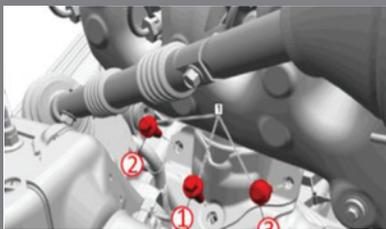




## Replace, Don't Repair, Coaxial Cables



Vibration or Rough Idle  
in Drive or Park

see page 3



Programming Radio  
Calibrations

see page 4

*Replace, Don't Repair,  
Coaxial Cables . . . . . 2*

*Mass Air Flow Sensor  
Performance . . . . . 5*

*Internal Transmission Faults Not  
Serviceable at the Dealership . . . . . 6*

*Loss of Window Motor Memory . . . 7*

*Vehicle Repairs and Product  
Assistance Claims . . . . . 8*

*Diesel Engine Rear Main Oil Seal . . 9*

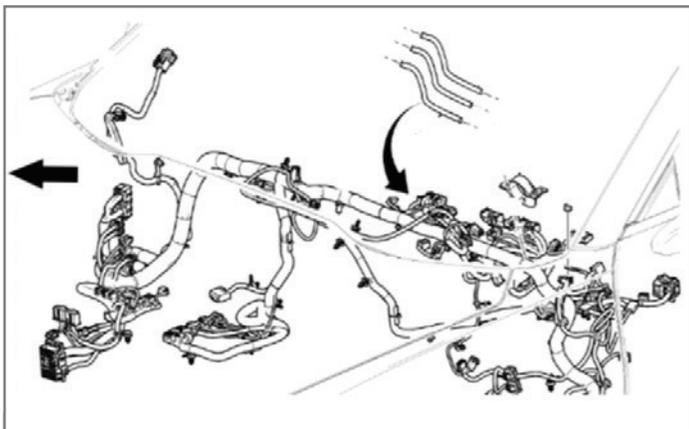
# Replace, Don't Repair, Coaxial Cables

Many GM vehicles are equipped with Low Voltage Differential Signaling (LVDS), Universal Serial Bus (USB) and Coaxial (Coax) cables for a number of screen and camera connections as well as high-speed data transmission.

For example, the Rear Seat Infotainment System on the 2021 Tahoe, Suburban, Yukon and Escalade features two video screen displays. Display 1, on the passenger's side, is a smart device that is connected to the radio via an Ethernet cable. Display 1 also is connected to Display 2, on the driver's side, and the Rear Consumer Port (USB and HDMI ports) via an LVDS cable.

Another example is the Surround Vision Camera system, which uses a shielded Coaxial cable to connect each camera to the Video Processing Control Module. The Coaxial cable provides power for the camera and also carries the video image to the Video Processing Control Module.

The GM cable repair strategy is to replace these cables instead of repairing when addressing related vehicle issues. Never attempt to repair these types of cables on a vehicle. The entire cable/harness or component must be replaced.



Identify the main harness and needed cables in the EPC.

**TIP:** LVDS, USB and Coax cables can be found in the Electronic Parts Catalog (EPC) by first identifying the main harness that contains the needed cable and then looking for the cable references in the accompanying graphic.

Cables come complete with cable, terminals and connectors fully assembled, except for cables contained within a hybrid connec-

tor (cable plus non-cable circuits) If the cable connector bodies are damaged, the complete cable must be replaced. If the cable is contained within a hybrid connector, the replacement cable assembly will not include the hybrid connector body. In addition, for Coax cables only, the cables must be replaced as an assembly when multiple Coax segments are together as one assembly.

## CABLE REPAIRS

When replacing a faulty or damaged cable, first disconnect the cable connectors at both ends. Route the new cable along the harness and use tie-straps to attach the cable to existing harnesses or brackets. Be sure to not pinch the cable or bend it more than a 2-inch (5 cm) radius. Tape or foam can be used to prevent the cables from rattling if needed.

With the new cable installed, reconnect the connectors to the components. Cut the connectors off of the older cable as close to the harness breakout as possible without damaging the harness.

## ETHERNET CABLES

Ethernet cables should be replaced and not repaired as well. Service harness kits are released per vehicle that contain a length for each leg/peripheral device. If an Ethernet wiring repair kit is not available, the entire harness must be replaced.

