

Aqua-Hot and Hydro-Hot Annual Service

By Roger Berke

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The Aqua-Hot recommended yearly service consists of replacing the diesel fuel filter and replacing the fuel nozzle. In this description I am going to call the unit an Aqua-Hot. The directions will also apply to the Hydro-Hot.

The fuel nozzle has a very small orifice. The smallest piece of debris in the fuel or fuel residue will clog the nozzle. It is important to run the diesel portion of the Aqua-Hot monthly so that the old diesel fuel is flushed out. The fuel filter protects against debris in the diesel fuel. If you Aqua-Hot is burning cleanly, you may be able to extend this service recommendation. If the unit is operating properly, there should be no smoke and minimal diesel odor.

The service will be easier if you turn off the diesel AND electric heat several hours prior to starting. This will allow the tank to cool off slightly and allow the diesel burner to start immediately, when you want to test operation.

It is assumed that you will follow all safety procedures and have some knowledge of mechanical procedures. If you are not comfortable in working on your coach or have difficulty in climbing in and out of the storage bays of your coach, you should not attempt this service. If your Aqua-Hot is not running, you should seek authorized service. Proceed at your own risk.

Parts are available from <http://www.Parts.RVHydronicHeaterRepair.com>

It will take an experienced service person a little over 1 hour to do this procedure completely. Aqua-Hot allows 1½ hours.

As follows are steps and description of what is involved in Aqua-Hot or Hydro-Hot yearly service.

1. Shut off diesel and electric switch in the coach.
2. **Replace fuel filter** – Locate and replace the fuel filter. The Aqua-Hot units prior to 1998 used a small plastic inline filter that is inside of the Aqua-Hot (remove cover, you will find white plastic filter). Units made from 1998-2005 use the Racor spin on filter with plastic bowl on bottom. You may find this filter almost anywhere on the coach. Monaco put the filter in the same bay as the fuel tank. In my Foretravel, the filter is about 15 feet forward in the bay with the generator radiator. I usually leave the plastic bowl with the filter until it is out of the coach, where I can separate them more easily. The units manufactured after 2005 use a Garber spin on fuel filter that kind of looks like a 'standard oil filter'. If you have any question that the spin on filters are located below the fuel level in your diesel tank, you should use 'pinch off' pliers on BOTH the inlet and outlet fuel lines. This will minimize fuel spillage. Caution: The filter is full of diesel fuel. Handle carefully, to minimize spills. I usually place a rag AND some type of container (if

there is room) under the filter to catch any spills before removing the filter. A great tip.... If you slightly loosen the filter, then put TWO, gallon size zip lock bags around the filter, you can drop the filter right into the bag, then zip shut and dispose of. One last tip; Do NOT break the plastic bowl on the bottom of the Racor filter..... it is very difficult to locate a replacement.

You can pre-fill the filter with diesel fuel before installing, but it is much easier to just put it on, and allow the Aqua-Hot to pump it full. Go into the coach; turn the 'diesel' switch on for about 3 seconds then off. This will allow the Aqua-Hot to begin the start up sequence, but not fire. One cycle should be enough to fill the filter and fill up all of the fuel lines. If you listen, you will hear the motor slow down and go under load, when the fuel line pressurizes. Sometimes it will take 2 'start up cycles' to fill the filter, especially the Garber fuel filters.

As soon as the fuel system pressurizes you are ready to start it again. Turn the diesel switch on, and allow the unit to fire up. You should run the unit for several minutes. Your objective here is to flush out the diesel fuel that is in the fuel line between the filter and the (old) nozzle, before you install the new nozzle. Two or three minutes should be fine. You do not want to run the unit longer than necessary, because it will heat up the unit and make it hard to work on.

3. **You are now ready to replace the nozzle.** You should turn off the diesel switch inside of the coach AND unplug the plug that goes between the control box on the diesel burner head, and the Aqua-Hot unit before you remove the diesel burner head.

You will need to loosen the eyebolts and swing them out of your way. There are two 'J' bolts (10mm socket) that hold the diesel burner in place. The top one is usually easy to see and reach, but the bottom one can be a whole new adventure. The lower bolt is 180 degrees away from the top bolt and in some instances cannot be seen.... You will need to do all of the work entirely by feel. Do not completely remove the bolts, but only loosen them enough so that they will move out of the way.

Gently pull the diesel burner head away from the burning chamber straight out about 4-5 inches. You may have to gently lift the burner head to allow it to move. When the nozzle is clear of the burning chamber, rotate it 90 degrees so that the nozzle is facing up. Try not to bump the electrodes that are near the nozzle.

