INDUSTRIAL
Fuel Air Separation System

INSTALLATION MANUAL

For Trucks Equipped with
Paccar MX13 Diesel Engines

PLEASE READ THESE INSTRUCTIONS THOROUGHLY BEFORE BEGINNING INSTALLATION

Part No. A3SPBT407

Revised 10/14/2022

NOW WITH DEMAND FLOW

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!

Bearings

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!

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.

6 Micron Particulate Filters
Long-Lasting MicroGlass Media

Water Separator/Prefilter
Long-Lasting Wire Mesh Media

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 Paccar MX13 Common Rail Diesel Engine.

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!

TYPICAL INSTALLATION LAYOUT

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

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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.

Installation Parts List

QTY	Description	Part Number	Image
1	**Installation Manual**	206-1-0407	
1	**AirDog® - *with Serial Number Plate*** Fuel Filter FF200-MG-6 Water Separator WS200-WS	FPII-200 WIP	
1	**Wire Harness w/ Indicator Light & Dash Plate** Includes: 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) - 7 ft Section**	4C-1-02-05-010-7FT	

ADFK-407 Installation Kit

1	**Fuel Pressure Sensor**	908-5C-9-007 ***or*** 908-5C-9-0010	
15	**12" Zip Tie**	5H-2-1-12	

908-00-0304 Frame Mount Bracket Kit

1 1	**Left Mounting Bracket** **Right Mounting Bracket**	002-3C-0003 002-3C-0004	
1	**901-08-0100 Frame Mount Bracket Bolt Kit** Includes: 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-W Washer Packet** 4 ea 3/8 Split Lock Washer & 4 ea 1/4 Split Lock Washer	 1J-1-C20SZ 1L-A32C *1S-1-CSZ & 1S-1-AC* *1R-6-CSZ & 1R-6-AC*	

908-08-0800 AirDog® FPII Basic Fitting Kit

2	**#10M JIC x 1/2 M NPTF Straight Connector**	4A-1-01-10-08-S	
2	**#10M JIC x #10F JICX 90º Swivel Nut Elbow**	4A-2-04-10-10-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	

908-01-020407-RLFK Return Line Fitting Kit

1	**#8M JIC x #8F JICX x 1/4 NPTF Port GagePort**	4A-1-11-08-08-4P	
1	**#6M JIC x 1/4 M NPTF Straight Connector**	4A-1-01-A-C-SZ	
2	**#6F JICX x 3/8 Push-lock Hose Barb**	4A-1-09-06-06-B	
1	**#6M JIC x #6F JICX 90º Street Elbow**	4A-2-04-06-06-S	

SBK-1000 Sandwich Bracket Kit

OPTIONAL

1	**Sandwich Mounting Bracket Kit for AirDog® & Champ** Includes: 1 Front Bracket (002-3C-0010-SBF), 1 Back Bracket (002-3C-0011-SBB), & 1 Universal Bracket (002-3C-0006PCB)	908-00-8888	
1	**901-08-0100-SB Hardware Kit** Includes: 4 ea 3/8-16 x 1 FHSCS 3 ea 3/8-16 x 3-1/2 HHCS 3 each 3/8-16 x 4-1/2 HHCS 7 ea 3/8-16 Hex Nut 7 ea 3/8 Split Lock Washer	 1M-C16SZ 1J-1-C56SZ 1J-1-C72SZ 1S-1-CSZ 1R-6-CSZ	

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!

Pictures below show examples of different AirDog® installations. There are many variations in the arrangements of the components on the various trucks. With a little ingenuity, the AirDog® can be successfully installed on any Class 8 Truck.

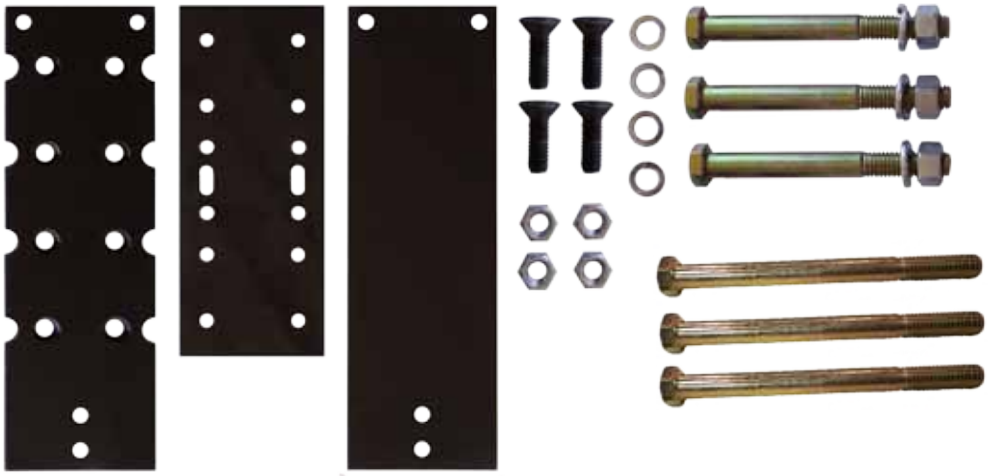
Picture below left shows the original filter mounted on the frame. Picture below right shows the AirDog® mounted in the same location in place of the original filter.