Ethernet cables come without the connector, but with the terminals crimped on the cable. The cables are a universal length to service as many applications as possible with the fewest part numbers. As a result, the cable received may be slightly (<500 mm) longer than the original cable contained within the factory harness. Any extra length of cable should be coiled up and secured.

After disconnecting the faulty or damaged cable connectors at both ends, remove the terminals from both connectors using the proper terminal removal tool. Overlay the properly twisted pair of wires provided in the Ethernet wiring repair kit and then route and secure the Ethernet wiring to the existing harness. Insert the terminals into the connectors and reconnect the components.

For more information about wiring repairs, refer to the appropriate Service Information. Be sure to always review the service procedures before beginning a repair in order to confirm the correct procedures are being followed.

► Thanks to Peter Joslyn

# VIBRATION

## or Rough Idle in Drive or Park

A rough idle or vibration at idle may be present with the transmission in Drive or Park on some 2019-2021 Silverado and Sierra models equipped with the 5.3L V8 engine (PRO L82, L84) or 6.2L V8 engine (RPO L87). The idle condition may be most noticeable when the engine is completely warmed up and accessories are off. There may be several possible causes: misfire or an engine concern, wrong fuel used, idle speed fluctuation, or engine mount pre-load.

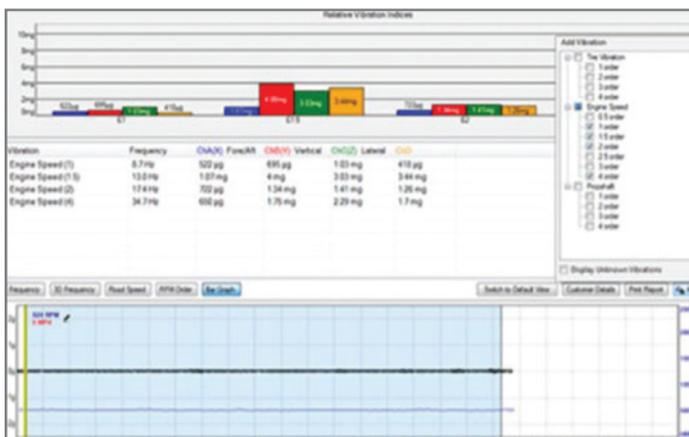
To correctly diagnose the potential sources of the idle condition, use the CH-51450 PicoScope oscilloscope following the procedures outlined in #PIP5798.

Begin diagnosis by checking for stored DTCs. Any DTCs should be addressed first. Also confirm there are not any illuminated warning lamps on the instrument cluster.

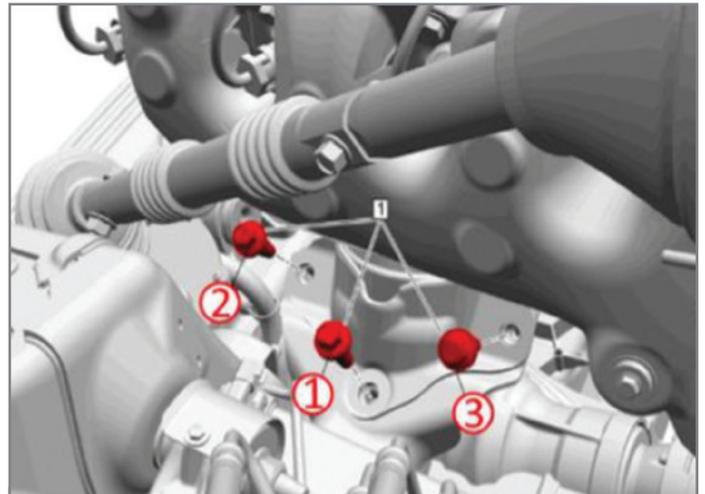
Next, monitor fuel trim readings and cylinder misfires to confirm there are not any engine concerns. Note the idle speed at this time.

In addition, if premium fuel is required, confirm that it is being used instead of regular fuel.

Perform an analysis using the PicoScope with a single axis sensor or a tri-axis sensor to measure the vibration disturbance frequency at the seat track. If the measurement is above the acceptable threshold, perform the Engine and Transmission Mount Settling Process covered in #PIP5798.



Measure the vibration disturbance frequency using the PicoScope.



