

2005 Volvo S60 ABS Pump Assembly Motor replacement

September 28, 2016

In order to get to the pump, do the following:

1. Remove the positive terminal from the battery in the trunk
2. Removed the air filter box
 - a. Disconnect the electrical connector to the mass air flow sensor
 - b. Remove the air vent tube from the air filter box
 - c. Remove the air filter cover and take the air filter out
 - d. Pull up on the three plastic capture fixtures to release the box
 - e. Move the box out of the way
 - f. That exposes one of the two fuse box mounting bolts
3. Remove the fuse box
 - a. Remove the 10mm exposed mounting bolt from the fuse box
 - b. Take off the fuse box cover
 - c. Take off the positive terminals by removing the attachment nut
 - d. That exposes the other fuse box mounting bolt in the recessed hole
 - e. Remove the second 10mm mounting bolt down in the hole
 - f. Slide the fuse box toward the engine to release the mounting slot
 - g. Move the fuse box out of the way
4. Remove the brake control pump motor
 - a. Remove the three bolts that mount the pump block to its bracket
 - b. Use a Torx T30 male driver for this
 - c. There is not much room, but it can be done
 - d. That releases the pump from its bracket, so it can move a little bit
 - e. Don't move it too much, because you don't want to bend or break the brake lines that are attached to it.
 - f. Move the pump unit about ¼" toward the front of the car to expose one of the two motor mount bolts that is obscured by the bracket
 - g. Remove the two motor mounting bolts using a T25 Torx driver
 - h. The motor will come free if you wiggle it off the aluminum block
 - i. No brake fluid leaks out, because the pump is sealed from the motor
 - j. Be careful not to remove the bearing inside the aluminum block
 - k. If you do remove that bearing, it is difficult to put back

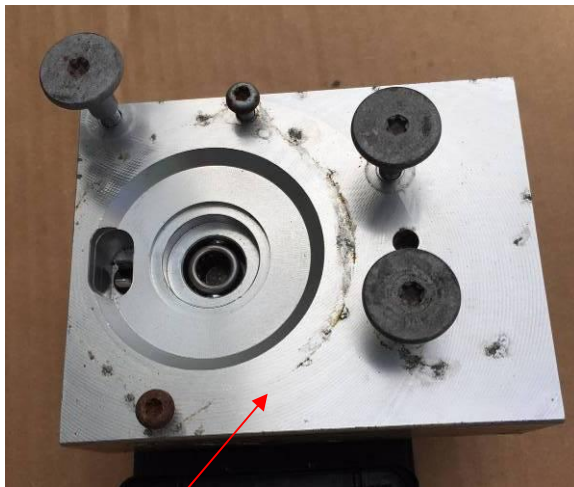
The pump motor has two brushes that are worn so it won't operate properly. The brushes can be replaced or the pump motor can be replaced with a used motor.

If you accidentally (or purposefully) remove the bearing from the aluminum block, here is how to get it back.

1. Fashion a tool to spread the two spring-loaded pump pins (see photos)
2. Spread the two pump pins wide enough to partially insert the bearing
3. Pull the spreading tool out, while keeping the bearing in place (sounds simple enough, but it isn't easy to do.)

Here is how the pump works:

1. The motor shaft is offset by a small amount (1/16" or so)
2. The shaft sits in a bearing in the aluminum pump block
3. The bearing sits between two spring-loaded pump pins in the pump block
4. When the motor shaft turns, the bearing oscillates, pushing the pump pins in and out alternately
5. The pump pins are sealed by o-rings, so that no brake fluid is leaks out to the oscillating bearing or motor shaft
6. The motor is mounted to the pump block by two Torx screws
7. There is a seal on the motor that mates with the pump block surface
8. Some photos below illustrate the pump and pump motor parts



