(Back Office Only) Volvo Chassis - Equipped With A Catalyzed Exhaust Aftertreatment System (EATS) - Regeneration (Regen) Failure Diagnostic Process - US07 to US16 Emissions

Internal Content

The regen process itself has been mostly unchanged from the time it was implemented for US07 emissions to present. The Engine ECU raises engine load to generate exhaust heat, and a Seventh Injector adds fuel to the exhaust to raise temperatures further and convert uncombusted particulate material in the Diesel Particulate Filter (DPF) to ash. However, with the addition of the Selective Catalytic Reduction System (SCR), the temperatures and engine parameter values changed, and there have been component changes to the system as well to improve regen function.

The first version of the EATS was used on chassis built from 2006 (The beginning of US07 emissions) through mid-2011 (early US10 emissions). The second version was instituted at that time and is used up until US16 emissions.

Chassis constructed between May 16 and November 14, 2011 were equipped with the new EATS configuration but also utilized a Discharge Return Valve (Compressor Bypass Valve) (DRV, CBV) on the turbo when initially put into service. Software advancement eliminated the need for the DRV. In the event that the DRV is malfunctioning or damaged (leaking) on a chassis built in this date range, a deletion kit can be installed in its place. The procedure can be found in Technical Service Bulletin V-258-029 located in Impact.

1. Navigate to the Service tab.

2. In the Info Type box, make sure Technical Service Bulletins is selected.

3. In the Additional search values box select Keyword

4. Enter 258-029 into the text entry box, press the Search button.

5. A link for the article will be shown in the results. Click on the title, then choose one of the options from the window that opens.

Live UI

US07 and Early US10 Emissions chassis use a Discharge Return

Valve (DRV) to raise engine outlet temperature. There is no Aftertreatment Hydrocarbon Injector (AHI) module on these chassis. Instead, there is a separate fuel shutoff valve, and the dosing valve is located on the Seventh Injector itself. Purge air is routed directly to the Injector. Fuel and Air enter the Dosing Valve via a Parker© T-Check valve.

Further information and diagnostic instructions for US07 and Early US10 emissions can be found **here**.

US10+6 and Newer Emissions chassis utilized an updated version of the EATS. Engine heat is now produced utilizing higher boost and fuel injection, eliminating the need for a DRV. AHI components were redesigned. The Fuel Shut-off Valve and the Dosing Valve were relocated to a new AHI Module, and a Purge Air Shut-off Valve was added to the system, also located in the AHI module. The Seventh Injector itself was changed from a solenoid valve to a simple nozzle.

Further information and diagnostic instructions for US10+6 and Newer Emissions can be found **here**.

Tags k06392288 volvo

Related links and attachments

TSB 258-029-V

Feedback

Give feedback

to help improve the content of this article

Live UI

Engine Turbocharger Compressor Bypass Valve Deletion Kit, Installation

V-258-029

(November 2011)

Valid for

Volvo engines built between May 16, 2011 and November 14, 2011

Case description

Trucks built during this timefrant are equipped with an engine turbocharger compressor bypass valve. On October 17, 2011 a main software update reprograms the engine control module (ECM) and the bypass valve is deactivated. If a vehicle has main software 21807200 and above, and the bypass valve is damaged, bypass valve deletion kit 85131416 can be used to replace the bypass valve at a greatly reduced cost.

Parts

Part Number	Description	Quantity
85131416	Engine Turbocharger Compressor Bypass Valve Deletion Kit	1

Procedure

You must read and understand the precautions and guidelines in Service Information, Function Group 2, "Engine Safety Practices" before performing this procedure. If you are not properly trained and certified in this procedure, ask your supervisor for training before you perform it.

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1. Secure vehicle for service by parking it on a flat level surface, apply parking brake, chock rear wheel, and place transmission in neutral.
2. Cut any cable ties securing bypass valve control air line. Disconnect air line at bypass valve. Cut steel air line off at right front of valve cover and discard.
3. Disconnect bypass valve fresh air hose from fresh air inlet elbow
4. Remove fasteners and remove bypass valve from the charge air cooler (CAC) pipe.
5. Install the plug from the kit in the fresh air elbow, secure with new clamp.

