”) to the AirDog® unit pump motor lead.

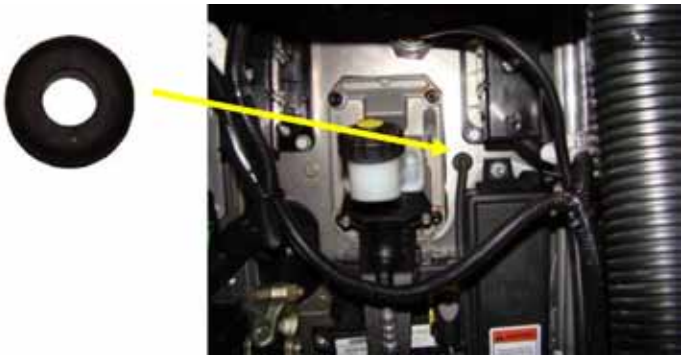
6-3. Connect the AirDog® wire harness fuel pressure sensor lead to the AirDog® unit fuel pressure sensor.

# Relay Trigger Lead and Indicator Light Lead

The indicator light lead must be routed through the firewall and to the dashboard. The relay trigger lead must be connected to a contact point that is electrically "HOT" when the key is in the "RUN" position. This could be either in a spare fuse holder in the fuse panel or on the ignition switch itself.

**NOTE: Do NOT** connect the relay trigger lead to a point that is "HOT" when the key is in the **ACCESSORY** position.

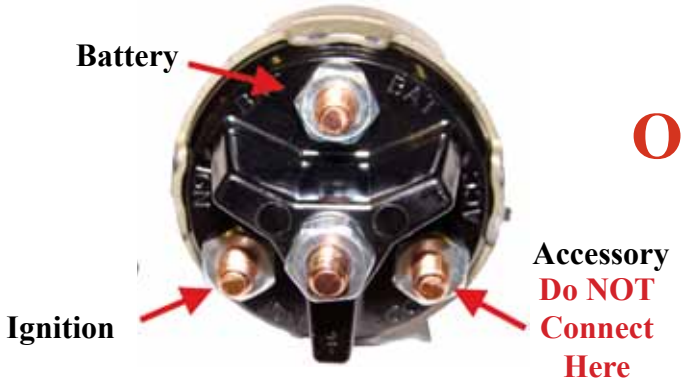
## Routing the Indicator Light and Relay Trigger Lead through the Firewall



6-4. If an access hole is available, remove the plug and route the lead through the hole. If no access hole is available, select the best location and drill a 5/8" hole in the firewall to allow entry of the relay trigger lead and indicator light into the cab.

6-5. Route the relay trigger lead (red) and indicator light lead through the firewall. Be sure to seal the opening or install a grommet (supplied) around the wire loom to prevent water leakage and protect it from chafing.

6-6. Connect the red relay trigger lead to a terminal on the ignition switch that is "HOT" when the ignition key is in the "RUN" position **OR** connect the red relay trigger lead to a fuse holder in the fuse panel that is "HOT" when the ignition key is in the "RUN" position.




**OR**

6-7. Select a location on the dashboard that is easily visible to the driver.

6-8. Remove the dash components as necessary to access the area behind the selected location.

6-9. Drill a 7/16” hole in the dash at the selected location. Be very careful when drilling. Do not damage components located behind the dash. Remove the nut from the indicator light.


6-10. Reinstall nut and tighten until snug. *Note-to adhere plate to dash, you may peel off the paper backing from the backside of the plate to expose adhesive. Connect the indicator light lead to the connector on the wire harness. Connect the positive (orange wire) lead on the wire harness to the positive (marked orange) quick connect terminal on the indicator light (see image above). Then connect the negative (blue wire) lead on the wire harness to the negative (unmarked) quick connect terminal on the indicator light.

6-11. Re-install the removed dash components to their original position.

## Connecting the Power Supply Leads

**The power supply leads can be easily connected to the appropriate contacts on the alternator. However, any high amperage terminal that is always “HOT” is OK for the Positive + (RED) lead. Be sure the NEGATIVE — (GREEN) lead is connected to a reliable chassis ground.**

6-12. Route the red and green power supply leads to the alternator. Connect the Green (-) ground lead to the alternator ***Ground*** connection.

6-13. Connect the Red (+) positive lead to the alternator ***Hot Lead*** going to the battery.

*NOTE: Secure wire harness with zip ties included in installation kit.*

# Initial Start Up Procedure

7-1. The AirDog® FPII-125 is a self priming system, however, to prevent possible damage to the system, it is recommended to fill the water separator with diesel fuel before initial start up.

7-2. Rub CLEAN diesel fuel or oil on filter seals before installing to ensure a proper seal.

7-3. Turn the starter key to the on/run position.

7-4. While the AirDog® FPII-125 is operating, bleed the fuel line to the engine of air by loosening the fuel line connection at the engine fitting. As soon as the line is purged of air and pure fuel is observed, properly tighten the fuel fitting.

**NOTE:** Put a rag or shop towel over and around the fitting to prevent fuel splatter or spray. Catch all spilled fuel and dispose of properly. Wear safety glasses.

7-5. Start engine.

**Recheck all fuel fittings for leakage and proper torque. Be sure all fuel lines are properly routed to protect from excessive heat and secured with supplied zip ties to protect from chafing and abrasion. Recheck all electrical lines and secure as necessary.**

# Checking for Excessive Pump Noise

NOTE: Each AirDog® FPII-125 has been manufactured in a quality controlled process and wet tested for operation and performance before shipment. This is a smooth running system. With fuel or air alone, the AirDog ® FPII-125 fuel pump will run quietly. However, if any fuel fitting on the vacuum side, between the fuel tank and the AirDog® FPII-125 or the pre-filter has been left loose during the installation process, the system may be sucking air at an excessive rate and will be very noisy. Excessive restriction in the suction line from the fuel tank can cause vapor and noise as well. Excessive air from a loose fitting or leaking pre-filter seal or vapor from fuel flow restriction is most likely the reason for the excessive noise. Correct as necessary.

A. The seal groove in the 3” filter is a snug fit and on occasion, the seal has been found to not be fully seated. Remove the pre-filter, remove the seal from the top of the nut plate. Clean and lubricate the seal groove. Carefully replace the seal in the groove. Be sure to fully seat the seal.

B. Check all fittings, especially the quick connect at the tank.

# Filter Service Recommendations

Plugging of either the fuel filter or the water separator itself will cause low fuel pressure and low flow to the engine. If a low fuel pressure issue exists, replace the fuel filter. Typical fuel filter life is 15-20k miles depending on fuel quality.


**Water Separator**

Replace the water separator every other time you change the fuel filter or if it becomes damaged or plugged. It is suggested to check/drain the water separator weekly or as needed if you experience excessive 'water in fuel' conditions. When installing the water separator, be sure to clean the underside of the AirDog® base. Follow the insturctions printed on the pre-filter for proper tightening procedures.

Check the water separator/pre-filter for plugging. Clean or replace as necessary. If the light continues to be on, check the screen in the water separator/pre-filter nipple for debris and plugging. Clean as necessary.

CAUTION: Be extremely careful to prevent any contaminates or debris from entering the pre-filter when removing it for cleaning. Large debris will jam the gerotor and cause the fuse to blow. This is

## Fuel Filter

Remove the fuel filter by turning it counter clockwise. Do NOT pre-fill the fuel filter with fuel. The AirDog® will fill the filter and prime the system automatically. Follow the instuctions on the filter for proper tightening procedures.

CAUTION: Dispose of waste fuel and used filters properly.

# NOTES

AirDog®
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