



AIRDOG SYSTEM INSTALL: PART ONE

BACKGROUND: New community partner AirDog, is looking to expand into the motorcoach market.

After many discussions about what might be the best way to make an introduction to our community, it was determined that installing a system on a Prevost coach and documenting the experience would be the best course of action and even better, if the coach receiving the install had years of records documenting the fuel consumption in all types of scenarios. After some back and forth, we approached Jon Wehrenberg and asked if he would be willing to volunteer. As a respected member of our community, retired owner and forum contributor extraordinaire, all parties gave the install an enthusiastic thumbs up with the condition that everything will be documented and be completely transparent. Risks are being taken on all sides. Jon is taking time to not only plan for and travel for the install, but also to document his experience over the next several months. AirDog is providing the product and expertise in order to venture into uncharted territory and learn how best to install their system in coaches in addition to their “go to” long-haul truck

market. And Bill and I share risks on both sides by bringing these two parties together.

AIRDOG'S PERSPECTIVE: AirDog Heavy Duty Diesel Fuel Systems are designed to optimize the factory fuel system to operate at peak efficiency. In stock form, most commercial diesel engines utilize an engine-mounted transfer pump to pull fuel from the tank, through a restrictive primary fuel filter or fuel/water separator, through the fuel pump, and then on to the injection system. The factory fuel pump is operating under suction, and will draw entrained air in with fuel, passing that air/vapor on to the injection system, which delays injection timing and robs the engine of achieving optimal efficiency. The AirDog HD Diesel Fuel System features an integrated lift pump, which does the work of pulling fuel from the tank, removing all contaminants, including water, particulates, and entrained air/vapor, and then sends a contaminant-free supply of fuel, under optimal pressure, to the factory fuel pump and injection system. The end result is a restoration of optimal conditions in the fuel system, the benefits of which include quicker starts, smoother and quieter engine idle, improved throttle response and pulling power, improvement in fuel economy, and prolonged lifespan of critical and expensive fuel system components, such as the transfer pump, fuel injectors, and emissions system componentry.

JON'S PERSPECTIVE: AirDog, as a recent partner on Prevost Community, made some very interesting claims about its benefits. It lists the benefits on its home page (<https://airdogdiesel.com>) including improved mileage, smoother idle, extended injector life, and restored horsepower and torque.

AirDog has so much confidence in its product it offered to install the system on a Prevost. Its typical customer base is on commercial large diesel trucks and diesel pickup trucks. Buses like Prevost are not commonly outfitted with the system and AirDog does not have a kit specific to Prevost so a perfect opportunity for both PC and AirDog was to install a system on a Prevost and test its claims while learning what would be involved in an installation.

Ever since I bought my first Prevost conversion, I have recorded miles driven and fuel added. Since generator use consumes fuel and can skew the calculation of miles per gallon, it turns out I also log generator hours and have done detailed calculations of fuel consumed per hour for the generator so an accurate benchmark for comparing fuel efficiency with the AirDog installed compared to my coach without the AirDog is possible.

It will not be the first time I have done long-term testing to determine product claims of improved mileage. The Ugly Fix manufacturer made claims of better mileage when installed by eliminating EGR usage. That product did in fact improve mileage by about 6/10ths of MPG. That amount was about a 10% improvement which is like getting a 10% discount on fuel prices.

The second test was to test claims of a fuel additive that not only claimed it kept fuel free of moisture and algae but also had a 15% improvement in mileage. As it turned out, the claims of preventing moisture and algae were not able to be evaluated because, prior to testing, the fuel in my tank was polished and no algae or moisture was found. The mileage claim was evaluated over about 10,000 miles (almost a year) and it was found there was no improvement in mileage.

THE INSTALL: Now a new test is beginning. The results will be reported over a broad time period and a reasonably large number of miles. This will make sure that during the test period all typical factors that influence mileage will have been experienced, and the results will be compared to a large period of previous performance. The benchmark data will go back to just following the start of operation of the bus with a non-functioning EGR.