Picture below left shows the original primary filter mounted on the passenger side frame. Picture below right shows the filter mounted on the Firewall.

OPTIONAL KIT AVAILABLE (PN: SBK-1000)

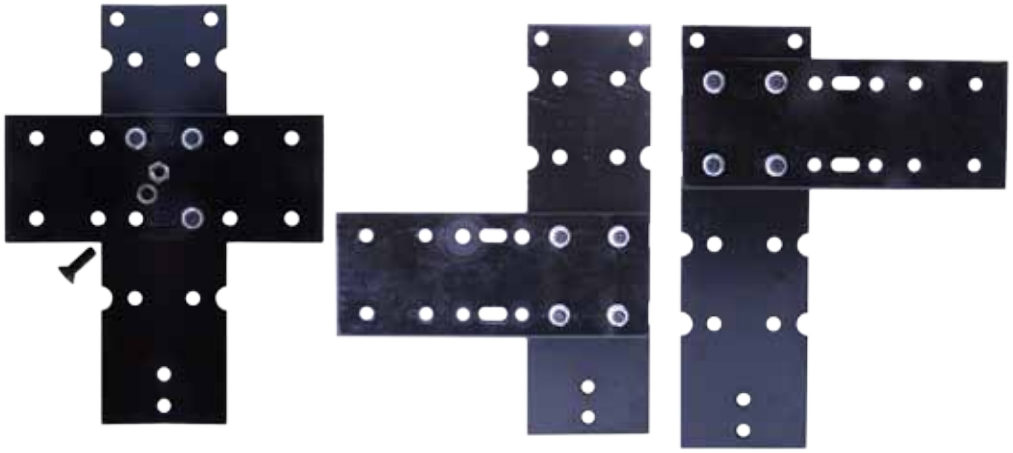
NO DRILL Universal Sandwich Mounting Bracket

Determine which holes in bracket 1 that you are going to need by holding it up to the frame of your vehicle.



Use mounting hardware to mount bracket 1 to bracket 2. The position of bracket 2 can be adjusted vertically and horizontally to suit your particular needs.

Using product mounting hardware, mount product to brackets.



Install 2 of the frame bracket bolts in top of bracket 1 & bracket 3. Slide over frame and install bottom bolt.

Note: 3.5” and 4.5” bolts are included. Use the length best suited to your vehicle’s frame width.

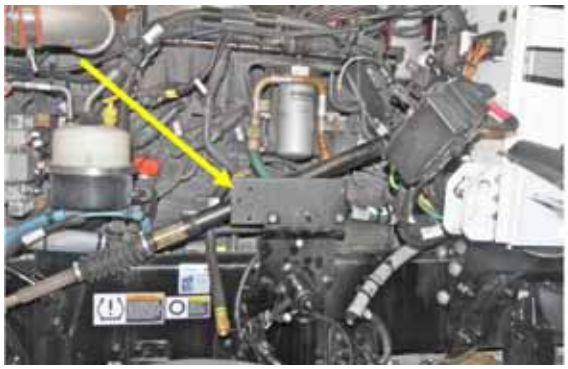
Tighten bolts as needed. Install filter or filter and water separator as applicable.

Mounting the AirDog®

NOTE: Do NOT mount the AirDog® on the engine! Mounting the AirDog® on the engine will immediately void your AirDog® warranty.

5A-1. Disconnect the fuel lines and remove the primary fuel filter.

5A-2. For this installation, bolt the Universal Mounting Plate (available from PureFlow® Technologies, see page 8) on the original filter bracket.



5A-3. Assemble the mounting brackets to the Universal Mounting Plate and then install the AirDog®.

Mounting the AirDog® on the Truck's Frame

5B-1. Loosely assemble the mounting brackets and filters to the AirDog®.

5B-2. Hold the AirDog®, with the brackets and filters attached, next to the frame at the selected mounting location. Check for clearance. If mounted between the frame and steer tire, turn the steering wheel fully to the left and right to check for tire clearance.

