

# Water Heater Removal and Coach Heater Repair

2004 Itasca Suncruiser 38R, Workhorse W22 chassis, 8.1L V-8, 10 gal Atwood Water Heater, with Motoraid

## Purpose

To provide step by step instructions and photos for repair of the Coach Heater (CH) blower, as installed in my coach, noted above. The systems mentioned are similar in many Winnebago products, but locations, sizes, and other features vary by model.

## The problem

My CH, controlled by a three-position rocker switch on the dash (Off, Low, and High), originally made the normal rushing-of-air sounds when we bought this coach used in 2006—a high whoosh on High and a lower whoosh on Low. When the engine was running it pumped out well-warmed air from the floor vents throughout the length of the coach. After a while, the unit started to make noise—a high speed noise when switched to High, and a low speed noise on Low, but it still put out the hot air. However, the noises increased and eventually the unit ceased to function.

## Related Problems

When the CH “died,” it blew its fuse, labeled “STEP ALARM” #24 (15 amp), in the upper right corner of the fuse block under the dash to the left of the driver. On my coach, I discovered (the hard way) that the Auto Retract feature of our electric entry door steps is wired through this fuse; this has big implications. I have also seen reports in the forums that this fuse powers the rear camera in various coaches. So if your CH blows a fuse, it would be prudent to find out what other systems might be affected.

## System Description

The Coach Heater (called the Rear Heater in some venues) is part of Winnebago’s “Motoraid” system. As you probably know, radiator fluid from the engine is routed through a heater core (a small radiator-like device) somewhere under the dash to heat the air that defrosts the front windshield, warms your feet in the front seats, blows from directional vents in the dash, or some combination thereof. This same radiator fluid comes from the engine via conventional heater hoses to flow through an additional heater core that forms the intake side of the Coach Heater box and also through an aluminum tube that is welded onto the back of the (aluminum) Water Heater (WH). So when you are driving, your hot water tank is being heated and the heater core is hot and ready to provide heat to the rear of the coach as soon as its fan (or blower) is turned on High or Low. This loop off the engine coolant system is always open (helping cool the engine), with no thermostatic control, although I have read of some who have put shutoff valves in this line for their own purposes.

The CH is roughly a cube-shaped box of galvanized sheet steel, where the sides, top, and bottom are joined with sheet metal screws. One side of this box is formed by the finned heater core, through which cold air is drawn and heated. The opposite side of the box has a rectangular opening through which the heated air is discharged. For this document, I’m going to call this steel box the Coach Heater Unit, or CHU.

The CH system is not to be confused with the propane fueled-furnace system. In my coach, the CHU is located behind the WH (toward the centerline of the coach) in the front-most basement compartment (identified as the WH compartment) on the curbside of the rig. The propane furnace is located in the rear end cap of the coach. However, both systems share the same ducting under the floor and the vents that put out the hot air. At each end of the duct, there is a gravity controlled one-way steel flapper that separates the duct from the heat source. When you run the CH, the air from the blower forces the front flapper to open into the duct and when the air gets to the flapper at the furnace in the back, it forces the rear flapper closed against the propane furnace outlet. Likewise, if you run the house furnace, its discharge blows the rear flapper open into the duct and forces the front one to close tight against the CH. If you run the CH and the propane furnace at the same time, I guess whichever has the more powerful blower wins! (Why would you want to do that? If the engine is running, radiator heat for the CH is “free.”)

When the CH is running, the air return in my coach is through a vent behind the passenger seat. This takes the air into the TV cabinet and then down through an opening cut through the floor into the top of the WH com-

partment below. When the furnace is running, the air returns at the rear through a grill and furnace filter under the master bed.

### The Water Heater Compartment

So what's the WH got to do with the CH? Configurations vary, but in my coach, try as I might, in very cramped space alongside and behind the WH, I was unable to uninstall the CHU for the necessary inspection and repair. It sits on a platform slightly above and behind the WH. In some coaches it is reported that there are access plates under or alongside the CHU to facilitate repair, so carefully survey under and around your CHU location before starting. When I finally admitted I was going to have to take the WH out, I found it best to remove the thick (1-1/16") wood partition between the WH and the open compartment space where the water pump, various water lines, and access to the curbside end of the living room slide front ram are located.



