

Air Dryer Maintenance is Imperative To Keep Your RV Running Smoothly

Ok, so its time to change the air dryer on your RV chassis. There are a couple of things you should keep in mind, first what is an air dryer, and second is what does it do?

The air dryer is designed to collect and remove air system contaminants in solid, liquid, and vapor form before they enter the brake system.

The air dryer consists of a replaceable desiccant cartridge, coalescent filter, purge valve, check valve, and Turbo-Saver Valve. The desiccant cartridge, coalescent filter, and purge valve housing assembly, which includes the heater and thermostat assembly, can be serviced without removing the air dryer from the vehicle. You should only need 3 - 4 inches of clearance.

The air dryer works like this: contaminated, wet compressed air at up to 160°F (71°C) coming from the air compressor enters the air dryer through the inlet port. The Turbo-Saver Valve, in the closed position, then forces the compressed air through the coalescent filter, where water droplets and contaminants are removed from the air stream. The compressed air then moves through the desiccant cartridge bed and the remaining moisture is removed. Some of the clean, dry compressed air is diverted to the purge area to dry the desiccant bed. The balance flows through the outlet port into the vehicle air system.

When the reservoir reaches the governor cutout pressure, air pressure from the governor unloading port enters the air dryer. This signal from the governor causes the Turbo-Saver Valve to shift, close and block the inlet, while simultaneously causing the purge valve to open. The sudden opening of the purge valve permits the pressurized air in the coalescent filter sump to flush moisture and contaminants from the housing.

Decompressing rapidly, opening of the purge valve also back flushes the desiccant bed and coalescent filter. Air trapped in the purged reservoir is metered through the purge orifice and allowed to slowly pass over the desiccant bed at a pressure slightly higher than atmospheric. The relatively small volume of air can easily absorb the water previously absorbed by the desiccant bed during the drying cycle. The moist air is then expelled through the purge valve.

Now that you know what an air dryer is and what an air dryer does you also need to know that the filters inside have to be serviced.

Freightliner Custom Chassis uses TWO types of air dryer's on its Rear Engine Diesel Chassis.

The first design that was used is called the Midland Pure Air Plus this Air Dryer was used on chassis built prior to 11/28/03 and has to be serviced every 18 months.

The second design used by Freightliner Custom Chassis is called a PURest Air Dryer by Haldex, this air dryer was put on Chassis built on or after 11/28/03 and has a scheduled change interval of 36 months. Below are images of both air dryer designs on our chassis to help you determine which product you have on your RV.

Now how do I know what I have?? Below are both designs of air dryers.

A. The Midland Pure Air Plus

The air dryer is equipped with a spin-on desiccant cartridge that is scheduled to be changed every **18 months**.

Inside this is a coalescing filter that should be changed every **18 months**.



B. The PURest Air Dryer by Haldex

This air dryer's cover is held down by 4 bolts and has a multi-treatment cartridge inside it and has a 36 month change interval.



The Locations I am going to give you should cover the majority of the Freightliner Chassis. The dryer is located either on the right hand frame rail (behind the rear axle) or on the left hand side outside the frame rail (behind the rear axle) or between the frame rails on the left (behind the rear axle) on later models.

OK now quit laughing; if you look under the coach behind the rear axle you will find the air dryer in one of those locations.

Freightliner chassis are equipped, ***as standard equipment***, with a heated automatic moisture ejector on the wet tank. This eliminates the need to climb under the coach to drain air and water from the tanks daily. You still must pull all three drain lanyards for 10 to 15 seconds every **6 months** to drain moisture if any from the tanks. A fine mist is normal due to condensation. If a large amount of moisture is present it should be completely drained and the air dryer serviced. Moisture in the braking system can cause brake system failure and is not covered by the manufacturers' warranty.

Now before you change any filters think about this:

1. Where do you operate your chassis, where does it live when stored.
2. Do I live in a High Humidity climate?

If you live in a High Humidity environment then you may have to change you filter more often then the manufacturer recommends do to high moisture content.

Lets proceed slowly from here because you can get hurt if you do not follow certain procedures.

