



INDUSTRIAL Fuel Air Separation System

INSTALLATION MANUAL

For Trucks Equipped with
VOLVO® & MACK® Engines
12V with Frame Mounted Water Separator
Model Years < 2024.5



Part No. **A3SPBT406**



NOW WITH DEMAND FLOW

Revised 7/30/2026



PROUDLY MADE IN THE USA

www.airdogdiesel.com
1-573-635-0555 or
1-877-463-4373

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

PATENT

www.AirDogDiesel.com/patents

AirDog[®] INDUSTRIAL Fuel Air Separation System

THE RIGHT CHOICE FOR YOUR DIESEL ENGINE

4G-HD Fuel Pump

Pump shaft, stabilized with bearings on each end, holds the gerotor in virtually perfect alignment for quiet running and extended longevity!



Low Fuel Pressure Switch and LED Indicator

Lets you know when to service the fuel filter and water separator before suffering power loss.
NO MORE GUESSING!



Bearings



LoveJoy Coupler System

The LoveJoy Coupler System is self-aligning and eliminates virtually all vibrations.



Positive Air Separation

with primary air discharge port.



Dual Port Pump

Balances the gerotor for quiet operation and higher flows.



Demand Flow System

Easy installation, only one small line connected to the engine return line to return air/vapor to the tank.



Protective Wire Screen

In water separator nipple.



Adjustable Regulator

For just the right fuel pressure.

Drain Valve

6 Micron Particulate Filters
Long-Lasting MicroGlass Media

Water Separator/Pre-Filter
with Drain Valve

CARB Executive Orders D-595-5 & D-595U-6 permit the advertisement, sales and installation of PureFlow Technologies AirDog[®] Diesel Fuel Systems in California on 2020 and older model year on-road diesel vehicles and off-road diesel vehicles/equipment.

SYSTEM OVERVIEW

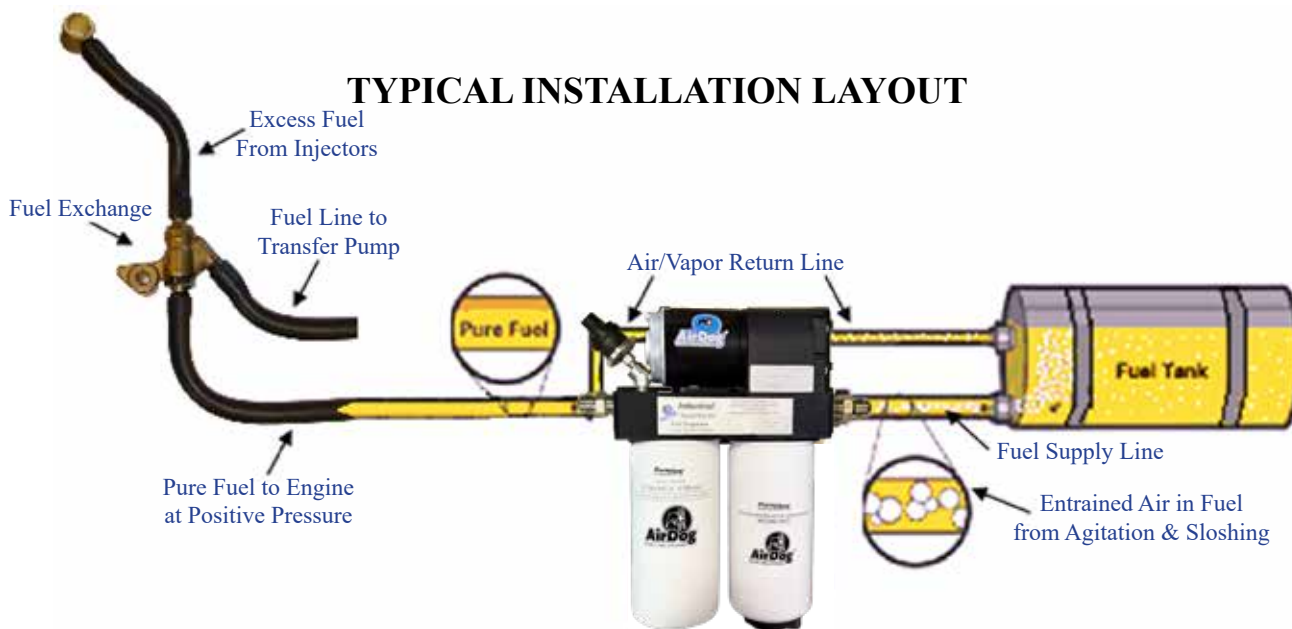
Welcome to the **AirDog® Heavy Duty Industrial**
Fuel Air Separation System for Class 8 Trucks