Our coaches are affected by a large number of factors such as speed driven, headwinds, tailwinds, hills, whether towing or not, and use of the OTR. My mileage will be the benchmark for evaluating mileage claims because during the test period I anticipate I will encounter all of the fuel efficiency factors experienced during the period used as a benchmark. The bus is driven at 62 MPH which has been a constant for as long as I have driven a coach with a Series 60 Detroit Diesel. As long as I am on an interstate highway or a country road, I drive at 62 MPH (1500 RPM) regardless of the posted speed limit. The only variation will be that previously the toad was an H2 Hummer which weighed 6700 pounds. During the test period the toad will be a Jeep Grand Cherokee at 5000 pounds. This of course should improve mileage but, based on experience, that weight reduction is likely to impact mileage by less than 1/10 MPG.

Claims of improved injector life cannot be evaluated. The injectors on the coach were replaced recently and the length of the test is so short relative to injector life no effort will be made to involve injector life as part of the evaluation. An evaluation of smoother idle and quieter operation of the engine is going to be a seat-of-the-pants effort, and while I hope I can feel an improvement, if I do not, it is because my backside might be too numb to feel an improvement.

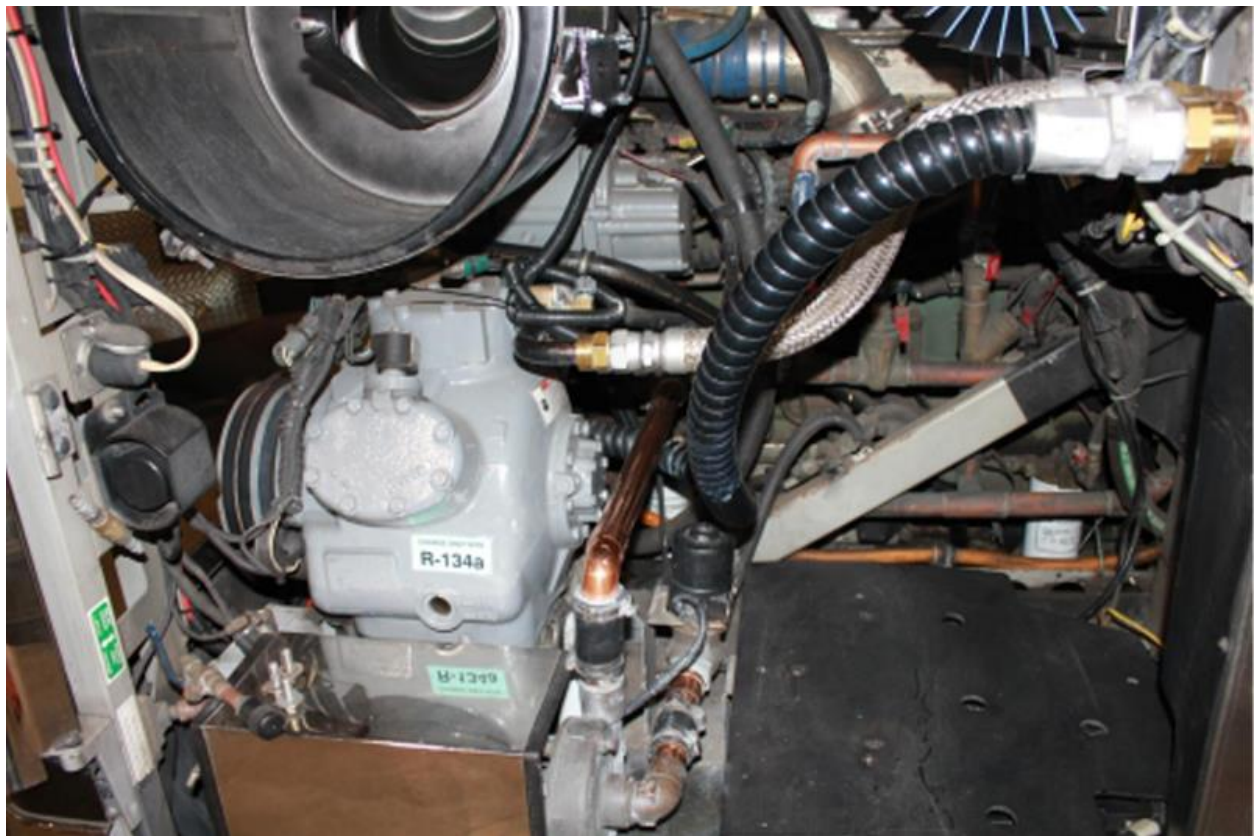
Prior to the start of testing, the system needs to be installed. This installation is not expected to be as easy or as straightforward as it is with a large truck. The first problem is to find areas for the installation. Prevost and the converters have made running changes that impact where the AirDog device can be installed. One option is in the area accessed through the passenger-side engine door. A second position could be in between the engine block and the engine cradle rails where the Detroit fuel filters are currently located. For this installation the AirDog will be mounted on the side of the air filter housing. It is likely to be an acceptable location on most coaches. A mounting in the area of the current spin on filters is not easily workable and for this installation the air filter was determined to be the location