Torque the new engine mount-to-frame bolts to specification in sequence.

Any engine mount-to-frame bolts removed during this process must be replaced with new bolts. Both the left-hand and right-hand engine mounts need to be seated to the vehicle frame at the same time to ensure the best alignment. Do not use an impact wrench. Torque the new bolts to specification in sequence.

If the disturbance frequency measurement does not improve after completing the settling process, replace the powertrain mounts. Before replacing engine mounts, check that the exhaust system is not bound up and that the rear transmission mount is clear of any debris and not damaged. Either of these can result in a higher than normal PicoScope measurement.

**TIP:** If the vibration condition was corrected following the procedures in #PIP5798, print and attach the “before and after” PicoScope measurements to the repair order. If the vibration condition is still not acceptable after completing the settling process or replacing the engine mounts, open a TAC case and attach your files to the case. Refer to #PIP5601A to upload the files.

For parts information and complete details on the Engine and Transmission Mount Settling Process, refer to #PIP5798.

► Thanks to Richard Renshaw

# PROGRAMMING

## Radio Calibrations

*When diagnosing an infotainment system, it's important to remember that software and calibrations are not the same thing and are not interchangeable terms. Calibrations instruct the radio what to do while the software tells the radio how to do things.*

And unlike software updates that offer continuous improvements to address common concerns such as a screen that freezes or a Bluetooth connection issue, radio calibrations for the infotainment system are usually not updated frequently. On 2018-2021 GM models equipped with an Infotainment 3 System (RPO IOR, IOS, IOT, IOU, IOV), calibration updates are performed using the Service Programming System (SPS) while software can be updated through SPS or may be pushed to vehicles remotely through an Over-the-Air (OTA) update.

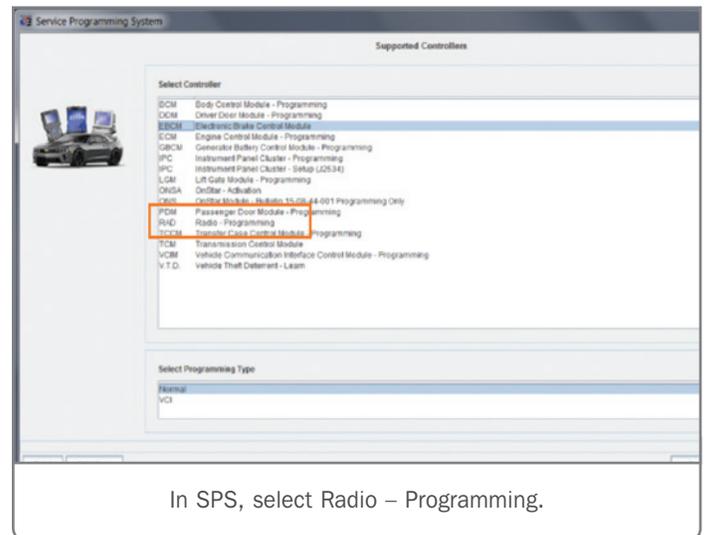


Infotainment 3 system

### CALIBRATION UPDATES

In the Service Programming System (SPS), the radio calibrations are updated by selecting Radio – Programming. If the radio is being replaced, the new module will require calibration programming using SPS, followed by USB programming for the software using a USB flash drive. Follow all the SPS on-screen instructions.

If the control module calibration is only being updated, USB programming may not be required, depending on the current software level or the release of updates. If USB files for the application are not available via SPS or have not been received from GM in another manner, the USB process will not need to be performed unless instructed otherwise in a service document or publication.



Before proceeding with USB programming, check for any Info Sys OTA updates under Settings > Updates on the vehicle's infotainment screen. If an update is available, it is more efficient to install the OTA update if it will install successfully. If the OTA update will not install and USB programming is necessary, first decline the OTA update before attempting USB programming. Decline the OTA update by selecting Details > Decline Update, followed by confirming the Decline Update. If an Info Sys OTA update is not available, proceed with USB programming.

Be sure to always check the appropriate Service Information and Bulletins for details on related programming as well as the correct programming order for each specific repair.

Once programming is complete, clear DTCs and perform the Manufacturer Enable Counter (MEC) reset using GDS 2. On the GDS 2 screen, select Module Diagnostics – Radio, select the appropriate RPO, and follow the on-screen instructions. Before verifying system operation after programming, turn the vehicle ignition off, make sure Retained Accessory Power is off, remove the key fob from range of the vehicle, and let the vehicle sit for five minutes.