The AirDog®, with ADVANCED FUEL AIR SEPARATION, DEMAND FLOW, ADJUSTABLE REGULATOR, LOW PRESSURE SENSOR with LED INDICATOR and the 4G-HD FUEL PUMP, is a premium fuel filtration and delivery system for the Volvo® & Mack® Diesel Engines.

Air & 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.

The AirDog® removes water, particulates and most importantly, the air that becomes entrained in diesel fuel, from the fuel flow to your engine. The entrained air and vapor that is 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, 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.

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



The AirDog® requires only one small return line connected to the engine return line, for quick and easy installations.

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Section 2

Installation & Safety Guidelines

The installation of your AirDog® 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® 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.)

DO NOT REMOVE FACTORY INSTALLED SECONDARY FUEL FILTERS. REMOVAL OF A FACTORY INSTALLED SECONDARY FUEL FILTER MAY VOID YOUR ENGINE WARRANTY.

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 573-635-0555 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 truck.

PureFlow® Technologies, Inc.

AirDog® FPII-150-LP

Volvo & Mack Engines

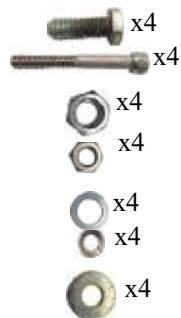
Section 3

Installation Parts List

Parts List

QTY	Description	Part Number	Image
1	Installation Manual	206-1-0406	
1	AirDog® Diesel Fuel System including: Fuel Filter FF200-MG-6 Water Separator WS200-WD	FPII-150-LP	
1	Wire Harness w/ Indicator Light & Dash Plate 1 ea Indicator Light 5G-1-1-47674 1 ea Dash Plate 201-3-0004-S-M716	5E-2-010 908-5G-1-1-47674	
1	3/8" Low Pressure Hose (Air/Vapor Return Line) - 10 ft Section	4C-1-02-05-010-10FT	
1	1- PC Mounting Bracket	001-3C-0034	

ADFK-406 Volvo/Mack Installation Kit

1	Fuel Pressure Sensor	5C-9-007-SC-06	
15	12" Zip Tie	5H-2-1-12	
1	Add-A-Circuit Fuse Tap Adapter Mini	908-5E-2-018	
1	901-08-0100-1 Bolt Kit 4 ea 3/8-16 x 1-1/4 HHCS 4 ea 1/4-20 x 2 SHCS 908-08-0100-N Nut Packet 4 ea 3/8-16 Hex Nut 4 ea 1/4-20 Hex Nut 908-08-0100-1-W Washer Packet 4 ea 3/8 Split Lock Washer 4 ea 1/4 Split Lock Washer 4 ea 3/8 Flat Washer	1J-1-C20SZ 1L-A32C 1S-1-CSZ 1S-1-AC 1R-6-CSZ 1R-6-AC 1P-2-CSZ	

908-01-0406-FK Volvo/Mack Fitting Kit

2	# 6 F JICX x 3/8 Push-Lock Hose Barb	4A-1-09-06-06-B	
2	# 6 F JICX x #6 M JIC 90° Elbow	4A-2-04-06-06-S	
1	Adapter for 1/2" plastic line	001-4A-1-0050	
1	Quick Connect Return Adapter Sub-Assy (1 ea) 1-1. Quick Connect Return Adapter M x F 001-4A-1-0051 (1 ea) 1-2. 1/4 NPT w/ Vibraseal Pipe Plug 4A-3-01-A-S2 (1 ea) 1-3. 11.6 x 2.4 mm O-Ring 1U-2-1-11.6 (1 ea) 1-4. Quick Connect Retainer Clip 4C-2-00-00 (1 ea) 1-5. #6M JIC x 1/4 M NPTF Straight Connector 4A-1-01-A-C-SZ	908-VM-QCRA	
2	#8M JIC x 1/2 M NPTF Straight Connector	4A-1-01-08-08-S	
1	#6M JIC x 1/4 M NPTF Straight Connector	4A-1-01-A-C-SZ	
1	3/8 ID, 7/8 OD Rubber Grommet	5J-1-1-04-2758	
1	3/4 Industrial Hose Barb Splicer	4A-1-16-12-12	
2	M18 x 1.5 Zero Leak Plug w/ O-Ring	4A-3-04-18-ZL	
2	1/2 F NPT x 1/2 M NPT 90° Street Elbow	4A-2-09-08-08	
2	1/2 F NPT x #8 F JICX Straight Adapter	4A-1-26-08-08-S	
1	Adapter for 1/2" plastic line	001-4A-1-0050	

