Torque Converter Replacement Instruction Sheet – Part Number 24290897

2016-2018 Camaro SS Automatic Transmission

Kit Contents:

Part Number	Description	Quantity
24290898	Torque Converter	1
24290899	Instruction Sheet	1
11546840	Torque Converter Bolts	6
23135703	Trans Fluid Pipe Cooler Seal	1

Notes:

1. **It is highly recommended that transmission fluid is changed and replaced with Option B transmission fluid for increased durability.**
2. **If you are not using a stock LT1 engine, it is recommended that you replace your transmission with the CTS-V transmission (24273554), which is capable to handling higher horsepower.**
3. **If re-installing factory exhaust, it is recommended to replace the exhaust seal (21992620) and the exhaust clamp (22860193).**

Table of Contents

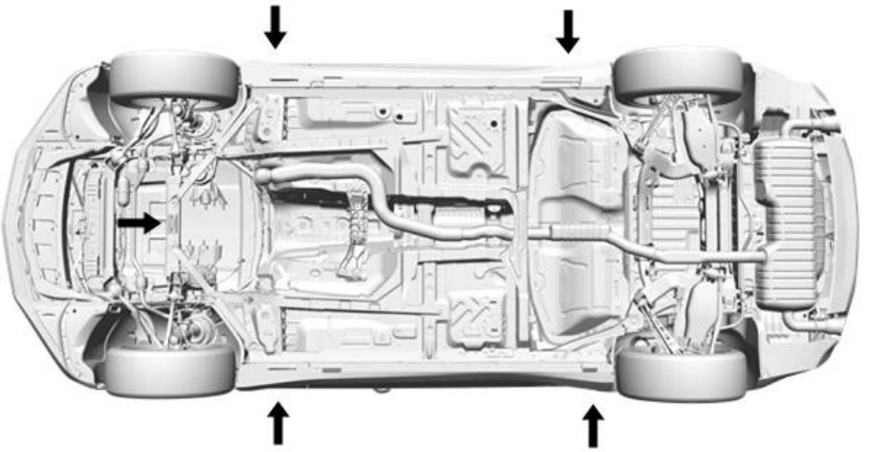
Cautions, Lifting and Jacking the Vehicle (Base)

Fastener Caution

Use the correct fastener in the correct location. Replacement fasteners must be the correct part number for that application. Do not use paints, lubricants, or corrosion inhibitors on fasteners, or fastener joint surfaces, unless specified. These coatings affect fastener torque and joint clamping force and may damage the fastener. Use the correct tightening sequence and specifications when installing fasteners in order to avoid damage to parts and systems. When using fasteners that are threaded directly into plastic, use extreme care not to strip the mating plastic part(s). Use hand tools only, and do not use any kind of impact or power tools. Fastener should be hand tightened, fully seated, and not stripped.

Lifting and Jacking the Vehicle (Base)

Note: The use of a LOW PROFILE LIFT ARMS SYSTEM may be required to avoid unwanted contact with the vehicle's body and structure depending on lifting equipment used. Refer to the manufacture's recommendation for their applications of low profile lift arms system for their lifting equipment.



Danger: To avoid any vehicle damage, serious personal injury or death when major components are removed from the vehicle and the vehicle is supported by a hoist, support the vehicle with jack stands at the opposite end from which the components are being removed and strap the vehicle to the hoist.

Danger: To avoid any vehicle damage, serious personal injury or death, always use the jackstands to support the vehicle when lifting the vehicle with a jack.

Caution: Perform the following steps before beginning any vehicle lifting or jacking procedure:

- Remove or secure all of the vehicle contents in order to avoid any shifting or any movement that may occur during the vehicle lifting or jacking procedure.
- The lifting equipment or the jacking equipment weight rating must meet or exceed the weight of the vehicle and any vehicle contents.
- The lifting equipment or the jacking equipment must meet the operational standards of the lifting equipment or jacking equipment manufacturer.
- Perform the vehicle lifting or jacking procedure on a clean, hard, dry, level surface.
- Perform the vehicle lifting or jacking procedure only at the identified lift points. DO NOT allow the lifting equipment or jacking equipment to contact any other vehicle components.

Failure to perform the previous steps could result in damage to the lifting equipment or the jacking equipment, the vehicle, and/or the vehicle contents.

Vehicle Lifting– Frame Contact Lift

Note: The vehicle should be lifted so that the hoist pads and or lift arms do not contact the rocker panel molding. The hoist pad must be located in the designated area. In the front location, place the lift pads on the rocker outer panel weld flange. In the rear location, place the lift pads on the rocker outer panel rear cradle brace. Care should be taken to ensure the hoist pad is inside the rocker panel molding cut out area (notch) to prevent damage to the vehicle.

Front Lift Pads

When lifting the vehicle with a frame-contact lift, place the front lift pads on the rocker outer panel weld flange, as shown.

Rear Lift Pads

When lifting the vehicle with a frame-contact lift, place the rear lift pads on the rocker outer panel rear cradle brace, as shown.

Vehicle Jacking

Caution: When you are jacking the vehicle at the front locations, be certain that the jack or the jack lift pad does not contact the front fascia, front fascia air dam, or the front fenders. If such contact occurs, vehicle damage may result. When jacking at selected front locations additional clearance may be required for the jacking points.

Note: When you are lifting a vehicle with a service jack, block the wheels at the opposite end from which you are lifting. Use jack stands to provide additional support.

Front of Vehicle

When using a service jack under the front of the vehicle use one of the following locations:
Place the service jack pad in the same location as shown for the front lift pads or on the front center jack pad.

Rear of Vehicle

Note: Place jackstands ONLY under strong and stable vehicle structures.

Place the service jack pad in the same location as shown for the rear lift pads.

Exhaust Service Warning

Warning: In order to avoid being burned, do not service the exhaust system while it is still hot. Service the system when it is cool.

Eye Protection Warning

Warning: Approved safety glasses and gloves should be worn when performing this procedure to reduce the chance of personal injury.

Hot Exhaust System Warning

Warning: While engine is operating, the exhaust system will become extremely hot. To prevent burns avoid contacting a hot exhaust system.

Gasoline/Gasoline Vapors Warning

Warning: Gasoline or gasoline vapors are highly flammable. A fire could occur if an ignition source is present. Never drain or store gasoline or diesel fuel in an open container, due to the possibility of fire or explosion. Have a dry chemical (Class B) fire extinguisher nearby.

Relieving Fuel Pressure Warning

Warning: Remove the fuel tank cap and relieve the fuel system pressure before servicing the fuel system in order to reduce the risk of personal injury. After you relieve the fuel system pressure, a small amount of fuel may be released when servicing the fuel lines, the fuel injection pump, or the connections. In order to reduce the risk of personal injury, cover the fuel system components with a shop towel before disconnection. This will catch any fuel that may leak out. Place the towel in an approved container when the disconnection is complete.

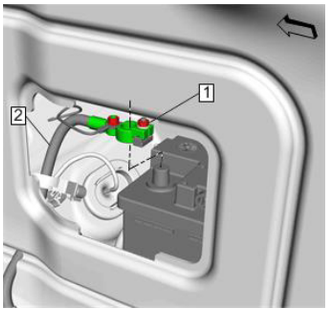
Battery Negative Cable Disconnection and Connection

Removal Procedure

Warning: Unless directed otherwise, the ignition must be OFF with the key removed, and all electrical loads must be OFF before servicing any electrical component. Disconnect the negative battery cable to prevent an electrical spark should a tool or equipment come in contact with an exposed electrical terminal. Failure to follow these precautions may result in personal injury and/or damage to the vehicle or its components.

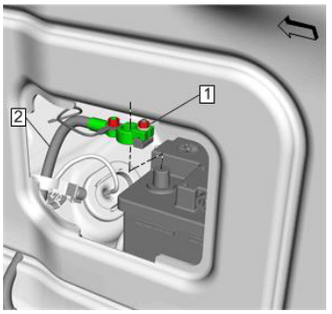
For Vehicles equipped with OnStar® (UE1) with Back Up Battery: The Back Up Battery is a redundant power supply to allow limited OnStar® functionality in the event of a main vehicle battery power disruption to the VCIM (OnStar® module). Do not disconnect the main vehicle battery or remove the OnStar® fuse with the ignition key in any position other than OFF. Retained accessory power should be allowed to time out or be disabled (simply opening the driver door should disable retained accessory power) before disconnecting power. Disconnecting power to the OnStar® module in any way while the ignition is On or with retained accessory power activated may cause activation of the OnStar® Back-Up Battery system and will discharge and permanently damage the back-up battery. Once the Back-Up Battery is activated it will stay on until it has completely discharged. The back-up battery is not rechargeable and once activated the back-up battery must be replaced.

1. Rear Compartment Access Door (1) » Remove



2. Loosen the negative battery cable nut. (1)
3. Remove the negative battery cable from the battery. (2)

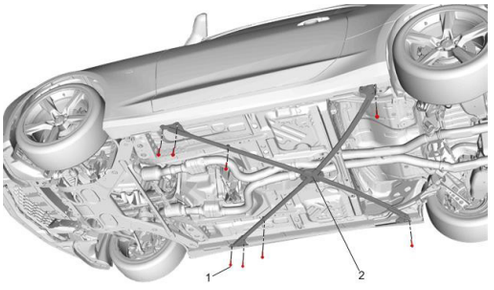
Installation Procedure



1. Install the negative battery cable to the battery. (2)
   Caution: Refer to Fastener Caution.
2. Battery Negative Post Clamp Nut (1) » Tighten **7 N·m (62 lb in)**

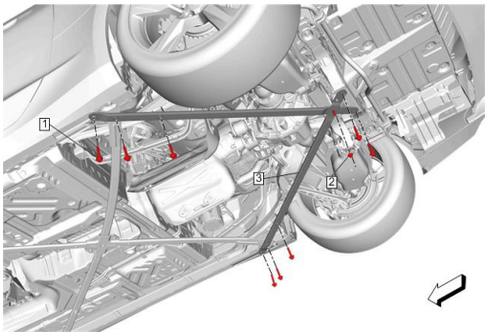
3. Rear Compartment Access Door (1) » Install

Underbody Rear Brace Replacement (Convertible Only)



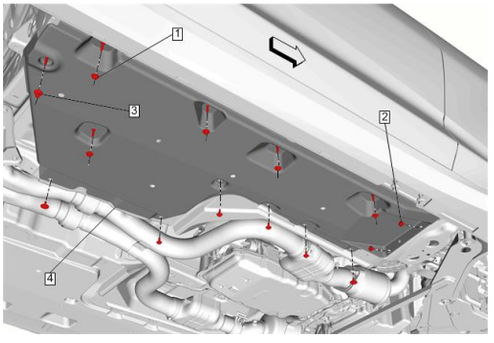
Underbody Rear Brace Replacement	
Callout	**Component Name**
Preliminary Procedure Floor Panel Tunnel Rear Brace Replacement	
1	Fastener [8X] **Caution:** Refer to Fastener Caution **Tighten** **58 N·m (43 lb ft)**
2	Underbody Rear Brace

Floor Panel Tunnel Rear Brace Replacement (Convertible Only)



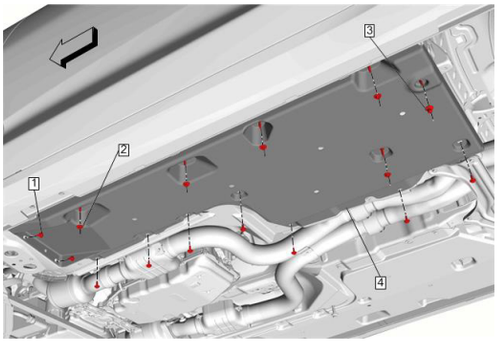
Floor Panel Tunnel Rear Brace Replacement	
Callout	**Component Name**
Preliminary Procedure Raise and support the vehicle. Lifting and Jacking the Vehicle	
1	Fastener [8X] **Caution:** Refer to Fastener Caution **Tighten** **58 N·m (43 lb ft)**
2	Fastener **Tighten** **58 N·m (43 lb ft)**
3	Floor Panel Tunnel Rear Brace