Cover Plate and Plug

6. Clean sealing surface on CAC pipe. Install cover plate with new O-ring and fasteners. Tighten fasteners to 24±4 Nm (18±3 lb-ft).
7. Secure the turbocharger compressor discharge temperature sensor harness using cable ties.
8. Disconnect harness connector at bypass valve solenoid. Use the plug in the kit to seal harness connector. Use cable tie to secure harness.
9. Start the engine and check for proper operation.

Warranty information

Reimbursement

This repair may be eligible for reimbursement if a product failure was experienced within time and mileage limits of the applicable Warranty coverage. Reimbursement is obtained via the normal claim handling process.	
Claim Type (used only when uploading from the Dealer Bus. Sys.)	W
Labor Code	
Primary Labor Code	25811-2-00 0.3 hrs.
Causal Part	20940438

Issued by

Technical Service

Volvo Trucks North America engages in a continuous program of testing and evaluating to provide the best possible product. Volvo Trucks North America, however, is not committed to, or liable for updating existing chassis.

DPF Regeneration Companion Sheet (SPN4094 v1440.2)

Non Spark Assist (catalyzed Mack and Volvo)

CES System with functional DRV (US07 and early US10)

1. Once a Regen is commanded, engine speed should go to ~1,200 RPM.
2. The HEST light should turn on.
3. The DRV should activate once all the conditions are met.
4. The Exhaust temp (PID 173) should climb quickly at this point.
5. When the Exhaust temp (PID 173) and Exhaust gas temperature #2 reach 482*F, the fuel shut off valve (PPID 328) should activate for 1 second and turn off again. What is happening in this phase is, the system is looking for a timed increase in aftertreatment fuel pressure and a timed decrease when the pressure drops (approximately 60 seconds). If the pressure does not climb fast enough, or decreases too fast with the valve shut off, this can be interpreted as an external fuel leak in this system, so it will not allow a Regen to happen. We cannot have fuel spraying on the exhaust manifold or turbo. If the pressure climbs fast but is too slow to drop back down, the system will interpret this as a possible blocked return line or blocked shut off valve port.
6. About 200 seconds later, if the test phase passes, the shut off valve and AHI should initiate.
7. Aftertreatment fuel pressure should go to near engine supply pressure.
8. The Exhaust gas temperature sensor #2 temperature should climb rapidly at this point. Typically 1,000 – 1150*F.
9. The system is actively Regenerating at this point and should continue for approximately 20 minutes.
10. Once the Regen is determined as completed, the AHI, Shut Off valve and DRV should go inactive, and the engine RPMs will return to idle.
11. The soot ratio should now be back to a low level
12. The HEST light will turn off when the exhaust temperatures return to normal.

Troubleshooting

1. **AHI won't start to inject.** Typically, this is due to the exhaust temp not reaching the required 482*F (engine side). The DRV needs to be check for function. There could be an external air leak from the air supply to the DRV control valve, or from the DRV control valve to the DRV itself. An EGR valve that is stuck open with drop exhaust temps. Check EGR valve position (PID 27) and Recirculated Engine Exhaust Gas Diff Pressure (or EGR dP - PID 411). The EGR valve should be commanded to 0% and EGR dP should be below 0.3 PSI during a Regen. The VGT should be positioned to a low number to assist in elevating Exhaust temp. The sector shaft travel resistance and full travel test should find issues with the turbo. Check for any air leaks in the intake system (hole in CAC, cracked intake manifold, etc) or exhaust leaks (gaskets, slip joints, etc...) If the Regen fails the fuel pressure test in phase 5 (Aftertreatment side), check for external leaks, kinks in the fuel lines, or any signs of blockage. Note that the 13 liter engines are prone to fuel coking in the lines near the exhaust. This can cause carbon build up in the line or the shut off valve.