Selecting the Best Location to Mount the AirDog®

Installing the AirDog® at the proper location on the vehicle is most important. When deciding where to locate the AirDog®, the following points should be considered:

- Best relationship to the transfer pump and the original primary fuel filter location.
- Protection from the elements and road debris.
- Accessibility for service.

CAUTION: DO NOT mount the AirDog® directly on the engine. Mounting the AirDog® directly on the engine will immediately void your AirDog® Warranty!

The Volvo/Mack primary fuel filter is usually found on earlier model trucks mounted on the passenger side frame rail, just to the rear of the bumper brackets. Additionally, Volvo/Mack uses “plastic type” fuel lines and plastic quick connect fittings.



The AirDog® can be easily mounted in the same location as the OE primary fuel filter in this application, as shown in picture.

**Mounting the AirDog® on the Truck's Frame
At the Original Primary Filter Location (406 Kit)**

Remove the Original Fuel Filter

5-1. Drain the fuel into a suitable container, from drain valve on bottom of filter housing.



5-2. Disconnect the fuel lines from the fittings in the filter housing.



5-3. Clamp off coolant supply lines to the water separator with suitable coolant hose clamp pliers, to minimize coolant loss. Disconnect the coolant lines where fittings come out of frame. Remove factory hose barbs. Install provided ORB plugs into coolant ports. On the older models connect the coolant lines with provided hose barb coupler, and secure with original hose clamps.



5-4. Remove the original primary filter assembly from the frame.



Mounting the AirDog® on the Truck's Frame At the Original Primary Filter Location

5-5. Hold the AirDog®, with the one-piece bracket and filters attached, next to the frame, in the location from which the original primary filter was just removed. Check for clearance around the system, and ensure the fuel lines will connect to the AirDog® inlet and outlet. Remove the AirDog® from the bracket, and attach the AirDog® one-piece mounting bracket to the frame with bolts through the original two mounting holes of the fuel-water separator. Tighten securely.



5-6. Loosely assemble the AirDog® to the mounting bracket. Snug the fasteners to achieve a good relaxed fit and then properly torque all the fasteners.

WARNING: DO NOT DRILL INTO OR DAMAGE ANY WIRE, AIR LINES OR OTHER COMPONENTS LOCATED BEHIND THE FRAME RAIL.

NOTE: These steps are necessary to prevent stress cracks from forming in the mounting brackets due to vibration.



This example shows the AirDog® installed.

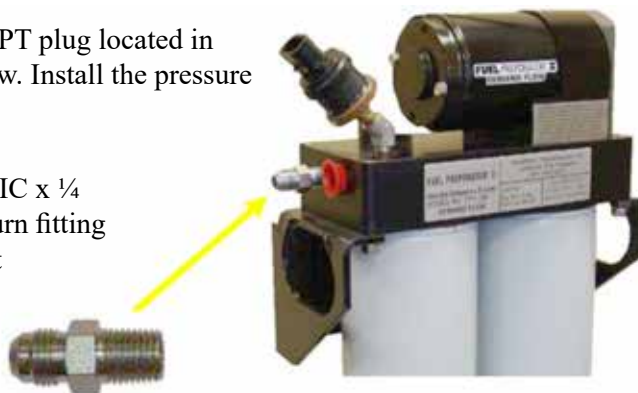
Pressure Sensor and Fuel Fittings

IMPORTANT: Use diesel compatible thread sealer when installing NPT fittings.



6-1. Remove the 1/8 NPT plug located in the end of the 45° elbow. Install the pressure sensor into the elbow.

6-2. Install the #6 JIC x 1/4 NPT Air/Vapor return fitting in the AirDog® port marked “TANK”.



6-3. Install one Quick Connect x 1/2” NPT fitting into the port marked ENGINE.

