

LAND ROVER CLUB V.I.

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ABS MODULATOR ELECTRICAL FAULT REPAIR

11/2009

Introduction:

The Land Rover Discovery Series II uses the same ABS MODULATOR as the H1 Hummer. The company that manufactures it is **WABCO (Meritor WABCO)**. If you have been experiencing an intermittent fault causing your ABS, HDC, and TC lights aka *Three Amigos*, your problem may be a result of a bad electrical connection.

The faults associated with this fix are:

- 1.6 - Shuttle valve switch (SVS) long term supervision failure
- 11.1 - One sticking SVS
- 11.4 - SVS electrical supervision failure

Disclaimer:

Use this guide at your own risk!!!

Before attempting this repair, read the ABS trouble codes stored on the SLABS ECU to verify it is not another issue. A specialized scanner is required to read and clear the code(s). An intermittent fault will clear itself after shutting the engine off and restarting it. It will not however clear the faults from the SLABS ECU memory.

Having intermittent codes stored in memory will not cause the three amigos to come on. Only current active faults cause them to display. See [Diagnostics](#) for more information about the scanner(s).

I REPEAT, use this guide at your own risk!!!! This FIX is not the "CURE ALL" for the THREE AMIGOS but has helped many get rid of them. If you have any questions or if after performing this fix the THREE AMIGOS return, please email me at josh@landroverclubvi.com. Be patient as I get MANY emails regarding the fix. =>

Options for fixing the SVS fault:

Option A: This is the popular Hummer fix as written out by a Hummer enthusiast where you repair a faulty solder at the pins of the SVS circuit board.

Option B: This is the bypassing of the SVS circuit board and straight wiring into the external connector on the outside of the modulator. I HIGHLY RECOMMEND THIS! (I messed up the circuit board while cutting off the hard black plastic doing Option A resulting in the research, testing, discovery and documentation of option B. Consider this method over OPTION A.)

Option C: This is removing the electric pins on the SVS circuit board and solder in wire and connect them to the SVS wires removing the SVS plug entirely. (No instructions for this method)

Note: For all options, the pump side of the ABS Modulator does not need to be removed although I have illustrated the steps to remove the entire unit. For option A, the modulator side does need to be removed. Option B can be carried out by only removing the SVS (Shuttle Valve Switch)

UPDATE** 03/2011: Correctly doing Option A or Option B in no way affects the function of the ABS Modulator nor the SLABS' effectiveness in monitoring the SVS.**

Read the following:

1. [Shuttle Valve Switch Related ABS-TC-HDC Warning Lamp Illumination Troubleshooting](#)
2. [70/07/04/NAS -- Troubleshooting_ABS-HDC-TC_Warning_Lamp](#)
3. [How ABS Modulator/Pump Works \(Coming soon\)](#)

This write-up is split into four sections

Instructions For Removing Entire ABS Unit (Steps 1- 14)

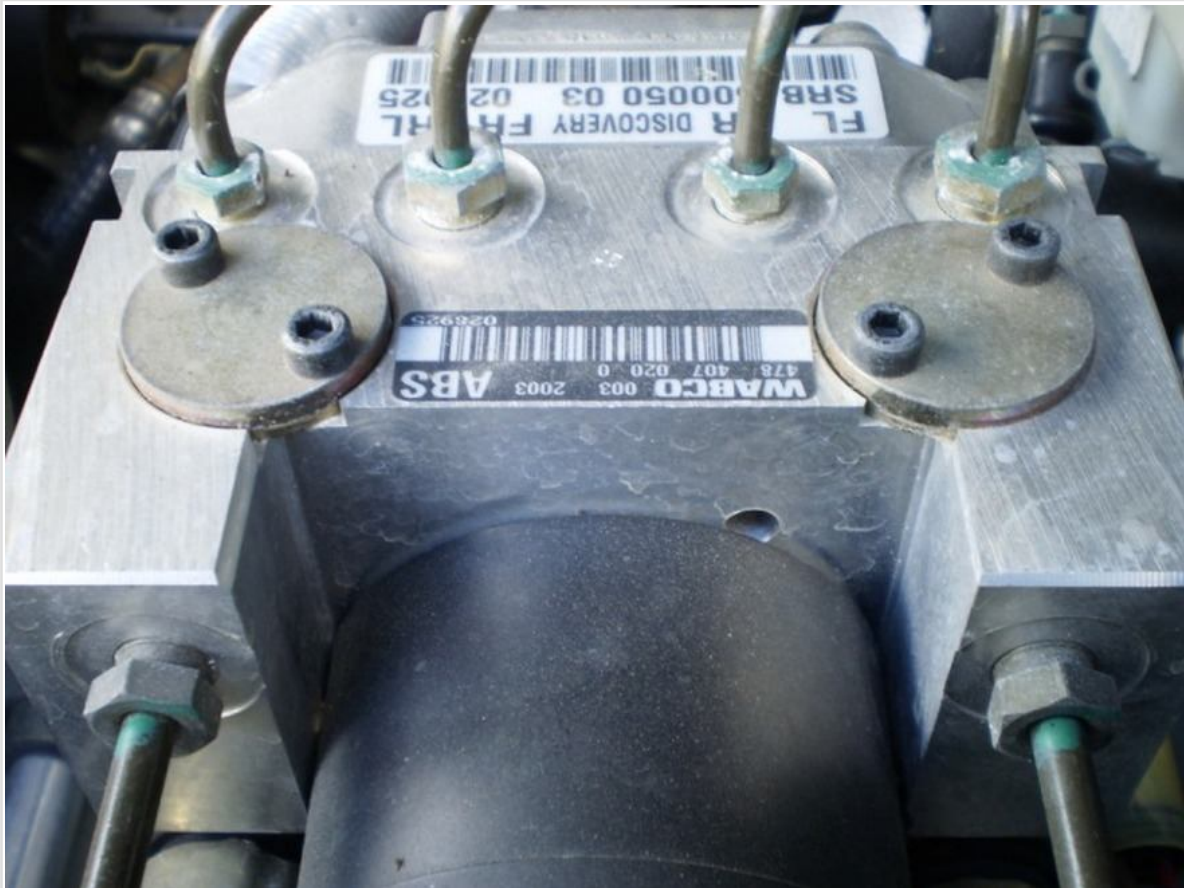
Instructions For Removing Modulator Side Only (Steps 19 - 30)

