



Small EVAP Leak, SCCM, and 8-speed Auto Park



REFERENCE BOOK AND TECH NEWS
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Introduction

This month we cover three short, but timely and important subjects. TechCONNECT service information published an updated diagnostic procedure for diagnostic trouble code (or DTC) P0456 – EVAP small leak (Figure 1).

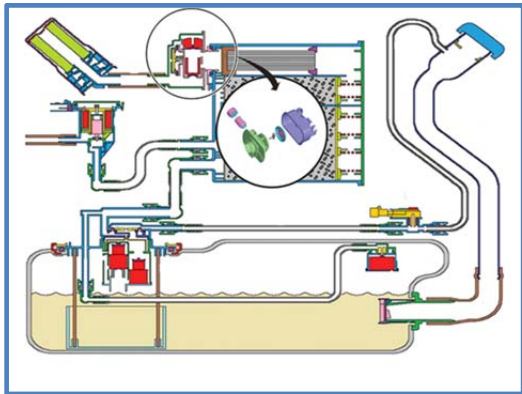


Figure 1: Typical EVAP system

In the first lesson, we go through the new procedure and highlight the key points that you need to remember.

Lately, too many perfectly good steering column control modules (or SCCMs) have been returned as defective. Inaccurate diagnosis has caused numerous chargebacks and unnecessary customer inconvenience.

The second lesson presents a quick review of the SCCM’s functions, connections, and diagnostics to help reinforce accurately isolating SCCM-related faults (Figure 2).



Figure 2: SCCM

The 8-speed transmissions have been updated to include an Auto Park function. In the last lesson, we focus on three key areas that deserve a little extra attention when servicing the 8-speeds.

Remember that the book and the presentation may contain unique information. So, reviewing both may be required to complete the posttest successfully.

P0456 Small EVAP Leak Diagnosis Update

In July of 2016, The FCA engineering team introduced an updated EVAP small leak detection procedure via TechCONNECT service information.

The changes, to the DTC “P0456 EVAP system small leak” procedure, affect all platforms for model years 2012 on.

Your tech advisors may have been made aware of these changes through a presentation that was released in May. As a follow-up, we were asked to present technicians with the same information.

This new procedure is refined to accurately identify and isolate normally hard to find very small EVAP leaks.

The upgraded diagnostic procedure calls for using the scan tool and the fuel tank pressure sensor to help determine the size and location of the leak before you connect an evaporative emissions leak detector (Figure 3).



Figure 3: *Evaporative emissions leak detector*

For a quick review of the tester's operation, refer to the April 2015 Master Tech release for EVAP System Highlights and Diagnostics.

The engineering team is asking your help. You can submit related field data, vehicle scan reports, freeze frame data, and any other test data related to P0456 diagnosis to engineering. STAR case S1625000010 has contact information for the engineer who is looking for the data.

Steering Column Control Module Diagnosis

Over the past several months, service engineering has seen quite a few cases where steering column control modules were replaced, without solving the customer complaint.

When analyzing the cases, step-by-step, in some cases, the technicians failed to follow the recommended diagnostic procedures in service information.

We will review three of the misdiagnosed cases. Each of these cases involved 2015 Jeep Grand Cherokees (Figure 4). On this vehicle, the SCCM includes the clock spring, the multi-function switch and the steering angle sensor.



Figure 4: *2015 Jeep Grand Cherokee*

The steering wheel must be removed to access and replace the SCCM. When working with airbag circuits, carefully follow all safety procedures.

Case One – LIN and LIN

In the first case, the customer complained that the left-side steering wheel switches worked intermittently on their new Grand Cherokee, and that the driver's information display (or DID) would freeze up regularly.

A technician was unable to reproduce either issue. The tech connected a scan tool and discovered that the powertrain control module (or PCM) and the body control module (or BCM) had flash updates available. Therefore, the tech flashed the modules and returned the Jeep to the customer.

A few days later, the customer returned with the same complaint, intermittent left-side steering wheel buttons, and a freezing driver's information display (Figure 5).



Figure 5: *Unhappy customer*

While trying to verify the complaint, the technician found that the right side switches were intermittent. In addition, that the BCM displayed DTC “U112D-00-Lost communication with EVIC steering wheel switches.”

