



Volvo Chassis - I-Shift Transmission - AMT Gear Box Air Leaks



> Internal Content

Complaint:

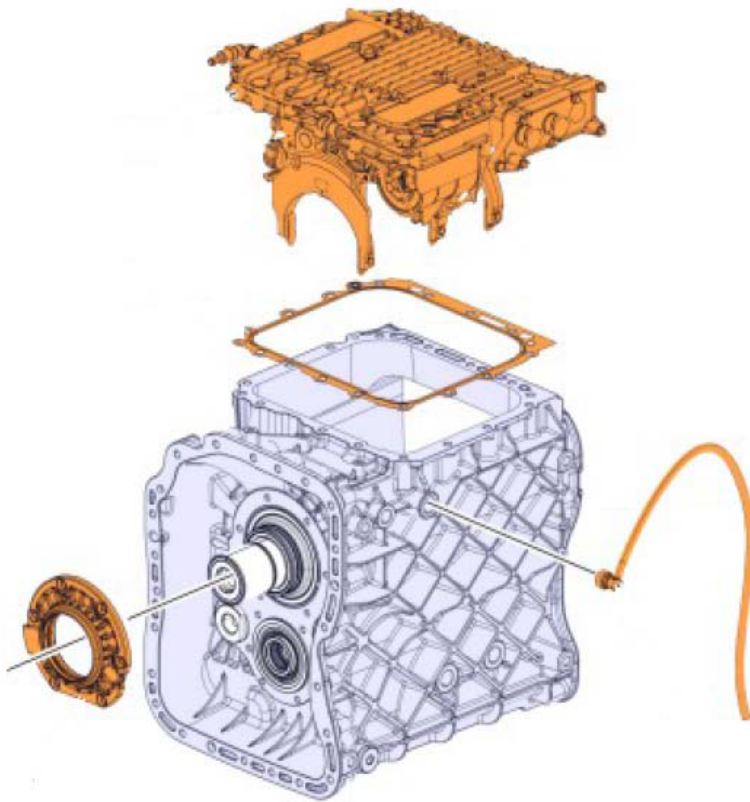
Air leak from the left or right side vent of the TECU all the time. AMT-D: See Figures 2 and 3.

Air leak from gearbox case vent tube all the time AMT-C: see Figure 5

Cause:

AMT - C & D; One or more TECU shift valves have become stuck open allowing the air path to the open venting solenoid. This can be an intermittent issue. Testing and investigation has shown that exercising the valves with TT by forcing shifts can 'unstick' the valves and the leak might not return however there is a good chance that the valve will become stuck again. TECU to control housing seals can leak causing symptoms like described and should be checked prior to major component replacement. A leak between ports in the TECU due to a failed gasket like in picture below can cause erratic or undesired shifting due to air bleeding to the wrong ports during shifting. The seals should be pliable and have a peaked appearance. This seal is bad due to the flattened sealing surfaces.





Repair:

Replace TECU to Control housing seals if faulty and retest

Replace TECU

 Live UI **Malaint:**

Air leak only when shifting or certain gears are not avail during operation or slow shifting accompanied by an air leak.

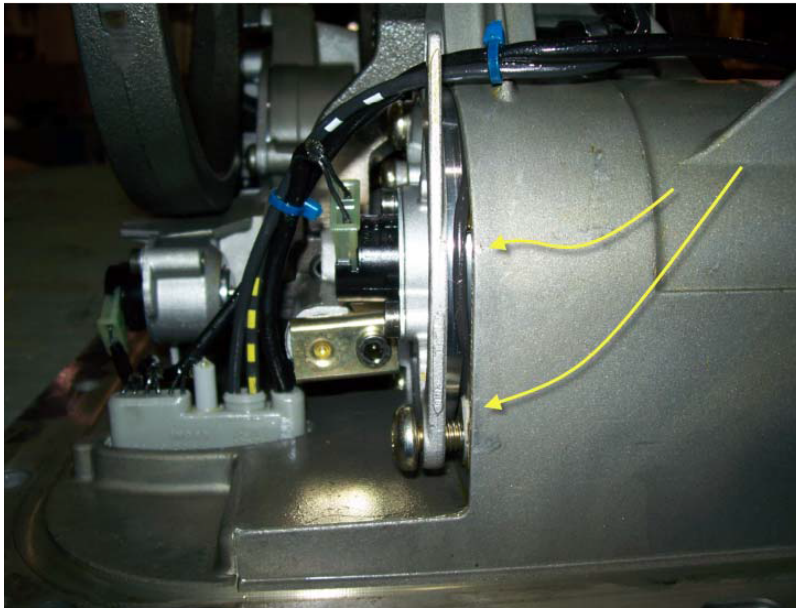
Cause:

Air leaks like these are in the shift control housing and not the TECU. Causes of these leaks are typically screws backed out of the shift piston covers (see figure 4) that allow the end cap to come out and vent air to the case during a shift. This will typically only be affecting one shifter and only when the shifter is asked to move in only one direction. The complaint may indicate that several gears are unavailable at random times. The TECU will find these gears and will try and avoid them if possible during operation. This may not always happen consistently but in an effort allow unit operation the TECU will abandon certain gears. A key cycle will typically reset this learning and the unit will have to relearn the 'bad' gears.

