



INDUSTRIAL Fuel Air Separation System

INSTALLATION MANUAL For Trucks Equipped with CATERPILLAR® Model 3406E, C10, C11, C12, C13, C15, C16 & C18 Engines



**PLEASE READ
THESE INSTRUCTIONS
THOROUGHLY
BEFORE BEGINNING
INSTALLATION**



Part No. A3SPBT451

NOW WITH DEMAND FLOW



Proudly Made in the USA

Revised 5/03/2024

**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



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

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!



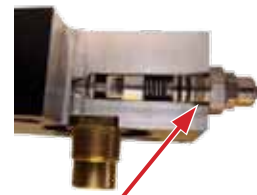
Positive Air Separation
with primary air discharge port.



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



Dual Port Pump
Balances the gerotor for quiet operation and higher flows.



Adjustable Regulator
For just the right fuel pressure.



Protective Wire Screen
In water separator nipple.

6 Micron Particulate Filters
Long-Lasting Micro-Glass Media

Water Separator/Pre-Filter
With a High-Quality and High-Absorbency Hydrosorb 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

The AirDog® with advanced fuel air separation, demand flow, adjustable regulator, low pressure sensor with LED indicator, and the new 4G-HD fuel pump, is a premium fuel filtration and delivery system for the 3406E, C10, C11, C12, C13, C15, C16 & C18 model Caterpillar® engine.

Caterpillar® Secondary Fuel System Upgrade

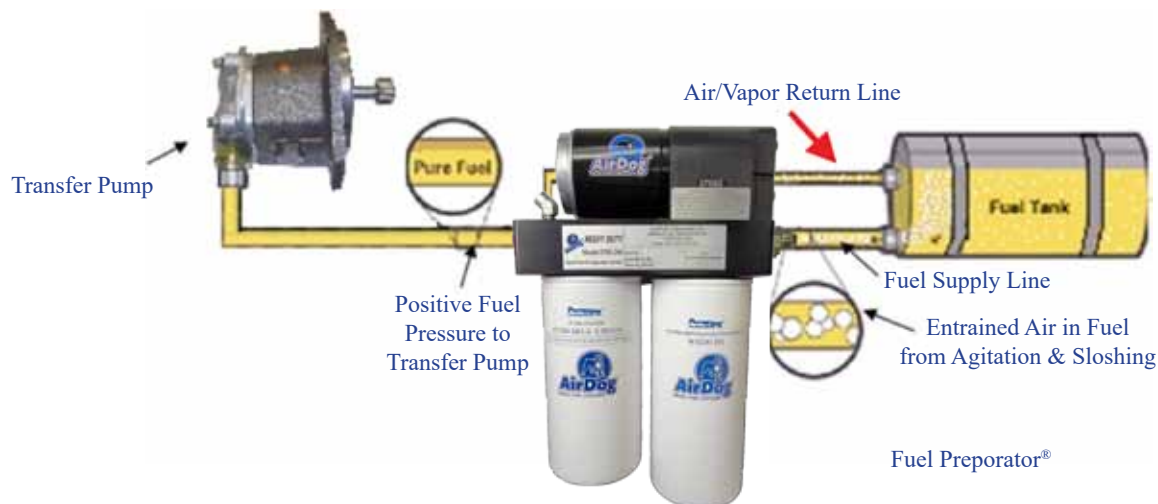
PureFlow® Technologies, Inc. addresses diesel engine efficiency and peak performance on the fuel side from the fuel tank to the tip of the injector. Removing entrained air and fuel vapor from the fuel flow to the engine is not enough if the internal conditions of the fuel system components are such to allow vapor to form in the injector itself.

Specifically, if the fuel pressure/flow to the injector, even with entrained air and vapor removed, can be insufficient to totally fill the injector barrel on the upstroke of the plunger, due to low pressure from restrictive fittings and small fuel lines. The low pressure allows a void to form that allows vapor to re-form within the injector. The result of the vapor is “injector lag”, which is just another name for “delayed injection timing”, causing increased fuel consumption, lost power, and increased exhaust emissions.

To overcome these concerns, PureFlow® Technologies has a fuel line “Upgrade Kit” available for the Caterpillar® 3406E, C10, C11, C12, C13, C15, C16 & C18 engines. The **upgrade kit is NOT included** with the AirDog® installation kit. **Contact PureFlow® Technologies at 573-635-0555 for additional information and ordering.** We have, however, included the complete and detailed instructions for the upgrade kit installation in Section 7, for your convenience and information.

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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CAT Secondary Fuel System Upgrade

*Optional Kit available from PureFlow Technologies, Inc. - this kit is **NOT included** but recommended for optimal fuel system performance.*

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INSTALLATION 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, contact
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-200

CAT® 3406E, C10, C11, C12, C13, C15, C16 & C18



Section 3

Installation Parts List



Parts List

QTY	Description	Part Number	Image
1	Installation Manual	206-1-0451	
1	AirDog® with Serial Number Plate Fuel Filter FF200-MG-6 Water Separator WS200-HS	FPII-200	
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-45 I Installation Kit

1	Fuel Pressure Sensor	908-5C-9-007-SC-06 <i>or</i> 908-5C-9-0010	
15	12" Zip Tie	5H-2-1-12	











908-00-0304 Frame Mount Bracket Kit

1	Left Mounting Bracket	002-3C-0003	
1	Right Mounting Bracket	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 <i>IS-1-CSZ & IS-1-AC</i> <i>IR-6-CSZ & IR-6-AC</i>	



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 90° 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	

908-01-0451 I-RLFK Return Line Fitting Kit

1	#8M JIC x 3/8 M ORB Straight Connector - Modified	4A-1-01-08-06-S-.16M	
1	#8M JIC x #8F JICX x 1/4 NPTF Port GagePort	4A-1-11-08-08-4P	
1	#6M JIC x #8F JICX x #6M JIC Tee (Air/Vapor Return)	4A-4-04-06-08-06-4-S	
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 90° Street Elbow	4A-2-04-06-06-S	
1	#10M JIC x 1/2 M ORB Straight Connector - Modified	4A-1-02-10-08-S-.5M	
1	#10M JIC x #10F JICX 90° Swivel Nut Elbow	4A-2-04-10-10-S	
1	CAT Hand Primer Pump Replacement Kit Includes: 1 Cap 002-4G-0006 & 1 Gasket 002-4G-0007	908-002-4G-0006/7	
1	CAT Fuel Pressure Shim Kit	SHK-CAFP	

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®

When possible, mount the AirDog® in the same location of the original fuel filter.