Instructions For Option A. (Steps 31-36)

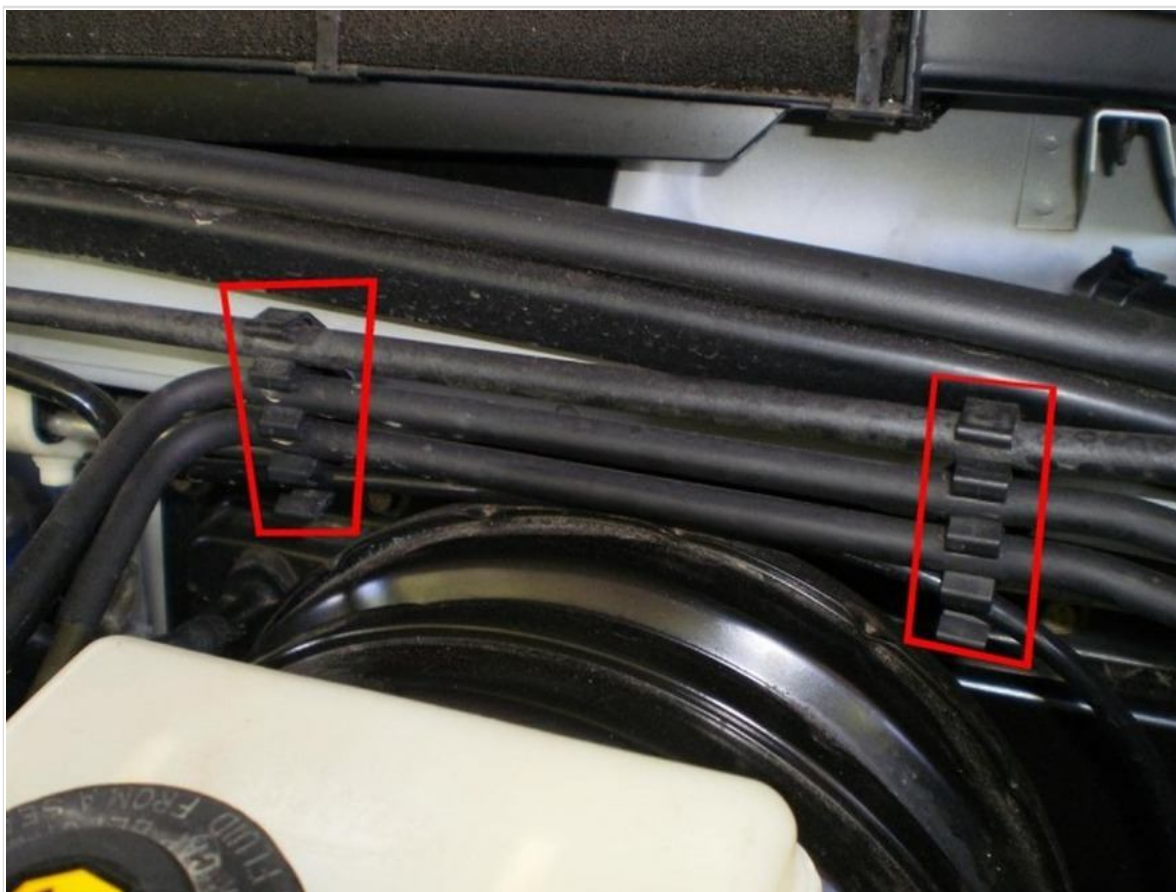
Instructions For Option B. (Steps 37 - 45)

Instructions For Removing Entire ABS Unit

1. Spray Liquid Wrench on the 6 brake line nuts (4 on top and 2 on the side).
2. Also spray the four hex screws on the cover plates. Removal of the screws and plate will help remove the brake lines but it is not required.



- 3A. While the Liquid Wrench is soaking the nuts and screws, remove the air intake arm and release the brake pipes from the clips on the bulkhead.



3B. Remove the 3 electrical connectors form the modulator. Two on the front and one on the side.