### Disclaimer and picture tip

Once again, this procedure is based on my determination that for my particular coach I need to get everything out of the way to get at the CHU; you have to assess your own configuration to determine which steps to take or not take.

The pictures in this document are reduced in size to keep the document size reasonable. However, if connected to the internet, you can hold the Ctrl key down and left click a picture to be taken to the original-size photos on line for downloading or closer examination of details. There are additional photos there as well.



### So let's get started

Not knowing where I was going, I started by attacking the 20-screw WH flange and the black caulk they sealed it with, because, as you have undoubtedly read in the forums, this goop is tough and requires a lot of cutting, digging, and scraping to get the WH free. However, writing this after the job is all done, I know that a more organized attack would be better. Keep notes, draw diagrams, and/or take pictures as you disassemble things to assure an accurate reassembly.

### Cut the supplies

Turn off the water pump switch at your control panel. Turn off the WH electric and gas heat switches. Tape a warning over these three switches to prevent accidental activation. Open the WH circuit breaker (c/b) at the 120 VAC c/b panel. Make sure your compartment lights are turned off or otherwise disabled. At your propane tank, close the main supply valve to prevent any gas leaks; tape a warning here, too. Shut off and disconnect any city water supply to your rig; tape a warning here if necessary.

Water lines are going to have to be opened, so this would be a good time to open the water heater bypass and then the drain valve that goes down through the floor to get rid of the pressure and water in these lines.



### Clear the pump area

Note the connection details and disconnect the two wires that power the pump. Place a plastic dish pan or suitable container under the pump to catch any water as you open the lines. My Shurflo pump has quick-connect o-ring inflow and outflow fittings that are easy to disconnect if you know how they work. There is a plastic horseshoe-shaped clip that goes around the joint and keeps the end fitting on the hose from pulling out of the pump fitting. You just push one end of the horseshoe back



and pull the double o-ringed hose fitting out. You may have to loosen or fully remove the pump's four mounting screws to move the pump a little to make room for the clips to move so you can disconnect the water lines. Remove the pump with its attached strainer and push the clips back in place to retain their shape and strength.

The curbside end of the front hydraulic ram for the streetside (living room) slide is located behind the pump. By removing the black cover you will gain a little working room at the back of the compartment. This cover is sealed with foam weather stripping and some caulking; it will need to be sealed when you put it back in.

Note attachment details as you go, and remove all the screws in the partition that hold tubing, clips, covers, valves, and the compartment light in place. The light's wires will likely need to be cut and you may want to install some kind of connector(s) here for reassembly.

Now you have to detach or remove selected water lines to get them out of the way of the partition as it is pulled away from the WH. I removed the drain valve and its down line, and I detached the cold water supply to the WH where it connects at the back of the partition, which will have to be removed anyway to get the WH out. The Flair-It to PEX compression fittings are fairly easy to open by backing the plastic nut well away from the fitting, then placing your thumb on the PEX tubing where the ridge of the fitting's nipple is and bending the tube and fitting over your thumb and pulling the line away from the fitting.

The partition is held in place by a two-screw bracket at the rear and three screws through the metal at the front into the edge of the board. This partition was wedged in place very tightly, so after removing the screws, it took some tugging to the left at the top and rear to get the bottom edge off the platform that the WH sits on.

## Now to the Water Heater

First off, it needs to be drained, so have buckets, dishpans, a swimming pool hose, or other means of controlling the gallons of water that are forthcoming when you remove the drain plug at the bottom. Lift the lever to open the temperature and pressure relief valve at the top and that will let air in to aid the outflow at the bottom. You might also consider flushing mineral deposits from your WH, either now or when you get it removed.

Drop the WH door down to reveal its hinges. Choose your tools to start dealing with the black rubber caulking that covers the hinges and grips the flange. I used a cheap, but tough, kitchen paring knife that is pretty sharp and a wood chisel that is also quite sharp. You need something stiff and with a cutting edge—a flimsy blade won't hack it, and even a stiff putty knife won't do much because it is not sharp enough. The black stuff needs to be cut away and/or cut so it separates. A flat blade screwdriver is useful, though, to dig some of the stuff out by brute force.