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 figures 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.



AirDog® mounted on the frame under the steering column to the rear of the shock absorber.



AirDog® mounted under the steering column ahead of the shock absorber.

NOTE: When mounting the AirDog® at this location, check for clearance with the tire turned both toward and away from the frame.



This installation on a short nose "Day Cab" is on the driver's side, behind the battery box.

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.

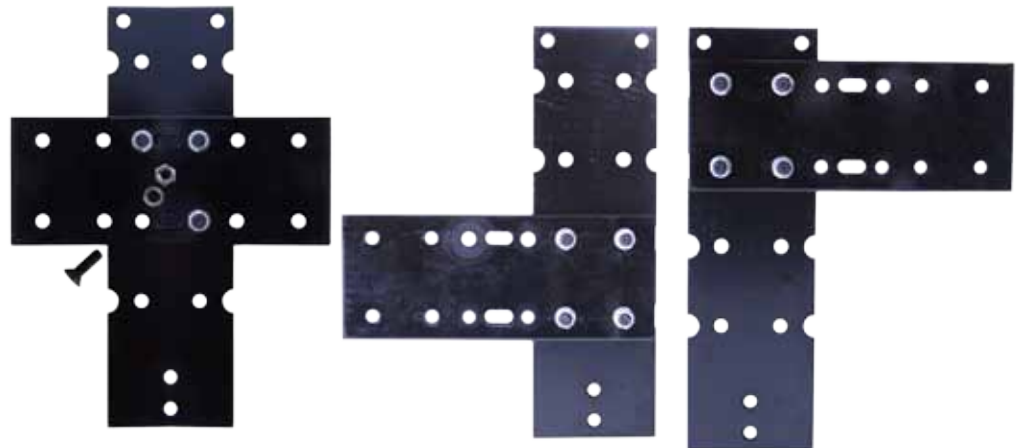
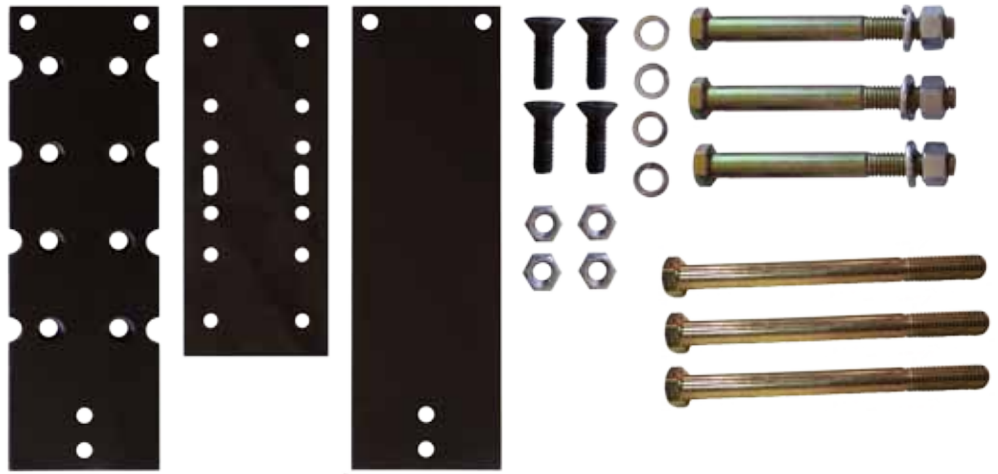
Use mounting hardware to mount bracket 1 to bracket 2. The position of bracket 2 can be adjusted vertically and horizontally to suit your particular needs.

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.

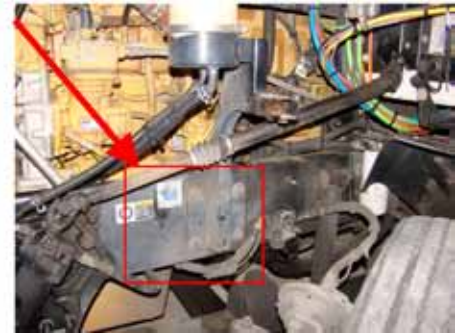
Note: 3.5" and 4.5" bolts are included. Use the length best suited to your vehicle's frame width.

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



Section 5: Mounting the AirDog® on the Truck's Frame (Drilling Method)

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



5-2. Mount the AirDog® as close to the original location of the primary fuel filter as possible. This will allow you, in most cases, to use the original fuel supply line from the fuel tank and also the fuel line to the engine.

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

5-3. Loosely assemble the mounting brackets and filters to the AirDog®.



5-4. 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.

Mounting the AirDog® on the Frame, cont'd

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



5-6. Drill a 3/8" hole at each of the 4 previously marked locations.

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

5-7. Loosely assemble the mounting brackets to the frame.



5-8. Loosely assemble the AirDog® on the brackets.

5-9. After mounting the AirDog® on the brackets, snug the fasteners to achieve a good relaxed fit.

5-10. 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 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 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.