CONTINUED ON PAGE 5

Some tips to always follow when programming include:

- Ensure the programming tool is equipped with the latest software and is securely connected to the Data Link Connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Install a GM Authorized Programming Support Tool to maintain system voltage. Do not connect a battery charger.
- Ensure the ignition is turned off. A load on the vehicle's battery, such as; interior lights, exterior lights (including daytime running lights), HVAC, etc., may affect the download process.

- Verify that the radio time and date are set correctly before inserting a USB drive into the vehicle for programming, otherwise an error will result.
- In Techline Connect, be sure the VIN selected in the drop down menu is the same as the vehicle connected before beginning programming.
- Clear DTCs after programming is complete.
- Record the SPS Warranty Claim Code on the job card for warranty transaction submission.

► Thanks to Jeremy Richardson, Jeremy Krall and Zach Gillett

# Mass Air Flow Sensor Performance

Some 2019-2021 Silverado and Sierra models equipped with the 5.3L V8 engine (RPOs L82, L84) or 6.2L V8 engine (RPO L87) may have an illuminated Check Engine MIL and DTC P1682 (Ignition 1 Switch Circuit 2) set in the Engine Control Module (ECM) as an active or history code. DTCs P0101 (MAF Sensor Performance), P0689 (Engine Controls Ignition Relay Feedback Circuit Low Voltage), P16A7 (Engine Controls Ignition Relay Feedback Circuit 2) or P16BC (Engine Controls Ignition Relay Feedback Circuit 3) also may be set. In addition, the vehicle may have previously had the Mass Air Flow (MAF) sensor replaced due to DTC P0101. These conditions may be caused by a compromised connection within the Underhood Bussed Electrical Center (UBEC) connector X3 at position H6, which can result in DTCs P1682 and P0101 setting together.



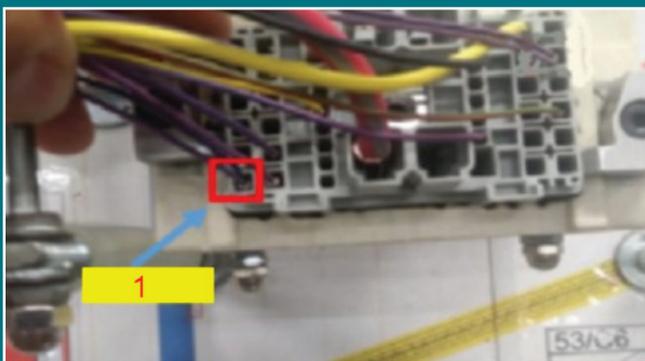
Poor connection of the dual crimp wire.

If the dual crimp wire has a poor connection, repair the wire. Refer to Repairing Connector Terminals in the appropriate Service Information.

If the dual crimp wire does not show any signs of a poor connection or if there is no trouble found with any wire-to-terminal connections, continue diagnosing the DTCs before replacing the MAF sensor.

For additional information, refer to Bulletin #21-NA-032.

► Thanks to Dave MacGillis

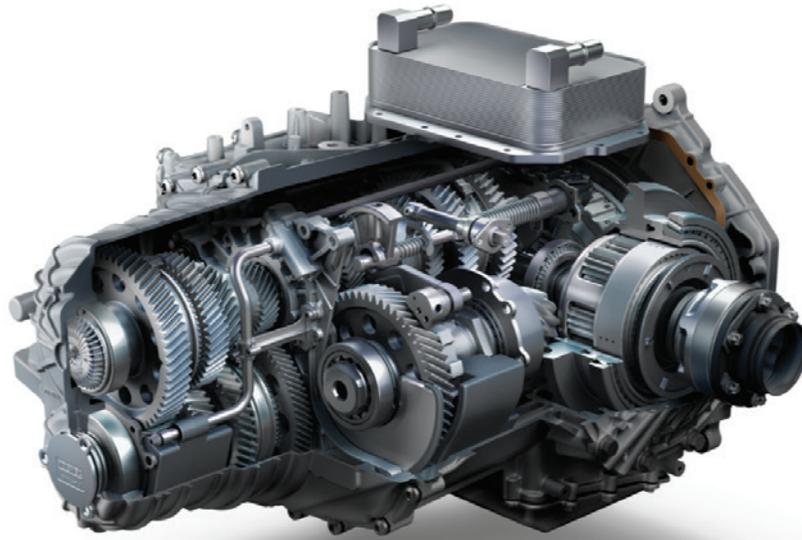


Dual crimp wire in the H6 pin (#1) in the X3 connector.