NOTE: In the event your original primary filter does not use Quick Connect fittings, please use the 1/2 NPT x #8 JIC fittings included in the AirDog® installation kit.



FUEL LINE OVERVIEW

The AirDog® has been engineered to eliminate fuel-related problems. It is important that the fuel lines are assembled and installed properly so as not to cause fuel flow restriction.

When possible, use the fuel lines that are on the vehicle. This will reduce your installation costs and make the installation go much more quickly.

NOTE: On various Class 8 trucks, the manufacturer may use “plastic” or other-than-traditional steel braided fuel lines. These lines require special fittings. The fittings used with the original primary fuel filter are specific to the fuel lines used on the truck. When possible, mount the AirDog® in the location that will allow the use of the original fuel lines and fittings.

Fuel Supply Line: The fuel supply lines from the tank to the AirDog® and to the engine should be size 10 or, at the absolute minimum, size 8 (1/2” ID).

Air/Vapor Return Line: The AirDog® Air/Vapor return line can be connected to the engine’s return line. A size 6 is adequate for the Air/Vapor return line.

Primary Fuel Filters: It is most important that there are no fuel filters between the fuel tank and the AirDog® or between the AirDog® and the engine’s transfer pump to plug and cause restriction. These filters should be removed from the system as part of the AirDog® installation.

Secondary Fuel Filters: DO NOT REMOVE SECONDARY FUEL FILTERS. This is the filter between the transfer pump and the engine.

Fuel Line from AirDog® to Engine
Note: AirDog® Mounted at Original Filter Position

It is best to have the fuel level at 1/4 tank or below before performing installation on single tank application.

7A-1. Re-connect the factory fuel line to the engine to the AirDog® out to “ENGINE” port.



Fuel Line from Fuel Tank to the AirDog®

7B-1. Re-connect the factory fuel supply line to the AirDog® “FUEL IN” port.



NOTE: In cases where extra clearance is required it may be necessary to use provided 1/2 M NPT x 1/2 F NPT 90° Elbow & 1/2 F NPT x #8 F JICX fittings to extend the quick connect port.

IMPORTANT: Be sure the Quick Connect Fitting clicks when connecting the fuel line.

Installing the AirDog® Air/Vapor Return Line

7B-2. On the older Volvo/Mack trucks the return lines are located on top of the fuel filter housing, and will be the smaller of the two fuel lines (3/8). On the newer Volvo/Mack trucks the return fuel lines are located underneath the rear of the fuel filter housing, and will be the smaller of the two fuel lines (3/8).

7B-3. Remove the factory quick connect fuel line, and install the provided quick connect return adapter into the factory fitting. **Be sure to lubricate the o-ring on the adapter and ensure the fitting is fully seated.** Then secure the fitting with the provided retainer clip. Install factory fuel line into the female side of quick connect return fitting. Once line is fully seated, secure with factory retainer clip.

7B-4. Measure and cut provided return hose. Install #6 F JIC x 3/8 Push-Lock Hose Barbs on each end. Attach one end to quick connect return fitting. Route return hose to the AirDog® and connect to port that says “TANK” (use provided 90° elbows if needed). Ensure return hose is secured by using zip ties.

7B-5. To assemble the fuel line, cut hose line to length. Apply oil to the fitting, then push the fitting into the line until seated.



7B-6. Connect one end of the air/vapor return line to port on the AirDog® labeled “TANK” (use provided 90° elbows if needed.)



7B-7. Route and connect the other end of the air/vapor return line to the quick connect adapter on the fuel tank, and properly tighten both fittings.

AirDog® Wire Harness

NOTE: The AirDog® wire harness includes 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.

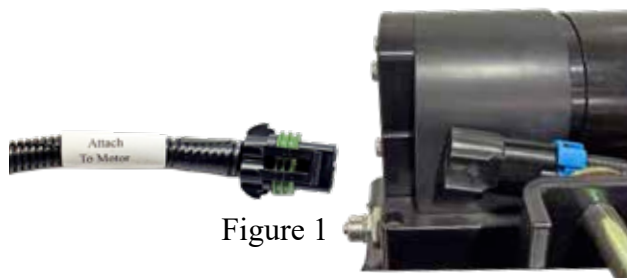


Securing the AirDog® Wire Harness Relay to the Vehicle

8-1. Secure the AirDog® wire harness relay to the vehicle. This picture shows the relay mounted on the firewall.