Removing black connector C0501 and grey connector C0500

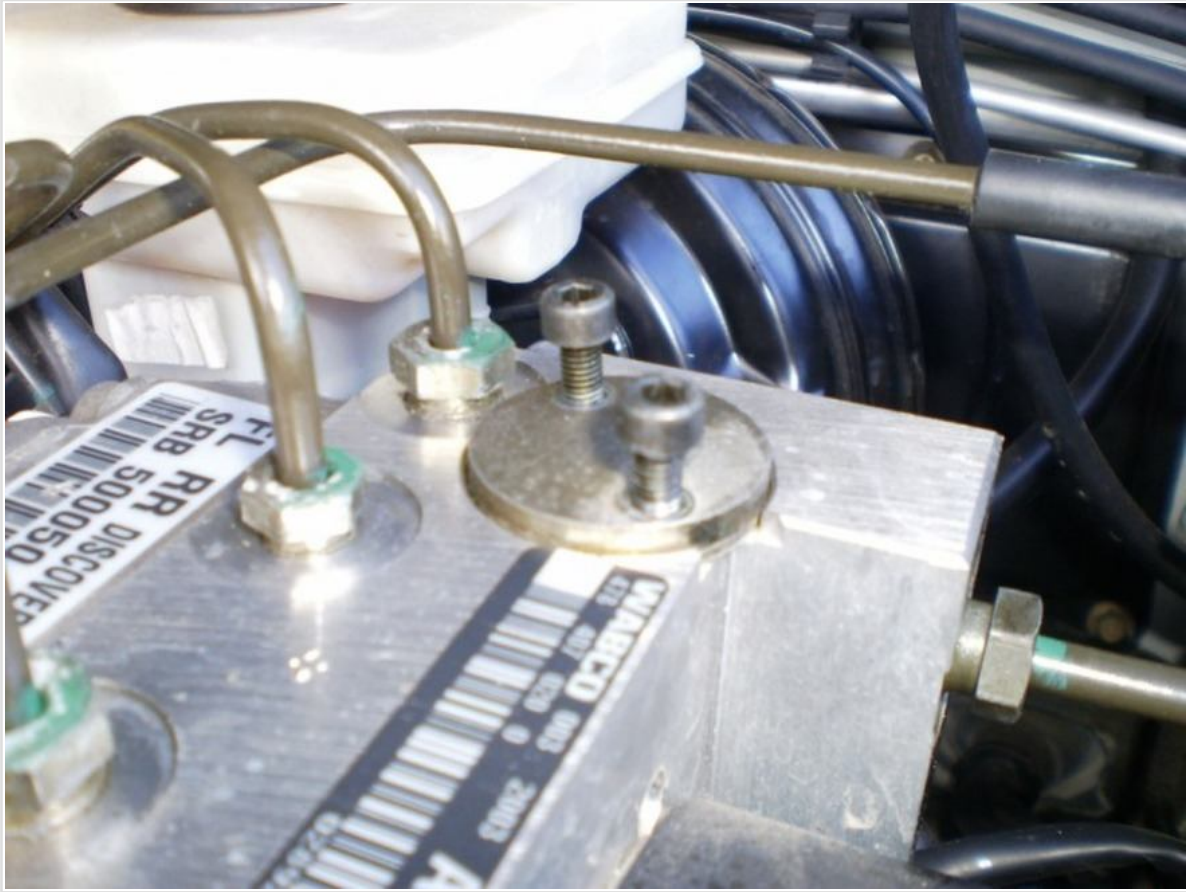


Side connector C0507

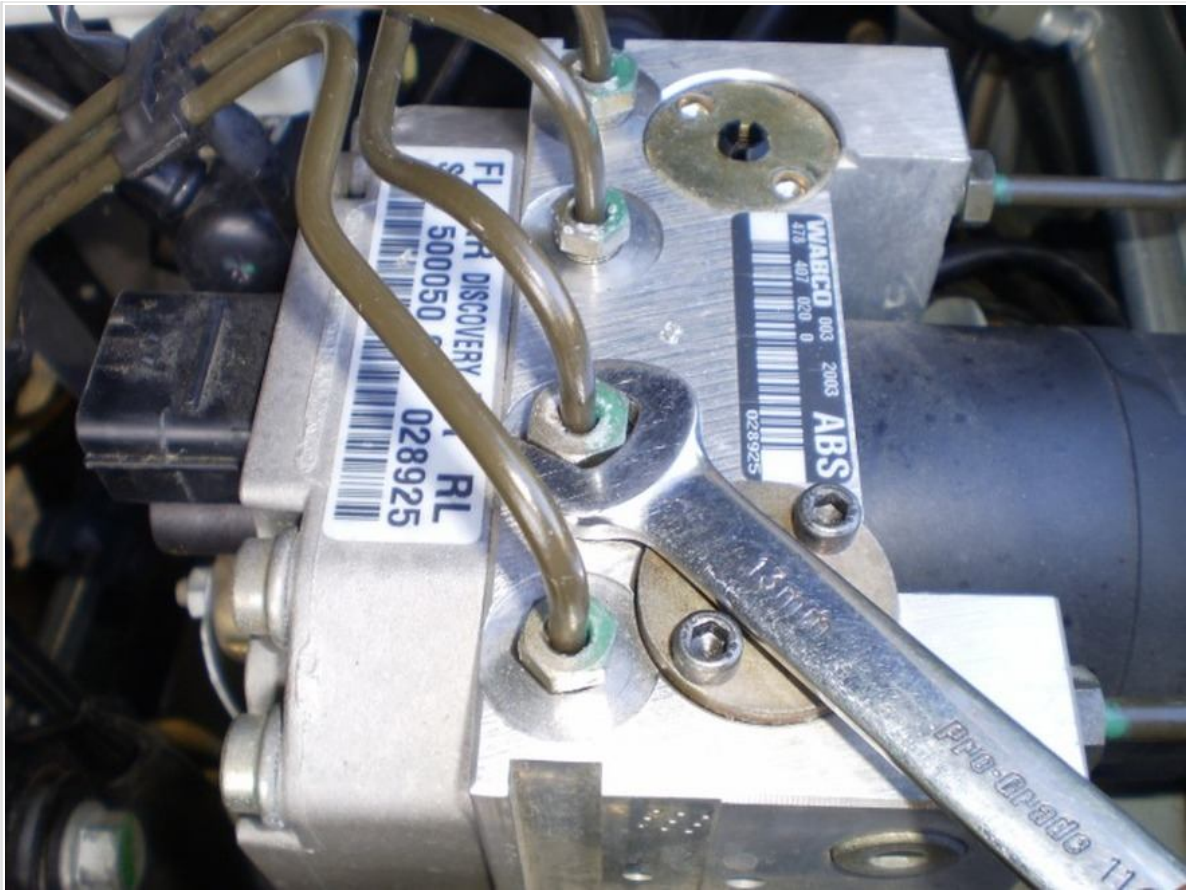


Place harness between intake and steering fluid reservoir

4. Using a 4mm hex bit, remove the two hex screws and cover plate.



5. Brake loose the two bigger flare nuts using a 13mm wrench.



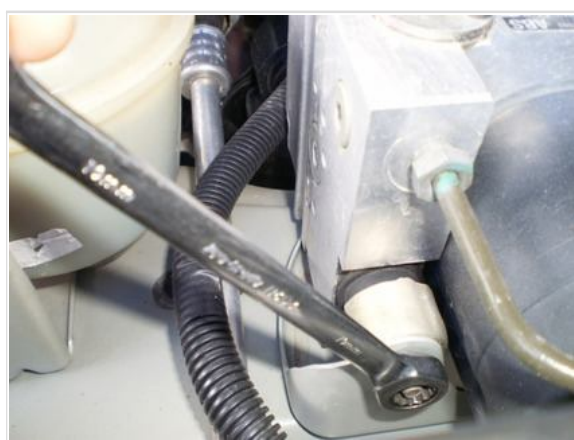
6. Brake loose the two smaller flare nuts using a 11mm wrench.