2. **Exhaust reaches 482*F, AHI starts to inject but #2 sensor temp does not climb.** AHI is dirty or plugged. Cleaning may correct this. Wrong AHI installed for the application. A 11 liter AHI installed on a 13 liter engine for example. A defective AHI is a possibility. A blockage in the fuel line will do this. Disconnect the fuel line at both ends and blow through it. If carbon comes out, replace the line as cleaning is not usually effective. If carbon is noted, it may also be necessary to replace the Shut Off valve and AHI as the carbon bits clog the filters. If the system has the Air Purge system, the tee may be defective, the air pressure to the tee may be too high (30 psi nominal is expected when flowing). The DOC may be face plugged and has lost the ability to react to the fuel injected. US07 DOC can be viewed easily by removing the DPF inlet housing. US10 DOC can be partially viewed through the exhaust inlet port. These can be cleaned by using a vacuum cleaner on the inlet side and blowing backwards through the DOC with shop air (do not breath the carbon dust).
3. **Regen appears to be happening but the soot ratio does not go below 140%.** This will happen when the filter temps increase but do not reach ideal temperatures associated with a good Regen (1,000 – 1150*F). The causes are similar to #2 but to a lesser degree. The same tests apply.
4. **Frequent Regen demand complaints.** This can be caused by either incomplete Regens as in #2 and #3, or the engine is putting out too much black smoke (soot). *Prior to doing any tests that requires any tear downs, road test while monitoring the sensor values as in SPN 4094 13.44.4 instructions.*
    a. If the DPF system check show that the DPF is OK, remove the 1/8" NPT plug from the DPF inlet housing and install a calibrated pressure sensor (0-10 psi) or a transducer and Fluke meter in the port. Run up the engine to high idle speed and compare the test gauge readings to the DPF Differential Pressure sensor readings in VCADS. The two readings should be real close. If there is a spread of over 1-2 psi, remove the DPF filter and run the engine up to check for black smoke (snap test or road test). If too much smoke is noted, remove the inlet pipe to the DPF and do the smoke test again. If NO smoke is noted, clean the DOC and test again. Also, on US10 chassis, a restricted SCR will cause black smoke when all is connected but no smoke with the DPF filter removed. A plugged SCR will also cause a high back pressure reading (test port) with low DPF differential pressure reading.
    b. If smoke IS noted, go to the sensor values recorded earlier and look for clues that would lead to excessive over fuelling or inefficient burn.
    c. Under a 100% Accelerator Pedal position (PID 91) at a road speed that should be accelerating, look at the corresponding Engine Load percentage (PID 92). The PID 92 should follow closely the PID 91. If PID 92 is consistently lower than PID 91 under a hard acceleration, this indicates that the software is trying to pull back on fuel injection (it senses overfuelling in other words). If this is the case, check the chassis history to see if any injectors have been replaced at one time or another. 13 liter injectors installed in 11 liter engines are the typical example of this error. A physical inspection of the injector information tags is necessary to verify this. Parts invoices can be wrong if there was a packaging issue. If the correct injectors are installed but with these conditions,

there may be other injector issues causing the same effect. Eroded tips, or plugged fuel return for example.

d. If PID 91 and PID 92 follow closely, there may be issues with the EGR system. Under steady state cruising speed (but not in cruise mode), the EGR valve is usually commanded to a relatively high percent command. Not the engine load, EGR command, EGR dP readings and EGR temp. If a high command is consistently given but the flow stays low for the conditions, this is an indication of either the sensor not reading correctly or the flow is genuinely low. Check the EGR dp sensor readings (PID 411) with key on, engine off. It should be reading below 0.3 psi. Replace it if it reads higher than that or reading a negative number. Clean the EGR venturi ports (and tubes and mounts on the 11 liters). If the sensor system is OK, the EGR cooler can be restricted. On engines with the early open ended EGR cooler, high EGR temp (PID412) readings above 400*F indicate a restricted and inefficient EGR cooler. There may be inactive EGR temp faults logged in the system to support this suspect issue. On engines with the current 'nose blocker' EGR cooler, the temps stay low but the flow is restricted. There may be inactive Mass Flow faults logged in the system to support this suspect issue.

e. Turbo issues can cause excessive black smoke. VGT sector shaft travel and binding checks should lead to turbo issues. Turbo compressor wheel damage (FOD) or turbine wheel erosion can cause black smoke output. Identify the source of the contamination and correct as needed.