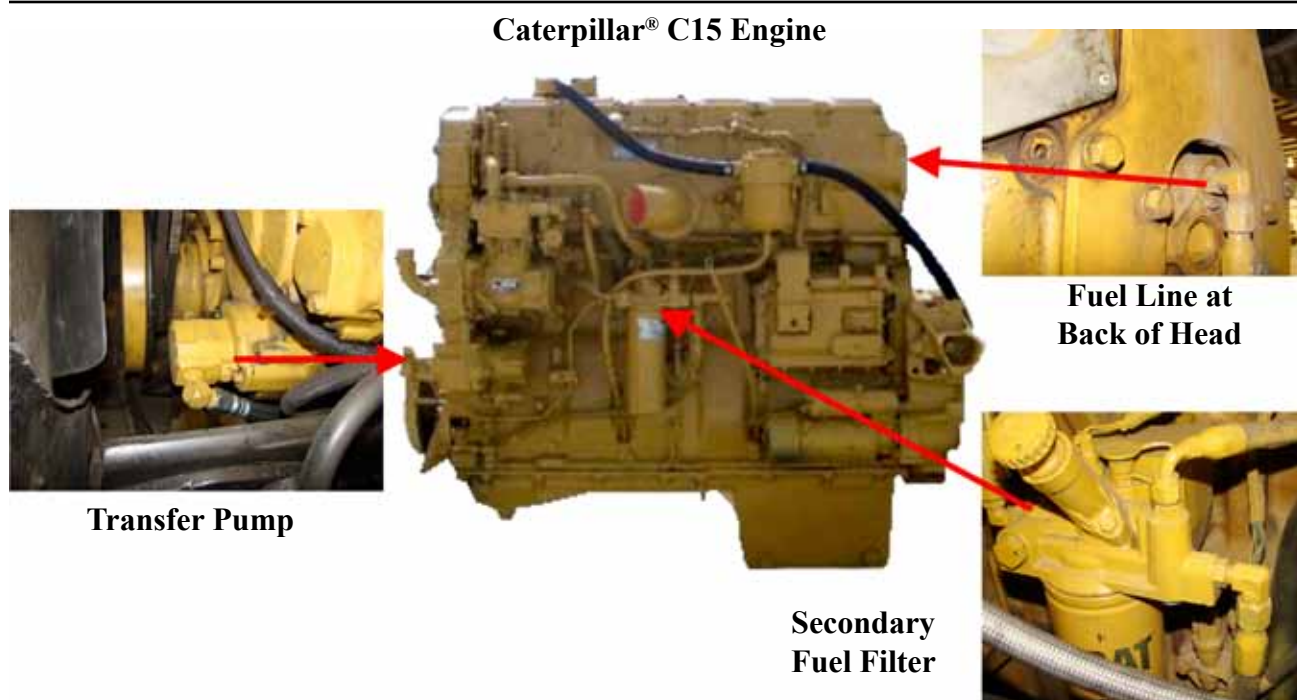
Inspect the original fuel lines for size, length, and condition. If the fuel lines are in good condition and the correct size and length to adequately reach the AirDog®, you may want to go ahead and use them. If any of the fuel lines need to be replaced, it is recommended that the fuel lines selected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



Section 6A: Installing the Fuel Fittings and Low Fuel Pressure Sensor

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

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

6A-1. Install a straight #10 M JIC x ½ M NPT fuel fitting in the AirDog® fuel port marked “ENGINE”.



6A-2. Install a straight #10 M JIC x ½” M NPT fuel fitting into the fuel inlet port next to the regulator marked “FUEL IN”.

6A-3. Install the ¼” NPT x #6 M 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.



Assembly Instruction for Hose Barb

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

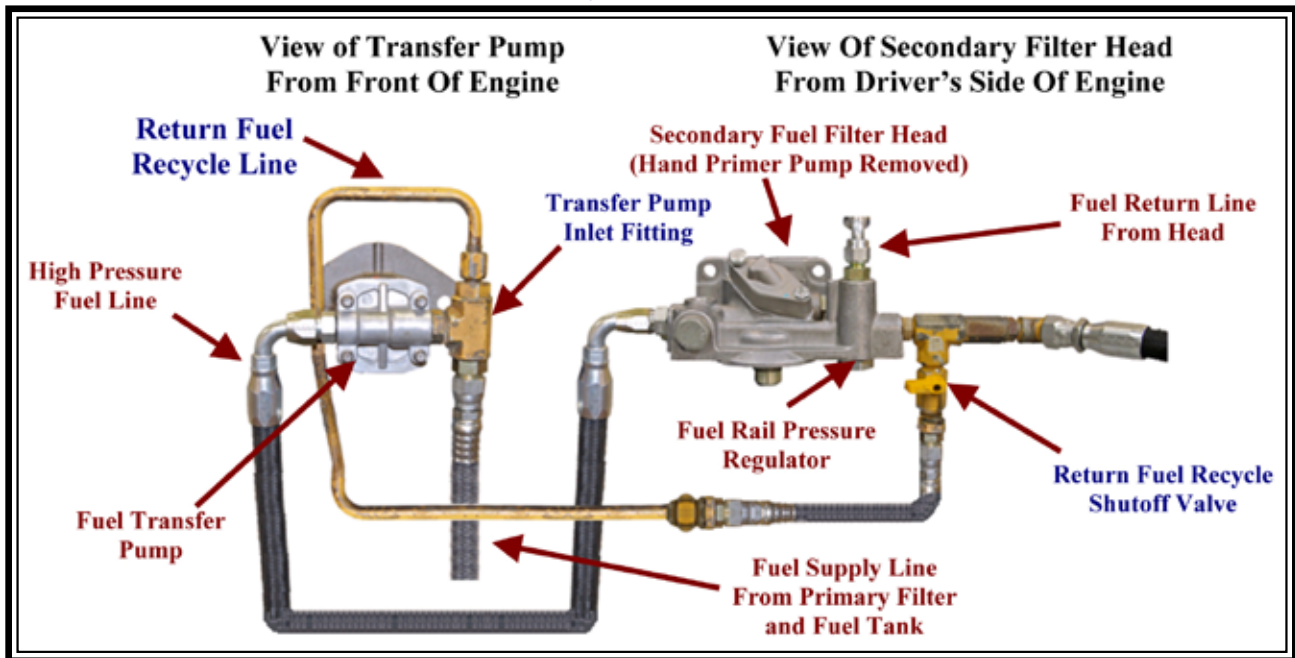


Section 6B: Caterpillar® ACERT Fuel Recycle Line (CAT ACERT Engines)

For Non ACERT engines, see Section 6C

Caterpillar® ACERT engines have a **return fuel recycle line**. This fuel line recycles “HOT” fuel, coming directly from the engine head, back to the fuel inlet port of the transfer pump.