The technician partially followed the diagnostics procedure for the DTC. He disconnected connector C1 for the SCCM and verified the power, ground, and the LIN bus connection to the BCM. After verifying the circuits, he replaced the SCCM and cleared the fault codes.

The DTC did not return, but the right-side switches were still intermittent, so the switch assembly was replaced as well.

Several days later, the Grand Cherokee was back with the original complaint, intermittent left switches, and a freezing driver's information display. The scan tool showed two DTCs, “U1446-00 implausible heated steering wheel temperature message received” and the good old “U112D-00-Lost communication with EVIC steering wheel switches.”

This time the technician was able to verify that the left switches were intermittent, so he tried replacing the left switch assembly, which did not help either.

Reading the diagnostics procedure for the heated steering wheel DTC, and closely examining the heated wheel wiring diagram showed that the temperature information travels over a LIN bus from the left switch to the SCCM.

This information allowed the technician to isolate the fault to the LIN bus circuit in the small harness located in the steering wheel. The terminal connection at the SCCM end was intermittent (Figure 6).



Figure 6: *Testing terminal connection at the SCCM.*

The moral of this case is to recognize that, in addition to the LIN bus between the SCCM and the BCM, there is a LIN connection between the steering wheel switch assemblies and the SCCM.

Therefore, “Lost communication with steering wheel switches” DTCs may indicate faults with the switches or wiring to the BCM, as well as the items covered in service information.

Case Two – Faulty Camera and Switches

The second case was a one-day-old Grand Cherokee that also suffered from inoperative left-side switches, and a “U112D-00-Lost communication with EVIC steering wheel switches” DTC. The scan tool also displayed another DTC, “U0264-00-Lost communication with camera module-rear.”

The tech verified that the power, ground, and LIN bus voltages at the camera were in spec, so he installed a new rear camera. He disassembled the steering wheel and verified the power, ground, and LIN bus voltages at the SCCM. They were in spec, so he installed a new SCCM.

A month later, the Jeep was back with the intermittent left-side switches and DTC U112D again. The tech followed the diagnostics steps, verifying the voltages, and replaced the SCCM again. A month later, the Grand Cherokee was back again. This time the technician talked to STAR (Figure 7).



Figure 7: Tech contacting STAR

After looking at the service history and the wiring diagrams, the field engineer pointed out that the rear camera and SCCM share a LIN bus to the BCM.

The tech carefully examined the connector at the BCM and found that the LIN terminal was loose, causing a poor connection (Figure 8).

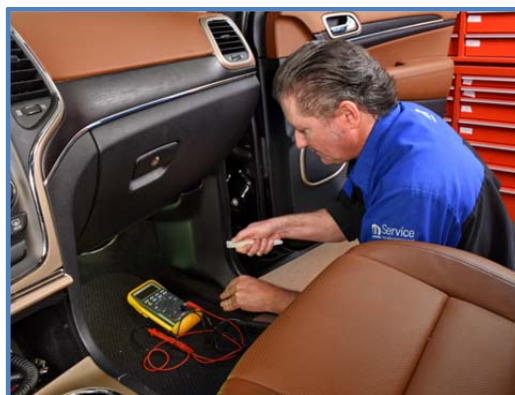


Figure 8: Tech accessing BCM connectors

In this case, if the first technician had taken a close look at the diagnostics for both the camera and the SCCM together, he may have realized the common denominator was the LIN bus to the BCM.

Case Three – Try this Module!

In our last case, the customer complained of an intermittent heated steering wheel. When we looked at the case history, there is no indication that TechCONNECT or wiTECH were ever consulted. The steering wheel was replaced and a heated seat module was ordered on the first visit. On the second visit, the heated seat module was replaced.

A few days later, the customer returned for the intermittent heated steering wheel. The technician replaced the SCCM, thinking that the clock spring may have an intermittent short or open.

By the fourth visit, the customer was not very happy. The heated seats and steering wheel were continually turning off.

This time the technician connected a scan tool and found that DTC “B11C1-13-Steering wheel heater power supply - circuit open” was stored in the heated seat module. A close inspection revealed a damaged harness feeding the heated seat module.

The lesson here is, always use the scan tool early in the diagnostic process (Figure 9). Not checking for DTCs until the fourth visit led to unnecessary replacing a steering wheel, an SCCM, and a heated seat module.