(WARNING)

- **PARK THE RV ON A LEVEL SURFACE AND CHOCK THE TIRES AND STOP THE ENGINE.**
- **THE AIR TANKS NEED TO BE BLED OF ALL PRESSURE ANY TIME YOU WORK ON THE AIR SYSTEM, PULL ALL 3 LANYARDS TILL NO AIR IS HEARD HISSING FROM THE AIR TANKS MUST HAVE 0 PSI.**
- **NEVER USE THE HYDRUALIC LEVELING JACKS ON THE MOTORHOME TO SUPPORT OR GIVE YOU HEIGHT TO GET UNDER THE MOTORHOME. USE APPROVED JACK STANDS OR RAMPS TO GIVE YOU CLEARANCE TO WORK UNDER THE MOTORHOME. SERIOUS INJURY OR DEATH MAY OCCUR.**
- **ALWAYS WEAR SAFETY GLASSES.**
- **USE CORRECT TOOLS.**

Safety Precautions:

When working on or around air brake systems and components, observe the following precautions.

1. **Chock the tires and stop the engine before working under a vehicle. Depleting air system pressure may cause the vehicle to roll. Keep hands away from brake chamber push rods and slack adjusters, which may apply as air pressure drops.**
2. **Never connect or disconnect a hose or line containing compressed air. It may whip as air escapes. Never remove a component or pipe plug unless you are certain all system pressure has been released.**

3. **Never exceed recommended air pressure, and always wear safety glasses when working with compressed air. Never look into air jets or direct them at anyone.**
4. **Don't disassemble a component until you have read and understood the service procedures. Some components contain powerful springs, and injury can result if not properly disassembled. Use the correct tools, and observe all precautions pertaining to use of those tools.**
5. **Replacement hardware, tubing, hose, fittings, etc. should be the equivalent size, type, length, and strength of the original equipment. Make sure that when replacing tubing or hose, all of the original supports, clamps, or suspending devices are installed or replaced.**
6. **Replace devices with stripped threads or damaged parts. Repairs requiring machining should not be attempted.**

MIDLAND PURE AIR PLUS 18-MONTH FILTER CHANGE

1. Using a strap wrench, loosen the desiccant cartridge at the base of the cartridge. Spin the cartridge off and discard it. Remove the o-ring from threaded neck and remove the coalescent filter and discard them. **(If there isn't enough room to remove the filter see following section.)**
2. Install a new small o-ring on the bottom of the coalescent filter in the O-ring groove. Insert the coalescent filter with the O-ring end going into the air dryer opening first. The "X" section of the coalescent filter will then be facing out. Install the new medium-sized O-ring over the threaded neck of the desiccant cartridge. Screw on the desiccant cartridge until resistance is detected. Then, tighten the cartridge $\frac{1}{4}$ to $\frac{3}{4}$ of a turn.
3. Start the engine, and let the air pressure build to 100 psi. Shut the engine down and check for leaks. Now restart the engine and let the air build to cut out pressure, you will hear the purge valve open and expel a large volume of air and then stop. Turn engine off and recheck for leaks.



USE THIS PROCEDURE IF THERE IS NOT ENOUGH ROOM TO SERVICE THE FILTER ON THE CHASSIS FOR THE MIDLAND PURE AIR PLUS

Removal

1. Park the vehicle on a level surface and chock the tires. Drain the air reservoirs.
2. Remove the air dryer.
 - 2.1 Mark and disconnect the air lines from the air dryer, and note the position of dryer ports relative to the vehicle. You should have a Steel Braided Hose from Engine Air compressor and a 1/4 inch silver air line from the governor and a 5/8 inch black line to the wet tank.
 - 2.2 Unplug the vehicle wiring harness from the heater/thermostat assembly.
 - 2.3 Loosen the mounting strap locknut. (1 and 2)
 - 2.4 Remove the 3/8-inch bolt from the bottom of the dryer. (3 and 4)
 - 2.5 Remove the air dryer from the mounting bracket. (5)