Remove the black stuff off the top of a hinge, remove the single screw that blocks the link from sliding out of place, and then wiggle the hinge link out of place with a screwdriver blade and pliers.



Figure 4

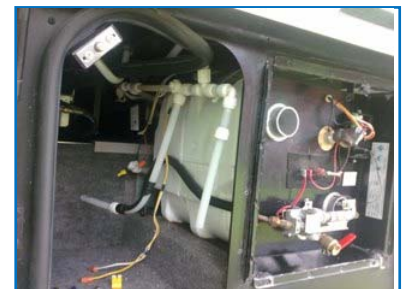


Figure 5



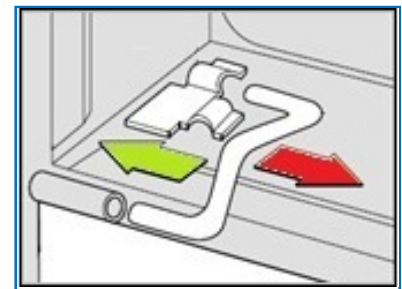
Figure 6



Figure 7



Figure 8



Hinge Diagram

Setting the door aside, remove the 20 screws around the front flange, along with the four corner plates. I removed the burner outlet baffle (a couple of screws), just to get it out of the way. You also need to remove the caulking that surrounds the copper propane supply line that comes into the burner area. Just dig and pull the goop out, being careful not to damage the rubber grommet that is also in the hole. With a wrench, remove the propane line flare nut from the burner assembly. (You did turn the gas off, didn't you?) When you start pulling the WH out, the grommet and propane line, with a little bending, will stay behind. Now, remove as much of the black stuff as you can from around the flange and then cut and dig it from behind the flange. It is flexible and tenaciously gooey, but you will triumph. The flange is pretty thin material, so prying behind it isn't much of an option. However as you get the caulking removed and cut, you can bend the flange away from its frame to about a 45° angle so you can get your finger tips on it to aid in the caulk removal and eventually pulling the WH from its opening. When enough of the caulking is removed or separated, you can use your left hand to pull the black sheet-metal flange box and/or the back of the WH itself toward you as you pull at the flange with your right hand. If you can get the left bottom corner of the flange to release, you can continue to cut and dig at the caulking where necessary to get it free all the way around. Needless to say, be careful of the Styrofoam jacket that insulates your WH and comes out with it.

As the flange comes free and you begin to move the WH outwards, you have to get in the left part of the compartment and disconnect the hot water outlet at the top back of the tank. This line will allow some WH movement, but ultimately must be removed. While you are back there, you might as well assess the amount of slack available in the motoraid radiator hoses that also connect to the back of the tank. In mine, there was enough slack to get the WH nearly half way out before I had to disconnect them, but that is next as the tank moves outward.

The 12V wiring harness goes over the top of the WH and there is a connector up there that releases easily from the coach wiring; note the wires and connector orientation before you disconnect. The AC wiring connects to the back of the WH and in my coach had enough slack to let the WH all the way out of the hole before I had to deal with it.

As you work the WH outward, you eventually will come to a place where the radiator hoses are holding you back. At this point you have to detach them from the nipples on the back, or create more slack by working on the other ends of the hoses. In my coach, these two hoses go through two holes in the bulkhead (wall) aft of the right front wheel well and the engine compartment. There are large rubber grommets in each hole for the hoses, accompanied by a generous portion of rubbery caulking. In the wheel well, there is a large mud flap hanging from a steel angle that is held up by two large chassis nuts. Removing this gave me a good view of the radiator hoses that go to the WH and the CH.