7. Brake loose the two side mounted brake line nuts using a 13mm wrench.

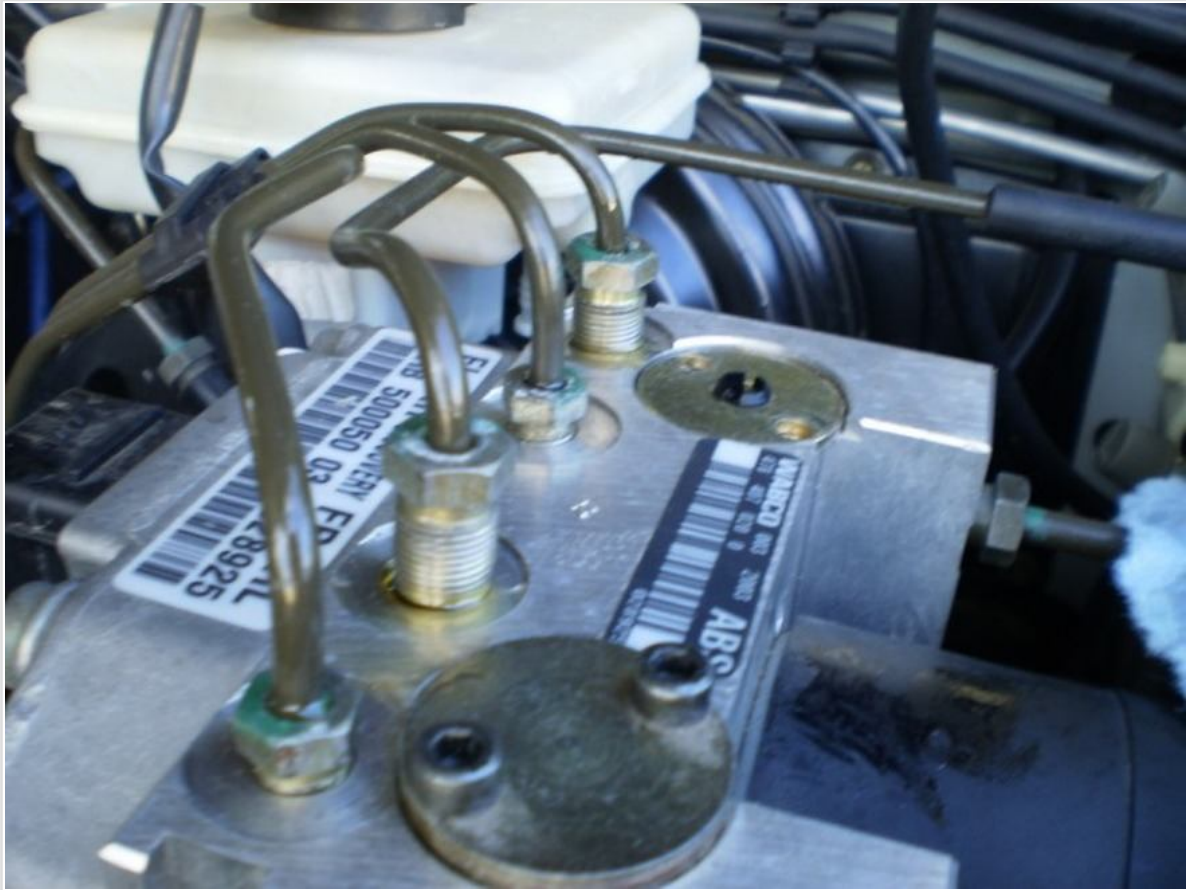


8. Once all 6 brake lines are broken loose, remove the 3 nuts securing the modulator on to its mounting bracket using a 10mm wrench.

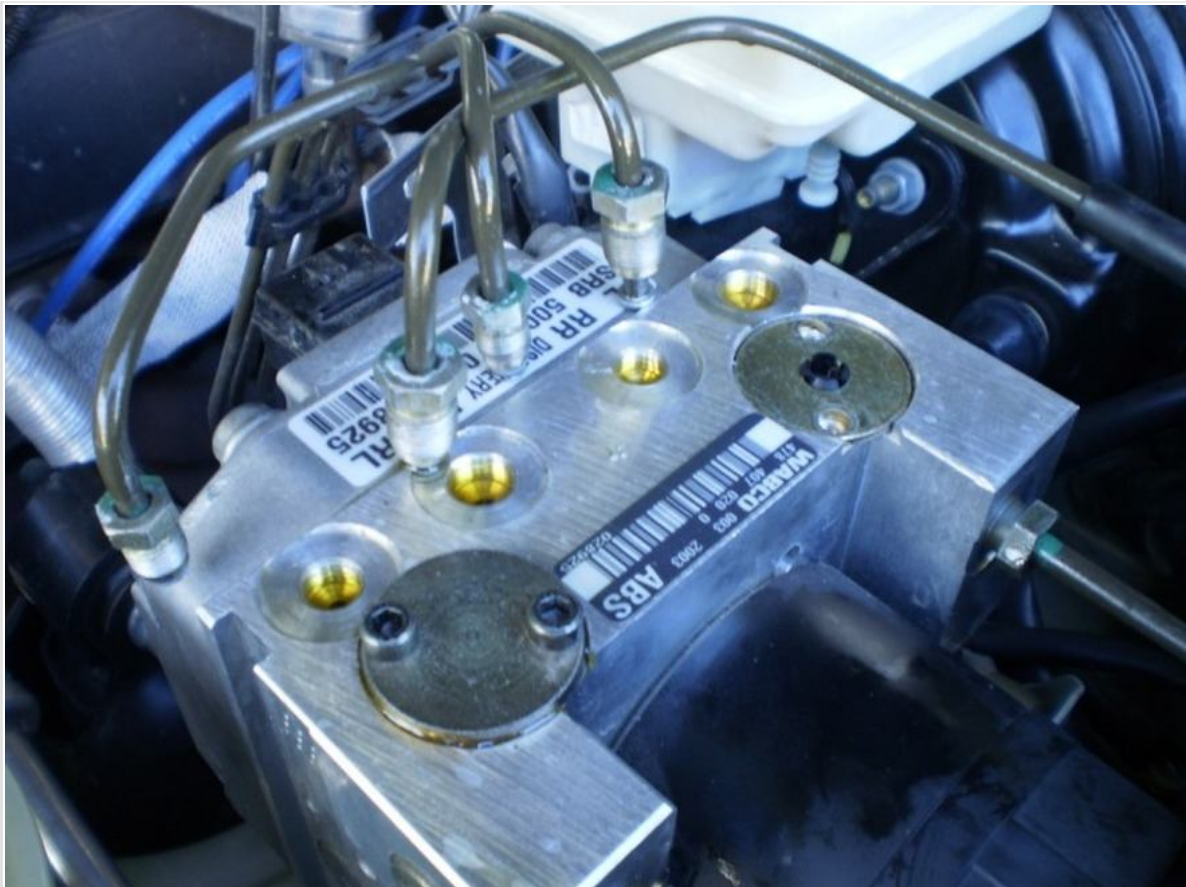


Note: Before fully disconnecting the brake lines from the modulator,
clean up any excess Liquid Wrench so that it does not get inside.