Integrated Parker System without DRV (later US10 and US13)

1. Once a Regen is commanded, engine speed should go to ~1,200 RPM.
2. The HEST light should turn on.
3. The Exhaust temp (PID 173) should climb quickly at this point.
4. When the Exhaust temp (PID 173) and Exhaust gas temperature #2 reach 482*F, the fuel shut off valve (PPID 328) and the injector should activate.
5. Aftertreatment fuel pressure should go to near engine supply pressure.
6. The Exhaust gas temperature sensor #2 temperature should climb rapidly at this point. Typically 840 to 940*F.
7. The system is actively Regenerating at this point and should continue for approximately 20 - 40 minutes.
8. Once the Regen is determined as completed, the AHI, and the Shut Off valve should go inactive, and the engine RPMs will return to idle.
9. The soot ratio should now be back to a low level
10. The HEST light will turn off when the exhaust temperatures return to normal.

Troubleshooting

1. Exhaust temps (PID 173) won't go up. This can be caused by turbo VGT position (PPID 307) stuck open beyond 13% or engine load (PID 92) above 20%. First thing to check here is software level. Make sure it is current. If the software is current with these conditions, check the VGT

sector shaft for freedom of movement and full travel. EGR valve open or by-passing with drop exhaust temperatures as well. Same check from the CES system apply to this system.

Spark Assist

Before starting diagnosing Regen issues with this system, a thorough investigation of the condition of the complete chassis needs to be done.

- Has the chassis air system been serviced correctly base on published service information? If not, correct the issues. The air dryer needs to be properly connected and serviced. The pressure in the system needs to be regulated within the correct tolerances.
- Has the fuel system been serviced correctly based on published service information? If not, inform the operator that the fuel system needs to be serviced.
- Is the engine air filter flowing correctly and not plugged? If not, inform the operator that the filter needs to be serviced.

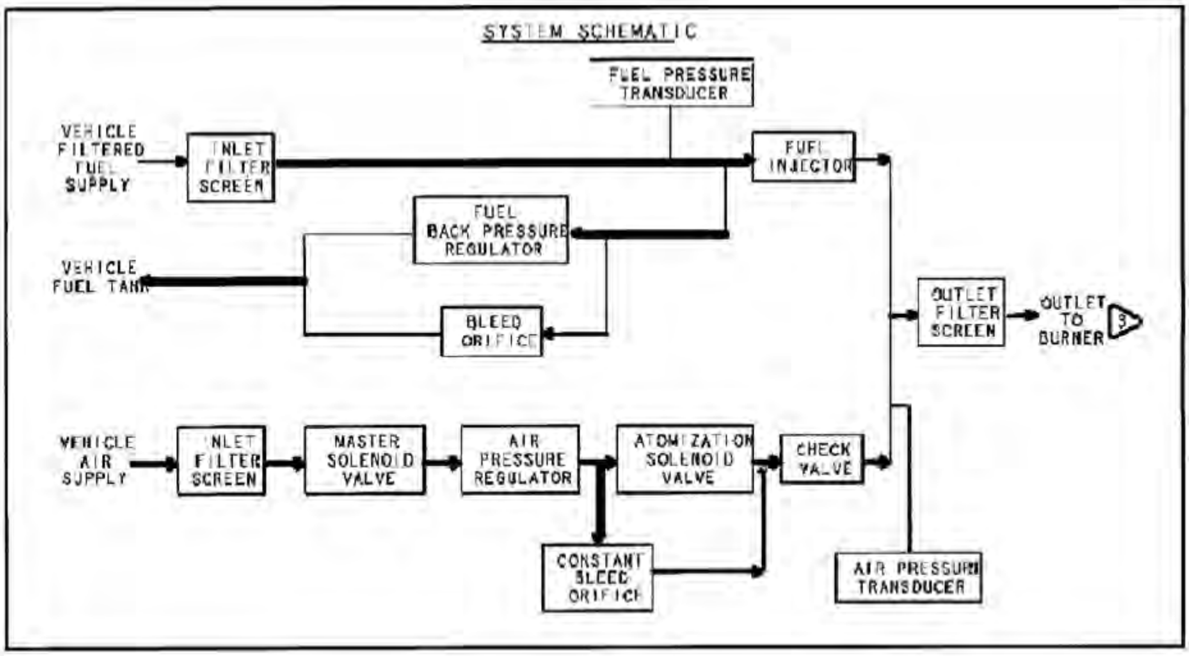
Combustion Air Flow. 400+ LPM is required during Regen with idle set to 700 RPM for US07, or at 1,200 Regen RPM for US10.

