Repairing and rebuilding the Smiths Heater System in a 1973 Land Rover Series III

This short article details a repair and rebuild of the heater system in a Series III. The most important information here relates to the replacement parts for the heater fan motor and squirrel cage that are the correct size and are readily available for purchase at a reasonable price. The interested builder can scroll toward the end of the article for pricing and part numbers.

Heater Core Box

The heater core box was dirty and rusted (Figure 1) but the core was sound and did not leak. I took the box apart by removing all of the small screws (see Figure 1), cleaned and sanded the individual components, primed and then painted with RustOleum black (Figure 2). I taped over the Smiths label so it was not damaged during painting.

Figure 1. Condition of the heater box, with the blower hose inlet covered with duct tape, and the inlet/outlet of the heater core covered over with masking tape. Blue arrows show some of the Phillips screws that must be removed to open the box.

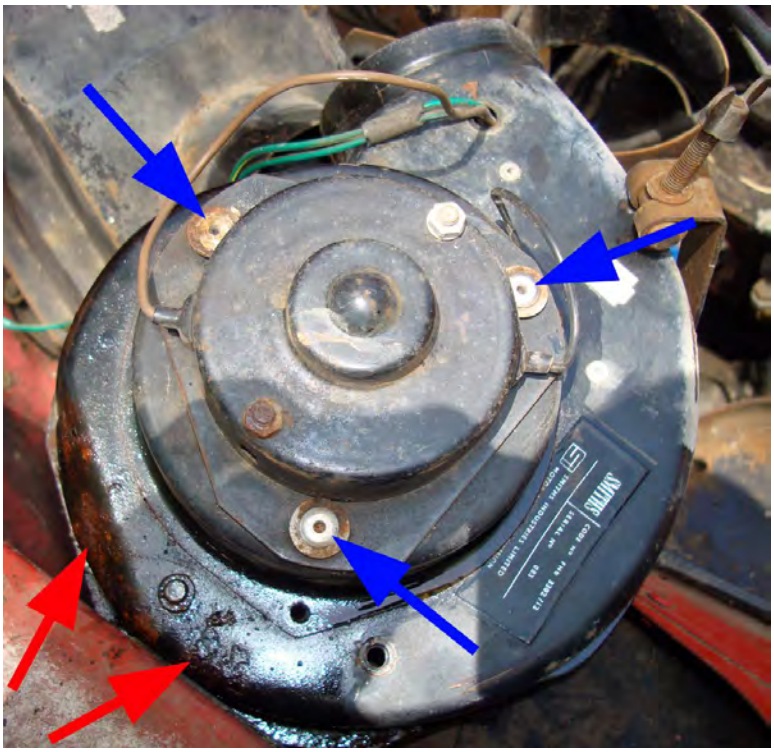
Be sure to add foam insulation at the holes where the core pipes exit the box.

Figure 2. Painted heater core box with core reinserted.

Heater Fan Motor and Snail Box

The base of the snail box was badly rusted (Figure 3) because moisture accumulates at its rounded bottom and in some places it was rusted through. I removed the stepped cowling that holds the fan motor and squirrel cage assembly by removing the 3 Phillips screws that attach the cowling to the snail box (blue arrow in Figure 3 shows one of the 3 screws that must be removed).

Figure 3. Base of snail box shows the extensive rust at the bottom of the box due to moisture accumulation. Three Phillips screws (one shown at blue arrow) must be removed in order to remove the cowling that the heater fan motor and squirrel cage assembly are attached to in order to replace the fan and squirrel cage and gain full access to the interior of the snail box.



The fan motor and squirrel cage assembly were removed from the cowling by drilling out the 3 rivet assemblies (Figure 4, blue arrows).

Figure 4. Inward-facing side of the snail box and heater fan motor assembly. This figure provides another view of the extensive rust (red arrows); the blue arrows show the 3 rivets that must be drilled out in order to separate the fan motor and attached squirrel cage from the cowling.

I sanded the snail box inside and out and used J-B Weld to fill in the holes and build up the rusted and thinned walls. I then sanded down the J-B Weld (Figure 5) and primed and painted the snail box. I drilled a small hole in the base of the snail box to serve as a drain hole for the moisture that accumulates here. Time will tell if this drain hole will prevent future rust.

Figure 5. Photo showing base of the snail box with the sanded J-B Weld fill before priming and painting.

Heater Fan Motor Replacement

It is possible to sometimes find a new replacement heater fan motor and even a fan motor with attached squirrel cage but the cost of these together can approach $200. The squirrel cage in my assembly was made of plastic and had largely disintegrated (Figure 6). The rust seen in the snail box was also found in the fan motor and was so extensive that large flakes of rust had broken loose and become so securely attached to the magnets of the fan motor that the entire assembly was frozen (Figure 6).