I neglected to take any "before" pictures of this area, but Figure 13 shows these hoses from the wheel well side after reinstallation; the OEM foam was dark in color, while the gap filling foam I used is an off-white. I did not determine the actual flow direction to/from the engine. I arbitrarily marked the supply and return to show the in series flow through the WH and then the CH; it may be the other way around. The two hoses to and from the WH each have their own separate holes. The CH has its two nipples close together and they both protrude through one large hole; its hoses attach on the wheel well side of the bulkhead, again surrounded by rubbery caulk and, like the others, under a



Figure 9



Figure 10

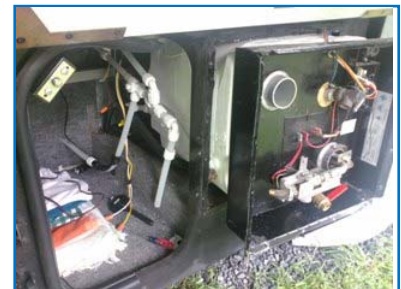


Figure 11



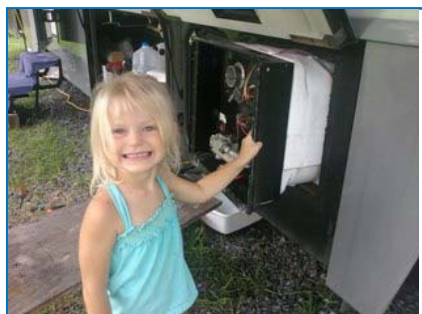
Figure 12



Figure 13

mound of foam. This foam is easily removed by breaking it off with your fingers and removing selected portions with a putty knife or screwdriver. Be careful not to unnecessarily harm any hoses.

At this point I marked the hoses, diagramed the connections, clipped a couple of nylon wire ties, and opened both engine hoses. One had a straight connector in it, so I separated it there. As quickly as I could, I used a felt tip marker cap (I had cut and filed the clip off) to plug the engine side to preserve the coolant. I cut and plugged the other line, as I planned replacement with new, longer hoses. After removing the hose clamps, I had to cut the hoses to/from the CH to get them off the nipples. After I dug and pulled out most of the caulking around the two hoses to the WH (careful of the rubber grommets), I let these hoses pull through the bulkhead as I extracted the WH itself.



Granddaughter "JJ"

As you can see, it's so easy, even a three-year-old can do it! When I started this whole project I sent her in there behind the WH with a drop light and, as if in a perfect world, she asked, "Can you hand me a #2 Phillips, Gramps?"

Just kidding . . . lol.

When I got the WH all the way out and sitting on a bench with the AC line still attached at the back, I thought I would just move it to the side and attack the Coach Heater, but then I thought better of it and proceeded to disconnect the AC. This facilitated access for such things as black goop removal, removal of

some mineral deposits on the back of the tank (my hot water outlet had apparently been leaking a small amount over the years), re-taping of some 1/2" pipe thread connections, painting the compartment floor, and rain protection over the several days the WH was out. As usual, document all connections first.

The 120V wiring all goes under a black plastic cover over the heating element that is held on by two nuts on studs protruding from the lower back of the aluminum tank. Connections are made with crimp connectors and I remade them that way so I wouldn't have a wire nut fall off back there while jouncing down the road during some dream vacation. There is a single yellow wire that runs from a connection inside the black cover across the top of the tank, but under the foam insulation to the control board at the front of the WH; like me you'll probably wish it wasn't stretched so tight. I thought about inserting an extension or a connector in this line, but in the end did not do it.

Also on the back of the tank are some plumbing items you might want to inspect, test, or even replace prospectively, as other members have advised. The two OEM check valves are made of plastic; what isn't these days? Mine seemed in fine shape and have not given me any trouble, so I did not replace them, but many RVers who have taken all the trouble to get back here think it a good idea to install brass check valves, or manual valves to achieve a WH bypass, or no check valves at all, depending on your winterizing strategy. But that's another thread!

Likewise, I did not replace my 120V electric heating element, but this is the time, if you ever were in doubt.

As the WH came out, lots of wires that transit the WH compartment fell down from the TV compartment above. They had been bundled with tape from the factory that didn't stand the test of time. I regrouped the wires with a few cable ties and fed them back up through the opening in the floor above.