9. Unscrew and disconnect the two bigger brake lines. Brake fluid will be dispensed from both the lines and pump side. Have a shop towel nearby.



10. Unscrew and disconnect the two smaller brake lines. Brake fluid will be dispensed from both the lines and pump side. Have a second shop towel nearby.



Luckily I had a second ABS modulator/pump that had plugs for all 6 brake line ports so I plugged them up. I also cut the fingers off a disposable rubber glove to keep the lines from dust contamination. It also helped catch some brake fluid. I recommend using a syringe or turkey baster to suck out the residual brake fluid from the modulator if you do not have brake plugs.

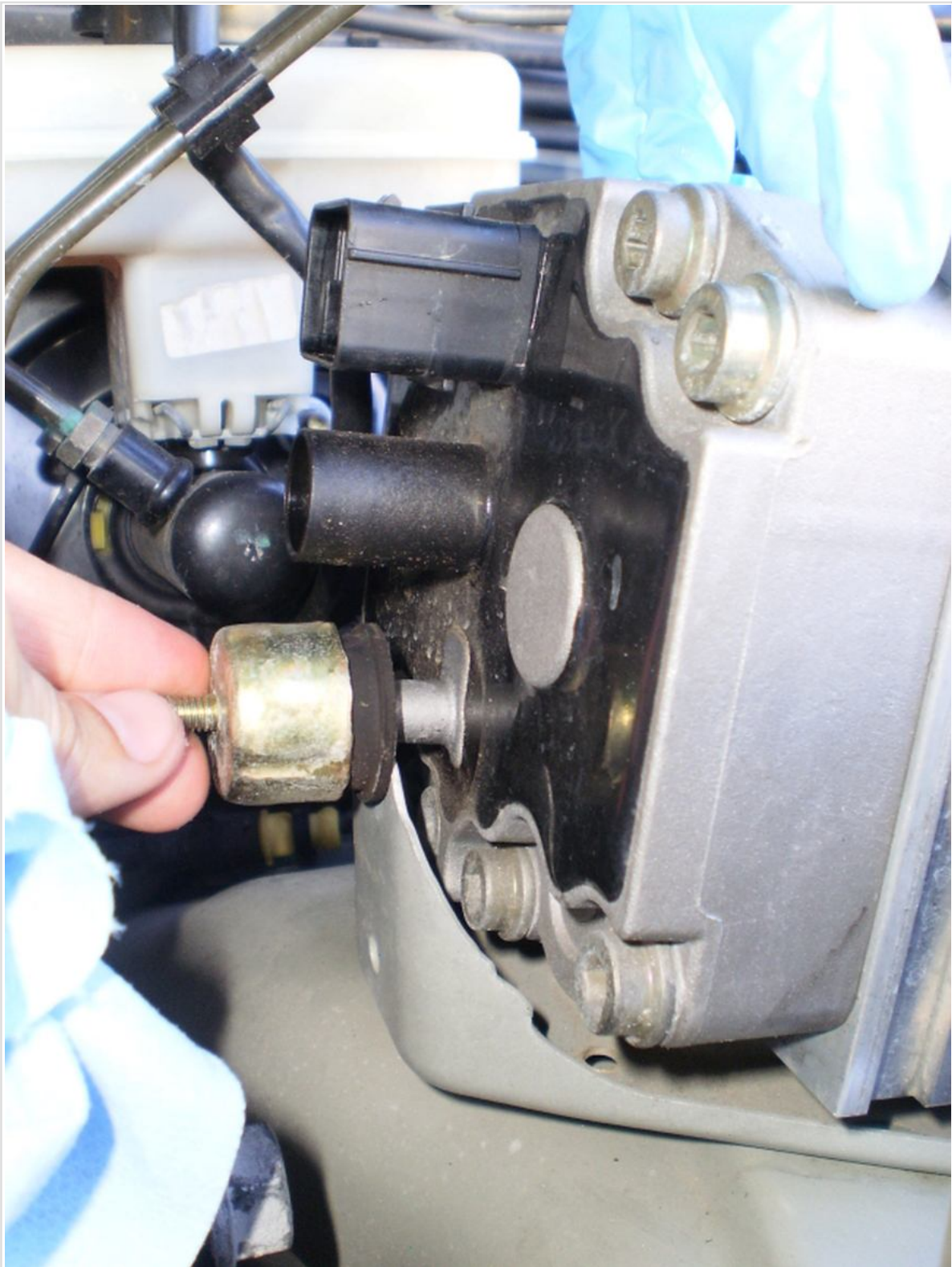


11. Disconnect the two side lines. Brake fluid will be dispensed from the lines and pump side. Have that third shop towel nearby.

Because of the slight incline on my drive way, it was necessary for me to elevate the two side brake lines coming from the master cylinder to prevent brake fluid from continuing to pour out. I used a hammer at first and wedged it between the inside of the quarter panel.



12. Lift the front of the modulator and remove the front rubber mount.



13. Carefully remove the ABS unit paying closing attention to the brake lines.



14A. Once removed, clean the area to prevent paint damage from spilled brake fluid. Place an absorbent shop towel or cloth to catch any brake fluid while you continue to work.





14B. Installation is the reverse of removal. However, when installing the 4 brake lines on top, ensure that they are screwing in flush and not cross threading. It took a couple of tries to get them seated right.

