

How to back flush a w113's coolant system

A back flush causes reverse water flow through the entire cooling system. Normally, cooling water goes up through the block, pushed by the water pump and convection, up through the thermostat (when open), then down through the radiator and back to the suction of the water pump. The heater takes hot water from the rear upper head, through the heater valve and core, and back to the suction of the water pump. Normally, a back flush is done by disconnecting the heater side, then connecting water to the head and removing the radiator cap. The remote tank makes it a little different, but this should work. Here are the first few steps. After step 4, there is some commentary on what just happened, and then the process continues in steps 5 through 15.

1. First place the car on pavement or a well-drained surface. This will be messy.
2. Place the heater valve lever (red lower lever) to the left, full open position.
3. With a cold engine, remove the drain plug (18mm wrench), drain all coolant and disconnect the top radiator hose at the thermostat. This will be an outlet so point the hose end toward the ground. Re-install the drain plug and hand tighten (you will remove this plug again at step 5 below)
4. Disconnect the left (driver's side) heater inlet hose from the firewall inlet.
 - A. Connect a length of hose to the entry point (mine is brass) to the firewall just disconnected at step 4. This will be an outlet, so point it down. A hose of 4 feet in length or more will allow it to clear the side of the car.
 - B. Connect a garden hose to the existing heater hose just disconnected at step 4. I bought a flush kit from the local parts store that included a 3/8 to 1/2 "T" connector with a garden hose connection point. I plugged one end of the "T" and inserted the other end of the "T" into the existing heater hose.. This is the hose that takes water into the upper head. I then screwed the garden hose on (need a female adapter for your garden hose as the "T" connector is male). Turn the garden hose on. This will send water down through the head and block. This will also be the entry point for the new antifreeze once you get to step 11.

Commentary on Steps 1-4

Step 4a above should result in sending water down through the head and block, down through the water pump (since the thermostat will be closed) then up through the radiator and out the upper radiator hose. Water will also flow up the water pump's heater return line on the right, through the heater core and out the left hose you've attached. If you don't get much flow through the heater core, restrict the flow out the upper radiator hose, by pinching it partially closed. Since these engines incorporate a full bypass type thermostat, which allows circulation of the coolant through the block while warming up, some water will bypass the lower block. Use sufficient flow to get a good stream of water out the openings.

5. After the water runs clear, with no rust particles, remove the radiator cap on the remote expansion tank to flush it's connecting lines. This may reduce or even stop the flow through the heater core, due to an easier exit. Open the lower radiator drain plug again (see step 2) and run it until clear.
6. Shut off water and fully drain system. If you have an air compressor, disconnect the water hose from the house, insert an air gun into the hose end previously connected to the house and blow out any remaining water.
7. Close the lower radiator drain plug opened at step 5. But first, examine copper crush washer and if old, replace to ensure a good seal.
8. Remove the drain hose attached to the brass entry point on the firewall (see step 4a)
9. Disconnect the garden hose from the heater inlet hose. Place a funnel into the heater inlet hose that was previously connected to the garden hose. This will be the entry point for the new anti freeze.
10. Pre-mix anti-freeze (50/50 mix of water and anti freeze if you used air to blow out all water, or because some water will remain in the block if not blown out by compressed air, suggest an initial stronger mixture of about 60% antifreeze, then check it.)
11. Pour pre mixed anti freeze into the funnel attached to the hose to which the garden hose was previously attached. Add 10 liters of the 50/50 mix. Suggest the MB anti freeze. See <http://www.imcool.com/articles/antifreeze-coolant/G05-Glysantin.htm>.
12. Re-install the top radiator hose at the thermostat.
13. Disconnect the top hose on the cold start valve of the FI pump. Continue filling with the 50/50 mix of anti freeze until water emerges from the top hose of the cold start valve and from the brass entry point on the firewall. This should clear all air from the system. Note: Total capacity 10.7 liters.
14. Reconnect the hose disconnected at steps 4 and step 13, replace cap on over flow bottle. You are done.

Questions:

1. Doesn't coolant run to the top of the injection pump to make a thermal sensor or valve or something work? Will this process flush that pathway out?
2. I have heard that it's easy to get air trapped in this car's coolant system. How do you minimize that? I suppose parking on a slope or disconnecting a particular hose when filling with fluid? Can you elaborate?

The cold start Valve on the Governor housing would be back flushed also, however there's not much flow in this circuit, so It wouldn't hurt to disconnect the top hose during this process. After you've checked it, push it back on, but don't tighten the clamp (see next).

The M-B engines from the fifties-sixties can easily form air pockets inside the cooling system after the coolant has been drained from them.

You're right, the cooling system is difficult to bleed out all of the air. I've found that the top hose on the cold start vale is the highest point in the cooling system. After topping off the tank, slide this hose off carefully, until antifreeze solution comes out. Same with the heater inlet hose on the firewall. Heater Temp valve wide open.

Another useful practice is to park the car uphill (or raise the front end) while the engine runs and continuously fill water as needed. When the thermostat opens, the air will come out nicely from the system.

I'd install a new thermostat. Not expensive at all, but not carried by most automotive stores. It's a full flow type, which circulates water through the block when cold. Most American built cars didn't have this feature until years later. It looks much different than most common flat plate type of thermostat in that it has an additional lower plate. As the thermostat opens to the radiator, this lower plate closes off the bypass line (smaller hose running from the bottom of the thermostat housing to the water pump inlet). This insures even warm-up, among other advantages and is used on truck and industrial engines.

Also, You might want to consider having the radiator professionally cleaned, I.e.: vatted and rodded out. This made an impressive change to my car. I'm able to run in southern Oklahoma on 100+ days with the air-conditioning system on.