Underbody Front Air Deflector Replacement - Right Side



Underbody Front Air Deflector Replacement - Right Side	
Callout	**Component Name**
Preliminary Procedure { If equipped } Underbody Rear Brace Replacement	
1	Underbody Front Air Deflector Bolt [9X] **Tighten** **9 N·m (80 lb in)**
2	Underbody Front Air Deflector Nut [5X] **Tighten** **9 N·m (80 lb in)**
3	Retainer
4	Underbody Front Air Deflector — Right Side

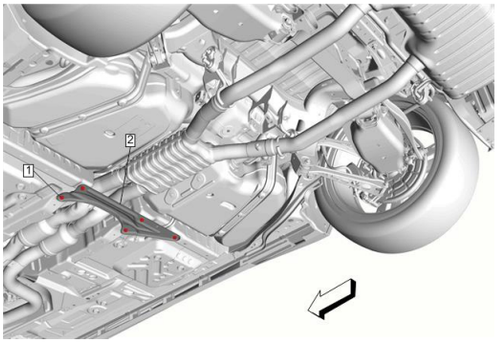
Underbody Front Air Deflector Replacement - Left Side



Underbody Front Air Deflector Replacement - Left Side	
Callout	**Component Name**
Preliminary Procedure { If equipped } Underbody Rear Brace Replacement	
1	Underbody Front Air Deflector Bolt [9X] **Tighten** **9 N·m (80 lb in)**
2	Underbody Front Air Deflector Nut [5X] **Tighten** **9 N·m (80 lb in)**
3	Retainer
4	Underbody Front Air Deflector — Left Side

1. Remove the floor panel number 2 cross bar reinforcement.

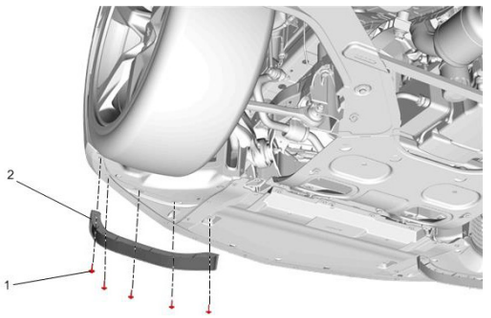
Floor Panel Number 4 Cross Bar Replacement



Floor Panel Number 4 Cross Bar Replacement	
Callout	**Component Name**
Preliminary Procedure Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle	
1	Floor Panel Number 4 Cross Bar Reinforcement Bolt [5X] **Caution:** Refer to Fastener Caution. **Tighten** **22 N·m (16 lb ft)**
2	Floor Panel Number 4 Cross Bar Reinforcement

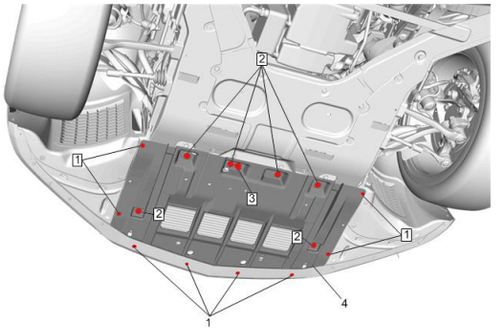
Front Tire Front Air Deflector Replacement

Removal Procedure



Front Tire Front Air Deflector Replacement	
Callout	**Component Name**
Preliminary Procedure Raise and support the vehicle. Lifting and Jacking the Vehicle	
1	Fastener [5X] **Caution:** Refer to Fastener Caution **Tighten** **2.5 N·m (22 lb in)**
2	Front Tire Front Air Deflector

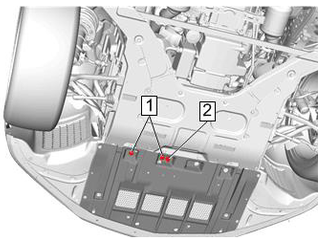
Front Compartment Air Deflector Replacement (Coupe - LT1)



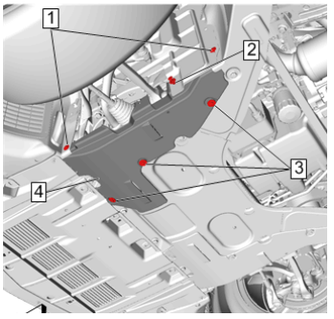
Front Compartment Air Deflector Replacement	
Callout	**Component Name**
Preliminary Procedure Front Tire Front Air Deflector Replacement	
1	Front Compartment Air Deflector Fastener [8X] **Caution:** Refer to Fastener Caution **Tighten** **2.5 N·m (22 lb in)**
2	Front Compartment Air Deflector Fastener [6X] **Tighten** **5 N·m (44 lb in)**
3	Retainer
4	Front Compartment Air Deflector

Front Compartment Side Noise Shield Replacement

Removal Procedure

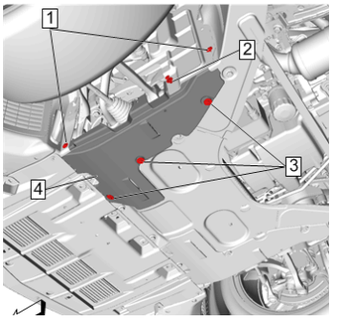


1. Front Compartment Air Deflector Fastener (1) » Remove [2x]
2. Front Compartment Air Deflector Retainer (2) » Remove



3. Front Compartment Side Noise Shield Fastener (1) » Remove [2x]
4. Front Compartment Side Noise Shield Retainer (2) » Remove
5. Front Compartment Side Noise Shield Fastener (3) » Remove [3x]
6. Front Compartment Side Noise Shield (4) » Remove

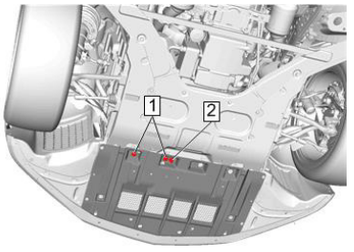
Installation Procedure



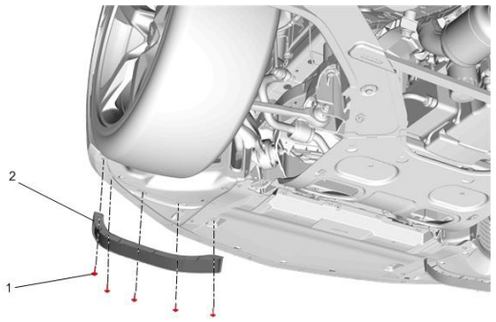
1. Front Compartment Side Noise Shield (4) » Install
2. Front Compartment Side Noise Shield Retainer (2) » Install

Caution: Refer to Fastener Caution

3. Front Compartment Side Noise Shield Screw (1) » Install and tighten [2x] **2.5 N·m (22 lb in)**
4. Front Compartment Side Noise Shield Bolt (3) » Install and tighten [3x] **9 N·m (80 lb in)**



5. Front Compartment Air Deflector Fastener (1) » Install and tighten [2x] **5 N·m (44 lb in)**
6. Front Compartment Air Deflector Retainer (2) » Install



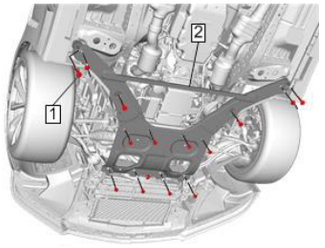
7. Lower the vehicle.

Front Tire Front Air Deflector Replacement	
Callout	**Component Name**
Preliminary Procedure Raise and support the vehicle. Lifting and Jacking the Vehicle	
1	Fastener [5X] **Caution:** Refer to Fastener Caution **Tighten** **2.5 N·m (22 lb in)**
2	Front Tire Front Air Deflector

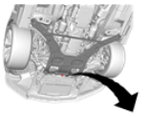
Front Cradle Shear Plate Replacement

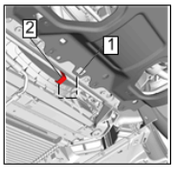
Removal Procedure

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle
2. Refer to Front Compartment Air Deflector Replacement » Remove
3. Refer to Front Compartment Side Noise Shield Replacement » Remove



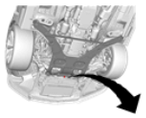
4. Front Cradle Shear Plate Fastener (1) » Remove

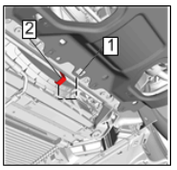




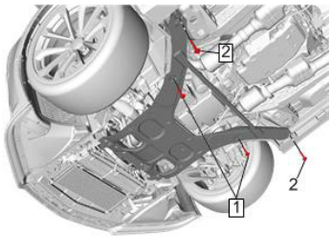
5. Front Cradle Shear Plate (1) @ Front Cradle Shear Plate Hook (2) » Remove

Installation Procedure

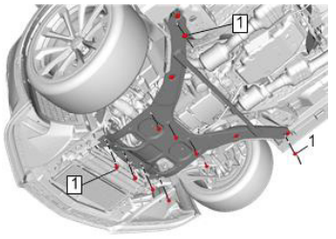




1. Front Cradle Shear Plate (1) @ Front Cradle Shear Plate Hook (2) » Install



2. Loosely install the front cradle shear plate alignment bolts. (1)
   Caution: Refer to Fastener Caution.
3. Front Cradle Shear Plate Fastener (2) » Tighten **50 N·m (37 lb ft)**
4. Tighten the front cradle shear plate alignment bolts. (1) **50 N·m (37 lb ft)**



5. Front Cradle Shear Plate Fastener (1) » Tighten **50 N·m (37 lb ft)**
6. Refer to Front Compartment Side Noise Shield Replacement » Install
7. Refer to Front Compartment Air Deflector Replacement » Install
8. Lower the vehicle.

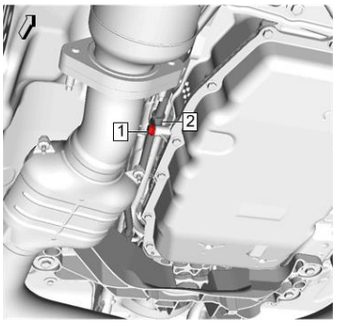
Exhaust Muffler Replacement (LT1, Coupe)

Removal Procedure

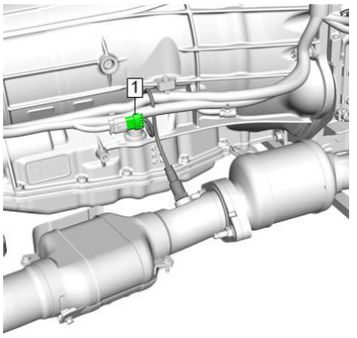
Warning: In order to avoid being burned, do not service the exhaust system while it is still hot. Service the system when it is cool.

Warning: Avoid contact with HOT components. Wear safety glasses and protective gloves to avoid personal injury.

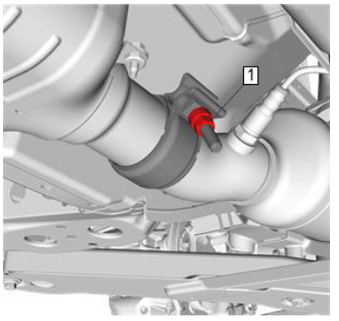
1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle
2. If equipped with performance exhaust, disconnect the rear exhaust control valve actuator electrical wiring harness connectors (1). — Refer to Exhaust Control Valve Actuator Replacement.



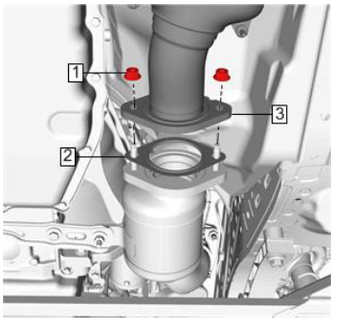
3. If equipped with rear differential transmission fluid coolant pipes (2), loosen the transmission fluid coolant pipe bracket bolt (1) to aid in accessing the heated oxygen sensor electrical wiring harness connector.