Do not replace the MAF sensor if these DTCs are set. Inspect the wire-to-terminal connections inside the X3 connector at the UBEC assembly for signs of a marginal connection or loose wires, especially the dual crimp at location X3-H6.



Dual crimp wire without any signs of a poor connection.



# Internal Transmission Faults

## NOT SERVICEABLE AT THE DEALERSHIP

A Service Transmission message or a Service Engine Soon message may be displayed on the Driver Information Center of some 2020-2021 Corvettes equipped with the DCT TR9080 transmission (RPO M1L) along with DTCs P2838 (Shift Fork 2 Position Sensor Circuit Low), P2839 (Shift Fork 2 Position Sensor Circuit High) or P283A (Shift Fork 2 Position Sensor Circuit Intermittent).

The Odd Sensor Module is located in the shift fork assembly and contains the transmission input shaft speed sensor – odd gears and the shift fork 1 position sensor and shift fork 2 position sensor. The TCM uses the output speed sensor signal along with the even and odd input shaft speed sensor signals to determine transmission line pressure, shift patterns, and the correct gear ratio.

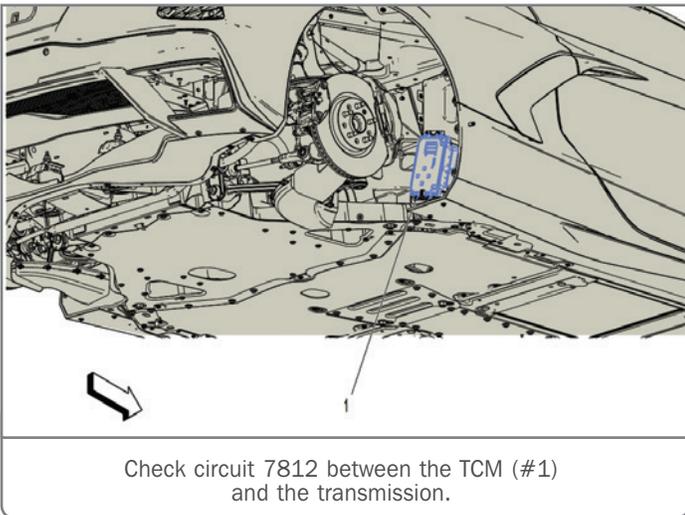
### DTCS P1955 AND P0867

In any instance where the vehicle has a current or history DTC P1955 and P0867 stored, the transmission fluid level should be checked and cleaning procedures followed according to Bulletin #21-NA-033. If DTCs P1955 and P0867 return, it is related to a loss of system pressure condition that is being investigated by Engineering.

**TIP:** DTC P1955 usually will not set as the only code. If it is among several codes stored, it is likely the cause of the other DTCs. A Main Control Valve (MCV) replacement will not repair vehicles with DTC P1955 set.

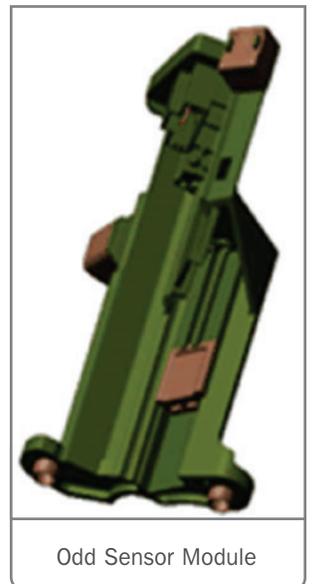
Refer to the latest version of #PIP5709 for more information on Dual Clutch Transmission part restrictions.

► Thanks to Steve Schipansky



If any combination of these DTCs have set (current or in history), check circuit integrity on circuit 7812 between the Transmission Control Module (TCM) and the transmission. Check the terminal tension as well for a possible short to ground.