Other causes of these types of leaks are broken shift forks piston rods and cracked internal pistons. The broken rods can be identified by inspection after removal of the control shift housing and manipulation of the shift forks. One of them will feel like it is 'not attached to anything inside'. An AMT-C with external vent tubes on the right side of the gearbox will vent air from the vent tubes when these two failures occur. An AMT-D is internally vented through the TECU and will leak air from the vents on the TECU.

Warning: *Do not transfer the external vent tubes from an AMT-C to an AMT-D gearbox during a repair.*

The other types of failure that can occur and cause leaks during shifting are broken/cracked internal shift pistons. This failure will in addition to having an air leak will be a slow shift of the failed piston. These failures will vent through the TECU vents on all AMT versions. Cracked pistons will vent air from the TECU vents but this is only during shifting. Air leaks during shifting can also be caused by a leaking countershaft brake assembly, CVU or CCA. Testing of these components is needed prior to replacing the control housing assembly.



Repair:

Replace shift control housing only, unless other damage is found.

Complaint:

Gearbox slow to engage a gear from Neutral or shift quality is bad. Slow to shift between gears or harsh shifting. Air leak heard from clutch/flywheel housing.

Cause:

Air leak on CCA (Clutch control Actuator) inside clutch housing.

Air leak on Countershaft brake assembly

Perform clutch release tests in TT and listen for excessive air to escape during these tests. Some air venting is normal but long blasts of air are not normal.

Repair:

Inspect and replace the cause of the leak. Tech tool can be used to manipulate the clutch actuator with the gearbox in or out of chassis to investigate this type of leak. Use 4111-08-04-01 - PWM Valves

Live UI Activation, Test (Transmission Removed) or 4111-08-03-06 - PWM Valves Clutch Activation, Test to pressurize the clutch system to check for leaks

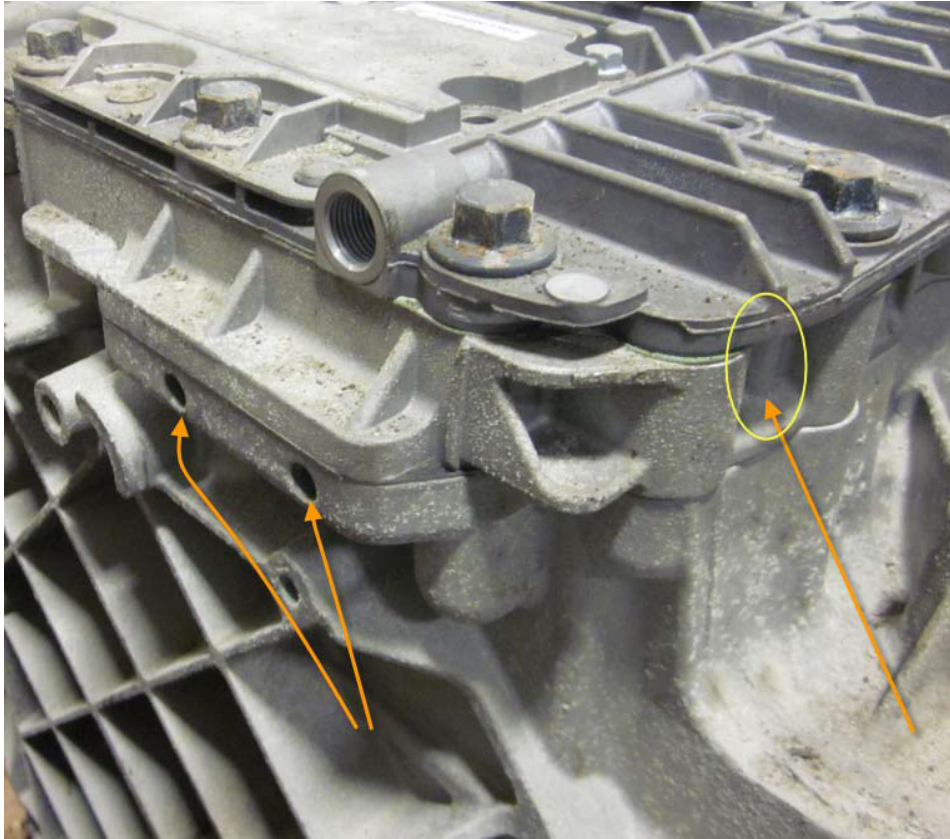
Internal AMT-D venting



The internal venting of the AMT-D is provided in the bearing retainer plate for the rear main shaft bearing. This provides venting and oil separation for return back to the gearbox.



AMT-D gearbox venting with bearing retainer removed. All of this is contained behind the high range synchronizer cone in the rear of the gearbox.



The Vent port is cast and drilled in the main case and leads into the control housing and TECU and is vented through the ports on the left side of the main case.



Live UI

Internal ports in the control housing and the air path for gearbox

case venting.

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