Figure 9: Use the scan tool early

Field engineering has been tracking cases of unnecessary SCCM replacement for the past several months. They are considering several ideas to reduce the replacements in the future.

The functions and circuits related to the SCCM are relatively complex. So, higher level technicians should be assigned to diagnose related issues.

Reading and understanding the recommended diagnostic procedures and related wiring diagrams will help an expert technician produce accurate and efficient diagnoses.

8-Speed Transmission Updates

This lesson is designed to provide technicians with an overview of recent updates to 8-speed transmissions, and to raise awareness of a current recall (Figure 10).

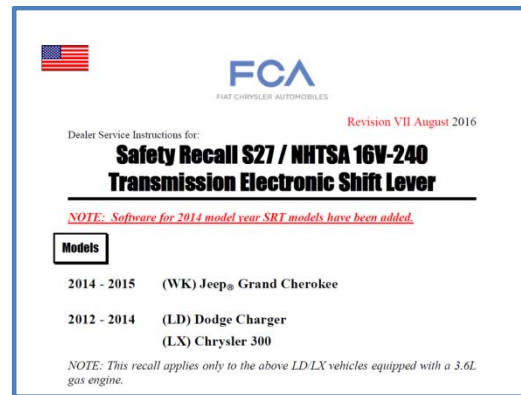


Figure 10: S27 recall

The recall, S27, affects all 2014-2015 Jeep Grand Cherokees and 2012-2014 Dodge Chargers and Chrysler 300s equipped with a 3.6L. S27 was created because the electronic shift lever on several 8-speed equipped vehicles may allow a roll away condition if the vehicle is not placed in park.

A roll away condition can occur if the vehicle’s engine is left running, the parking brake is not engaged, and the transmission is not in the PARK position when the customer exits the vehicle.

To correct this condition, the transmission control module (or TCM) must be flashed with new software that includes the Auto Park feature.

The new software eliminates the consequences of a driver failing to place the transmission into park prior to exiting the vehicle, by automatically shifting the transmission to park when the vehicle speed is below 1.9 km/h (1.2 mph), the driver's door is ajar and the driver's seatbelt is unbuckled.

The Auto Park feature should never be confused with the electronic Auto Park Brake feature found on some vehicles. The Auto Park Brake feature electrically applies the parking brake and does not shift the vehicle into park.

No parts are required to perform this recall procedure. After service is complete, an addendum card for the owner's manual is placed in each updated vehicle (Figure 11).



Figure 11: Place addendum card in vehicle.

Module Flashing

To flash the necessary modules, you will need a scan tool. Always be sure to perform the procedure with the latest software release level. Remember, if a flash is aborted or interrupted, the procedure must be repeated.

In all, the recall requires reprogramming four ECUs in a specific order starting with the PCM. The TCM is the next module in the programming procedure. It is important to remember that you only get one chance to flash the TCM correctly.

If the TCM is flashed with the wrong software, the valve body assembly ECU will lock-up, preventing further reprogramming. The valve body will have to be replaced. This may cause a chargeback.

Before flashing the TCM, use VIP to determine the correct sales code. Verify that the flash is for this exact sales code. A service advisor can assist you with finding the correct sales code if necessary.

The Radio Frequency Hub (or RFHM) is the third module to be reprogrammed, followed by the Instrument Panel Cluster (or IPC) module.

The PCM, TCM, and RFHM require about five minutes each to accept the new software. The IPC however, requires up to two hours to complete the reprogramming process. The service department should schedule recalled vehicles to accommodate customers.

As always, be sure to have a battery charger connected to keep the system voltage between 13.2 and 13.5 volts during the flash process. Also, avoid any interruptions to the procedure. Have a copy of the recall handy, and be sure to complete every step in the procedure.

Pay special attention while comparing the "Current Flash Number" with the "New Part Number" listed on the "sort table", before and after flashing the TCM.

Technicians servicing two-wheel drive Grand Cherokees equipped with a 3.0L diesel may encounter DTC U0403 after the recall procedure is completed. Disregard this DTC. The DTC cannot be erased, and it will not trigger a malfunction indicator lamp (or MIL).

Make sure to clear any DTCs after each flash. Remember, no parts are required to complete recall S27 unless the wrong flash file is selected during the repair.