- US07 - The CAV has an arrow on it to show direction of flow. The orifice in the intake manifold should be 3/8". There should be NO orifice at all in the CAV fitting boss at the combustor housing.
- US10 – The CAV (DRV style) is controlled by a solenoid mounted on the EATS rack. There is NO orifice in the intake manifold where it mounts. There is a 9/32" orifice in the Combustor Housing.
- Since we had issues with replacement US07 combustor housings that had the US10 orifices in place (see above – should be no orifice for US07), **do not be surprised to see other anomalies with the new replacement units such as weld quality**. Don't assume a new part is a good part.
- Some US10 combustors have been reported to have failed or bad welds at internal components. One test is to insert an appropriately sized screw driver through the 9/32" orifice hole in the combustion air inlet port and verifying there is a plate ¾" to 1 ½" up blocking the screwdriver and the plate does not move. It should be solid. This plate is actually a type of vane the directs the air in a swirling pattern for better combustion.

Typically, the Spark Assist system will complete a **Service** Regen even when there is NO combustion air flow. It will only display Flame Temp readings of only around 1700*F (should be 1850 – 2100*F). There is typically enough oxygen remaining in the exhaust stream to support combustion under Service Regeneration conditions. This has fooled many in the past giving the feeling of successful Regens but when under load, on the road, the oxygen from the engine is all used up by the engine and Regens will fail. So it needs Combustion Air under these conditions to support successful combustion.

Note that any leaks in the intake or exhaust systems will cause issues.

Since we had issues with replacement US07 combustion chambers that had the US10 orifices in place, **I would not be surprised to see other anomalies with the new chamber installed on this unit.** Just a personal feeling. Weld quality on new replacement parts is always an issue that needs to considered with this vendor. Don't assume a new part is a good part.



(Air Atomization Module flow chart)

100 PSI **fuel pressure** Nominal. Range is 95 to 105. 95 psi is at the hairy low limit. 94 or less will give you reliability issues. The pressure is controlled by the Atomization Module (AAM) and not the pump.

- If fuel pressure is low, remove the fuel return line from the AAM to the fuel tank and look for the amount of return with the engine running and pump active. Remove the AAM return line at the return tee and cap the tee
- LOW fuel pressure – LOW return flow indicates a bad pump or restriction from the engine supply to the pump inlet.
- LOW fuel pressure – HIGH return flow indicates the pressure control valve in the AAM is stuck open.
- HIGH fuel pressure – LOW flow indicates a blockage in the Atomization Module or the return line. Test return flow again at the return fitting at the Atomization Module. If flow returns to normal, the issue is a blocked return line. If the flow remains low with high fuel pressure, the issues is a blockage within the Atomization Module.
- ***Note: In some cases, drops in engine power have been reported when the system goes into auto Regens while driving. In most of these cases, the issue is engine fuel***

starvation due to the Atomization Module pressure control valve stuck open and dumping fuel pressure. The engine fuel pump cannot keep up with the engine AND DPF fuel demand with this condition, and the fuel pressure drops.

120 PSI air system air pressure to the AAM Nominal. 100 to 130 PSI is acceptable.

Less than 100 PSI will cause issues. Pressures over 135 will cause issues. If the pressure is OK stationary (no Regen), and drops during Regen, there is a restriction in one of the lines, or a sticking valve, or a valve installed incorrectly, or the air supply was modified by the body builder (we have seen air taken from the wrong tank). The air system actually does not take all that much air. Atomization air is restricted through the orifices in the nozzle and the flow should decrease as fuel is injected (sharing the same holes). On the US07 system the Supplemental Air Valve should only activate momentarily on the initial system test (1 or 2 seconds) then remain off for a Service Regen. US10 system does not have a supplemental air valve.