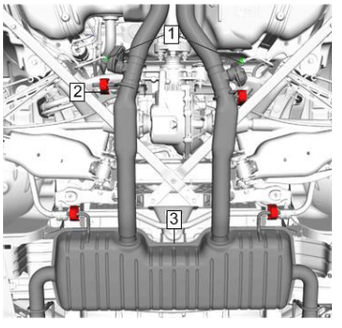
4. Disconnect the bank 2, sensor 2, heated oxygen sensor electrical wiring harness connector. (1)
5. Refer to Floor Panel Number 4 Cross Bar Replacement » Remove
6. Refer to Exhaust Rear Muffler Rear Hanger Replacement » Remove



7. Catalytic Converter Clamp (1) » Remove and DISCARD

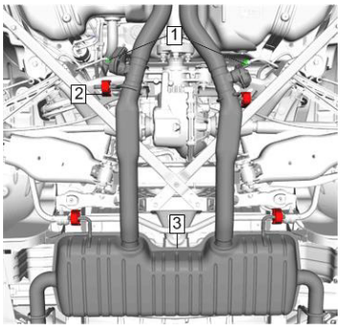


8. Catalytic Converter Nut (1) » Remove [2x]
9. Exhaust Muffler (4) @ Catalytic Converter (3) » Separate
10. DISCARD the gasket. (2)

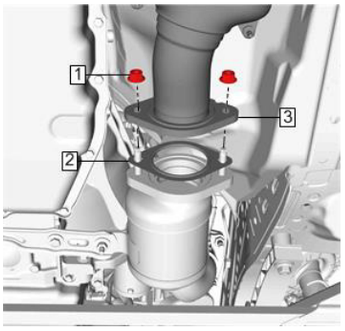


11. Exhaust Control Valve Actuator (1) » Disconnect [2x]
12. Exhaust Isolator (2) » Separate [4x]
13. Exhaust Muffler Assembly (3) » Remove
14. Transfer components as necessary.

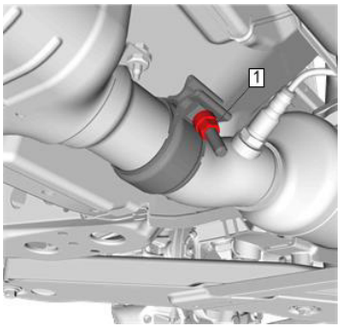
Installation Procedure



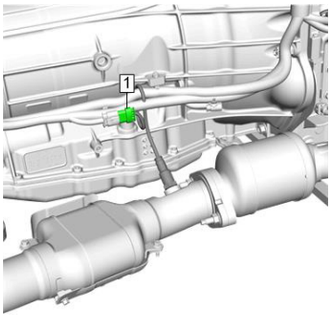
1. Exhaust Muffler Assembly (3) » Install
   Note: Clean and lubricate the exhaust isolators for ease of installation.
2. Exhaust Isolator (2) » Connect [2x]
3. Exhaust Control Valve Actuator (1) » Connect [2x]



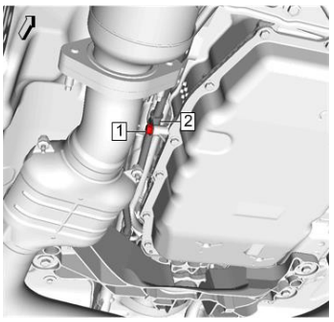
4. Install a NEW gasket. (2)
5. Exhaust Muffler (4) @ Catalytic Converter (3) » Install
   Caution: Refer to Fastener Caution.
6. Catalytic Converter Nut (1) » Tighten **50 N·m (37 lb ft)** [2x]



   Note: Install a NEW clamp.
7. Catalytic Converter Clamp (1) » Install and tighten **22 N·m (16 lb ft)**
8. Refer to Exhaust Rear Muffler Rear Hanger Replacement » Install
9. Refer to Floor Panel Number 4 Cross Bar Replacement » Install



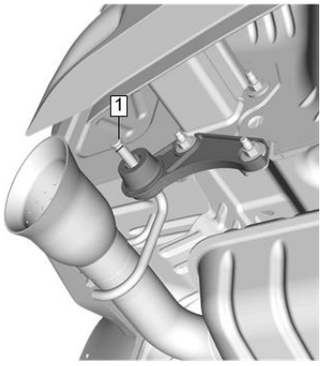
10. Connect the bank 2, sensor 2, heated oxygen sensor electrical wiring harness connector. (1)



11. If equipped with rear differential transmission fluid coolant pipes (2), tighten the transmission fluid coolant pipe bracket bolt (1) to **10 N·m (89 lb in)**.
12. If equipped with performance exhaust, connect the rear exhaust control valve actuator electrical wiring harness connectors (1). — Refer to Exhaust Control Valve Actuator Replacement
13. Lower the vehicle.

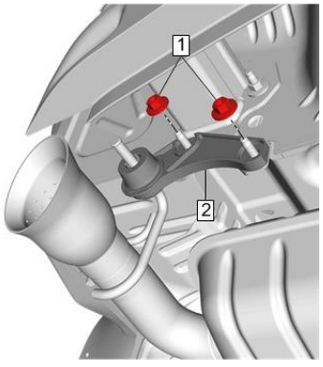
Exhaust Rear Muffler Rear Hanger Replacement LT1

Removal Procedure



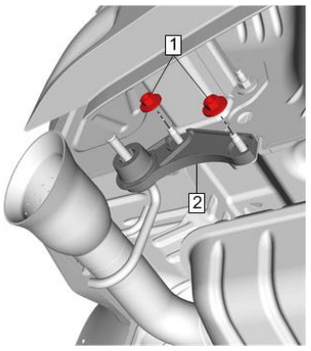
Important: The exhaust muffler rod must be cut prior to removing the exhaust rear muffler insulator to avoid damage to the rubber insulator.

1. Cut the flared section of the exhaust rod at the location shown. (1)



2. Exhaust Rear Muffler Insulator Nut (1) » Remove [2x]
3. Exhaust Rear Muffler Insulator (2) » Remove

Installation Procedure

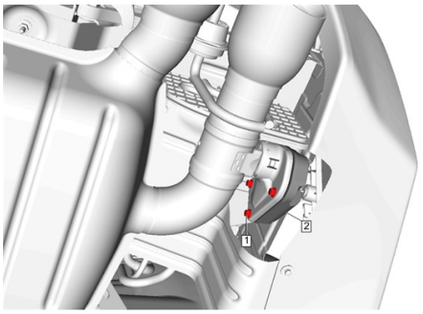


1. Exhaust Rear Muffler Insulator (2) » Install

Caution: Refer to Fastener Caution.

2. Exhaust Rear Muffler Insulator Nut (1) » Install and tighten [2x] **40 N·m (30 lb ft)**
3. Lower the vehicle. Refer to Lifting and Jacking the Vehicle

Exhaust Control Valve Actuator Replacement (Rear Valves with Performance Exhaust)



Exhaust Control Valve Actuator Replacement	
Callout	**Component Name**
Preliminary Procedure Refer to Lifting and Jacking the Vehicle	
1	Exhaust Control Valve Actuator Fastener [3x] **Caution:** Refer to Fastener Caution. **Tighten** **6 N·m (53 lb in)**
2	Exhaust Control Valve Actuator **Procedure** 1. Disconnect the electrical connector. 2. Perform the exhaust flow control valve actuator re-learn procedure. Refer to Exhaust Flow Control Valve Lear

Exhaust Flow Control Valve Learn (Tail Pipe Exhaust Flow Control Valve)

Procedures Requiring an Exhaust Flow Control Valve Learn

The calibration procedure for the exhaust flow control valve actuator may be required after certain service procedures are performed. Some of these procedures are as follows:

- Replacement of the chassis control module.
- Replacement of the exhaust flow control valve actuator.

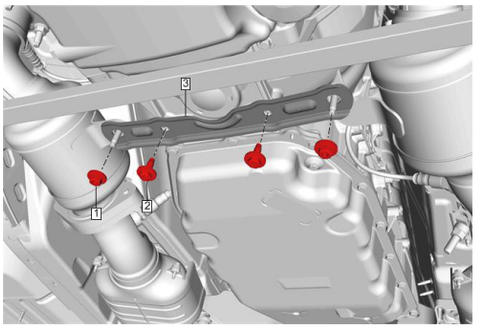
Exhaust Flow Control Valve Learn Procedure

The exhaust flow control valve learn procedure is performed with a scan tool using the following steps:

1. Place the vehicle on a level surface.
2. Connect a scan tool to the data link connector.
3. Turn the ignition ON, with the engine OFF.
4. Select Exhaust Flow Control Valve Learn in the Chassis Control Module Configuration/Reset Function list.
5. Follow the scan tool directions to complete the calibration procedure.
6. Perform the scan tool Exhaust Flow Control Valve test in the chassis control module control function list.

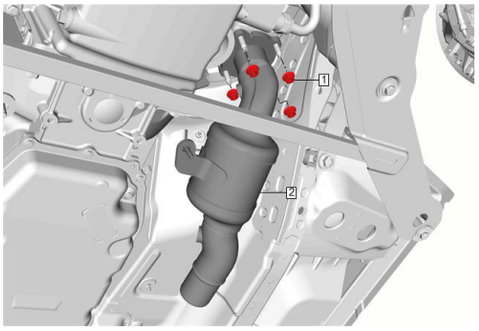
7. Clear any DTCs that may have set.
8. Road test the vehicle and verify proper operation of the exhaust flow control system.

Catalytic Converter Brace Bracket Replacement (LT1)



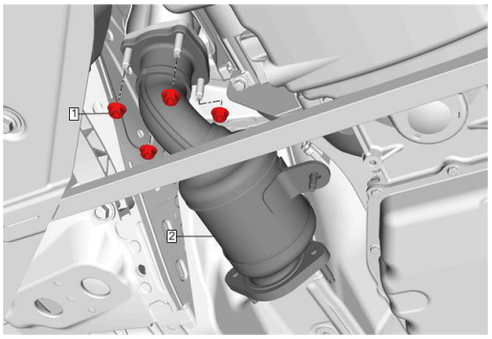
Catalytic Converter Brace Bracket Replacement	
Callout	**Component Name**
Preliminary Procedure Lifting and Jacking the Vehicle	
1	Catalytic Converter Brace Bracket Nut [2x] **Caution:** Refer to Fastener Caution. **Tighten** **22 N·m (16 lb ft)**
2	Catalytic Converter Brace Bracket Bolt [2x] **Caution:** Refer to Fastener Caution. **Tighten** **22 N·m (16 lb ft)**
3	Catalytic Converter Brace Bracket

Catalytic Converter Replacement - Left Side LT1



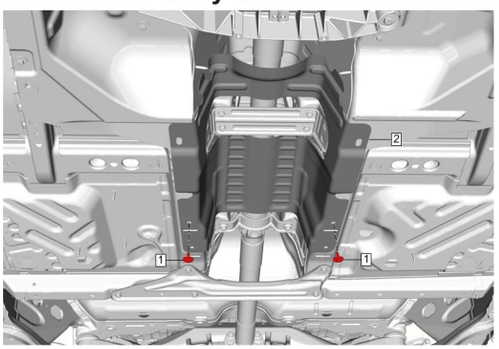
Catalytic Converter Replacement - Left Side	
Callout	**Component Name**
Warning: In order to avoid being burned, do not service the exhaust system while it is still hot. Service the system when it is cool. **Warning:** Avoid contact with HOT components. Wear safety glasses and protective gloves to avoid personal injury. **Preliminary Procedure** 1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle 2. Disconnect the oxygen sensor electrical connectors. 3. Catalytic Converter Brace Bracket » Remove — Refer to Catalytic Converter Brace Bracket Replacement 4. Exhaust Muffler @ Catalytic Converter » Disconnect — Refer to Exhaust Muffler Replacement	
1	Catalytic Converter Nut [4x] **Caution:** Refer to Fastener Caution. **Tighten** **50 N·m (37 lb ft)**
2	Catalytic Converter **Preliminary Procedures** 1. Install a NEW catalytic converter gasket. 2. Transfer components as necessary.