Then where and how to connect fuel lines and a fuel return line had to be determined. Finally, the power source to the device for the pump and the dash warning light had to be selected. For this installation it was determined the power will be from the “key on” posts on the floor of the rear electrical box. Normally the AirDog installation uses a dash mounted warning light to indicate low fuel system pressure. At this time a dash light will not be installed due to the difficulty in running the needed wires as well as potential problems with the cosmetics of adding a light to the dash. As installed the AirDog pump will run with the key on. If there is service work required and the key has to be on, such as to check bus electrical circuits, a fuse was used in the installation that when pulled will stop the AirDog pump. Additionally, a plug was installed at the AirDog pump so that is an alternate source to open the circuit. AirDog is going to have to develop an understanding of the best ways to mount the device, make the connections and develop a kit specific to Prevost coaches. Their device as mentioned will fit in a number of locations and the exact location may just end up being an owner’s preference. In my case I prefer to mount it on the air filter housing just above the chassis batteries on my XLII. Others may prefer having it mounted lower near where the current fuel filters are located. Owners of an H3 may find a more desirable location that works better on an H3. At this point what is known is during the actual installation the ideal location may be different from what we now think to be the best options.



At the start of the installation the air filter was removed to allow access to the mount and mounting bolts for the AirDog. Additionally, the Liberty installed

cabinet that houses the hoses and spare parts was removed to access the two fuel line connections at the fuel pump and the current filter housings.



To the right of the OTR compressor is the open area that allows access to the fittings. One of the existing filters (white) is seen low and to the right.

Not visible is the return fuel line, into which the entrained air will be pumped. That line was accessed on the opposite side of the engine in the area of the fuel cooler.

Notice on the RH side of the air filter housing the base plate and mounting nuts and bolts for the AirDog. On my coach that location not only has the needed space to service the AirDog and change filters but also offers a significant improvement in the effort required to access and change fuel filters.

As can be seen in the photo below, Lance Hees the AirDog technical guru, slid into the open area above the batteries and was connecting two of the needed fuel hoses that were going to be connected to the AirDog. Lance is highly

skilled and very knowledgeable about fuel systems so no effort was wasted in hooking up the fuel lines to the coach.



In the photo below Lance is about to install the return fuel line and the tee into the existing return fuel line. On my EGR-equipped coach there is a panel behind the driver's side tag wheel and he is using that for access to the return fuel line.

Not all coaches are likely to have that removable panel but it is probable all coaches are going to have the fuel cooler so finding a spot to tee into the return fuel line between where it comes out of the engine head to the cooler should be no issue.