When checking the spray pattern at the nozzle, with Atomization Valve active and Injector control active, you should have a heavy white fog. Not a stream of fuel and not a light mist.

When checking for spark quality, it should be checked during an active Regen command, not with the Tech Tool test. For some reason, when tested with the Tech Tool, the pulse rate is lower (longer coil charge time) than it is during an active Regen. A good test tool to have handy is a straight in-line spark tester (the style with the light bulb and not the open gap type). Auto parts supply stores typically sell these for about $7.00.

On the US07 system, I would monitor the Emcon module Battery and Ignition voltage during the system test period when all components are turned on and again during an active Regen. There should be no voltage drop at all compared to the battery voltage. The wires from fuses 54 and 64 are marginal in my mind and it does not take much of a resistance problem in the wires to cause Regen issues. 54 is the Batt power and 64 is the Ign power. 54 goes from the FRC connector pin C7 to 102 pin connector pin 5 to CDPF connector pin B to the Emcon A connector pin A1. 64 goes from FRC connector pin A3 to the 102 pin connector pin 78 to the CDPF connector pin F to the Emcon A connector pin A3.

(US10 electrical information to follow)

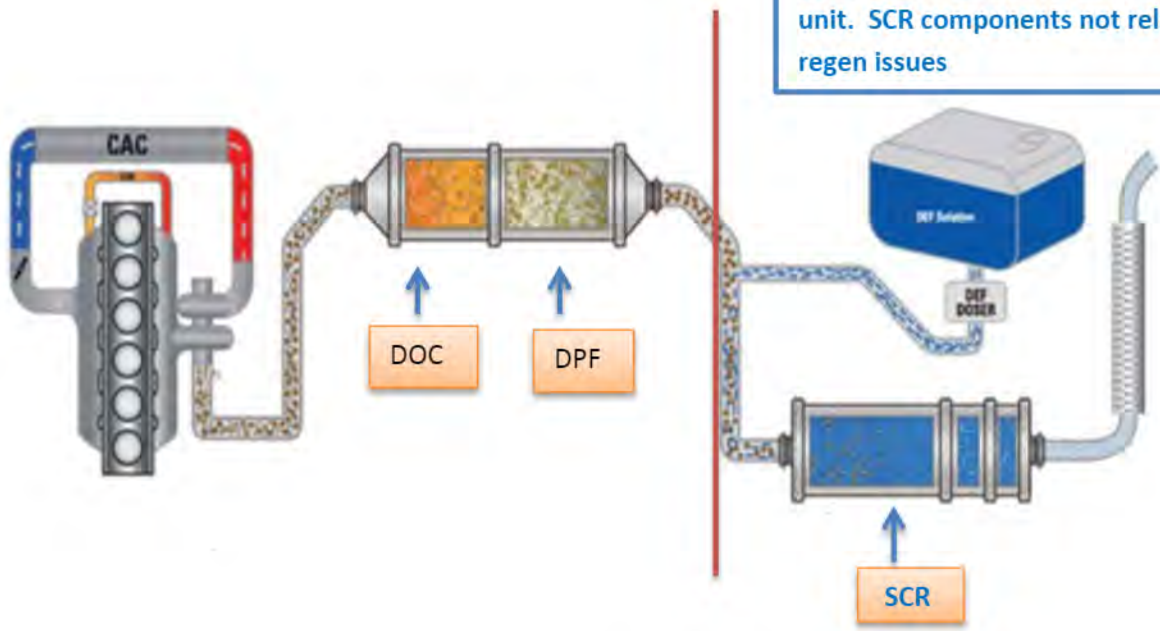
Note that on the US07 the Emcon module will NOT log a fault for open circuits (FMI 5) on the CAV circuit. This circuit is shared with the Atomization Air Valve. If you get an open circuit on any of these circuits, the other component will take up the load and the module cannot detect the open circuit condition.

These are just observation from working with this system and this document will be updated from time to time.