5B-3. While holding the AirDog® at the selected mounting location on the frame, mark and center punch each hole location.

Mounting the AirDog® on the Truck's Frame

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

5B-4. Drill a 3/8" hole at each of the 4 previously marked locations.

5B-5. Loosely assemble the mounting brackets to the frame.

5B-6. Loosely assemble the AirDog® on the brackets.

5B-7. After mounting the AirDog® on the brackets, snug the fasteners to achieve a good relaxed fit.

5B-8. Properly tighten all of the fasteners.

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

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 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 other than traditional steel braid 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.

Inspect the original fuel lines for size, length, and condition. If the fuel lines are in good condition and the correct size and length to adequately reach the AirDog®, you may want to go ahead and use them. If any of the fuel lines need to be replaced, it is recommended that the fuel lines selected meet or exceed DOT requirements.

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.

Assembly Instruction for Hose Barb

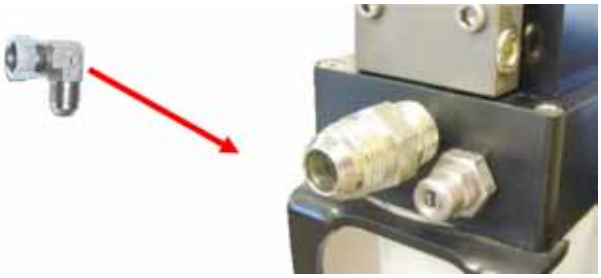
1. Cut hose line to length.
2. Apply oil to fitting.
3. Push fitting into line until seated.

Section 6A: Installing the Fuel Fittings and Pressure Sensor

IMPORTANT: Use diesel compatible thread sealer when installing NPT fittings

NOTE: Pictures below illustrate the installation of straight fittings. However, in some instances 90º fittings may be required to connect the fuel lines to the AirDog®. Two 90º fittings have been included in the kit for this purpose.

6A-1. Install a straight #10 JIC x ½" NPT fuel fitting in the AirDog® fuel port marked **"ENGINE".** Use a 90º swivel fitting as needed when connecting the fuel line.



6A-2. Install a straight #10 JIC x ½" NPT fuel fitting into the fuel inlet port next to the regulator marked **"FUEL IN"**. Use a 90º swivel fitting as needed when connecting the fuel line.

6A-3. Install the ¼" NPT x #6 JIC return fitting into the Air/Vapor return port marked **"TANK".**

6A-4. Remove the 1/8" NPT plug from the end of the pre-installed 45° fitting in the AirDog® base. Install the fuel pressure sensor into the 45° fitting.

Very Important: Use diesel compatible thread sealer on all NPT threads.

Section 6B: Connecting the AirDog® to the Engine

6B. Connect the fuel line that originally connected the primary fuel filter (see Step 5A-1) to the transfer pump to the AirDog® "Out to Engine" port. If the fuel line is not in good enough condition or the proper length to make the connection, replace it with a new fuel line.

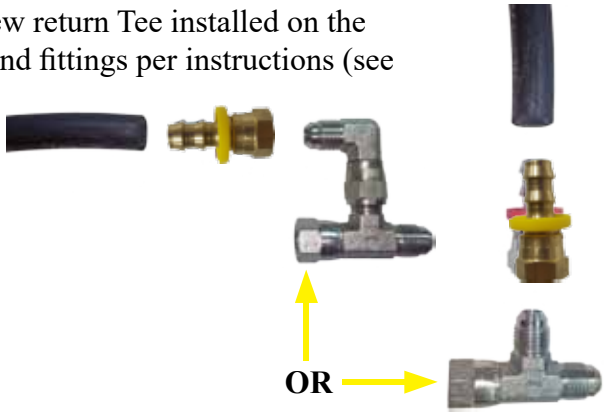
Section 6C: Installing the AirDog® Return Line

The Paccar engine fuel return line routes through a fuel cooler before returning to the fuel tank. The cooler is located in front by the radiator. The steel lines to and from the cooler connect to steel braid reinforced lines. Connect the AirDog® air/vapor return line here.

6C-1. Disconnect the #8 steel braid fuel return line connected to the formed steel line coming from the fuel cooler and install the Tee included in the installation kit. Install the ¼" NPT x #6 JIC fitting into the "Tee".

6C-2. Connect the #8 steel braid line (disconnected in 6C-1) to the flare end of the Tee.

6C-3. Measure and cut the return line (included in kit) to the length required, when properly routed, to connect the AirDog® Air/Vapor return port to the new return Tee installed on the engine fuel return line. Assemble the fuel return line end fittings per instructions (see page 11).