Figure 14



Figure 15



Figure 16



Figure 17

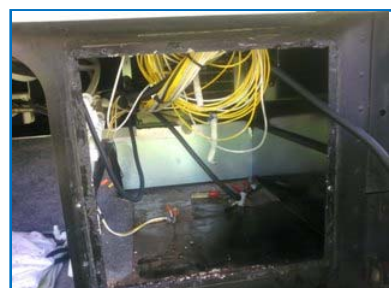


Figure 18

## At Last! The Coach Heater Is Ours!

With everything finally out of the way, the CHU is a beautiful sight sitting on the platform in the back of the compartment. It is fastened to the floor with screws through three tabs that extend from the CHU baseplate, which you can now crawl in and remove; two at the left and right front and one on the left side at the rear. But the CHU won't come out yet, unless you have already removed the radiator hoses from the heater core nipples on the other side of the compartment's forward bulkhead and the caulking that seals them passing through the grommets hole in the wall. Moving the CHU to the left will free it from the hole and then all that remains is to diagram and disconnect the CH wiring from the connector on the right side, behind the hose connections. Note in Figure 19 that the left side of the CHU is open from my abortive attempt to undo screws and get at the motor and blower *before* I took out the WH. Ha ha!

Figure 22 shows the CHU off its platform and down on the WH floor.

Figure 23 shows the rectangular opening into which the CH blows hot air to supply the floor duct and its floor vents throughout the coach. The panel just behind the rectangular opening is the top-hinged flapper door to the duct system. When the CH blower is turned on, its discharge air pressure pushes the door out, opening it into the duct. When the propane furnace blows through a similar one-way door at the rear, the pressure on the other side of this door pushes it towards us, in the closed position as you see it here. You can push on this flapper to check that it is free, and if you remove the front floor vent above, you can reach in enough to pull the door open from the other side.

Figures 24, 25, and 26 show additional views of the CHU, now completely free of the coach. Note the two closely-placed copper heater core nipples and the electrical connector whose connecting harness comes from the Coach Heater Switch on the dashboard.

Figures 27 – 29 show the blower discharge opening with the blower wheel peeking out from be-

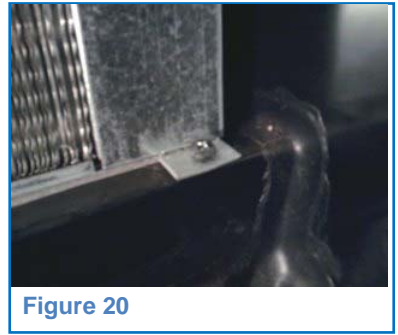
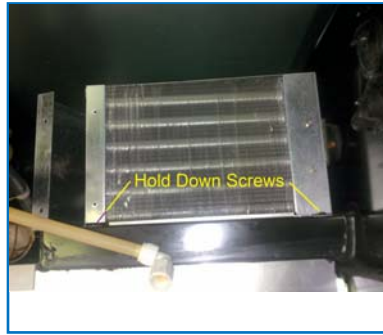


Figure 20



Figure 21

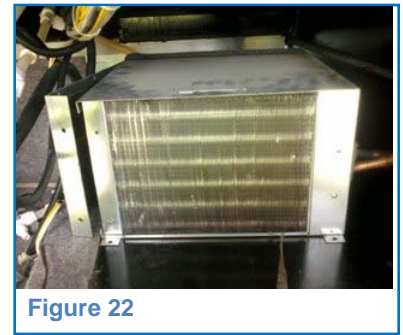


Figure 22

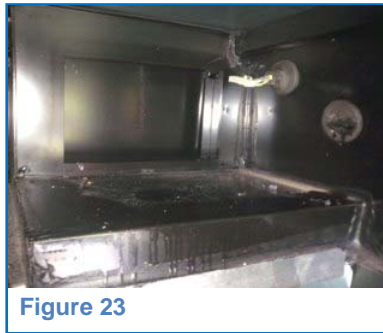


Figure 23



Figure 24



Figure 25



Figure 26



Figure 27



Figure 28



Figure 29

hind. I found I could just barely turn the wheel with my fingers—a lot of intermittent resistance.