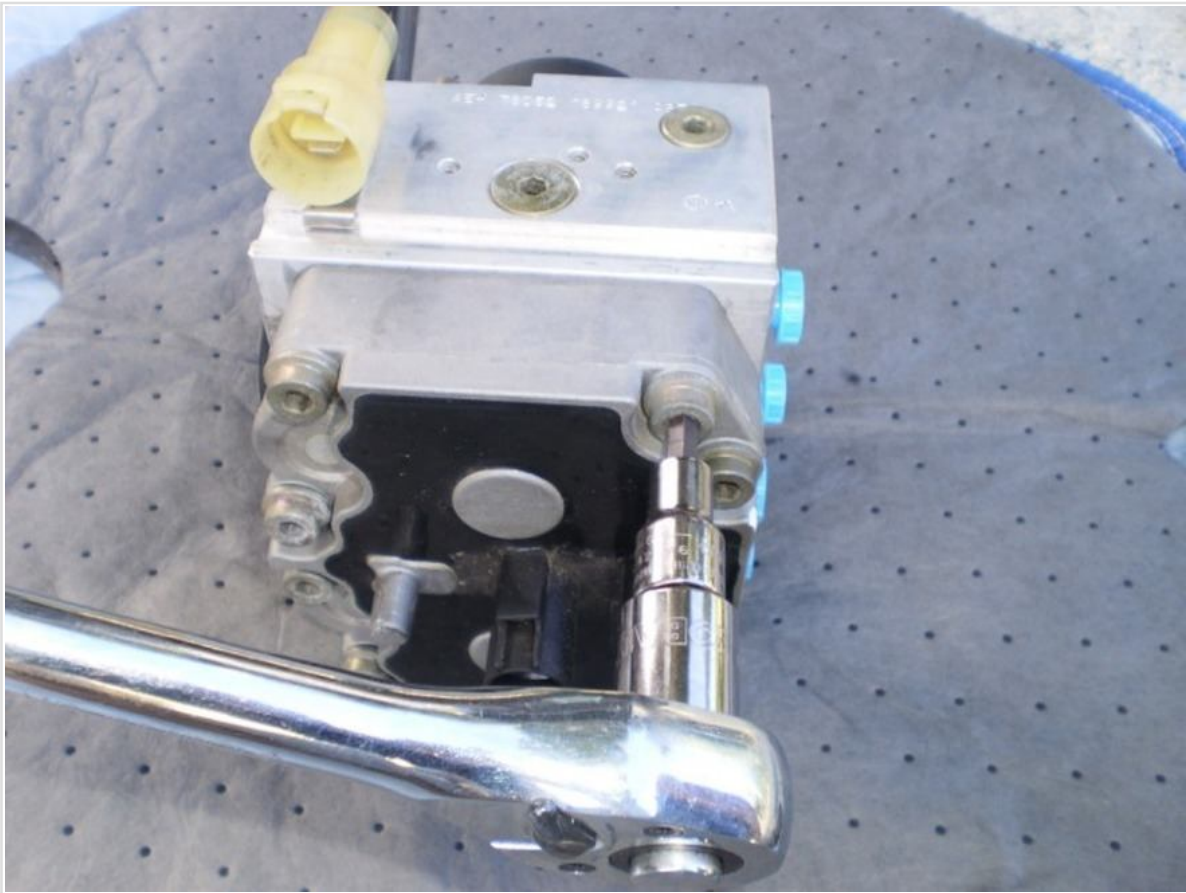
14C. Bleed the brakes. You can use the traditional method with a helper following this sequence: Rear Right, Rear Left, Front Right, Front left. Pedal may still feel spongy.

14D. Go for a test drive and try to get the ABS and TC to kick on. Find a good incline to test HDC or on a flat ground, accelerate and let off the Pedal and HDC should kick in, slowing you down. This MAY help get some trapped air out.

14E. Re- bleed the brakes.

Steps 15 - 18 is the continuation for performing Option A or B with entire unit removed.

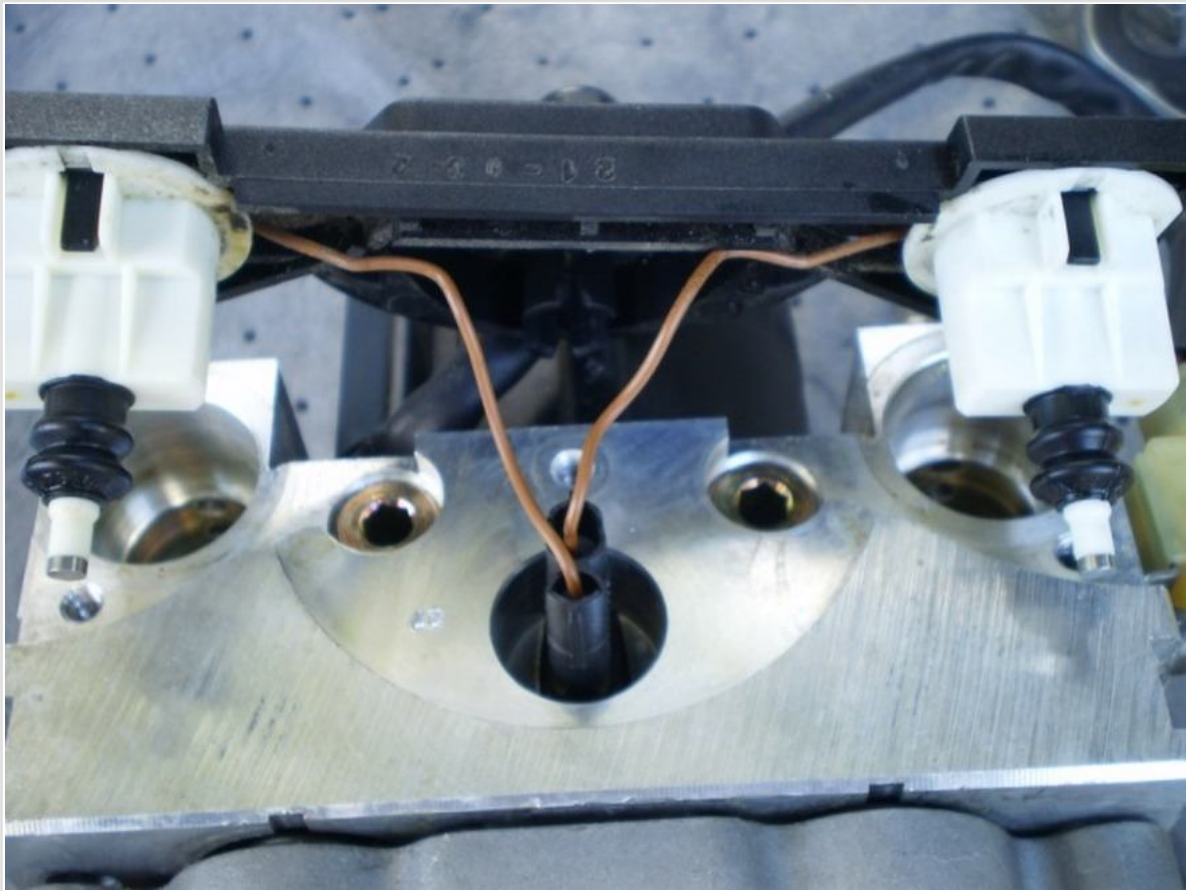
15. Clean off the modulator. Using a 6mm hex tool, remove 8 bolts on the modulator.