6C-4. Route and connect the new Air/Vapor return line from the AirDog® to the Tee in the engine return line return "Tee". Properly tighten the fittings. Secure the fuel line with zip ties as necessary to prevent abrasion and chafing.

Connecting the AirDog® to the Tank

6D. Connect the fuel supply line to the engine that was connected to the original fuel filter to the fitting in the AirDog® "Fuel In" port.

WIRE HARNESS

***VERY IMPORTANT: The AirDog® wire 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.

THE AIRDOG® WIRE HARNESS

Relay
(7-1)

AirDog® Pump Motor Lead (7-2)

Fuel Pressure Sensor Lead (7-3)

Indicator Light & Dash Plate (7-9)

Battery Positive Lead - Red (7-11 & 7-12)

Battery Negative Lead - Green (7-11)

Indicator Light Lead (7-5 & 7-9)

Relay Trigger Lead (No Connector/Plug) (7-5 & 7-6)

Securing the AirDog® Wire Harness Relay to the Vehicle

7-1. Secure the AirDog® wire harness relay to the vehicle. This picture shows the relay mounted on the firewall.

7-2. 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.

7-3. 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 dash board. 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 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:

7-4. Most Peterbilts and Kenworths have access holes located below the steering column. Remove the plug and route the leads through the hole. For other make trucks, drill a 5/8" hole in firewall to allow entry of the indicator light lead into the cab. Use the grommet to seal around the loom cover.

7-5. Route the AirDog® wire harness trigger lead (red wire with no connector/plug) and indicator light lead through the firewall.

By the Steering Column **Under the Dash**

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

7-6. Connect the AirDog® wire harness relay trigger lead to a terminal on the ignition switch that is "HOT" when the ignition switch is in the "RUN" position **OR** connect the AirDog® wire harness relay trigger lead to a fuse holder in the fuse panel that is "HOT" when the key is in the "RUN" position.

INSTALLING THE AIRDOG® WIRE HARNESS INDICATOR LIGHT

Amber LED Indicator Light

7-7. 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.

7-8. 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. Remove the nut from the indicator light.

7-9. Install the dash plate and indicator light in the dash. *Note-to adhere plate to dash, you may peel off the paper backing from the backside of the plate to expose adhesive. Reinstall nut and tighten until snug. 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.

7-10. 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 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.

7-11. Route the red & green power leads to the alternator. Connect the green (-) ground lead to the alternator ***Ground*** connection.

7-12. 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.

SECTION 8: 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".

❒ 8-1. Rub CLEAN diesel fuel or oil on filter seals before installing to ensure a proper seal.

❒ 8-2. Pre-fill the water separator/pre-filter with diesel fuel up to the bottom of the nut plate.

❒ 8-3. Turn the starter key to the on/run position.

❒ 8-4. 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.

❒ 8-5. 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

The AirDog® low pressure sensor monitors the fuel filter and water separator.

FUEL FILTER: When the fuel filter becomes plugged, the AirDog® Indicator Light will illuminate, indicating it is time for a fuel filter replacement. The AirDog® fuel filters have a typical lifespan of 25,000+ miles, and up to 40,000 miles, as they are made with a high-quality and high-capacity Micro-glass media, as opposed to a paper element, and filter life is affected by many variables. In any case, we do not recommend exceeding 40,000 miles of service with a fuel filter. It is recommended that you keep a replacement AirDog® fuel filter on-hand, ready for replacement when the AirDog® Indicator Light illuminates. When replacing the fuel filter, be sure to clean the under side of the AirDog® 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® will fill the filter and prime the system automatically. Follow the instructions on the filter for proper tightening procedures.

The Water Separator/Pre-Filter

WATER SEPARATOR: Should the water separator/pre-filter or the wire screen in the nipple become plugged, preventing sufficient operating pressure flow to the engine, the Indicator Light will immediately illuminate.

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.

Replace the water separator if it becomes damaged or permanently plugged. 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. Before re-installing the water separator after cleaning, be sure to clean the under side of the AirDog® base. Rub clean diesel fuel or oil on filter seals before installing to ensure a proper seal. 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 filter.

Caution: Be careful to prevent any contaminants from entering the water separator when removing for cleaning or replacement. Although the water separator pre-filter nipple has a protective wire screen, any debris passing through the system could cause the gerotor to lock up, which can then 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.

NOTES

World Headquarters

AirDog

FUEL PREPORATOR

www.airdogdiesel.com

1-877-463-4373 or

1-573-635-0555

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