4. Remove the combustion chamber sleeve. Be cautious, because it may be hot. Sometimes the sleeve is hard to pull out. If you place a screwdriver blade between the sleeve neck and the cast iron burning chamber, and pry it out evenly about 1/16 inch, it can then be removed by hand. There is usually some carbon on the inside of the sleeve. It is real nasty and is hard to get off your hands. I wear rubber gloves to do this.
5. Take the sleeve away from the coach, and with a wire brush, clean the loose carbon off the inside and outside of the sleeve.
6. Inspect the sleeve.... Some warpage on the stainless steel is ok. It may not be perfectly round. Sometimes you will find cracks on the stainless steel portion of the sleeve on the opposite side from the burner head. I am told that cracks up to 1 inch in length are safe.

You need to look inside of the burning chamber. You will see the cast aluminum part of the sleeve that has slots that 'swirl' the incoming air to mix with the diesel fuel that is sprayed into the chamber. You will need to inspect this area of the burning chamber to make sure that the aluminum has not melted. If the burning chamber has been overheated, the first thing to melt is this portion of the burning sleeve. If there is any sign of warpage in this area, the burning chamber needs to be replaced.

7. You will need to inspect, then brush out the metal fins INSIDE of the cast iron burning chamber of the Aqua-Hot. It can be difficult to see sometimes. I use a small wire brush attached to a dowel about 18" long to brush out this chamber. You can normally just leave the carbon inside of the burning chamber. It will blow out when the burner is started again.
8. You can reinstall the sleeve in the burning chamber again. It is recommended that you install the burning chamber with the seam in the 12:00 position. If your chamber has a problem this will help you identify what area to start looking at. You can take your gloves off the nasty part is done.
9. **Inspect burner head** for:
 - a. Fuel leaks.
 - b. Cracked or bare wires.
 - c. The 4 rubber grommets that fuel lines, electrical harness, and electrode wires should be in place and be soft enough to seal tightly so you do not have blower air leaks.
 - d. Inspect for signs of overheating or damage.
10. **Clean electrodes** and check for damage
11. **Clean photocell** (flame sensor) – Spray with cleaner and wipe off with soft cloth. Check to see that it is not cracked or been overheated.
12. **Check Photo Disc** - It should be loose (so that it seals properly) and not bent or warped.
13. **Replace nozzle**.....- You will need a 3/4" wrench to hold the tower and a 5/8" wrench to remove the nozzle. Remove the old nozzle, and install the new one. Try not to touch the tip (orifice) of the new nozzle. Try not to bend the electrodes. It is recommended that you tighten the new nozzle, then loosen 1/4 turn, and then retighten to get the nozzle to seat properly. There is more information and drawings in the Aqua-Hot shop manual. Here: <http://www.aqua-hot.com/b2c/ecom/ecomEnduser/staticpages/documents/ARCHIVED7-20-05AHE-100-04SAHE-120-04XandAHE-130-04XAqua-HotShopManual03-05.pdf> Page 55, listed as page 52 in the manual.
14. **Gap the electrodes**..... You will need an electrode adjustment gauge tool. This is a small gold heavy sheet metal piece that should be screwed to your diesel burner head. You may want to order one, when you order parts from Aqua-Hot. You can see drawings and description of this procedure in shop manual listed above on Page 53, listed as page 50, in figure 16.

11. Reinstall Diesel Burner – Rotate the diesel burner head back down horizontal again without bumping the electrodes that you just gapped. You will need to reinstall the burner head into the opening that you took it out of. Be very cautious not to pinch any wires or fuel lines between the burner head and the burning chamber. You will need to lift the upper 'J' bolt out of the way, before the burning chamber will go in place. When you have it in place, push the upper 'J' bolt back in place. You should then reach in the back and push the lower 'J' bolt into position. When you have them in place, you can tighten them evenly and snugly... but not too tight as you could break the ears off of the diesel burner or pull the 'J' bolts off of the cast iron burning chamber. Specifications call for between 20-40 inch pounds of torque on these bolts.
12. Reattach any wires or relays that were removed or came loose.
13. Check to see that everything is in its proper place.
14. Connect the plug from the diesel burner control box to the Aqua-Hot.
15. **Test Aqua-Hot** – Turn on diesel burner and let it runs until it shuts off on its own. When it shuts down, run hot water or turn on heater until burner ignites again.
16. **Top off overflow tank** – Add coolant until overflow tank is at 'Full' mark. Proper coolant level is achieved by measuring coolant level just after diesel burner shuts off. Coolant will be at maximum temperature. The coolant level will vary greatly in the overflow tank, depending on temperature.
17. Reinstall cover... you are done.

Optional Tests / Parts

Check PH of coolant with PH Test Strips. PH should be between 7 and 9.

Some service technicians replace the radiator cap on an annual basis.

Aqua-Hot parts are available at <http://www.Parts.RVHydronicHeaterRepair.com>

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These directions will help you become proficient in Aqua-Hot® maintenance. It has been written by Roger Berke, a factory-certified Aqua-Hot technician.

This is information on how to do advanced repairs. Since I have no idea of your capabilities, I provide this information without being able to judge whether or not you should actually try this repair. Only you can judge if this is a repair that you should attempt. If you are not comfortable with this repair you should seek out someone to do it for you. Proceed at your own risk.

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