For BEST FUEL ECONOMY and MAXIMUM ENGINE EFFICIENCY, the return fuel recycle line must be removed.



6B-1. Disconnect the return fuel recycle line from the top of the inlet fitting at the transfer pump.

6B-2. Disconnect the return fuel recycle line from the bottom of the return line shutoff valve.

6B-3. There is a bracket on the return fuel recycle line that secures the line to the block. Remove the bolt holding the bracket. Remove the return fuel recycle line from the engine.

6B-4. Disconnect the fuel supply line from the bottom of the inlet fitting at the transfer pump.

6B-5. Remove the transfer pump inlet fitting.



6B-6. Install the #10 M JIC x 1/2" M ORB fitting in the transfer pump inlet port.



6B-7. Reconnect and tighten the fuel supply line removed earlier.

Note: Use the #10 F JIC swivel x #10 M JIC 90° elbow, as needed.



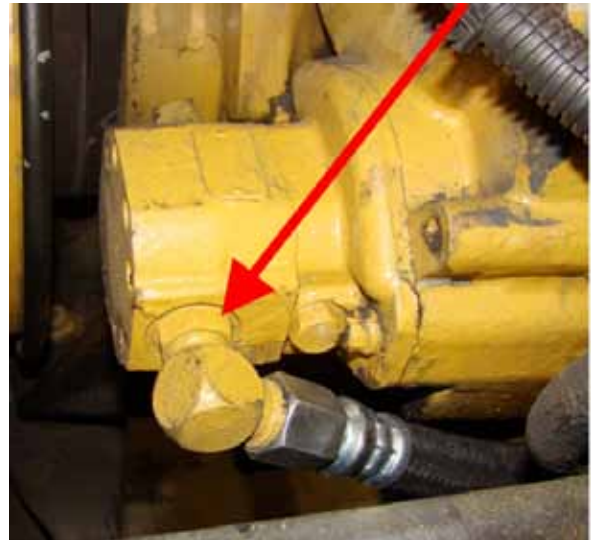
Section 6C: Replacing the Transfer Pump Fuel Inlet Fitting (Non ACERT Engines)
(For ACERT engines, see Section 6B)

NOTE: The small hole in the ORB side of the fitting, opening into the larger-volume section of the inlet to the transfer pump creates a vacuum, therefore a pressure drop, which can cause vapor to form. The remedy for this is porting the fuel inlet fitting.



6C-1. Disconnect the fuel line from the fitting and remove the fuel fitting from the transfer pump.

6C-2. Replace the fuel inlet fitting with the #10 M JIC x 1/2" M ORB modified fitting. If needed, attach the 90° #10 F JIC swivel x #10 M JIC fitting.



6C-3. Connect the fuel line originally connecting the primary fuel filter to the transfer pump to the AirDog® "Out to Engine" port. If the fuel line is in poor condition or too short to make the connection, replace it with a new fuel line.



6C-4. Reconnect the fuel line to the transfer pump.

Section 6D: Installing the AirDog® Air/Vapor Return Line

Early Model 3406E CAT Secondary Fuel Filter Head

The early model CAT 3406E engines have a fuel distribution casting mounted on the driver's side, upper front of the engine. (Figure 1)

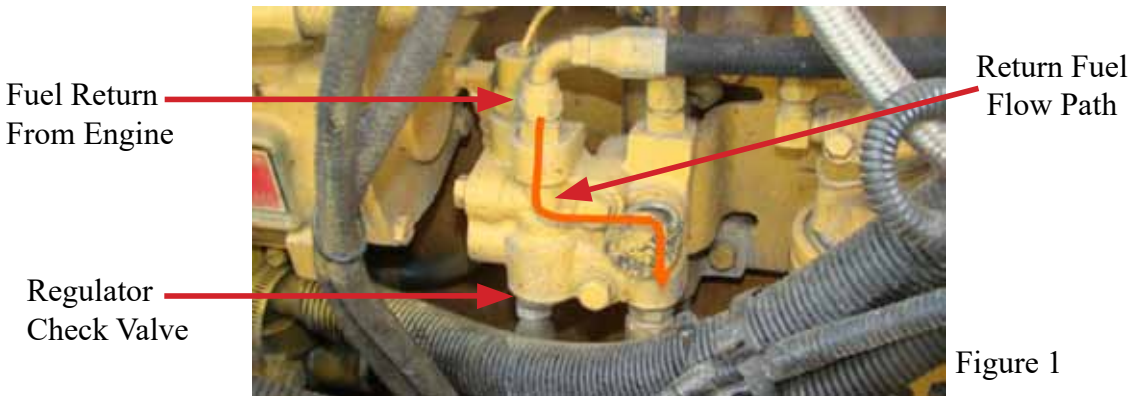


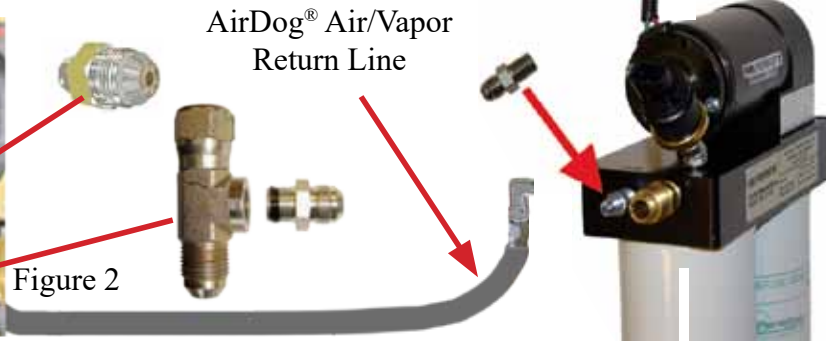
Figure 1

6D-1. Remove the original fuel return line and fitting and install the restrictor fitting into the fuel return port. (Figure 2)



Figure 2

Figure 3



6D-2. Assemble and install the AirDog® return tee. Reconnect the original fuel return line. (Figure 2)