8-2. 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 (Figure 1).



8-3. Connect the AirDog® wire harness fuel pressure sensor lead to the AirDog® unit fuel pressure sensor.



Relay Trigger Lead and Indicator Light Lead

The AirDog® Wire Harness 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, using an Add-A-Fuse (included) to add the relay trigger lead to an existing circuit, or on the ignition switch itself.

Note: DO NOT connect the AirDog® wire harness 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:

8-4. Most Volvo/Mack trucks have an access plate located on the firewall. Remove the access plate and drill a 5/8” hole to allow entry of the indicator light lead into the cab. If not equipped with access plate or suitable entry location, a 5/8” hole will need to be drilled into the firewall. Use the grommet to seal around the loom cover.

8-5. Route the AirDog® indicator light lead through the access plate.



NOTE: Be sure to seal the opening or install a grommet around the wire loom to prevent water leakage and protection from chafing.

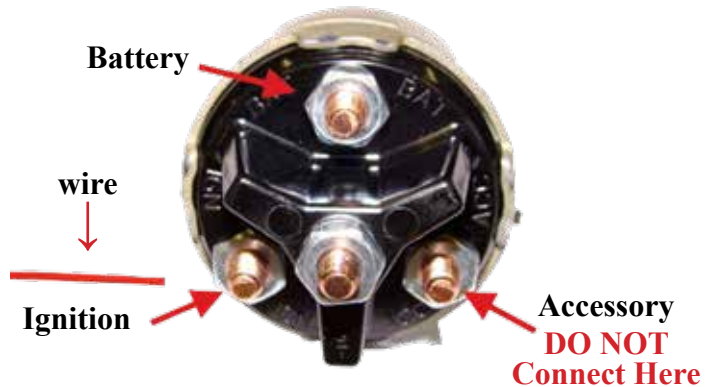


Relay Trigger Lead

This

There are several options for attaching the relay trigger wire:

8-6A. Connect the relay trigger lead to a terminal on the ignition switch that is “HOT” when the key is in the “RUN” position, as detailed in this picture:



OR

Add-a-Fuse

That

8-6B. Using the Add-a-Fuse (included in your AirDog® installation kit), connect the relay trigger lead to a fuse holder in the fuse panel that is “HOT” when the key is in the “Run” position. An example is pictured here:



Installing the AirDog® Wire Harness Indicator Light *LED Indicator Light*

8-7. Select a location on the dash that is easily visible to the driver. Remove the dash components as necessary to access the area behind the selected location.



8-8. 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.

Installing the AirDog® Wire Harness Indicator Light *LED Indicator Light*

8-9. Remove the nut from the indicator light and insert the indicator light through the dash plate. To adhere the dash plate to the dashboard, peel off the paper backing from the back side of the plate to expose the adhesive. Install the dash plate with indicator light into the hole in the dash. Reinstall the nut to the indicator light at the back side of the dash, and tighten the nut until snug.

Connect the positive (orange wire) lead of the wire harness to the positive quick-connect terminal (marked orange) on the indicator light (see image below).

Then connect the negative (blue wire) lead on the wire harness to the negative (unmarked) quick connect terminal on the indicator light.

8-10. Re-assemble the dash components back to their original position.



Connecting the Power Supply Leads

The power supply leads can be easily connected to the appropriate contacts on the battery. Another alternative option would be to connect the power supply leads to the appropriate contacts on the alternator. 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.

IMPORTANT: On 24V systems, the power supply leads can be easily connected to the appropriate contacts on the ALTERNATOR. DO NOT connect directly to the 24V batteries.

8-11. Route the red & green power leads to the battery or an alternator. Connect the green (-) ground lead to the negative battery terminal post.

8-12. Connect the red (+) positive lead to the positive battery/alternator terminal post.



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



Installing your filter restriction gauge into the AirDog® Gerotor Cap Sensor Port

Does your HD truck have a filter restriction gauge that you would like to continue using with the AirDog®?

9-1. Every AirDog® Heavy Duty Diesel Fuel System is now equipped with a port for your restriction sensor. On the inside surface of the gerotor pump cap, you will find a 1/8" NPT plug.

Port for Sensor



9-2. Remove that plug (3/16" Allen), and install your restriction sensor with the same 1/8" NPT thread, using an elbow if necessary, and you can now connect and use your original filter restriction gauge with the AirDog® system.