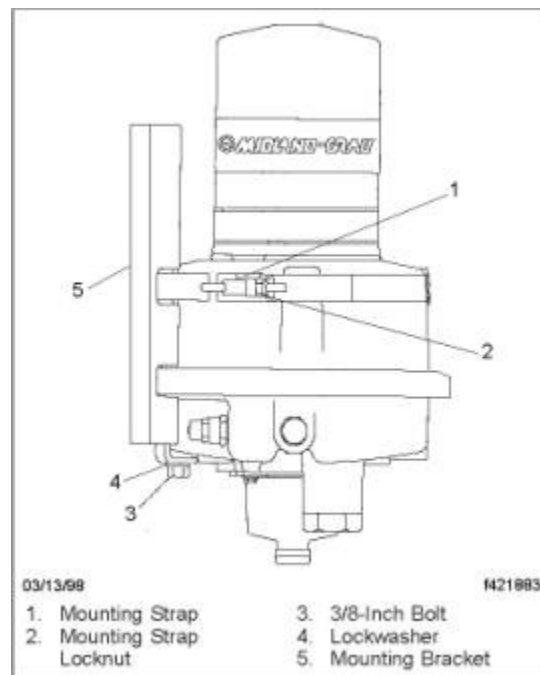


Figure 1

Installation:

1. Position the air dryer through the mounting strap and bracket as noted in "Removal."
2. Insert the 3/8 inch bolt and lock washer into the bottom of the dryer and tighten the bolt **20 to 25 lbf · ft (27 to 34 N·m)**. See Fig. 1 above.
3. Tighten the air dryer mounting strap locknut **50 lbf · in (565 N·cm)**.
4. As referenced earlier in "Removal", connect the airlines to their appropriate ports on the air dryer.
5. Connect the vehicle wiring harness to the air dryer heater and thermostat assembly connector. Plug it into the air dryer connector until the lock tab snaps in place.
6. Test the air dryer – Start the Engine up and let the air pressure build to 100 psi, shut the engine down and check for leaks. If there is no air leaking, you're finished.
7. Remove the chocks from the tires.

**FOR CHASSIS BUILT ON AND AFTER
NOVEMBER 28, 2003
PURest by HALDEX**

PLEASE READ ALL INSTRUCTIONS BEFORE PROCEEDING!

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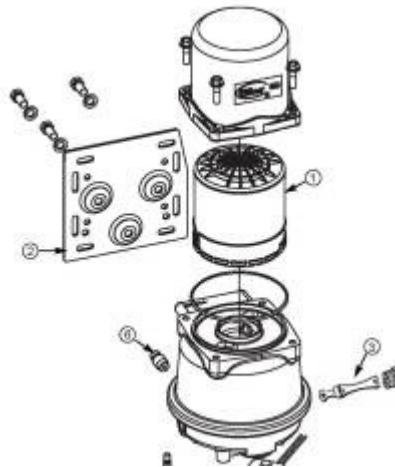
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Disassembly

1. Remove the four 15mm mounting bolts and discard. Lift the canister about 1/2" and remove.
2. Place the assembly upside-down. Press the cartridge down to compress the rubber spring then rotate counterclockwise 45° to release the cartridge. The cartridge itself contains no hazardous material, but there may be a small amount of oil from the compressor.
3. Clean the inside of the canister and aluminum housing.
4. Remove the cartridge o-ring and discard.



Assembly

1. Remove new cartridge included in the kit. Ensure that the rubber spring is attached.
2. Install the new cartridge into the canister. Align the slots on the cartridge with the dimples inside the canister. Press the cartridge into the canister and rotate clockwise 45 degrees to engage the cartridge.
3. Place a new o-ring on the aluminum housing.
4. Place the cartridge assembly on the air dryer housing and install the four new 15 mm mounting bolts. Using an alternating diagonal tightening process, torque to 35-40 ft.-lbs.

If you do not have the clearance to change the chassis filter, remove the 5/8 black air hose. It has a push on fitting (so you must push in and twist while holding the outer ring in, and then you can pull the hose out). Disconnect the 1/4-inch silver air line and the steel braided line from the air compressor. Be sure to loosen the four bolts on the canister before removing the three bolts on the plate. This will make removing the canister easier.