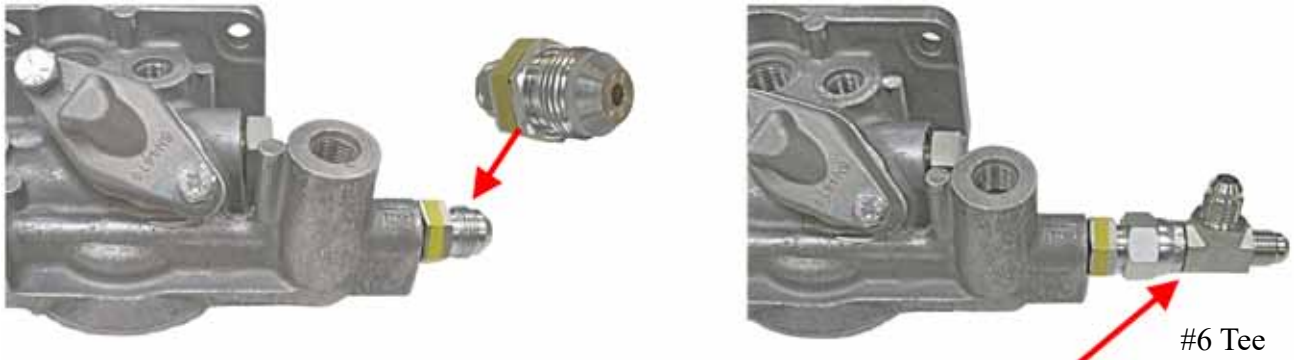
6D-3. Install the AirDog® air/vapor return line to connect to the engine fuel return line. (Figure 3)

Section 6E: Installing the AirDog® Air/Vapor Return Line *Later Model 3406E CAT Secondary Fuel Filter Head*

The AirDog® returns entrained air & vapor to the fuel tank. The AirDog® air/vapor return line may be connected directly to the engine fuel return line “Low Pressure” side after the regulator.

Connecting the AirDog® Air/Vapor Return to the Engine Fuel Return Line

6E-1. Disconnect the fuel return line connected to the fuel return fitting on the secondary filter and remove the #6 fitting. Install the special AirDog® 9/16-18 ORB x #8 restrictor fitting in the “return to tank” port in the secondary filter head.



6E-2. Assemble the correct AirDog® return tee to the restrictor fitting. Install the #8 swivel x #6 x #6 tee if you have a #6 engine return line. Install the #8 tee and #6 M JIC x 1/4” M NPT fitting if you have a #8 engine return line.



6E-3. Measure and cut the length of fuel line required, when properly routed, to connect the AirDog® air/vapor return port to the new return tee installed on the secondary fuel filter head. Assemble the fuel line per standard procedures.

6E-4. Connect the new return line to the AirDog® air/vapor return port.

6E-5. Route and connect the other end of the air/vapor return line to the newly installed return tee.



Important: Properly tighten the fittings. Secure the fuel line with zip ties as necessary to prevent abrasion and chafing.

Section 6

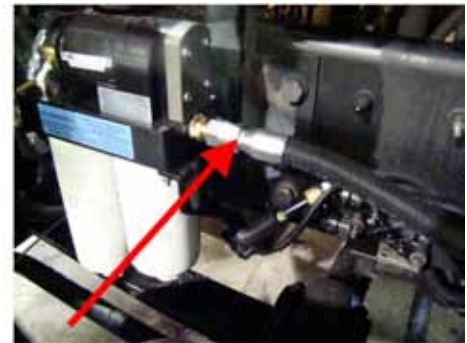
Fuel Lines

Section 6F: Connecting the AirDog® Fuel Supply Line to the Fuel Tank

6F-1. Inspect the fuel supply lines that connect the fuel tank(s) to the primary fuel filter for size, length, and condition. If a fuel line has deteriorated or if it is too short to connect to the AirDog®, replace it or make an extension as necessary.

6F-2. If it is necessary to replace the fuel line, measure and cut the length of fuel line required when properly routed and secured to make the connection from the fuel tank to the AirDog®. Assemble the fuel line per standard procedures.

6F-3. Route the fuel supply line from the fuel tank to the fitting on the AirDog® fuel inlet port marked “FUEL IN”.



6F-4. Connect the fuel supply line from the fuel tank to the fitting. Secure the line with zip ties to prevent chafing and abrasion.

Section 7: Caterpillar® Secondary Fuel System Upgrade

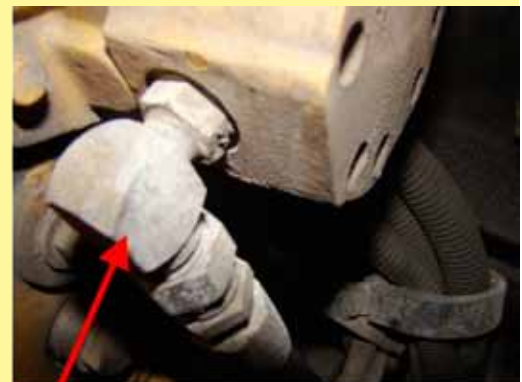
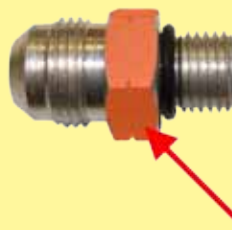
Optional Kit available from PureFlow Technologies, Inc. - this kit is NOT included but recommended for optimal fuel system performance.

Section 7A: Upgrading the Fuel Line from the Transfer Pump to the Secondary Fuel Filter

NOTE: The passageways in the original 9/16-18 x #6 fuel fittings and #6 lines are small and restrictive to the fuel flow and performance. Upgrading the system with ported #8 fittings and installing #8 fuel lines increases fuel flow and performance.