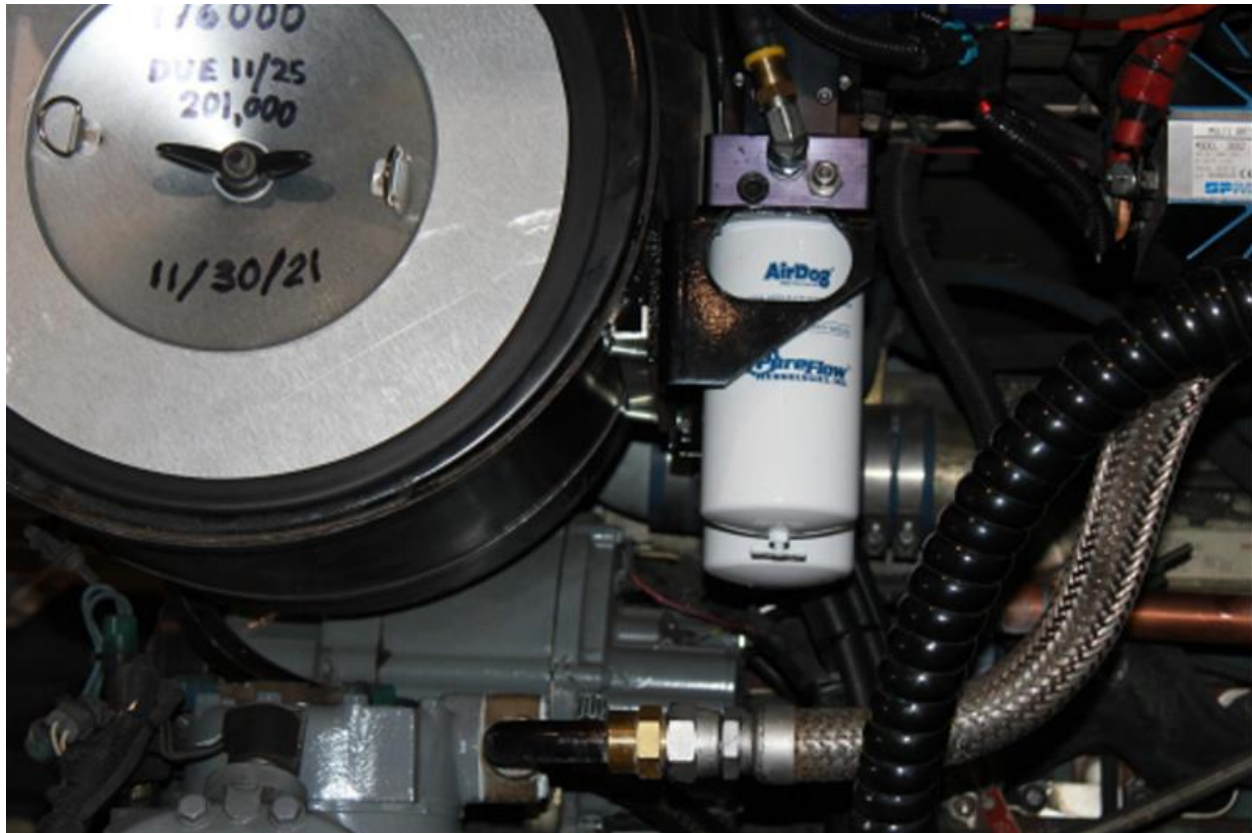




In the photo above you can see the tee inserted in the return fuel line. A new hose leading back to the AirDog will be installed and secured as necessary.



The AirDog prior to mounting. It is not a very large unit as you can judge from the hands holding it. The photo below shows the completed assembly mounted on the side of the air filter housing.



THE STATS: To help understand any data reported after the installation of the AirDog the following benchmarks are used for comparison purposes. The benchmark MPG is going to be based on fuel added from 141,098 to 176,523 and the total number of gallons added, minus 158.4 gallons of generator gallons consumed based on a 396-hour period of generator run time during the accumulated miles. The average MPG is determined to be 6.4.

The same method will be used to determine if the use of AirDog does in fact improve MPG.

Unlike trucks, installing an AirDog device and associated fuel and power connections on a Prevost coach may require a great deal of flexibility. Not all coaches will accept a standard location. Not all fuel line connections, especially the return fuel line, will be the same. For this location, based solely on a Liberty conversion of an XLII, access to the fuel return line was made via the engine

access panel behind the tag axle. It may be accessed from different locations on different model coaches such as an H3, XL or X3.

The testing has begun. Meaningful updates will be provided as miles are accumulated and fuel is added.

Jon W. Wehrenberg

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