If any issues are found, repair as needed and verify proper vehicle operation. If no issues are noted, the transmission would need to be replaced as anything related to the Odd Sensor Module (OSM) is not serviced.





# Loss of WINDOW Motor Memory

The front windows may drop enough to cause wind noise on some 2018-2021 Equinox and Terrain models. After driving the vehicle while the infotainment system is at a high volume or music with high bass has been played, the windows may lower by approximately 1/4 inch (6 mm) or more. There also may be an Open Then Close Driver Window message displayed on the Driver Information Center.

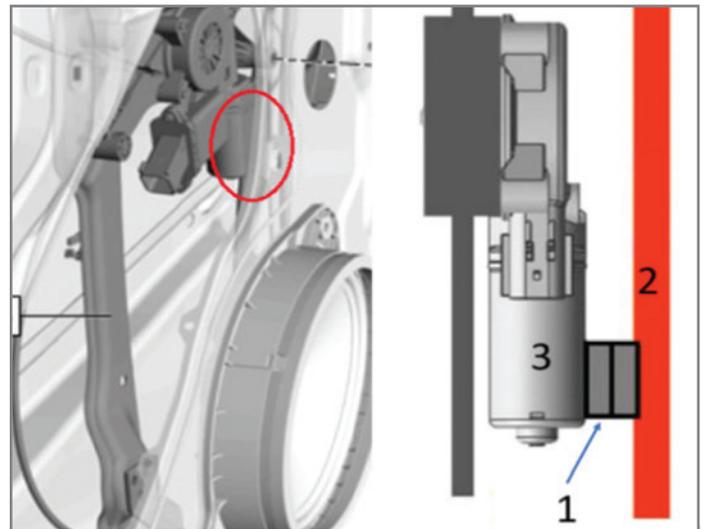
The window may be lowering as a result of the window motor losing memory due to speaker vibration. It can occur with high volume or high bass use. If this condition is present, install foam between the window motor and the inner door panel to dampen any motor vibration/resonance. As shown, the foam is in the correct location in relation to the motor housing; however, the repair will have the foam applied to the inner door panel, not the motor housing.



Install foam to dampen any motor vibration/resonance.

To make the repair, remove the front door trim panel and move the water deflector in order to access the window motor casing. Use a dense, adhesive-backed, foam block that has a depth of 1/2 inch (12 mm) and is 1 inch square (25 mm).

The foam should be adhered to the inside of the inner door panel and mounted between the end of the motor housing and the door panel.



Position the foam (#1) between the inside of the inner door panel (#2) and the motor housing (#3).

When reinstalling the water deflector, be sure that the integral locators are installed properly and that the water deflector is secured and leak proof.

After installing the front door trim panel, perform the window motor normalization procedure. Refer to Window Motor Programming – Express Function in the appropriate Service Information. After the window motor has been disconnected or the door harness has been disconnected, the window motor must be normalized or it may no longer perform the express-up function or may not index up when the door is closed.

For more details and parts information, refer to Bulletin #21-NA-046.

► Thanks to Rob Smith

# Vehicle Repairs and Product Assistance Claims

When a GM vehicle is involved in an incident that involves vehicle damage or possible property damage, dealerships may need to work with their respective Customer Assistance Center to make a Product Assistance Claim (PAC).

**TIP:** When a vehicle is part of a PAC case, repairs should not be made to the vehicle until PAC directs the dealership to do so or until PAC has completed the case review. The GM Technical Assistance Center (TAC) will not be able to provide diagnostic assistance or repair direction. A PAC case requires a complete review of all available information on the vehicle.

Some of the possible reasons for working with the PAC team include:

- Vehicle damage, including fire/smoke/melt
- Damage to personal property
- Unwanted airbag deployment
- Airbag deployments that occur when the vehicle is being serviced or repaired by a GM dealership

## DEALERSHIP REQUIREMENTS

A PAC specialist will contact the servicing dealer to review the PAC process. During the case, PAC may request historical repair orders, a preliminary inspection be performed (including DTCs and photos related to the vehicle's condition), repair estimates (for body and mechanical repairs), a complete inspection/diagnosis and other services to support the claim process.

When submitting inspection forms, dealerships should verify all sections have been fully documented and photographed as appropriate. Once PAC receives all inspection documents, Engineering will review and provide a final resolution.