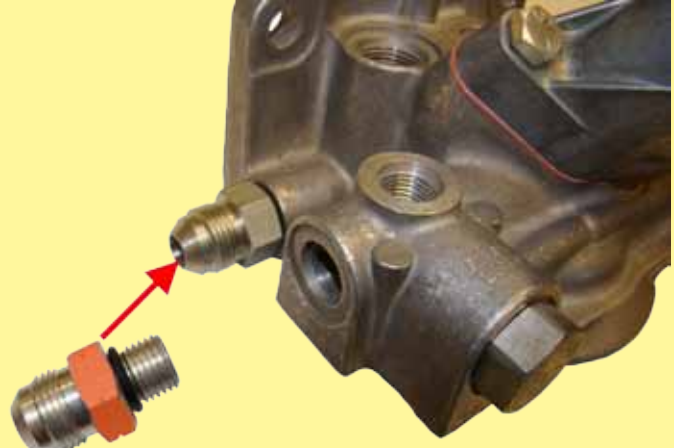
7A-1. Disconnect the fuel line from the discharge side (high pressure side) of the transfer pump.



7A-2. Remove the #6 fuel fitting in the transfer pump and install the #8 M JIC x 9/16-18 ported fitting.

Section 7A: Upgrading the Fuel Line from the Transfer Pump to the Secondary Fuel Filter, cont'd

7A-3. Remove the other end of the fuel line from the inlet fitting on the secondary fuel filter.



7A-4. Remove the #6 fuel fitting in the secondary filter head and install the 9/16-18 ORB x #8 ported fitting.

7A-5. Measure and cut the length of fuel line required, when properly routed, to connect the new #8 ported fitting in the transfer pump to the new fitting installed in the secondary fuel filter head inlet fitting. Attach the proper ends. Assemble the fuel line per standard procedures.



7A-6. Connect the end with the 90° fitting to the transfer pump. Be careful to position the fuel line with proper clearance.



NOTE: Do NOT position the fitting and fuel line too close to the harmonic balancer. Be sure to have adequate clearance.

Section 7A: Secondary Fuel Lines, cont'd

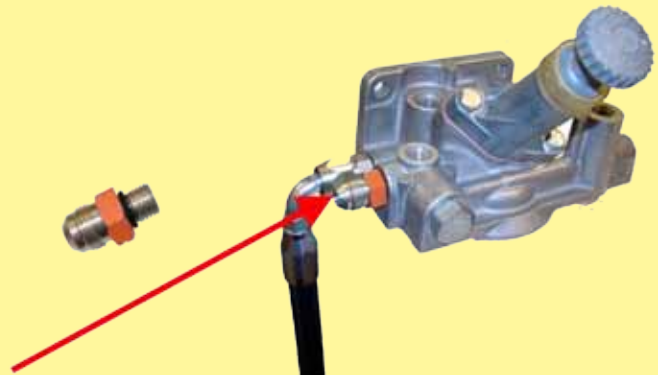
Replacing the Fuel Line from the Transfer Pump to the Secondary Fuel Filter

7A-7. Route the fuel line to the secondary fuel filter and connect the other end to the newly installed #8 fitting. Use the 90° fitting as necessary. Properly tighten the fuel lines to the fittings.



Section 7B: Replacing the Fuel Line from the Secondary Fuel Filter to the Engine Head

7B-1. Disconnect the fuel line fitting from the secondary fuel filter head “To Head” port and remove the #6 fitting. Install a new #8 M JIC x 9/16-18 Ported fitting in the filter head in place of the fitting just removed.



7B-2. Disconnect the other end of the fuel line to the engine and remove the line completely.

7B-3. Follow the #6 engine fuel return line from the secondary filter head to the back of the engine head. Disconnect the fuel line from the fitting in the back of the head and remove the #6 fitting.



7B-4. Replace the original #6 fitting with a #8 M JIC x 9/16-18 ported fitting.

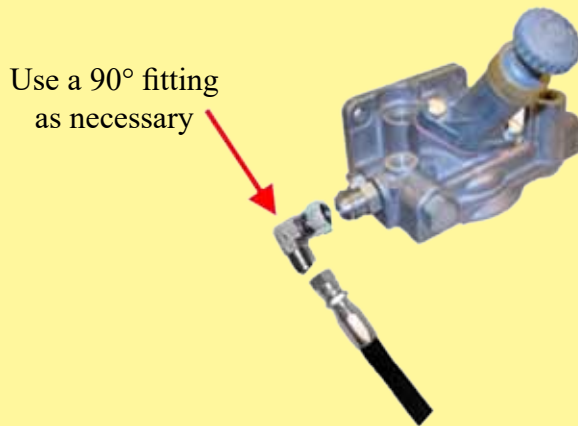
NOTE: The return line just disconnected will be reconnected at a different location.

Section 7B: Replacing the Fuel Line from the Secondary Fuel Filter to the Engine Head, cont'd

7B-5. Measure and cut the length of #8 fuel line required, when properly routed, to connect the new #8 Ported ORB fitting in the secondary fuel filter head to the new #8 fitting installed in the back of the engine head. Attach the proper ends and assemble per standard procedures.



7B-6. Connect the 90° end of the new #8 fuel line to the fitting in the “TO HEAD” port in the secondary fuel filter head.



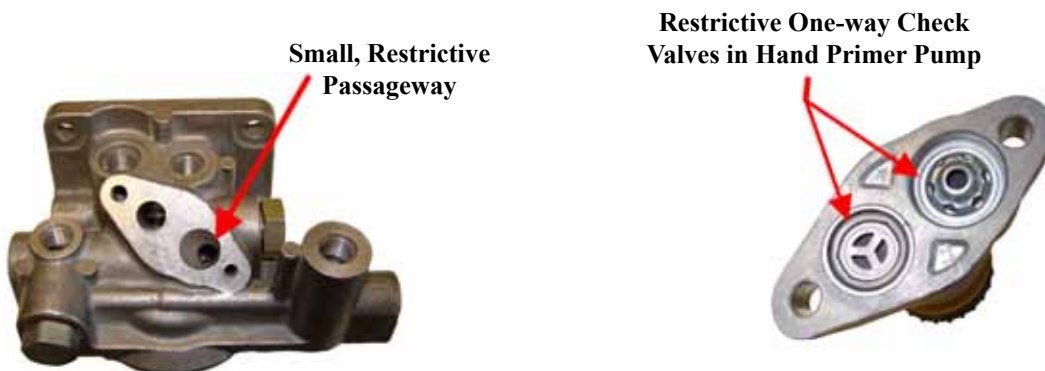
7B-7. Connect the other end of the new #8 fuel line to the ported #8 fitting in the back of the head. Properly tighten all fuel line connections.