Start taking the CHU apart by removing the short sheet metal screws that hold the box together. Removing the left side will reveal the motor side of the blower housing and the resistor that gives you two-speed operation of the motor. Removing a few screws on the back and right side will get you complete access to the blower assembly, mounted on the back/bottom plate as shown in Figure 32

Remove four screws to remove the blower assembly. Then remove another four screws from the assembly to separate the two halves of the blower housing. Now you have the motor and blower in your hands. Figure 34 is the motor end; Figure 35 is the blower end. I removed the mounting web from the motor (yet another four screws in Figure 34), but I don't think that's absolutely necessary. If you do, take a picture or draw a diagram to help you reassemble it.

At this point I could tell by turning the blower wheel that it was rubbing and releasing against something many, many times during one rotation. Some parts, or intermittent parts, of the wheel had to be rubbing on the motor, or intermittent parts thereof. When the rubbing used to be light, it is easy to see how this would set up a loud grinding, or whining noise, depending on blower speed. Even after the thing had ceased to turn at all under its own power, it was not a solid, steady rubbing, but rather an intermittent resistance; it was sufficient to stall the motor, which is quite powerful, as small as it is.

Which leads me to this: **WARNING:** DO NOT apply 12V power to this motor and blower for testing or troubleshooting unless they are securely anchored in the blower housing. This motor jumps to top RPM instantaneously and with quite a kick. If you have it lying on a table or in your hands, you are going to break something or injure someone, or both.

At the outboard end of the motor shaft (Figure 35), the plastic blower wheel hub is a “snug” fit on the steel shaft. The hub is further reinforced (and maybe tightened on the shaft) by a coil spring. I used a small screwdriver to gently nudge the coils in the “loosening” and outward directions and slipped it off the hub. Then, with a firm pull on the blower wheel, I slid the wheel outboard just a little bit. That enabled the wheel to turn freely.

So the remedy I chose, as suggested by some other member in these forums, was to pull the wheel off the shaft, install a standard washer loosely on the shaft, and then press the wheel



Figure 30



Figure 31



Figure 32



Figure 33



Figure 34



Figure 35



Figure 36



Figure 37

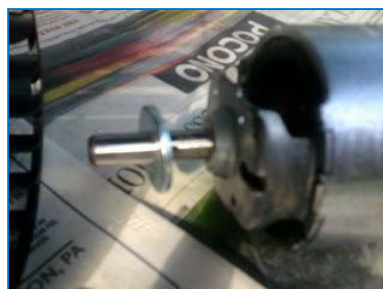


Figure 38



Figure 39

back on as far as it would go. The washer spaces the wheel hub away from the motor just enough to prevent any interference or rubbing—it still turns freely.

Next I reinstalled the coil spring and reassembled the motor and blower in their housing for testing. Applying 12V to the motor produced a satisfying whir and blast of wind in my face. Yippee! So the washer will, I hope, keep the blower wheel from migrating any closer to the motor, but other forum threads make me wonder, “What happens if it migrates outboard? It is not locked positively to the shaft in any mechanical way.” To add just a tiny bit of insurance, I thoroughly cleaned the protruding tip of the shaft and coated it with contact cement, shown in Figure 39. In theory, the snug-fitting hub shouldn’t be able to move outward now, either.

For my next trick, I reassembled the blower assembly, re-mounted it to the CHU’s back wall, put the unit’s wiring connectors back in place, and loosely assembled the CHU box with most of the sheet metal screws. Then I placed it back on its shelf and plugged in the coach’s wiring harness. Back inside the coach: Ignition key – On; Coach Heater Switch – High; and success!—blower makes its audible high-speed whir in the compartment below. Coach Heater Switch – Low; and nothing. No low-speed whir; no sound at all. Rats!

Based on more forum wisdom, my best guess was that the resistor, which splits off the low speed voltage, was fried, so I ordered that part for \$40 through the standard Winnebago parts chain. Although I asked around, it didn’t look like a part I could pick up at Radio Shack. When the new part arrived, I quickly installed it, re-accomplished the dashboard switch test, and Voila! – success was mine: a fully functional, two-speed Coach Heater.

### Now Just Do It All in Reverse

So, I suppose I could just type THE END, and wish you luck, but there are a few more footnotes before I roll down the wintry road all roasty toasty in my Suncruiser.