Initial Start Up Procedure

The AirDog® is a self priming system. However, to prevent damage to a dry seal and reduce the life expectancy of the system, it is suggested to pre-fill the water separator/pre-filter with diesel fuel to the bottom of the "NUT PLATE".

- ☐ 10-1. Rub CLEAN diesel fuel or oil on filter seals before installing to ensure a proper seal.
- ☐ 10-2. Pre-fill the water separator/pre-filter with diesel fuel up to the bottom of the nut plate.
- ☐ 10-3. Turn the starter key to the on/run position.
- ☐ 10-4. The AirDog® should now be running and pumping fuel, bleed the fuel line to the engine 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.

- ☐ 10-5. Start the 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 to protect from chafing and abrasion. Recheck all electrical lines and secure as necessary.

Servicing the AirDog® Fuel Filter and Water Separator/Pre-Filter

It is highly recommended that you keep a replacement AirDog® fuel filter and water separator on-hand, ready for replacement when the AirDog® Indicator Light illuminates.

When the particulate fuel filter, water separator, mesh screen in the water separator nipple, or a combination of these, become plugged, the restriction will cause a loss in pressure and flow through the AirDog® system, which will cause the AirDog® Indicator Light to illuminate, and stay on. When the Indicator Light comes on, this indicates it is time for a filter change. It is strongly recommended that BOTH filters be changed at the same time. After changing filters, if the Indicator Light remains on, please check that the AirDog® fuel pump is running, with the key in the “RUN” position. If the pump is not running, check the fuse in the wire harness, located near the AirDog® wire harness terminals connected to the battery or alternator for power. It is possible for a restriction in flow to cause the pump to draw high amps for a short period of time, which could pop the 15A fuse in the harness. Replace the fuse, if blown. After replacing the fuse, if the Indicator Light remains on, please use the following procedure to check for debris in the water separator nipple:

- Remove the water separator from the AirDog® filter base.
- Using a 1-1/8” (29mm) deep-well socket, loosen and remove the threaded nipple that the water separator was installed on.
- Inspect the wire mesh screen inside the nipple, blow any debris out of the screen with compressed air.
- Reinstall the threaded nipple into the AirDog® filter base.
- Tighten the nipple securely with the socket and ratchet. Torque spec for the nipple installation is 35 FT-LBS.

FUEL FILTER: The AirDog® 6-micron fuel filters have a typical lifespan of 25,000+ miles, and up to 40,000 miles, as they are manufactured with a high-quality and high-capacity Micro-glass media, as opposed to a paper element. Fuel filter life is affected by many variables. In any case, we do not recommend exceeding 40,000 miles of service with a fuel filter.

When replacing the fuel filter, be sure to clean the underside of the AirDog® filter base. Rub clean diesel fuel or oil on filter seals before installing, to ensure a proper seal.

It is not necessary to pre-fill the fuel filter with fuel; the AirDog® integrated fuel pump will fill the filter and prime the system automatically. Follow the instructions on the filter for proper tightening procedures.

WATER SEPARATOR: The AirDog® water separator/pre-filters have a typical lifespan of up to 40,000 miles. Servicing of the water separator simply requires draining at regular intervals. It is suggested to check/drain the water separator weekly or as needed should you experience excessive ‘water in fuel’ conditions. Replace the water separator when the AirDog® Indicator Light illuminates, if it becomes damaged or permanently plugged, and when changing the AirDog® fuel filter. Before installing a new water separator, be sure to clean the underside of the AirDog® filter base. Rub clean diesel fuel or oil on filter seals, to ensure a proper seal. It is suggested that you pre-fill the water separator (only) with clean diesel fuel when changing filters, to assist the system with priming. Follow the instructions printed on the water separator/pre-filter for proper tightening procedures.

When tightening filters with a filter wrench, DO NOT overtighten, as doing so may damage the filters.

Caution: Be careful to prevent any contaminants from entering the water separator when replacing. Although the water separator pre-filter has a protective wire screen, any debris passing through the system could cause the Gerotor fuel pump to lock up, which can cause the in-line fuse to blow. Such a pump lock-up is not covered under warranty.

DISPOSE OF WASTE FUEL AND USED FILTERS PROPERLY TO PROTECT OUR ENVIRONMENT!





www.airdogdiesel.com
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1-573-635-0555

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