Catalytic Converter Replacement - Right Side LT1



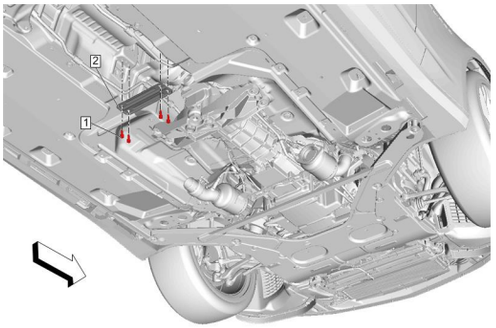
Catalytic Converter Replacement - Right Side	
Callout	**Component Name**
Warning: In order to avoid being burned, do not service the exhaust system while it is still hot. Service the system when it is cool. **Warning:** Avoid contact with HOT components. Wear safety glasses and protective gloves to avoid personal injury. **Preliminary Procedures** 1. Refer to Lifting and Jacking the Vehicle 2. Disconnect the oxygen sensor electrical connector. 3. Catalytic Converter Brace Bracket » Remove — Refer to Catalytic Converter Brace Bracket Replacement 4. Exhaust Muffler @ Catalytic Converter » Disconnect — Refer to Exhaust Muffler Replacement	
1	Catalytic Converter Nut [4x] **Caution:** Refer to Fastener Caution. **Tighten** **50 N·m (37 lb ft)**
2	Catalytic Converter **Procedure** Install a NEW catalytic converter gasket.

Intermediate Body Exhaust Heat Shield Replacement



Intermediate Body Exhaust Heat Shield Replacement	
Callout	**Component Name**
Warning: Refer to Exhaust Service Warning. **Warning:** Refer to Eye Protection Warning. **Preliminary Procedures** 1. Refer to Underbody Front Air Deflector Replacement - Right Side 2. Refer to Underbody Front Air Deflector Replacement - Left Side 3. Refer to Exhaust Muffler Replacement	
1	Intermediate Body Exhaust Heat Shield Bolt [2x] **Caution:** Refer to Fastener Caution. **Tighten** **9 N·m (80 lb in)**
2	Intermediate Body Exhaust Heat Shield

Floor Panel Number 2 Cross Bar Reinforcement Replacement

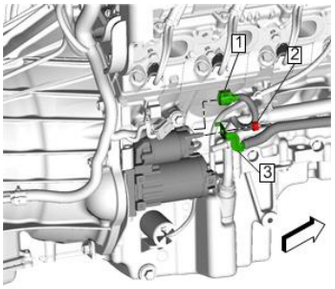


Floor Panel Number 2 Cross Bar Reinforcement Replacement	
Callout	**Component Name**
Preliminary Procedure: Exhaust Muffler Replacement	
1	Floor Panel Number 2 Cross Bar Reinforcement Bolt [4x] **Caution:** Refer to Fastener Caution **Tighten** **22 N·m (16 lb ft)**
2	Floor Panel Number 2 Cross Bar Reinforcement

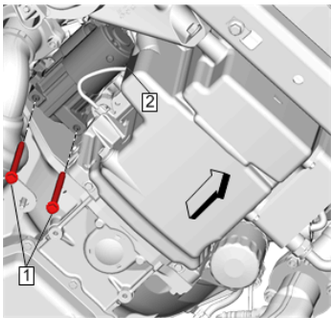
Starter Replacement (LT1)

Removal Procedure

1. Disconnect the battery negative cable. Refer to Battery Negative Cable Disconnection and Connection
2. Catalytic Converter-Right Side » Remove — Refer to Catalytic Converter Replacement - Right Side
3. Exhaust Manifold-Right Side » Remove — Refer to Exhaust Manifold Replacement - Right Side
4. If equipped with a manual transmission, reposition the transmission fluid cooler pipe. Refer to Exhaust Manifold Replacement - Right Side
5. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle
6. Starter Shield » Remove — Refer to Starter Shield Replacement

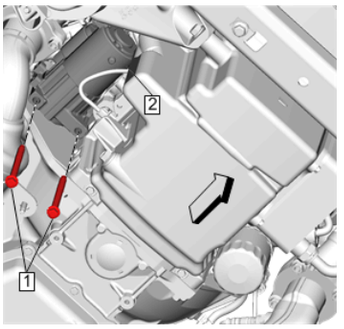


7. Starter Solenoid Cable Nut (2) » Remove
8. Battery Positive Cable (3) » Remove
9. Electrical Connector (1) » Remove



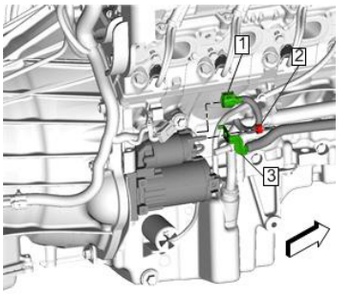
10. Remove the starter bolts. (1)
11. Remove the starter. (2)

Installation Procedure



Caution: Refer to Fastener Caution.

1. Install the starter. (2)
2. Install the starter mounting bolts. (1) » Tighten **50 N·m (37 lb ft)**

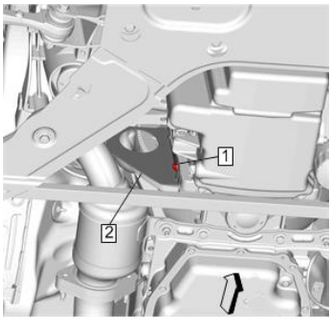


3. Connect the electrical connector. (1)
4. Battery Positive Cable (3) » Install
5. Starter Solenoid Cable Nut (2) Tighten **12 N·m (106 lb in)**.
6. Starter Shield » Install — Refer to Starter Shield Replacement
7. Catalytic Converter-Right Side » Install — Refer to Catalytic Converter Replacement - Right Side
8. Lower the vehicle.
9. Exhaust Manifold-Right Side » Install — Refer to Exhaust Manifold Replacement - Right Side
10. Connect the negative battery cable. Refer to Battery Negative Cable Disconnection and Connection

Transmission Converter Cover Replacement (Right Side M5U)

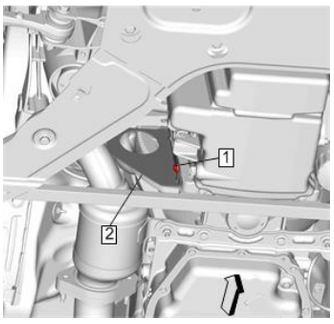
Removal Procedure

1. Refer to Starter Replacement » Remove



2. Remove the right flywheel inspection cover bolt (1) and cover (2).

Installation Procedure

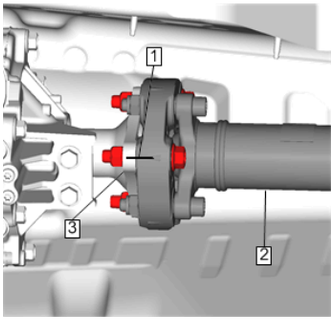


Caution: Refer to Fastener Caution.

1. Install the right flywheel inspection cover (2) and bolt (1). Tighten the bolt to **10 N·m (89 lb in)**.
2. Refer to Starter Replacement » Install

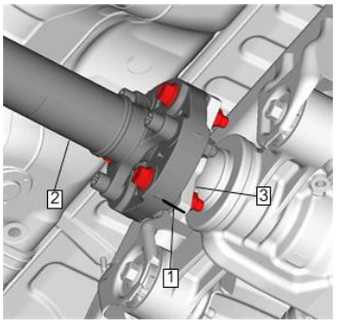
Two-Piece Propeller Shaft Replacement (Coupe M5T, M5U)

Removal Procedure

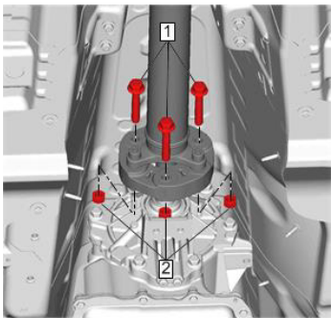


Note: Before removing the propeller shaft from the vehicle, paint or scribe references marks on the transmission flange to the propeller shaft and the rear differential drive flange to ensure minimal driveline system imbalance.

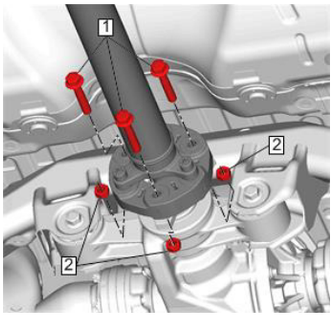
1. Mark (1) the relationship of the propeller shaft flange (2) and the output flange (3) of the transmission.



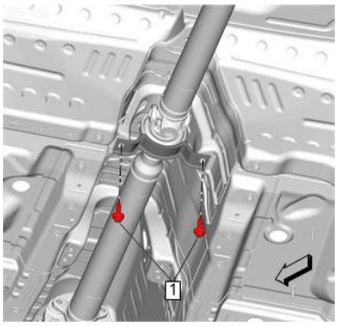
2. Mark (1) the relationship of the propeller shaft flange (2) and the rear axle pinion flange (3).
   Note: Ensure that the propeller shaft is secured to the hydraulic jack stand.
3. Support the propeller shaft with a suitable hydraulic jack stand.



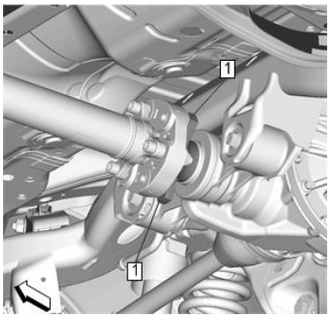
4. Remove the three front propeller shaft bolts (1) and the nuts (2).



5. Remove the three rear propeller shaft bolts (1) and the nuts (2).



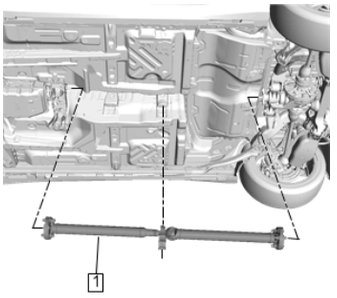
6. Remove the two propeller shaft bearing support bolts (1).



Caution: Care should be taken not to use sharp or pry tools when separating the propeller shaft coupler from the drive flange. Damage to the coupler could result and replacement of the entire propeller shaft would be required.

Note: It may be necessary to apply a small amount of penetrating lubricant or WD-40® to the area shown (1) to aid in separation of the propeller shaft coupling.

7. If the propeller shaft does not easily separate from the differential, transmission or transfer case, use a rubber mallet to gently tap the locations (1) on the rubber coupling shown above to separate.

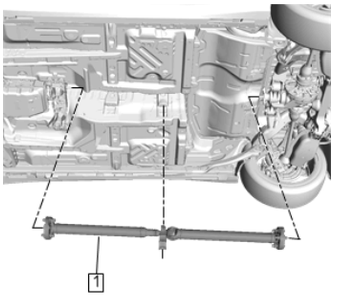


8. Remove the propeller shaft (1) from the vehicle.

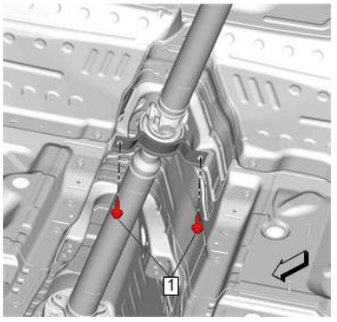
Installation Procedure

Note: If reusing the propeller shaft bolts, to ensure proper adhesion and fastener retention, the threads must be free of debris prior to the application of thread-locker. Use an appropriate cleaner to thoroughly clean the threads and allow to dry. Apply thread-locker to the propeller shaft to flange bolts. Ensure that there are no gaps in the thread-locker along the length of the filled area of the bolts. Allow the thread-locker to cure approximately 10 minutes before installation.