## DEALER PAYMENT FOR ASSISTANCE

A Pre-Repair Authorization (PRA) will be created based on the repair estimate provided by the dealership for inspection time



It is critical that the dealership provides as much information as possible about the vehicle and its history.

and repairs. Once the PAC case is complete, a final repair order must be provided to PAC before the transaction can be submitted in Global Warranty Management.

Dealerships must send the final repair order using the dealer's warranty rate. The final repair order should include any applicable repairs, inspection hours and rental days that were previously approved by PAC based on the repair estimate.

The PAC Specialist will provide the Pre-Authorization Number to the dealership for each labor code identified on the final repair order. It is important to enter the information in GWM as it appears in the email sent by PAC. A transaction cannot be submitted in GWM without a Pre-Repair Authorization Number.

For additional information, refer to Bulletin #18-NA-099.

▶ Thanks to Ernie Haller, Kim Horvath and Anna Chenet

# Diesel Engine Rear Main Oil Seal

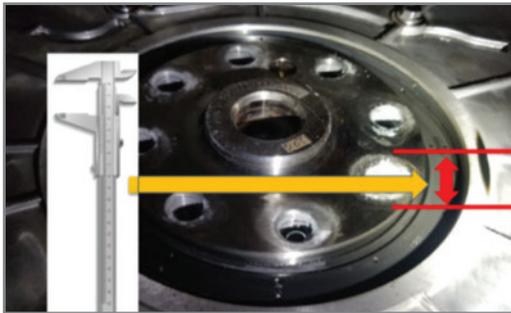
Some 2020-2021 Silverado, Sierra; 2021 Tahoe, Suburban, Yukon and Escalade models equipped with the 3.0L diesel engine (RPO LM2) may have an oil leak concern and DTC P06DD (Engine Oil Pressure Control Valve Performance) may be set. These conditions may occur if the rear main oil seal has moved or is severely shifted out of position in the timing chain lower cover.

If these conditions are found, replace the timing chain lower cover, which comes with a seal already installed.



Timing chain lower cover

If the seal is tilted out of position, use a caliper and record the depth where the seal is pushed in prior to removing the rear cover. Also place an indexing mark on the seal and



Use a caliper and record the depth where the seal is pushed in prior to removing the rear cover.

cover, which will be helpful to the Warranty Parts Center in case the seal falls out or moves during shipping.

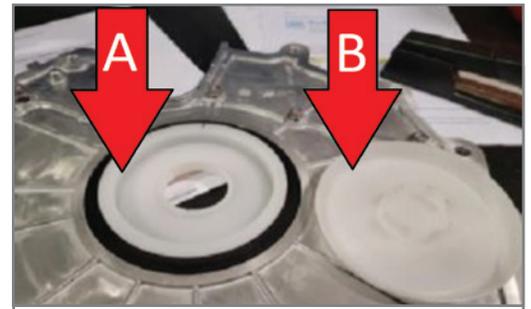
Record the Part Unique Number (PUN) found on the white label attached to the back of the cover.

The timing chain lower cover comes with a two-piece protector/installer. The inner piece becomes the installation tool. The outer piece simply holds them together for shipment.

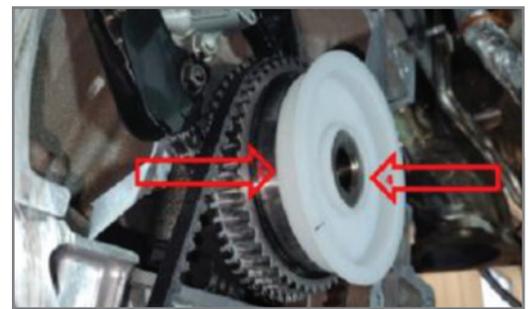
Remove and discard the outer piece.

The inner piece acts as an installation tool substitute for the EN-52466-2 seal protector and fits over the bevel on the end of the crankshaft. Be sure that the inner lip of the seal slides over the rear of the crankshaft without rolling during installation or a repeat oil leak may occur. The protector/installer (shown without cover) will have a snug fit to the pilot of the crankshaft.

► Thanks to Robert Bastien



A. Inner piece acts as installation tool  
B. Outer piece provides protection during shipping



The installer (shown without cover) will have a snug fit to the pilot of the crankshaft.

## TECH LINK

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