INTERNAL USE ONLY

REGENERATION FAILURES

Look at the SCR system as a separate unit. SCR components not related to regen issues



Scenario 1

REGEN OVERTEMP

Before any type of direction is given first look through the warranty history for any type of failures that could have compromised the DOC or DPF.

Excessive Temps could be related to many possible reasons, first find out which exhaust temp sensor is showing the spike in temp. Follow the steps below that applies to which temp sensor is showing the temperature spike.

Make sure sensor readings are attached if able at the start of the case

T1 issues are normally not related to high temperatures during regens so for high temp issues we will start with sensors T2 and T3. Select the sensor that is showing the overtemp (T2 page 2) (T3 page 4)

T2 Sensor

A temperature Spike on T2 sensor is normally an issue with overdosing of the AHI injection system or a mechanical issue with the engine injection system like a injector that is no longer properly seating in the injector cup creating excessive oxygen to be entered in the fuel system this excessive oxygen in the fuel system will create hotter temperatures normally seen on the T2 sensor during a regen.

Troubleshoot the AHI only if a related fault code is logged

Question the tech about any hard starting issues or stumbles going down the road. If yes then good chance we have injector sleeve leakage. At this point we would remove injectors.

If no complaints of hard start or stumble issues move to page 3, DON'T'REMOVE INJECTORS AT THIS POINT

AHI DOSING SYSTEM

Picture 1

Notice on a properly sealed injector you will have a uniform ring around the injector

If we find an injector that was not sealing properly only change that injector.

A performance issue may not always be detected with injector sleeve leakage but if no performance issues are found at this point we need to cancel the injectors being an issue for now. We may have to go back to the injectors if the next step proves not to resolve this issue.

Picture 2

This is a picture of a failed injector that is no longer seating properly in the injector sleeve. Notice there is no sealing ring around the injector like picture 1

Continued from page 2

AHI DOSING SYSTEM

Only troubleshoot the AHI system if a related fault code is logged.

If a fault was logged for the AHI module troubleshoot and correct the issue if the temperature spike is still present move to next step.

Is T2 sensor still showing a high temp spike? If so then we need to remove injectors and inspect for a failed injector sleeve.

Note: an injector sleeve leakage that is not showing any type of performance complaints is very hard to detect even using the air in fuel test procedures keep that in mind.

Replace only the injectors that show sign of leakage like picture 2 on page 1. After replacement of the injector perform regen if no more spikes issue is resolved

T3 SENSOR

Now we are troubleshooting high temp on the T 3 sensor. There are 3 common things that could spike T3 temps.

1. A failed DOC, normally caused by a previous failure turbo, injector etc.
2. Excessive soot cause by an EGR valve stuck open or an injector that is putting excessive soot in the exhaust system resulting in soot build up on the DPF; these deposits can ignite creating excessive heat to be shown on T3.
3. A failed Flex pipe that has put fiberglass through the DOC and DPF.

For an EGR valve that is stuck open this would most likely had been a previous failure. This would be a good thing to look for in the warranty claims. If the EGR valve was failed now then you would experience low exhaust temperatures on T1 and would likely not be able to initiate a regen.

FAILED DOC

At this point drop the DPF and see what we find

The signs of a failed DOC is normally low temperatures on the T2 sensor normally T2 staying within 100F of T1 sensor and a sharp temp spike on T3.

The example below shows T1 to be around normally what you would see on the exhaust during the regen. Notice that T2 really is never much higher than T1 and T3 has spiked. This is a good indication of a failed DOC.

200F difference between T2 and T3

Example	T1	T2	T3	
	650F	750F	950F	temperature span to great between T2 and T3 (approximate range)
	630F	890F	900F	normal (approximate range)

Check warranty history for flex pipe, turbo, or any type of EGR system failures.

After removal of the DPF if the DPF filter shows no signs of damage or soot build up or signs of fiberglass then most likely the DOC has failed. Would replace the DOC, perform another regen and see if issue remains, if not then issue is resolved

FAILED DPF

Review warranty history of any component failures that could be related to excessive soot build up on the DPF, also take notice of any engine performance issue if any make repairs prior to cleaning or replacing the DPF.