1. Thoroughly clean apply thread-locker to the threads of the propeller shaft bolts. Refer to Adhesives, Fluids, Lubricants, and Sealers.

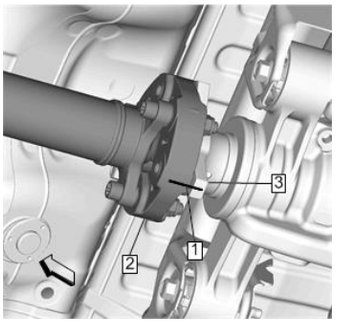


2. Position the propeller shaft (1) in the vehicle.

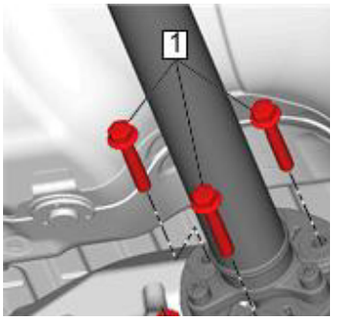


Caution: Refer to Fastener Caution.

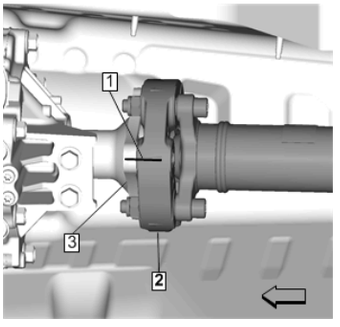
3. Install the two propeller shaft bearing bolts (1) and tighten to **50 N·m (37 lb ft)**.



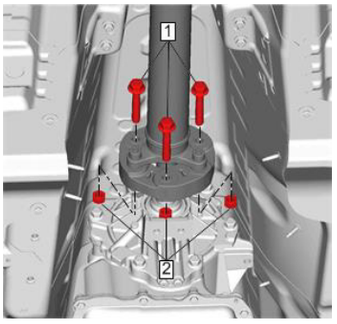
4. Align the reference mark (1) between the propeller shaft flange and the rear axle pinion flange.



5. Install the three rear propeller shaft nuts (2) and the bolts (1).
6. Tighten the bolts (1) to **90 N·m (66 lb ft)**.

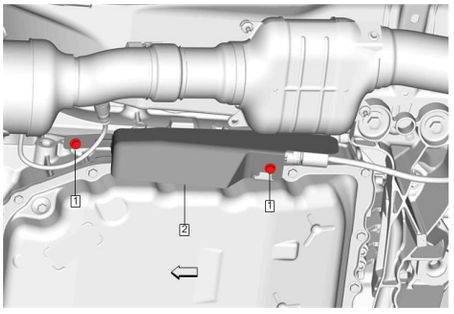


7. Align the reference mark (1) between the propeller shaft flange and the output flange of the transmission.



8. Install the three front propeller shaft nuts (2) and the bolts (1).
9. Tighten the bolts (1) to **90 N·m (66 lb ft)**
10. Install the floor panel number 2 cross bar reinforcement. Refer to Floor Panel Number 2 Cross Bar Reinforcement Replacement.
11. Install the intermediate body exhaust heat shield. Refer to Intermediate Body Exhaust Heat Shield Replacement.
12. Install the exhaust muffler. Refer to Exhaust Muffler Replacement.
13. Install the floor panel number 4 cross bar. Refer to Floor Panel Number 4 Cross Bar Replacement.
14. Remove the support and lower the vehicle.

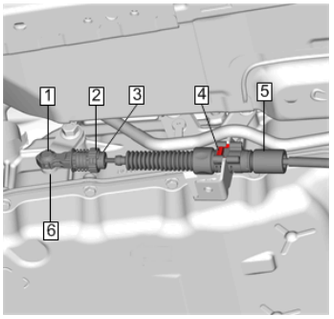
Transmission Heat Shield Replacement



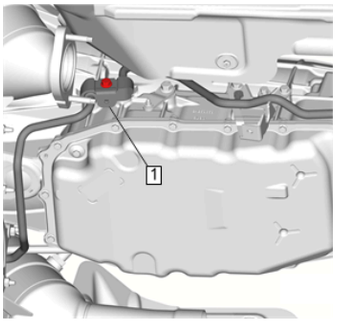
Transmission Heat Shield Replacement	
Callout	**Component Name**
Preliminary Procedures: Refer to Lifting and Jacking the Vehicle.	
1	Transmission Heat Shield Bolt [2x] **Caution:** Refer to Fastener Caution. **Tighten** **9 N·m (80 lb in)**
2	Transmission Heat Shield

Transmission Fluid Cooler Inlet and Outlet Pipe Replacement (LT1 with M5U, With KNR)

Removal Procedure

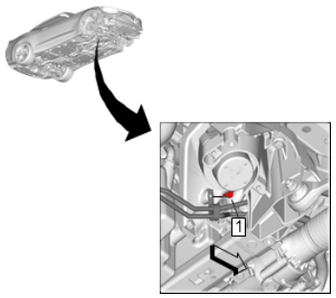


1. Disconnect the transmission range selector lever cable terminal (1) from the transmission manual shift lever pin (6).
2. Slide the retainer (4) forward to release the transmission range selector lever cable (5) from the bracket.

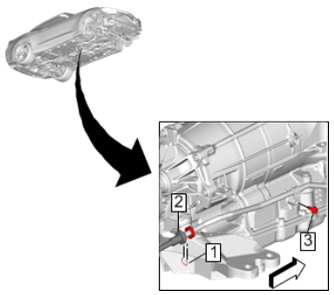


3. Place an oil drain pan under the transmission fluid cooler pipes (1).
4. Remove the transmission fluid cooler inlet and outlet pipes (1) from the transmission, and position aside, or remove from the vehicle as necessary. Refer to Transmission Fluid Cooler Inlet and Outlet Pipe Replacement.
5. Plug the open fluid ports to prevent fluid loss and contamination.

NOTE: Complete disassembly of the Transmission Fluid Lines is not required. They need only be disconnected from the Transmission and moved aside / secured to keep them out of the path of the Transmission during its removal and installation. Should you chose to remove these lines, the separation procedures should be followed.

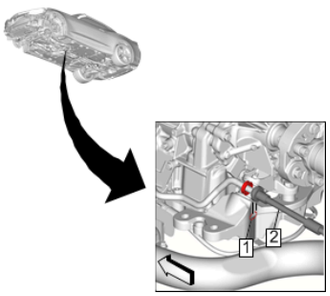


1. Transmission Fluid Cooler Pipe Clip Bolt (1) @ Engine Mount — Right Side » Remove



2. Transmission Fluid Cooler Pipe Clip (1) @ Transmission Fluid Cooler Pipe (Mid Line Right) » Remove — Refer to Transmission Fluid Cooler Hose/Pipe Quick-Connect Fitting Disconnection and Connection

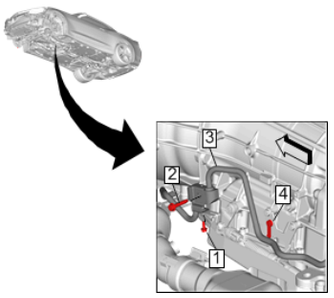
   Note: Cover or plug all open transmission fluid cooler pipe connection points to help avoid any accidental contamination.
3. Transmission Fluid Cooler Pipe (Mid Line Right) (2) @ Transmission Fluid Cooler Inlet and Outlet Pipe » Remove
4. Transmission Fluid Cooler Pipe Clip Bolt (3) @ Transmission » Remove



5. Transmission Fluid Cooler Pipe Clip (1) @ Transmission Fluid Cooler Pipe (Mid Line Left) » Remove — Refer to Transmission Fluid Cooler Hose/Pipe Quick-Connect Fitting Disconnection and Connection

   Note: Cover or plug all open transmission fluid cooler pipe connection points to help avoid any accidental contamination.

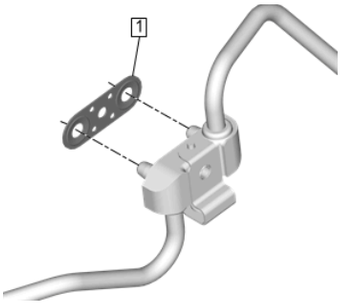
6. Transmission Fluid Cooler Pipe (Mid Line Left) (2) @ Transmission Fluid Cooler Inlet and Outlet Pipe » Remove



7. Range Selector Lever Cable Heat Shield Bolt (1) » Remove
8. Transmission Fluid Cooler Pipe Clip Bolt (2) » Remove

Note: Cover or plug all open transmission fluid cooler pipe connection points to help avoid any accidental contamination.

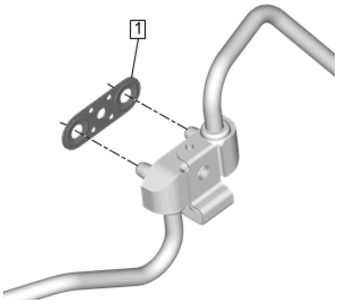
9. Transmission Fluid Cooler Inlet and Outlet Pipe (3) @ Transmission » Remove
10. Remove the transmission fluid cooler pipe plastic retainer (4) from the range selector lever cable bracket.



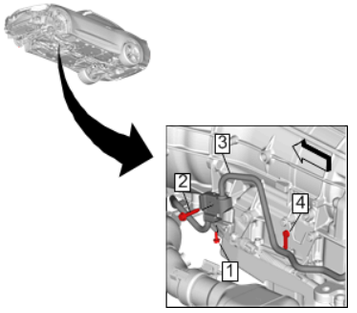
11. Transmission Fluid Cooler Pipe Fitting Seal (1) » Remove
    DISCARD the seal.
12. Remove the transmission fluid cooler inlet and outlet pipe (1) from the vehicle.
13. Transfer components as necessary.

Installation Procedure

1. Position the transmission fluid cooler inlet and outlet pipe (1) on the vehicle.



2. Transmission Fluid Cooler Pipe Fitting Seal (1) » Install
   Use a NEW seal.

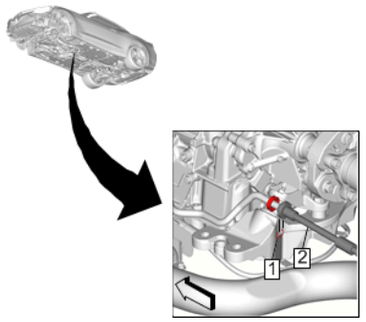


3. Install the transmission fluid cooler pipe plastic retainer (4) in the range selector lever cable bracket.

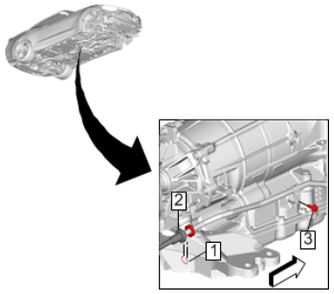
4. Transmission Fluid Cooler Inlet and Outlet Pipe (3) @ Transmission » Install

   Caution: Refer to Fastener Caution.