Always check your sales codes before performing any flashes on the TCM, and, read the entire S27 recall document before beginning any repairs.

Module Flashing Missteps

As mentioned earlier, installing the wrong flash file to the TCM when performing an update, will lead to the TCM ECU locking-up. This is a crucial and expensive misstep. The 8-speed ECU and valve body are serviced as a unit. So, the entire assembly must be replaced. Since the issue was caused by a misstep, there will most likely be a chargeback to your dealership.

Again, anytime multiple flash files are displayed on the scan tool, refer to the sales codes provided in the flash file descriptions before updating the software in the TCM. Failure to use sales codes for determining proper flash file may result in otherwise avoidable costly valve body replacement (Figure 12).



Figure 12: Avoid costly valve body replacement

Remember, the TCM ECU flash is coordinated with three other ECU updates.

Always refer to the recall information regarding the TCM flash and verify that all ECUs related to the recall information are updated successfully prior to returning the vehicle to the customer (Figure 13).



Figure 13: Verify TCM flash files

On 2012-2013 LX and LD models, some generic replacement transmissions and valve bodies use the same part number as a valid vehicle calibration number. Make sure you know what number you are looking at.

When the recall procedure is performed, the scan tool will read the calibration number from the ECU and display several flashes available for the ECU being programmed.

The list of multiple flashes for multiple applications will be listed for the technician to pick from on the scan tool application. Use the sales code and read the entire flash description before choosing a flash file.

Generic modules will have multiple flashes for multiple applications listed. Therefore, the technician must choose the correct flash the first time.

As we mentioned earlier, if the wrong flash is selected, there is no second chance to re-flash the TCM with a different number. The valve body must be replaced.

Perform the Auto Park functional check after each repair before returning the vehicle back to the customer (Figure 14).



Figure 14: Always perform the functional check

Valve Body Identification

The purpose of this short lesson is to help technicians avoid installing the incorrect valve body when servicing 8-speed transmissions.

The valve body includes the TCM, solenoids, and sensors. It may be referred to as the transmission control module assembly in some documents.

The TCM is attached to the valve body. If any part of the valve body including the TCM sensors or solenoids need to be replaced, the entire valve body must be replaced.

There are two different valve bodies available for 8-speed transmissions depending on the manufacturer. The 8HP45 is manufactured by ZF, while the 845RE is manufactured by FCA. The valve bodies are not interchangeable; installing the wrong one can cause shifting issues and set DTCs.

Therefore, correctly identifying the transmission being working on is very important, and could save you a lot of time.

Transmissions have two bar code labels attached to the transmission case. The label on the driver-side of the case contains the component tracking number on the top, and the service part number on the bottom.

The valve bodies themselves can also be identified by different markings on the casting of the valve body. The 8HP45 manufactured by ZF, has a “ZF” logo, and the 845RE manufactured by FCA has the familiar Pentastar logo (Figure 15).



Figure 15: Transmission identification

Technicians must verify the transmission manufacturer before ordering any valve bodies from your parts department. Otherwise, you could waste a lot of time and money by installing the wrong part.

New TCMs are supplied with generic software from the manufacturer. When replacing a TCM, it must be programmed with vehicle specific software. Follow the programming procedure found in service information.

After the repairs are complete, perform the TCM adaptation procedure found in section 08 - Electrical/8E - Electronic Control Modules/MODULE, Transmission Control/Module Programming.

Before returning the vehicle to the customer, perform the TRANSMISSION VERIFICATION TEST, found in section 28 - DTC-Based Diagnostics/MODULE, Transmission Control (TCM) - Standard Procedure.

Close

Learn more

Check out the Learning Center site to find classes covering subjects related to this month's topics.

Also, remember to read the STAR Center News. You can find the STAR Center News by logging on to TechCONNECT and clicking the "STAR Center News" link on the left side of the screen.

Next month

Be sure to join us next month when we cover some Pacifica vehicle prep issues and TR6060 repair vs. replace.

Questions or comments

If you have any questions or comments about a Master Tech presentation, or would like to suggest topics for future Master Techs, please contact us at mastertech@chrysler.com.

Be sure to include your contact information so we can get back to you!

Master Tech Posttest

Use one of the three links in the presentation to navigate to the October posttest, course code MT1610T.

Complete the posttest by the end of November for certification credit.

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