Pump Block

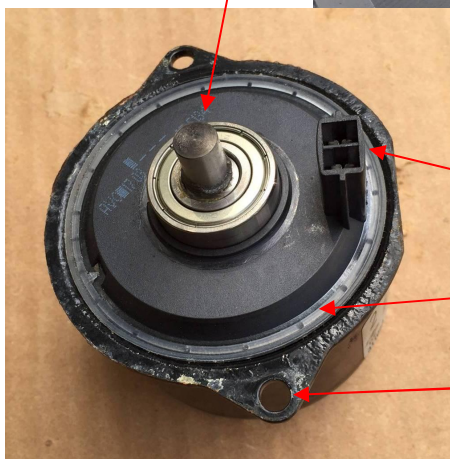
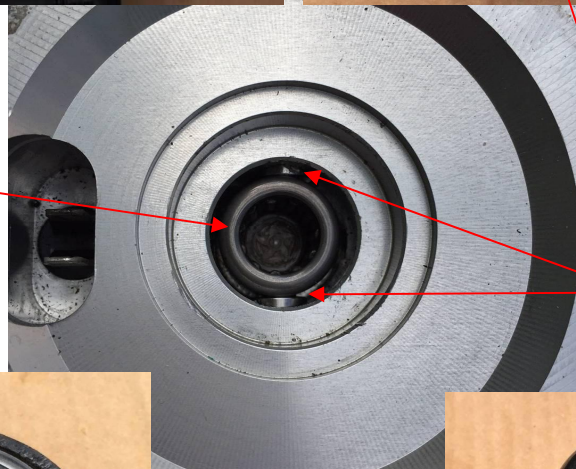
Oscillating bearing

Offset shaft

Pump Mounting Bracket

Bracket obscures one motor mount bolt

Pump Pins



12v supply connector

Seal

Mounting hole

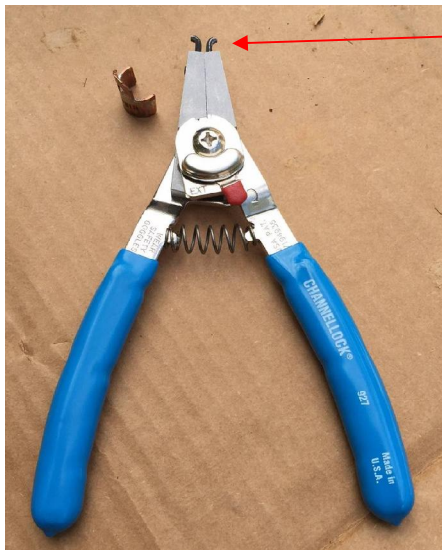


Here is how the spreading tool works:

1. Fashion two tips to fit in a snap-ring removal tool
2. Bend them at a 90-degree angle and cut them to length
3. Use the snap-ring tool to spread the two pump pins apart
4. Make sure the snap-ring tips are on the lower portion of the pump pins
5. Insert the spreading tool between the pump pins to hold them apart
6. Remove the snap-ring tool
7. Push the spreading tool all the way to the bottom of the hole in the block
8. Insert the bearing inside the spreading tool
9. Hold the bearing down while pulling the spreading tool out

Here is how you make the spreading tool:

1. Fortunately a 1/2" copper pipe hanger is about right for the spreading tool
2. Cut the hanger with tin snips at the half-circle points to form a crescent
3. The ID of the spreading tool must fit snugly around the bearing
4. The OD of the spreading tool must fit loosely in the pump block hole
5. Add a gripping point by soldering a portion of the hanger to the crescent

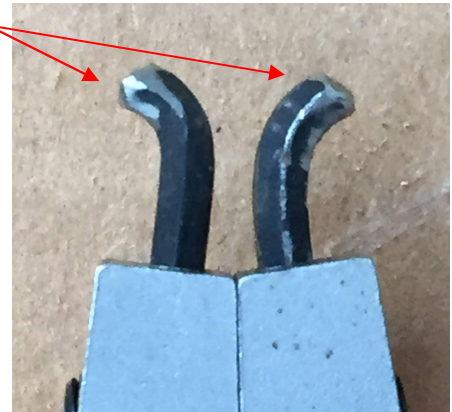


Snap-ring
removal tool

Allen wrench tips
(bent to fit)

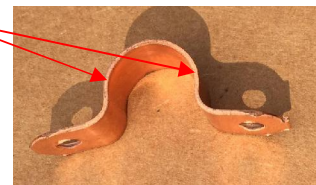


Spreading
tool



Tips close up

Half-circle points



1/2" copper
pipe hanger