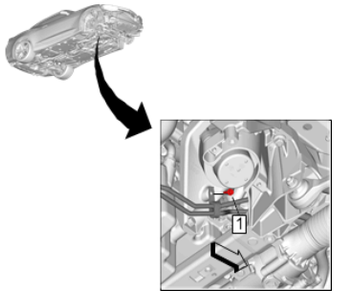
5. Transmission Fluid Cooler Pipe Clip Bolt (2) » Install and tighten **22 N·m (16 lb ft)**
6. Range Selector Lever Cable Heat Shield Bolt (1) » Install and tighten **9 N·m (80 lb in)**



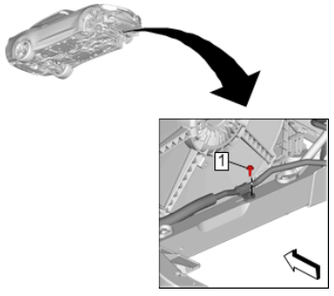
7. Transmission Fluid Cooler Pipe Clip (1) @ Transmission Fluid Cooler Pipe (Mid Line Left) » Install — Refer to Transmission Fluid Cooler Hose/ Pipe Quick-Connect Fitting Disconnection and Connection
8. Transmission Fluid Cooler Pipe (Mid Line Left) (2) @ Transmission Fluid Cooler Inlet and Outlet Pipe » Install



9. Transmission Fluid Cooler Pipe Clip (1) @ Transmission Fluid Cooler Pipe (Mid Line Right) » Install — Refer to Transmission Fluid Cooler Hose/ Pipe Quick-Connect Fitting Disconnection and Connection
10. Transmission Fluid Cooler Pipe (Mid Line Right) (2) @ Transmission Fluid Cooler Inlet and Outlet Pipe » Install
11. Transmission Fluid Cooler Pipe Clip Bolt (3) @ Transmission » Install and tighten **22 N·m (16 lb ft)**



12. Transmission Fluid Cooler Pipe Clip Bolt (1) @ Engine Mount — Right Side » Install and tighten **9 N·m (80 lb in)**
13. Fill the transmission to the proper level with NEW transmission fluid. Refer to Transmission Fluid Level and Condition Check
14. Inspect for transmission fluid leaks.



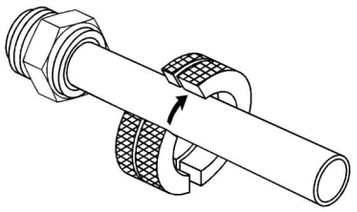
Transmission Fluid Cooler Hose/Pipe Quick-Connect Fitting Disconnection and Connection

Special Tools

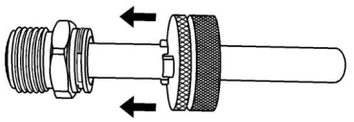
- *DT-28585* Universal Snap Ring Remover for the 5/8 inch Line
- *DT-41623-B* 3/8 inch Line Quick Release Tool

Removal Procedure

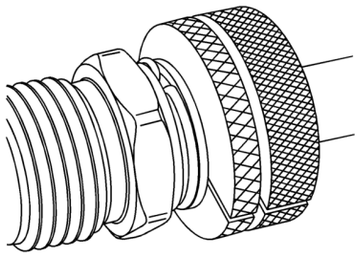
1. Remove the plastic cap from the quick connect fitting by pulling the cap back along the pipe.



2. Install the *DT-41623-B* 3/8 inch line quick release tool onto the transmission oil cooler (TOC) pipe, or use the *DT-28585* universal snap ring remover for the 5/8 inch line.



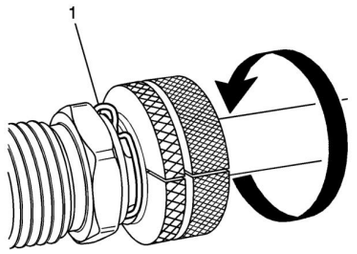
3. Slide the *DT-41623-B* 3/8 inch line quick release tool toward the TOC pipe fitting, or use the *DT-28585* universal snap ring remover for the 5/8 inch line.



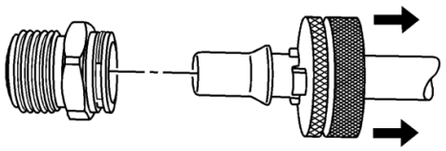
Note: Rotate the *DT-41623-B* 3/8 inch line quick release tool to engage the TOC pipe fitting's retainer slots.

The *DT-41623-B* 3/8 inch line quick release tool should be nearly flush with the fitting.

4. Connect the *DT-41623-B* 3/8 inch line quick release tool onto the TOC pipe fitting.

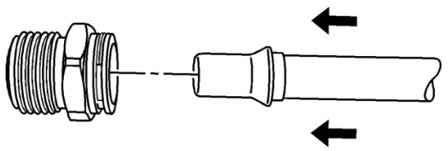


5. Rotate the *DT-41623-B* 3/8 inch line quick release tool or use the *DT-28585* universal snap ring remover for the 5/8 inch line until the retainer clip (1) rises above the fitting retainer seat.



6. Pull back on the TOC pipe to disengage the pipe from the TOC pipe fitting.
7. Remove the *DT-41623-B* 3/8 inch line quick release tool or the *DT-28585* universal snap ring remover for the 5/8 inch line from the TOC pipe.

Installation Procedure



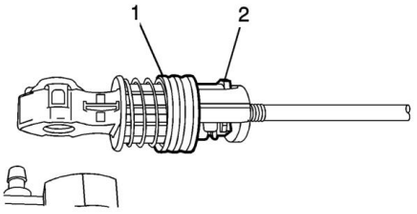
Note: Discard the TOC retaining clip and install a new retaining clip.

1. Install the TOC pipe into the TOC pipe fitting.
   A distinct snap should be heard or felt when assembling the TOC pipe to the fitting.
2. Install the plastic cap onto the quick connect fitting. The plastic cap should snap onto fitting and spin freely by hand.
3. To ensure the cooler line is properly installed, give the cooler pipe a gentle pull.

Range Selector Lever Cable Adjustment

Note: Adjust the automatic transmission range selector cable while the transmission and the gear selector are in the Park position only. Failure to do so may cause mis-adjustment.

1. Set the park brake and chock the wheels.
2. Transmission Heat Shield Replacement » Remove, if equipped.
3. Verify the transmission range select lever is in the park position.
4. Verify the transmission manual shift lever is in the park position.

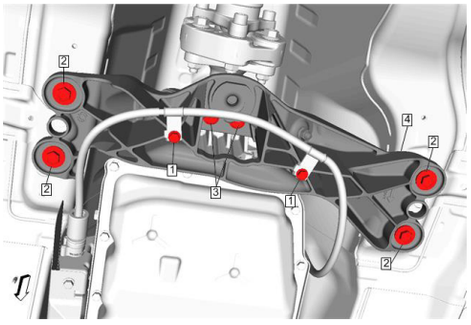


5. If installing a new cable, skip this step and go to the next step. Pull the retaining collar (1) forward, then release the range select cable adjuster clip (2) by pushing in on the adjuster clip from the backside.
6. Depress the adjuster clip (2) inboard, locking the adjuster clip completely.

Warning: After installing the transmission range selector shift cable, pull up and push down on ALL connections to verify that the connections are fully seated and properly engaged. Failure to perform this task can result in the vehicle not being able to shift into PARK causing potential vehicle damage and bodily injury.

7. Ensure that the cable adjuster clip (2) is secured with retaining collar covering the adjuster clip.
8. Refer to Transmission Heat Shield Replacement »Install, if equipped.
9. Check the transmission range select lever in all gear selections for proper operation.

Transmission Support Replacement (Automatic Transmission)



Transmission Mount Replacement	
Callout	**Component Name**
Note: The transmission support and the transmission mount are replaced as an assembly. **Preliminary Procedures** Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle Support the transmission with a suitable jack.	
1	Shift Control Cable Bolt [2X] **Caution:** Refer to Fastener Caution **Tighten** **9 N·m (80 lb in)**

2	Transmission Support Crossmember Bolt [4X] **Tighten** **58 N·m (43 lb ft)**
3	Transmission Mount Bolt [2X] **Tighten** **58 N·m (43 lb ft)**
4	Transmission Support Crossmember

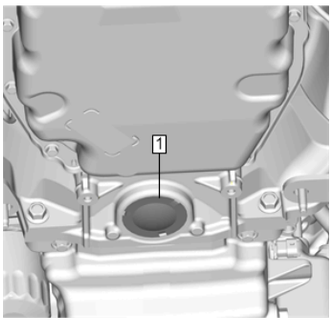
Transmission Replacement (M5U with LT1 Engine)

Special Tools

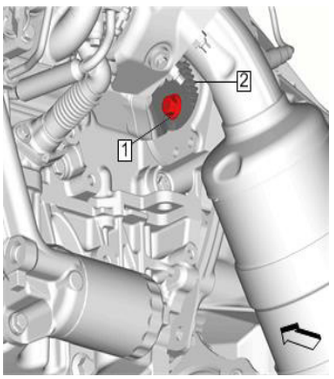
J-21366 Torque Converter Holding Strap

For equivalent regional tools, refer to Special Tools.

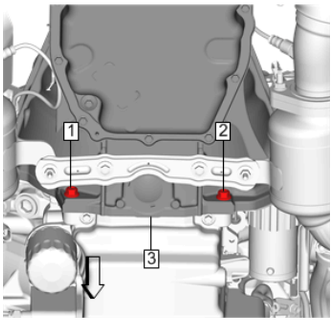
Removal Procedure



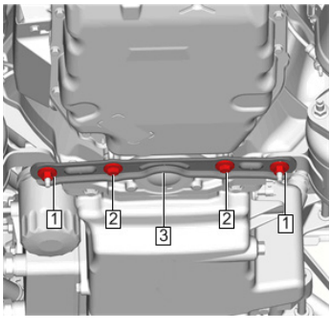
1. Remove the transmission close out plug (1).
2. Mark the torque converter to flexplate orientation to ensure proper realignment.



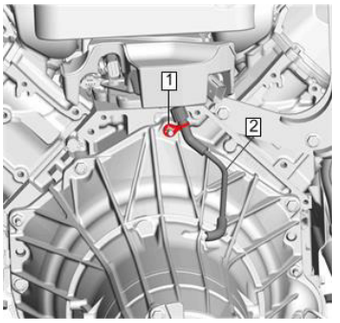
3. Repeat the following steps for all torque converter bolts (1):
   1. Rotate the harmonic balancer center bolt clockwise ONLY, in order to align the torque converter bolt with the starter opening.
   2. Remove and Discard the torque converter bolt.



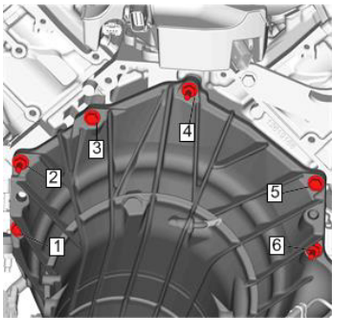
4. Remove the lower transmission to engine bolts (1, 2).



5. Remove the catalytic converter brace bracket (3) from the transmission.
6. Remove the left side catalytic converter. Refer to Catalytic Converter Replacement - Left Side.
7. Support the transmission with a suitable transmission jack.
8. Refer to Transmission Support Replacement » Remove
9. Tilt the transmission downward just enough to gain access to the upper transmission fasteners.



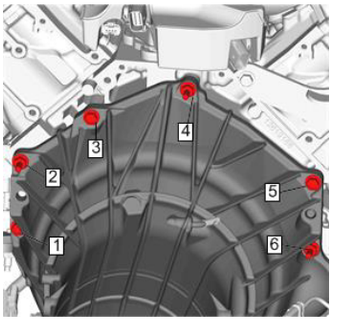
10. Disconnect the transmission vent hose retainer (1) from the transmission bolt
11. Disconnect the electrical wiring harness retainers from the transmission to engine fasteners and from the transmission case.



17. Remove the transmission to engine bolts (1, 2, 3, 4, 5, 6).
18. Pull the transmission straight back.
19. Install the *J-21366* strap onto the transmission bell housing to retain the torque converter.
20. Remove the transmission from the vehicle.
21. Transfer components as necessary.
22. Flush and flow test the transmission cooler and transmission pipes. Refer to Transmission Fluid Cooler Flushing and Flow Test.