Figure 6. Photo showing the disintegrated plastic fan squirrel cage and rusty original motor.

I searched far and wide for a replacement 12V fan motor of the correct dimensions so that it would: (1) fit the cowling, and (2) provide the correct shaft length and diameter so that the attached squirrel cage did not protrude beyond the fender-facing opening of the snail box. I won't bother to tell you how long this search took, but the bottom line is that NAPA Auto had one on the shelf (Figure 7). (I have no financial relationship with NAPA except that it seems that my paycheck should be on direct deposit to them, ha ha!) This fan motor protrudes inward toward the engine a bit more than the original fan motor but there is still plenty of room between it and the heater core box.

Figure 7. NAPA Part No. BK 6552123, radiator fan motor from Balkamp. Price: $45.49 on 13 June 2010.

http://www.napaonline.com/Search/Detail.aspx?R=BK_6552123_0006348092#

The mounting flanges did not match the holes for the original fan motor flanges in the cowling (rivet positions in Figure 4) and so I filled in the old holes with J-B Weld, sanded and primed and painted the cowling, then drilled new holes that match the flanges for the new fan motor. I mounted the fan motor to the cowling with a stainless steel bolt assembly.

Squirrel Cage Replacement

Finding the correct replacement for the broken squirrel cage also took some time. It had to have a CCW rotation. I wanted to go with steel instead of plastic and found one at Indiana Fan (Figure 8) (Again, I have no financial relationship with this company.).

Figure 8. Indiana Fan and Fabrication replacement squirrel cage Part No. 02895776: 4.25" diameter, 2" height, 0.25" bore, and CCW rotation. Price: $16.87 on 13 June 2010. http://www.indiana-fan.com/p-143-single-inlet-blower-wheels-galvanized-3-1316-to-4-14-diameter.aspx

The spindle bore of the squirrel cage was slightly smaller than shaft diameter of the fan motor and so I drilled out the bore of the cage to match the fan motor spindle. I attached the squirrel cage to the fan motor, attached this assembly to the cowling, and then used stainless steel screws to attach the cowling and fan motor assembly to the snail box.

Final Installation

I placed strips of adhesive foam insulation around the opening in the firewall, reinstalled the heater core box, and then reattached the heater hoses (Figure 9).

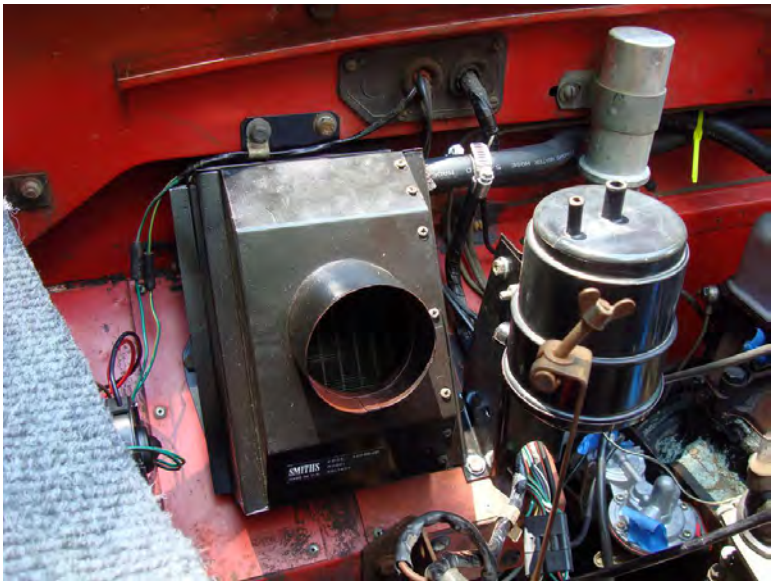


Figure 9. Photo showing heater core box reinstalled and heater hoses attached.

I next installed the snail box and fan motor and squirrel cage assembly (Figure 9). The foam insulation seal at the intake on the front wing can be re-installed by folding it and inserting it into the exterior opening. I used aluminum screws to attach the exterior intake grill to the front wing.

Figure 10. Snail box and fan motor and squirrel cage assembly reinstalled.

I connected the wiring and added a new blower hose, flipped the switch, and it worked!

Figure 11. New fan blower hose attached between snail box and heater core box (shown in upper left of the photo).

Conclusion

The total cost of repairing and rebuilding the heater system was about $65, not including shipping and tax.