Once the DPF has been removed look for melted spots or severe soot. In the case of signs of melting is found then the DPF would need replaced. If excessive soot is found then the filter would need to be cleaned. After cleaning of the DPF a regen would need to be performed and if temperature spike no longer remain the issue is resolved.

FAILED FLEX PIPE

Here is an example of a failed flex pipe that has coated the DPF with insulation.

Continued on page 5

In the case of the flex pipe failure cleaning of the DPF and DOC is required but if temperature spikes remain then most likely the DOC has been damaged and will need replaced along with the DPF.

At this point we have cleaned or replaced DPF and DOC at this point perform a regen if temperatures are no longer spiking then the issue is repaired.

This completes troubleshooting for high temperature spikes during the regen.

Scenario 2

This section covers low regen temperatures.

Low temperatures during a regen are commonly the cause of two things.

1. Exhaust heat (Heat expected out of the engine). This is monitored by the T1 sensor
2. The AHI dosing system not delivering out the correct amount of fuel to perform the regeneration.

DOC and DPF normally not related to low temperature issues

Let's first look at exhaust temp.

Normal exhaust range during a regen on T1 sensor is between 550F to 650F- If within these ranges most likely not an engine issue.

If the exhaust temperature (T1) is within the ranges of 550 F to 650F during the regen move to page 9 for AHI system.

If exhaust temperature (T1) is below these readings then we have an engine performance issue.

What would cause low engine exhaust temp? What is the common thing that causes low temperature readings on T1 sensor?

1. EGR valve
2. Turbo
3. Injectors

EGR VALVE

Taking a look at the EGR valve first

An EGR valve that is stuck open can cause low exhaust temperatures

How to identify?

During the regen normal turbo RPM range is around 52,000 RPM's. If an EGR valve is stuck open you can normally see turbo speed start to drop during the regen and end up being around the area of 35.000 RPM's.

We should at this point remove the pipe of the front of the EGR cooler and cycle the EGR valve multiple times to see if we detect the valve sticking, if unsure at this point would suggest removing the EGR valve and physically check.

If EGR valve is stuck replace the valve perform a regen and see if T1 temps are between 550 to 650 F and the regen has kicked off and completed if so then the issue is resolved.

If nothing found go to the turbo

TURBO

What is the turbo speed during regen?

Normal range around 52,000 RPM's

Normal boost- PSI.

US10 +6 **8 PSI**

Non-plus 6 US10 **1.5 to 2.0 PSI**

If the Turbo during the sensor readings showing excessive RPM's say in the range of 65,000 + or very low RPMs say around 35,000 RPMs

Note: For the turbo lets question the tech to see if the customer has noticed any type of surging during first start up in warm hold mode if so that is another clue the turbo may be faulty.

Use check card and inspect sector shaft movement. If sector shaft takes excessive effort to move or sector shaft is not going into the green using the check card, the turbo will need replaced.

After the turbo replacement perform a regen and see if Turbo speed around the 52,000 Mark, the regen has been initiated and was able to finish if so turbo resolved the issue

If turbo was found fault free move to the next step

INJECTORS

Last is injectors this is the least likely of the two so this would be last resort if all else fails.

Again we need to ask the tech if the customer has experienced any low power complaints if so and we have canceled the EGR valve and Turbo as being the root cause of low temps on T1 then injectors will need replaced regen performed and confirm exhaust temps are around 550 to 650F.

AHI SYSTEM

If exhaust temperatures are correct the next step is the AHI System,

At this point we have verified the engine exhaust (T1) sensor is within the 550 to 650F range and regen temps are not climbing. The example in red is normally what you will see, notice T2 is staying around 700F and T3 is following the same trend. These are approximate readings. In the green is closer to what you will see in a normal regen.

Example:

T1	T2	T3		
630F	730F	750F	low	(approximate range)
630F	890F	900F	normal	(approximate range)

First have them check the doser to confirm no restriction this will require using GD on this step

If failed replace the doser perform regen and confirm repairs. If not then next step is to replace the AHI module and again confirm repairs