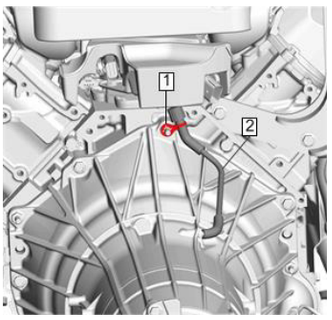
Installation Procedure

1. Remove the *J-21366* strap from the transmission bell housing.
2. Install the transmission to the vehicle.

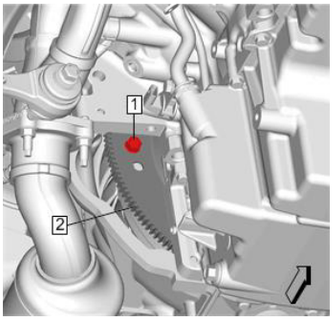


Caution: Refer to Fastener Caution.

3. Install the six transmission to engine bolts (1, 2, 3, 4, 5, 6) and tighten to **58 N·m (43 lb ft)**.

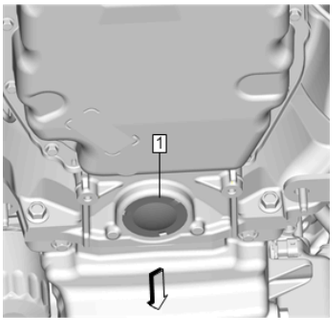


4. Connect the transmission vent hose retainer (1) to the transmission bolt.
5. Connect the electrical wiring harness retainers to the transmission to engine fasteners and to the transmission case.
6. Install the transmission support. Refer to Transmission Support Replacement.
7. Remove the transmission jack from under the vehicle.
8. Align the torque converter to flexplate orientation marks made during the removal procedure.

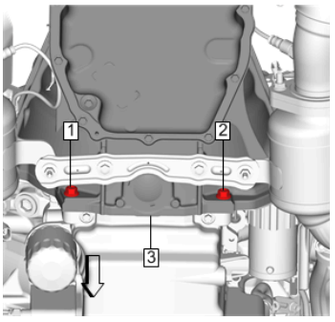


Note: Torque converter bolts are self-locking and must be replaced with NEW torque converter bolts every time the bolts are removed.

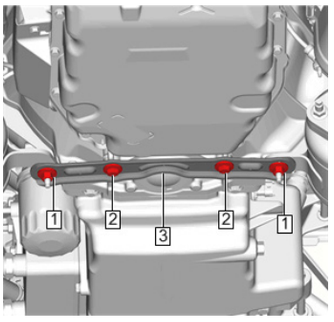
9. Complete the following steps for all torque converter bolts (1):
   1. Rotate the harmonic balancer center bolt clockwise ONLY, in order to align the torque converter bolt holes in the flexplate with the starter opening in the engine block.
   2. Install all NEW torque converter bolts (1) and tighten to **63 N·m (46 lb ft)**.



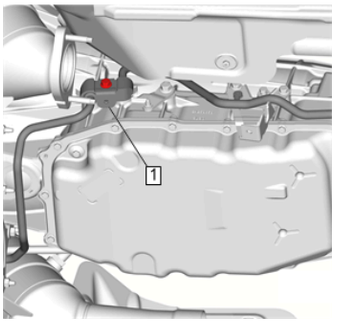
10. Install the transmission close out plug (1).
11. Refer to Transmission Converter Cover Replacement. » Install
12. Install the starter motor. Refer to Starter Replacement.



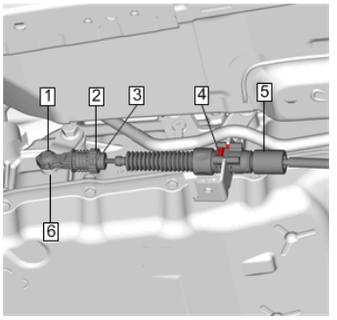
13. Install the lower transmission to engine bolts (1, 2) and tighten to **58 N·m (43 lb ft)**.
14. Install the left side catalytic converter. Refer to Catalytic Converter Replacement - Left Side.



13. Install the catalytic converter brace bracket (3) to the transmission.
14. Install the two retaining nuts (1) and tighten to **22 N·m (16 lb ft)**.
15. Install the two retaining bolts (2) and tighten to **22 N·m (16 lb ft)**.



16. Install the transmission fluid cooler inlet and outlet pipe (1) to the transmission. Refer to Transmission Fluid Cooler Inlet and Outlet Pipe Replacement.
17. Connect the wiring harness retainers and connectors to the transmission.



19. Install the cable in the bracket, then slide the retainer (4) rearward to lock the transmission range selector lever cable in the bracket.
20. Connect the transmission range selector lever cable terminal (1) to the transmission manual shift lever pin (2).
21. Adjust the cable. Refer to Range Selector Lever Cable Adjustment.
22. Refer to Transmission Heat Shield Replacement. » Install
23. Install the propeller shaft. Two-Piece Propeller Shaft Replacement.

Torque Converter Replacement - (M5U with LT1)

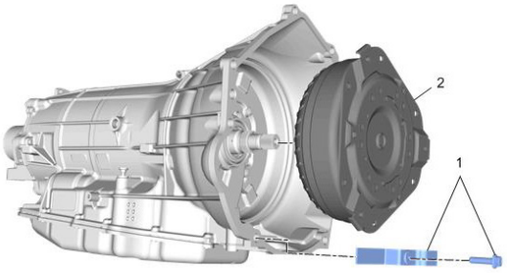
Special Tool

DT-21366 Converter Holding Strap

For equivalent regional tools, refer to Special Tools.

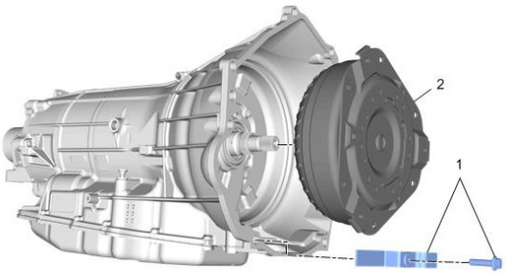
Removal Procedure

1. Remove the transmission. Refer to Transmission Replacement.



2. Remove the converter holding strap (1) *DT-21366* Converter Holding Strap from the transmission.
3. Place a drain pan under the front of the transmission.
4. Remove the torque converter (2) from the transmission.

Installation Procedure



Note: Lubricate the converter pump hub OD and the torque converter seal with clean transmission fluid.
Note: Use care not to damage the torque converter seal during the installation procedure.

1. To install the torque converter (2), spin the torque converter to engage the turbine shaft splines in the torque converter hub, the stator shaft splines in the stator race and to engage the drive flats on the converter pump hub with the oil pump drive gear.

   Warning: The torque converter must be held to the torque converter housing by a retaining device such as shipping brackets. Without the retaining device, the torque converter may slide forward, disengaging the oil pump, or may fall completely out of the transmission causing personal injury and/or property damage.

2. Install the converter holding strap (1) *DT-21366* Converter Holding Strap to the transmission.
3. Install the transmission. Refer to Transmission Replacement.
4. RE-ASSEMBLE ALL COMPONENTS IN THE REVERSE ORDER, FOLLOWING THE ASSEBLY PROCEDURE IN EACH SECTION.

Approximate Fluid Capacities

Application	Specification	
	Metric	English
8L45 or 8L90		
Pan Removal and Filter Replacement – Approximate Capacity	7.0 liters	7.4 quarts
Overhaul– Approximate Capacity (Transmission Volume Only)	10.3 liters	10.88 quarts
Complete Trans System– Approximate Capacity (Including Cooler Volume)	10.8 liters	11.41 quarts

Transmission Fluid Fill Procedure

Special Tools

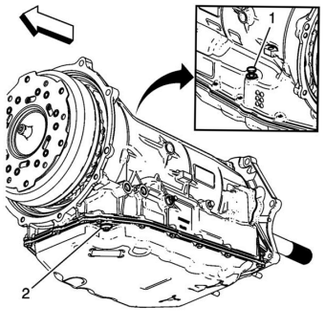
- *DT-45096* Transmission Oil Cooling System Flush and Flow Test Tool
- *DT-45096-30* Transmission Cooler Flush Adapters
- *DT-45096-40* Transfloow Oil Fill Adapter
- *DT-51190* Transmission Fluid Fill Adapter

For equivalent regional tools, refer to Special Tools.

Caution: Use Dexron® HP transmission fluid only. Failure to use the proper fluid may result in transmission internal damage.
Caution: Check the transmission fluid level immediately after adding fluid and before vehicle operation. Do not overfill the transmission. An overfilled transmission may result in foaming or fluid to be expelled out the vent tube when the vehicle is operated. Overfilling will result in possible damage to the transmission.

Check the transmission fluid level, refer to Transmission Fluid Level and Condition Check.

Fill Tube Plug Method

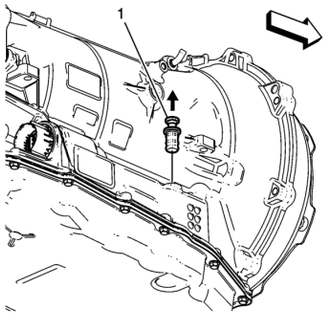


Caution: Use Dexron® HP transmission fluid only. Failure to use the proper fluid may result in transmission internal damage.

1. Based on accessibility, transmission fluid may be added through the fluid fill tube plug assembly (1) hole or through the oil level check plug (2) hole in the bottom of the transmission fluid pan.

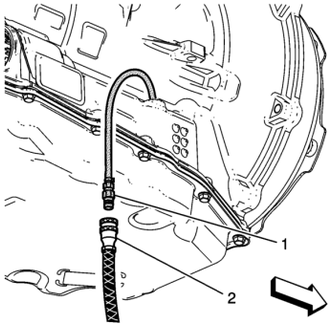
   Caution: Before removing the transmission fluid fill tube plug assembly, thoroughly clean around the plug to prevent dirt or contaminants from entering the transmission during plug removal. Use compressed air to dislodge any caked dirt that may be stuck on and around the plug area. Use a mirror to confirm the area is free of dirt before removing the plug. Failure to clean around the plug may result in transmission contamination.

2. Clean around the fluid fill tube plug (1).



Note: It may be necessary to use a long pair of 90 degree needle nose pliers to lift the plunger and remove the plug assembly.

3. Unlock the fill tube plug by lifting the plunger. Once the plunger is lifted, remove the entire plug assembly (1).
4. Determine the approximate amount of fluid needed to fill the transmission, based on the repair performed. Refer to Approximate Fluid Capacities. To avoid an under-fill condition, slightly overfill the transmission, and then allow the extra fluid to drain out through the oil level check plug during the transmission fluid level and condition check procedure.



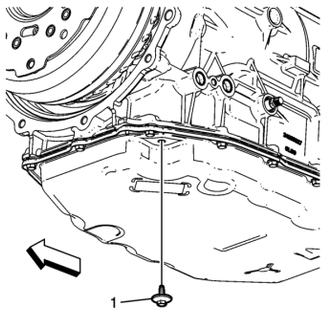
Note: The *DT-45096* flush and flow test tool is being utilized as a convenient method to pump the fluid into the bottom pan. A suitable hand pump may also be used instead. When using the *DT-45096* flush and flow test tool, monitor the display panel to determine the amount of fluid being pumped from the tool supply tank into the transmission.

5. Using the *DT-45096-40* transflow oil fill adapter (1) and the *DT-45096* flush and flow test tool (2), or a suitable hand pump, add transmission fluid through the fill tube plug opening. Refer to Transmission Fluid Cooler Flushing and Flow Test for complete *DT-45096* flush and flow test tool operating instructions. Use the FLOW position on the main function switch to pump the fluid.

   Caution: Check the transmission fluid level immediately after adding fluid and before vehicle operation. Do not overfill the transmission. An overfilled transmission may result in foaming or fluid to be expelled out the vent tube when the vehicle is operated. Overfilling will result in possible damage to the transmission.

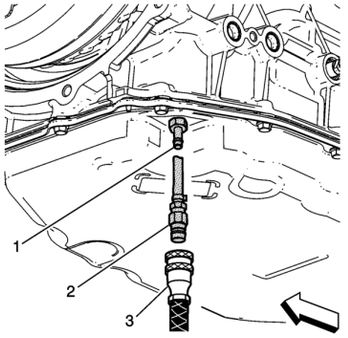
6. Check the fluid level. Refer to Transmission Fluid Level and Condition Check.