After the successful blower test, I pulled the CHU back out for its last look at the sunlight. I carefully checked that all wiring was in place, all subassemblies were secure, and I tightly screwed the box back together. I replaced the foam weather stripping around the discharge side of the box, replaced a strip of thin weather stripping on the bottom under the heater core, and used small pieces of the discharge side stick-on foam around and between the two heater core nipples to help seal their exit hole through the bulkhead. At this point, if you haven’t done it, clean the CHU mounting area and clear out any remaining caulking in the bulkhead holes that you don’t want as part of your reassembled system. With the CHU back on its shelf, connect the wiring harness, work the core nipples through their hole, and push the CHU to compress the foam weather stripping against the back wall to seal the discharge to the duct system. Install the three screws that hold the CHU to the floor. Now, up in the cab, turn the ignition on and test the two-speed switch again. Relish the modest whirring of the blower and the gentle rush of air from your floor ducts!

Before pushing the WH back in place, a few things need to be done. I scraped away as much of the old caulking as I could from the compartment opening and the WH front box flange. Then I bent the flange back to its original 90° shape. There was a little bit of rust under the paint on the floor where the WH sits, so I wire-brushed it well and painted it with anti-rust primer and black paint, allowing ample drying time while I waited for the resistor to arrive. I secured new butyl rubber tape from my local RV dealer, a weatherproof flexible caulk, and some gap-filling foam sealer from my local hardware store. I also bought about 10’ of heater hose, two 90° elbows, one straight connector (plastic fittings, what else?), and some hose clamps from my local auto store. I made up my new heater hoses and allowed enough length so the WH could sit outside on the bench when all connected to the engine coolant system. It is important to position the 90° turns (whether via elbows or formed in the hose) of the heater hoses so the hoses will take nice natural positions behind the heater when it is back in place, without any kinks that could block the motoraid flow and functions. At this late point in the game, I found that there is a nearly clear rubber seal that goes in the white plastic nuts of the Flare-It fittings that connect the PEX plumbing tubing to the ½” male pipe check valves on the back of the WH. One of mine



Figure 40



Figure 41



Figure 42

was chewed up pretty badly, and the other was missing; don't know where that went. I found new seals at a local plumbing supply.

One other thing you might consider before reinstalling the WH is cutting an access panel in the floor at the back of the compartment that would give you access from under the coach to the area behind the WH when it is back in place. This suggestion can be found in another of the forum threads and makes a lot of sense for leak inspection/detection, later fitting changes, valve or control manipulation, or other troubleshooting and repair. Covered by a steel or aluminum plate, screwed on from below, this could prove invaluable for future maintenance and could save a removal in some cases. I did not make this modification, but in retrospect, I'm thinking I should have while I had the chance. I suppose it could be cut out after the fact from below if you started small and made sure you didn't damage any hoses or such. I have a saber saw!

With the WH on its bench in front of its opening, I reconnected the 120VAC using crimp connectors. I completed all the radiator hose connections at the WH, at the CH from the wheel well, and joined these to the engine with the straight connectors. A few strategically placed nylon wire ties help support the hoses as they come from the engine and intersect each other on the way to the bulkhead. An engine run verified that there are no leaks in the motoraid loop and that after a short time the hot engine coolant is getting to the WH and the CH.

After placing the butyl tape around the opening (it's white stuff this time, as shown in Figure 43), the WH is pushed back into its place, keeping overhead wire bundles out of the way, reconnecting the 12V wire harness on top, and guiding the propane line through its grommet. When nearly home, the hot water outlet line can be reconnected (with its new seal), and now the white partition has to go back in place. Be careful as you push the partition back in place, especially at the top front corner where a small notch is cut to pass the shrouded wiring for the compartment door light switch. Once it's screwed in securely, you can push the WH home as you realign the propane line and secure its flare nut to the burner assembly. Then secure the WH flange and corner plates with the 20 screws or so and trim any excess butyl tape outside the flange, as it will interfere with the WH door when it goes back on. If previously removed, replace the burner outlet baffle.

Now the cold water supply (with its new seal) can be reconnected around the back end of the white partition. The drain valve and tube can be reconnected and the rest of the fittings and things can be screwed back onto the white wall.