7B-8. To reconnect the #6 fuel return line that was disconnected from the back of the engine head, re-route it to the original fuel inlet block and connect the fuel return line to the fitting.



Section 8: Porting the Secondary Fuel Filter Head

All Caterpillar® diesel engines are equipped with a secondary fuel filter mounted on the engine. The filter head usually includes an attached hand primer pump, to make it easier to prime and start the engine after filter changes. However, the fuel passages in the filter head, and the valves in the hand primer pump, are restrictive to the flow of fuel through the system, and the restriction negatively affects engine performance. The passages should be enlarged to improve fuel flow through the filter head (see below).



NOTE: Perform the following steps to improve fuel flow and engine performance. In most cases, the filter head can be drilled out without removing it from the engine.

8-1. Remove the hand primer



pump and



fuel filter from the filter head.

8-2. Using a 3/8" bit, carefully drill out the passageway that carries the fuel from the primer pump into the fuel filter.



Note: Remove the primer pump bypass valve before porting this passageway.



NOTE: Be careful not to drill into the fuel filter gasket seat in the underside of the filter head.

Section 8: Porting the Secondary Fuel Filter Head

8-3. Remove all burrs and shavings from the filter head.

8-4. Install the hand primer pump ported replacement cap and gasket on the filter head in place of the hand primer pump. Re-install the fuel filter.

NOTE: The primer pump replacement cap (included in the kit) cross passage has been ported to 3/8" to increase fuel flow for better engine performance.



IMPORTANT: It is recommended that you keep the hand primer pump on board, in the event it is needed to prime the system.

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



Securing the AirDog® Wire Harness Relay to the Vehicle

9-1. Secure the AirDog® wire harness relay to the vehicle. This picture shows the relay mounted on the firewall.



9-2. 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.



9-3. Connect the AirDog® wire harness fuel pressure sensor lead to the AirDog® unit fuel pressure

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 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:

9-4. 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.



9-5. Route the AirDog® wire harness trigger lead (red wire with no connector/plug) and indicator light lead through the firewall.

By the Steering Column



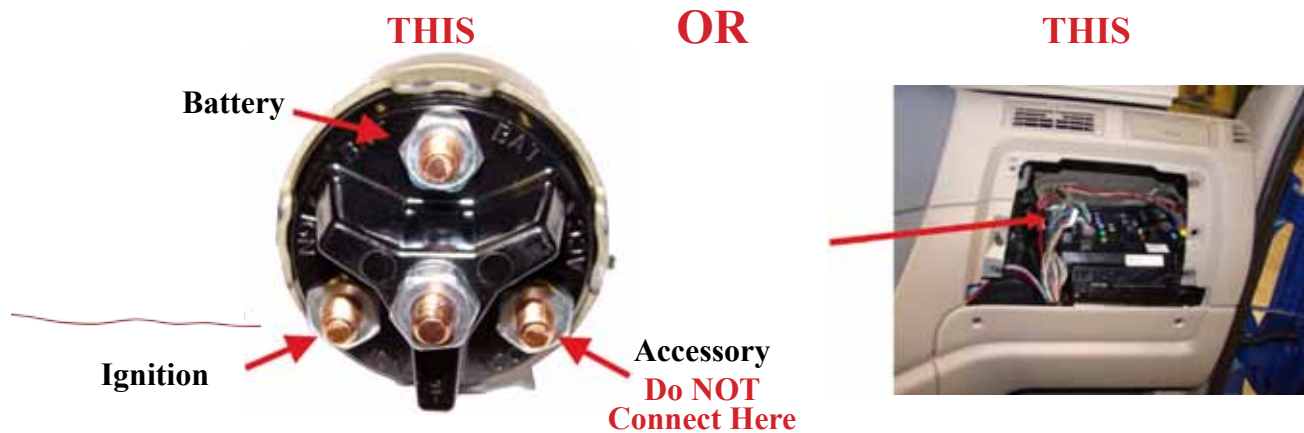
Under the Dash



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

Relay Trigger Lead and Indicator Light Lead, cont'd

9-6. 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.



INSTALLING THE AIRDOG® WIRE HARNESS INDICATOR LIGHT

Amber LED Indicator Light

9-7. 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.



Installing the Indicator Light, cont'd

9-8. 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.



9-9. 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.

9-10. 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.

9-11. Route the red and green power leads to the alternator. Connect the green (-) ground lead to the alternator **Ground** connection.



9-12. 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 10: 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.

Re-check 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.

Re-check all electrical lines, secure as necessary.

Section 11: Adjusting the Fuel Rail Pressure

For the CAT engine to perform at peak efficiency, the fuel rail pressure must be adequate to completely fill the fuel injectors during the upstroke of the plunger. A minimum of 115 PSI to an absolute maximum of no more than 120 PSI at “high idle” is required.

There are three models of the Caterpillar® fuel transfer pump. The early model 1st generation (Figure 1) with a small diameter spring and hex head plug and the 2nd generation (Figure 2) and 3rd generation (Figure 3) with a larger diameter spring and socket head plug.

Temporarily Install a 150 PSI Fuel Pressure Gauge



Connect the Pressure Gauge Here

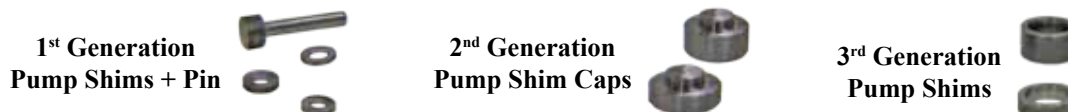
It is important to know the original fuel pressure before you start.