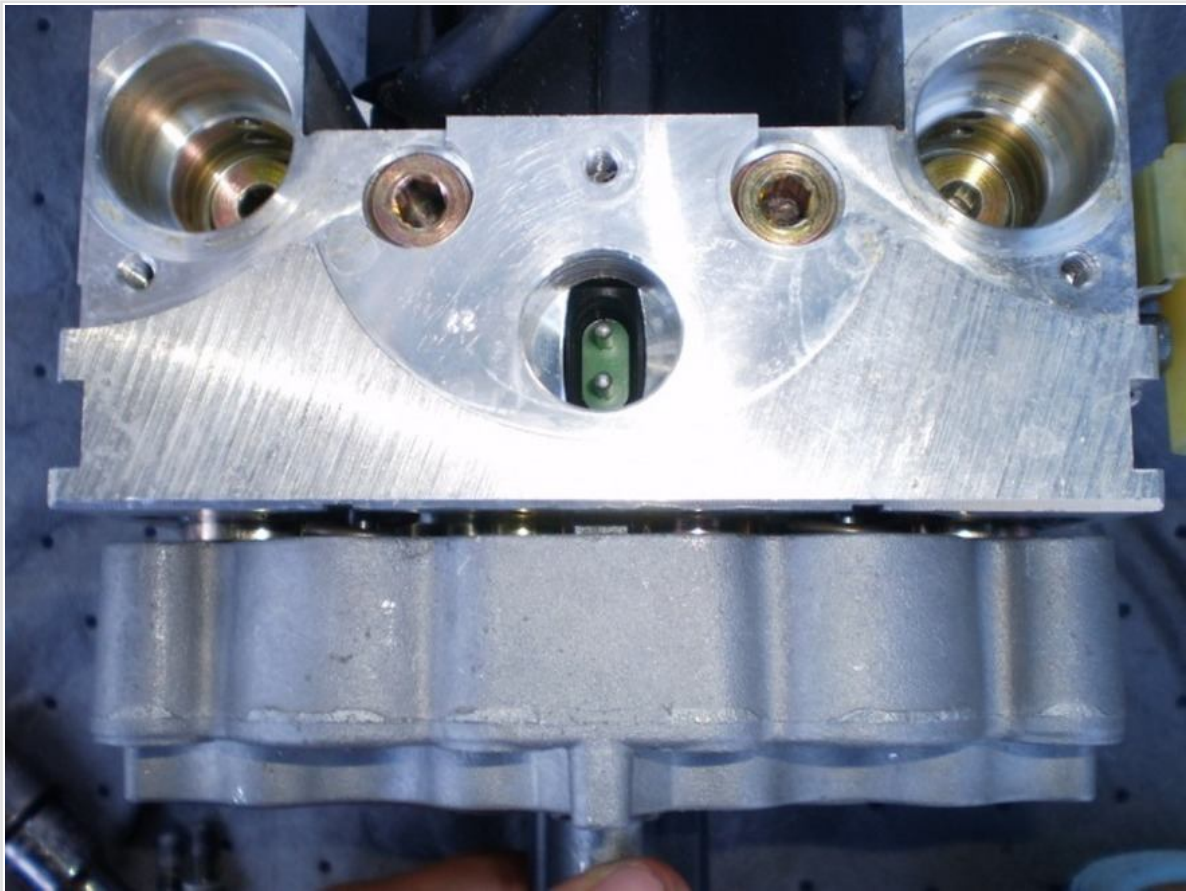


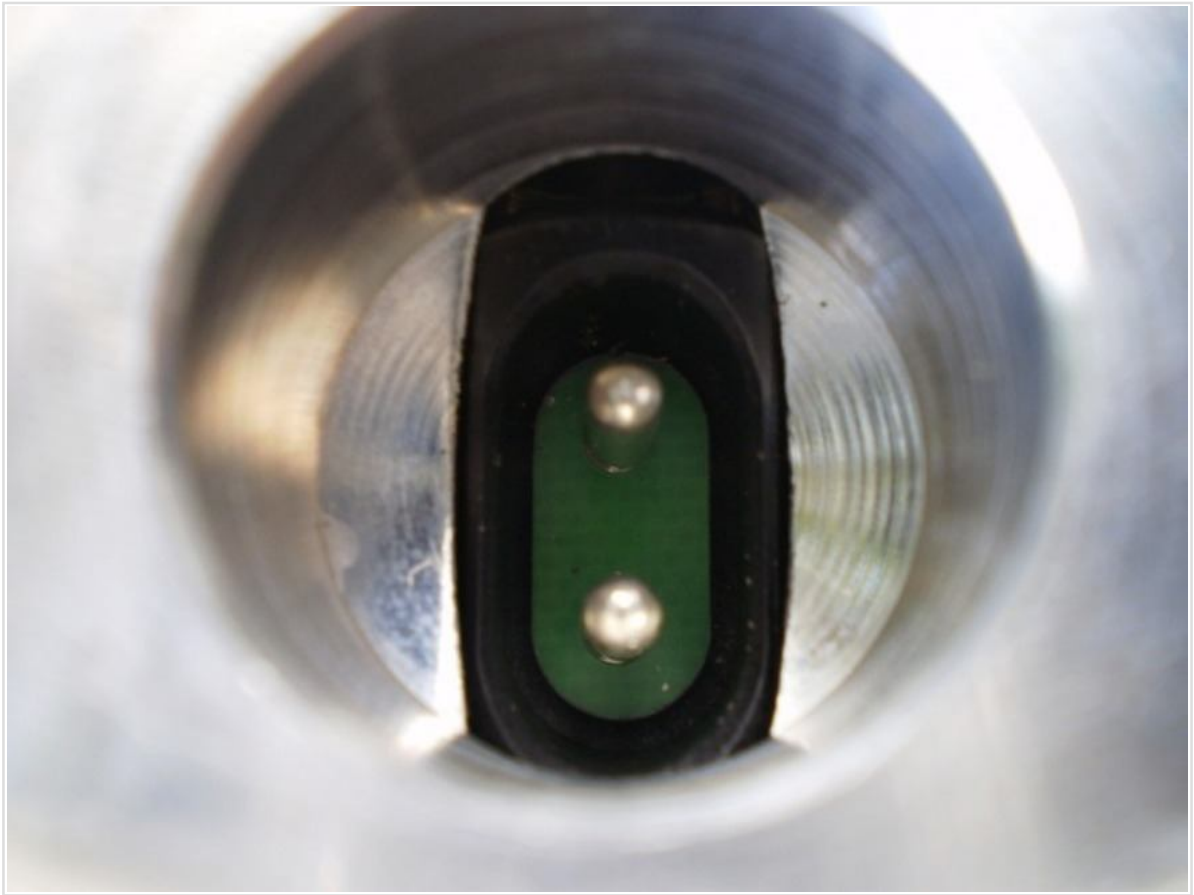
16. Turn the unit upside down. The SVS cover plate reading "WABCO" should now be on top. Using the 4mm hex bit, remove the 3 hex screws. They are installed with blue or red loctite, so let them soak in penetrating fluid to ease removal and prevent stripping.



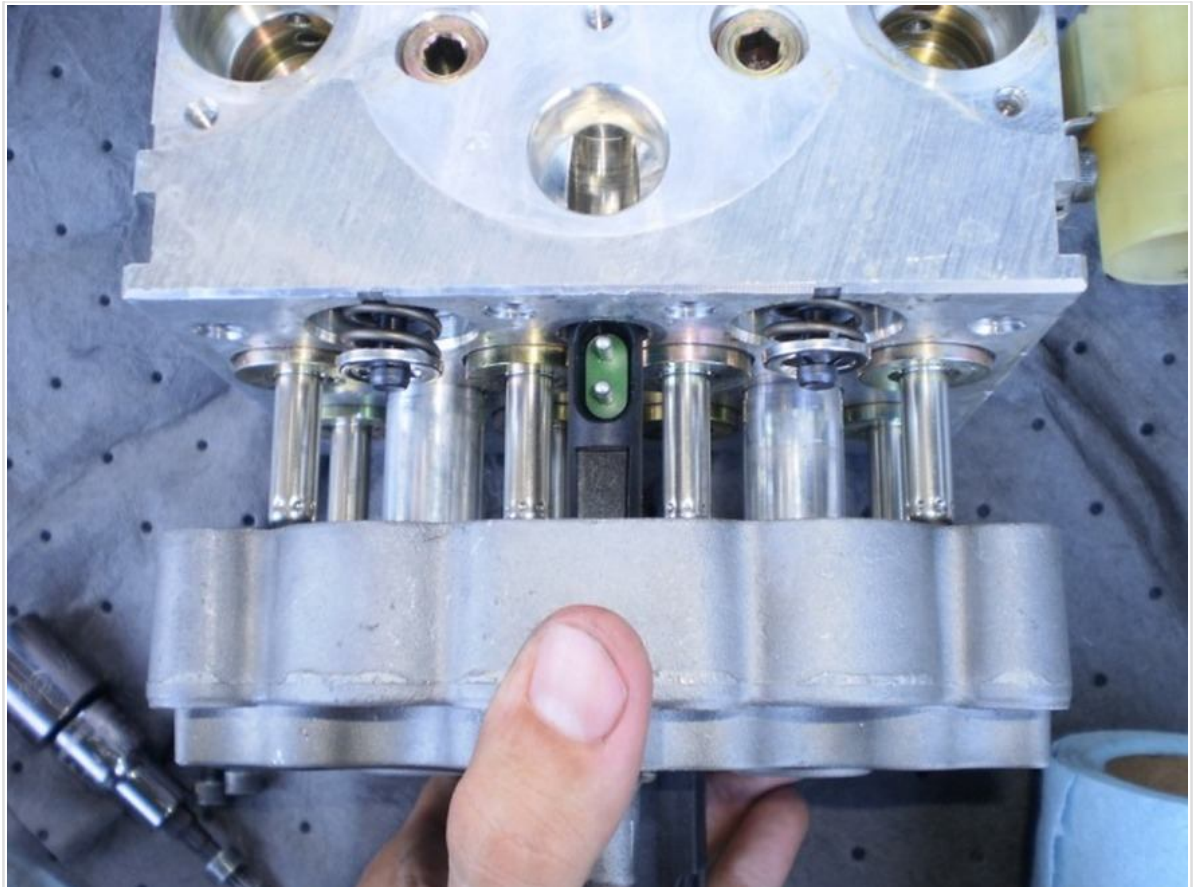
17. Carefully remove the SVS cover plate and disconnect the SVS plug. The plug should dislocate from the cover plate with minimal effort or hold it in place as you pry the cover out. If you find that a pin is lodged in the plug upon removal, and it did not remain in the SVS circuit board then you may have found your intermittent fault.







18. Continue to remove the two halves.





Pump side of the unit. Unit is upside down. Notice the brake line plugs at bottom.



Modulator side of the unit