You can complete the sealing job in the wheel well by applying caulk around the heater hoses where they come through the grommets in the bulkhead. After that cures for a couple of days, you can finish it off with a gap-filling foam to further insulate, seal, and protect these pass-throughs. If, like me, you haven't used this foam before, do some practicing beforehand. It can be a little awkward to dispense with the can upside down in a restricted area. Dispense it gently, slowly, and don't overfill the gap. Just barely fill it; the foam does expand a lot and will surprise you. Thankfully, dribbles can be scraped off fairly easily. When the foam is fully expanded and you are satisfied with the result, you can reinstall the mud flap in the wheel well.

The cover for the slide ram has several edge surfaces that have thin foam weather stripping on them to provide an air seal when installed. The foam on mine was in terrible shape, so I cleaned it all off and replaced it with new. Then screw that cover back in place. There are a couple of corners where air gaps must be sealed with



Figure 43



Figure 44

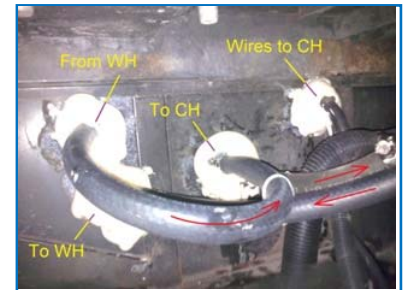


Figure 45



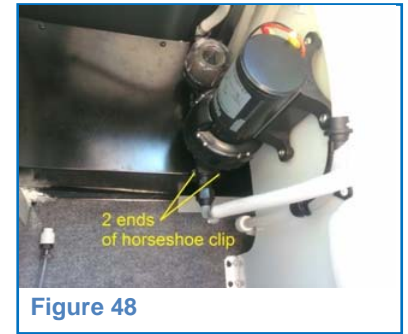
Figure 46



Figure 47

caulking. Remember, the whole water heater compartment area is the intake for air that is sucked by the CH through the heater core and blown into the floor duct system. The compartment gets this air from the cabin through the hole in the floor above via the TV cabinet and the louvered vent behind the passenger seat. If you have any air leaks into the WH compartment around the WH, in the door seal around the left part of the compartment, in the slide ram cover, around the hoses or wires that enter or exit the compartment, you will be drawing cold, possibly freezing, air into this space where water lines, the water pump, and the WH reside. Not good, so feel and look around the edges and corners of the ram cover, and wherever you find gaps, fill them with caulk. If you can find any other outside air leaks into the WH compartment, seal them somehow.

Speaking of the water pump, it can be reconnected to its source above the strainer and its outlet at the bottom by pushing back one leg of the horseshoe clips, inserting the fittings into the openings as far as they will go, and closing each plastic clip around the flange pair it holds together.



### Now it is time for testing

Turn on the water pump; check the pump area and behind the WH for leaks; open, then close the drain valve on the white partition to let some water flow; open and close some other coach faucets briefly to clear out any air in the system. Still no leaks? Close the WH bypass to start filling the WH; open a hot faucet somewhere or open the relief valve to give the displaced air somewhere to go; close the relief when it's full and close the hot faucet when water flow is steady. Now the WH is under pressure; check for leaks behind the WH. If all is well, let's check for heat. Turn on your propane main supply valve and use an appropriate soap solution to check for any gas leakage where you reconnected the burner supply. All tight? Start your gas water heater and check for a good burner flame and operation. If that checks okay, turn it off. Close your WH circuit breaker on the 120VAC panel and turn on the electric water heater; in a few minutes, you should be able to confirm warm water from your hot faucets inside the coach. Now make another serious check for leaks of any kind in all the plumbing involved. This would be the time you wish you had an access panel under the rear of the water heater, so you could easily illuminate and view this important area.

### The End

Lastly, I think, the water heater door needs to be reinstalled, getting the links in under the clips and replacing the blocking screws. Maybe you want to add a big glob of caulking over the hinge links and clips so the next guy won't have any idea how the stupid door is hinged. 😊

Now what have I forgotten? Just one screw left over . . . not bad for an amateur!

Many thanks to all who have contributed to our forums, gave me the courage to do this project, and supplied so many tips that helped me and others along the way. Have a wonderful trip!