Adjusting the Fuel Rail Pressure, cont'd

NOTE: The first step to resetting the “Fuel Rail Pressure” has already been performed when the AirDog® 9/16-18 ORB x #8 special restrictor return fitting was installed in step 6D-1. If your transfer pump is in good condition and not worn out, with the engine running, the fuel rail pressure should be at approximately 118 PSI at high idle (1,900 to 2,100 RPM). If the fuel rail pressure is still low, follow the steps below.

To adjust the rail pressure after the AirDog® restrictor fitting has been installed (Section 6D), reset the spring tension on the high pressure bypass regulator.

Note: The shim kit includes shims for each of the three generation pumps.



Adjusting the Rail Pressure for the 1st Generation CAT® Fuel Transfer Pump

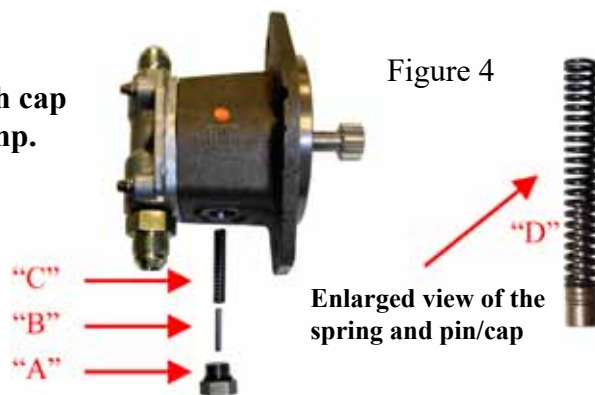
11-1. Remove hex plug “A” on the side of the transfer pump. (Figure 4)

11-2. Take out spring “C” and the stiffener pin “B”.

NOTE: The shim kit includes new stiffener pin with cap and three shims for the 1st generation transfer pump.

11-3. Put the new stiffener pin with cap “D” into the spring and re-install in transfer pump.

11-4. Start the engine. Run the RPM up slowly until high idle is reached. High idle is 1,900 to 2,100 RPM. Read the fuel rail pressure. If the rail pressure does not reach 118 PSI, add a shim and repeat until at least 118 PSI, but not more than 120 PSI, is reached. All three shims may be required to reach 118 PSI.



WARNING: Do NOT exceed 120 PSI fuel rail pressure. High rail pressure (130 PSI and above) will void your factory engine warranty and may cause engine damage.

Adjusting the Fuel Rail Pressure, cont'd

Adjusting Rail Pressure for the 2nd & 3rd Generation CAT® Fuel Transfer Pump

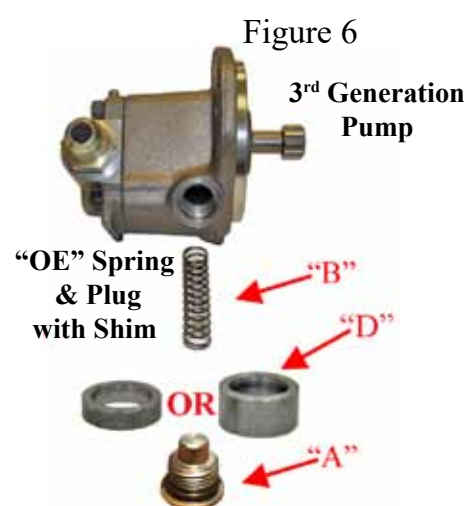
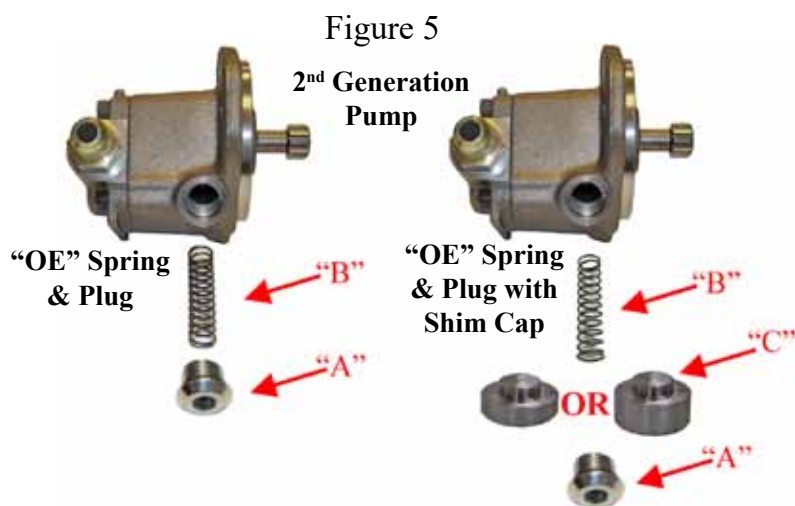
11-5. Remove hex plug “A” on the side of the transfer pump. (Figures 5 & 6)

NOTE: The Shim Kit includes:

- ♦ Two shim caps, one 0.25” thick and one 0.125” thick, for the 2nd generation pump.
- ♦ Two shims, one 0.25” thick and one 0.125” thick, for the 3rd generation pump.



11-6. Hold the 0.125” shim cap “C” (2nd Generation) or 0.125” shim “D” (3rd Generation) on the end of the plug “A” and re-install the spring, shim cap or shim, and plug into the transfer pump.



11-7. Start the engine. Run the RPM up slowly until high idle is reached. High idle is 1,900 to 2,100 RPM. Read the fuel rail pressure. If the rail pressure does not reach 118 PSI, remove the .125 shim and replace with the .250 shim and repeat until at least 118 PSI is achieved, but not more than 120 PSI.

11-8. When you have completed adjusting the fuel rail pressure, remove the pressure gauge from the secondary fuel filter head and replace the plug.

VERY IMPORTANT: After the adjustments have been performed and the rail pressure does not reach 118 PSI \pm 3, it would be wise to have the fuel pump checked for excessive wear. Your fuel pump may be worn out and need replacing.

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, as they are manufactured with a high-quality and high-absorbency Hydrosorb media. 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!

[illegible]



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