Check Plug Method



Caution: Use Dexron® HP transmission fluid only. Failure to use the proper fluid may result in transmission internal damage.
Note: When the oil level check plug is removed with the engine OFF, transmission fluid may drain from the hole.

1. Remove the oil level check plug.



2. Install the *DT-51190* fluid fill pan adapter (1) and, if necessary, one adapter from the *DT 45096-30* cooler flush adapters (2).
3. Determine the approximate amount of fluid needed to fill the transmission, based on the repair performed. Refer to Approximate Fluid Capacities. To avoid an under-fill condition, slightly overfill the transmission, and then allow the extra fluid to drain out through the oil level check plug during the tranmission fluid level and condition check procedure.

   Note: The *DT-45096* flush and flow test tool is being utilized as a convenient method to pump the fluid into the bottom pan. A suitable hand pump may also be used instead. When using the **DT-45096** flush and flow test tool, monitor the display panel to determine the amount of fluid being pumped from the tool supply tank into the transmission.

4. Using the *DT-51190* fluid fill pan adapter (1), *DT-45096-30* cooler flush adapters (2), and the *DT-45096* flush and flow test tool (3), add transmission fluid through the check plug hole. Refer to Transmission Fluid Cooler Flushing and Flow Test for complete *DT-45096* operating instructions. Use the FLOW position on the main function switch to pump the fluid.

   Note: Failure to start the engine and move the shift lever through the gear ranges before removing the *DT-51190* fluid fill pan adapter and *DT-45096-30* cooler flush adapters from the bottom pan will result in an excess amount of fluid draining from the check plug hole. This may lead to an under-fill condition.

5. Start the engine and move the shift lever through each gear range. Pause for at least 3 seconds in each gear range.

   Caution: Check the transmission fluid level immediately after adding fluid and before vehicle operation. Do not overfill the transmission. An overfilled transmission may result in foaming or fluid to be expelled out the vent tube when the vehicle is operated. Overfilling will result in possible damage to the transmission.

6. With the engine still running, remove the *DT-51190* fluid fill pan adapter (1), (2), and *DT-45096* flush and flow test tool (3) and then check the fluid level. Refer to Transmission Fluid Level and Condition Check.

Transmission Fluid Level and Condition Check

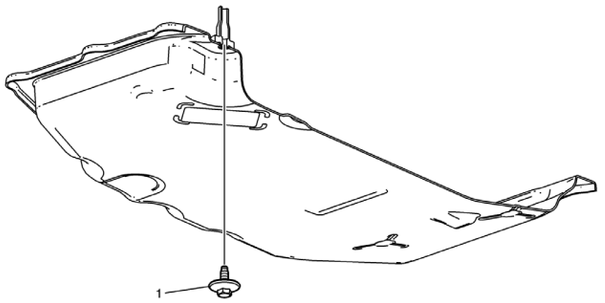
This procedure checks both the transmission fluid level, as well as the condition of the fluid itself. Since the transmission on this vehicle is not equipped with a fill tube and dipstick, a tube in the bottom pan is used to set the fluid level.

Warning: The transmission fluid level must be checked when the transmission fluid temperature (TFT) is between 35–45°C (95–113°F). If the TFT is not within this range, either idle or brake torque the vehicle to raise the fluid temperature, or shut off the vehicle to allow the fluid to cool as required. Setting the fluid level with a TFT outside this range will result in either an under or over-filled transmission. TFT>45°C=under-filled, TFT<35°C=over-filled. An under-filled transmission will cause premature component wear or damage. An over-filled transmission will cause fluid to discharge out the vent tube, possibly causing a fire that may result in serious bodily injury or severe vehicle damage, fluid foaming, or pump cavitation.

Note:

- CTS-V/LT1 Camaro, if running a track session, should have the transmission fluid level checked when the TFT is between 55-65°C (131–149°F).
- If vehicle is equipped with a thermal bypass valve, the transmission fluid level should be checked only after the TFT has reached or exceeded an operating temperature of 90°C (194°F). Once the TFT has reached or exceeded 90°C (194°F), then turn OFF the vehicle and allow the TFT to cool back down to 35–45°C (95–113°F) before checking the fluid level as required. Reaching or exceeding an operating temperature of 90°C (194°F) opens the bypass valve and allows the cooler to fill up with fluid, which will result in a more accurate fluid level check.

1. Observe the TFT using the driver information center (DIC) or a scan tool.
2. Start and idle the engine.
3. Depress the brake pedal and move the shift lever through each gear range. Pause for at least 3 seconds in each range. Move the shift lever back to PARK. Ensure the engine RPM is low (500–800 RPM).
4. Allow the engine to idle for at least 1 minute.
5. Raise the vehicle on a hoist. The vehicle must be level, with the engine running and the shift lever in the PARK range.



Caution: THE ENGINE MUST BE RUNNING when the trans oil level check plug is removed or excessive fluid loss will occur, resulting in an under-filled condition. An under-filled transmission will cause premature component wear or damage.

Note: Continue to monitor the TFT. If the TFT is not within the specified values, reinstall the trans oil level check plug and repeat the previous steps.

6. Remove the transmission oil level check plug (1) from the transmission fluid pan. Allow any fluid to drain.
   - If the fluid is flowing as a steady stream, wait until the fluid begins to drip.
   - If no fluid comes out, add fluid until fluid drips out. Refer to Transmission Fluid Fill Procedure.
7. Inspect the fluid color. The fluid should be red or dark brown.
   - If the fluid color is very dark or black and has a burnt odor, inspect the fluid and inside of the bottom pan for excessive metal particles or other debris. A small amount of “friction” material in the bottom pan is a “normal” condition. If large pieces and/or metal particles are noted in the fluid or bottom pan, flush the oil cooler and cooler lines and overhaul the transmission. If there are no signs of transmission internal damage noted, replace the fluid filter assembly, repair the oil cooler, and flush the cooler lines.
   - Fluid that is cloudy or milky or appears to be contaminated with water indicates engine coolant or water contamination. Refer to Engine Coolant/Water in Transmission.

Caution: Refer to Fastener Caution.

8. Replace the transmission oil level check plug and tighten to **9 N·m (80 lb in)**.
9. Inspect for external leaks. Refer to Fluid Leak Diagnosis.

Solenoid Valve Characterization Reprogramming

The solenoids in this transmission require unique performance characteristic data in order to function at maximum efficiency. This data is programmed and stored in the vehicle’s transmission control module (TCM). When a transmission assembly, TCM, or solenoids are replaced during service, the performance characteristic data for the solenoids must be retrieved from a web server “cloud” repository and reprogrammed into the TCM.

Reprogramming also ensures that the characteristic data relationship is properly matched between the solenoids, valve body, and transmission.

Solenoid characterization reprogramming is performed using the TIS2Web Service Programming System (SPS).

Solenoid Reprogramming Procedure

Perform solenoid characterization reprogramming after one of the following service procedures:

Note: Select “Replace Transmission” at the MCVM Characterization selection screen.

- Replace transmission assembly

Note: Select “Replace Valve Body” at the MCVM Characterization selection screen.

- Replace valve body assembly

Note: Select “Replace Solenoid” at the MCVM Characterization selection screen.

- Replace solenoid (currently not an available Service Procedure)

Note: Select “Refresh Characterization Data” at the MCVM Characterization selection screen.

- Replace TCM

Note: Select “Refresh Characterization Data” at the MCVM Characterization selection screen.

- Solenoid characterization may also be performed to “refresh” characterization data.

To perform solenoid characterization after a transmission component replacement:

1. Document the new Transmission Unique Number (TUN) or Part Unique Number (PUN) as required.
   - The TUN location may be found here: Refer to Transmission Identification Information. Since the TUN can be difficult to access when the transmission is installed in the vehicle, ensure you document the 16-digit TUN prior to installing the transmission in the vehicle.
   - The PUN location may be found here: Refer to Control Valve Solenoid Body Identification Information. Before installing the control valve solenoid body onto the transmission, document the 16-digit PUN. If the control valve solenoid body PUN has not been saved for reference, it may be necessary to disassemble the control valve solenoid body from the transmission to clearly read the control valve solenoid body PUN.
2. Log into TIS2Web/SPS.
3. Type the vehicle identification number (VIN).
4. Perform the SPS Transmission Control Module programming event.
   - Select “Transmission Control Module - Programming” to update TCM calibrations and Solenoid Characterization data.
     OR
   - Select “Transmission Control Module - MCVM Operations” to update Solenoid Characterization data only.
5. From the “MCVM (Mechanical Characterization and Virtual Matching) Operation Selection” screen, select the applicable service procedure to be performed. You will be prompted to provide the necessary Transmission Unique Number (TUN) or Part Unique Number (PUN) when replacing a transmission part.

At this point, the system will read the VIN from the engine control module (ECM) using the multiple diagnostic interface (MDI) and then retrieve the applicable genealogy data tree from the cloud. This data tree accesses the original characterization data so that it may be updated with the new component information. The system acquires characterization data for the given TUN/PUN via the cloud and updates the genealogy tree. The TCM is updated with the correct solenoid characterization data, and the cloud is updated with the new genealogy relationship.

Transmission Fluid Cooler Flow Test and Flushing (8L90)

GM studies indicate that plugged or restricted transmission oil coolers and pipes cause insufficient transmission lubrication and elevated operating temperatures which can lead to premature transmission failure. Many repeat repair cases could have been prevented by following published procedures for transmission oil cooler flushing and flow checking. This procedure includes flow checking and flushing the auxiliary transmission oil cooler, if equipped.

Note: Use the DT-45096 transmission oil cooling system flush and flow test tool to flush and flow test the transmission oil cooler and the oil cooler pipes after the transmission is removed for repairs.

Only use the appropriate GM automatic transmission fluid when doing a repair on a GM transmission.

If the fluid in the DT-45096 transmission oil cooling system flush and flow test tool is different than what is used in the transmission, after performing the flush and flow test, use compressed air to blow the residual transmission fluid out of the oil cooler and lines.

Time allowance for performing the cooler flow checking and flushing procedure has been included in the appropriate labor time guide operations since the 1987 model year. The service procedure steps for oil cooler flushing and flow testing are as follows:

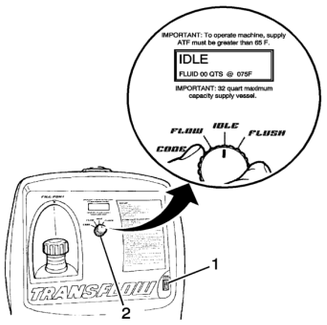
Cooler Flow Check and Flushing Steps

1. Machine Set-up
2. Determine Minimum Flow Rate
3. Back Flush
4. Forward Flush
5. Flow Test
6. Code Recording Procedure
7. Clean-up

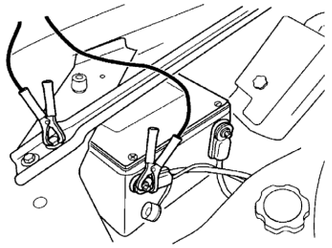
Special Tools

- *DT-45096* Transmission Oil Cooling System Flush and Flow Test Tool
- *DT-45096-30* Transmission Cooler Flush Adapter
- *J-35944-200A* Cooler Flushing Adapter
- Shop air supply with water/oil filters, regulator and pressure gauge — minimum 90 psi
- Eye protection
- Rubber gloves

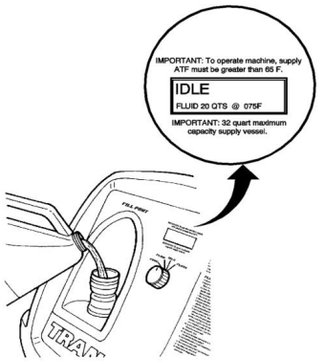
Machine Set-up



1. Verify that the main power switch (1) is in the OFF position.
2. Place the main function switch (2) in the IDLE position.

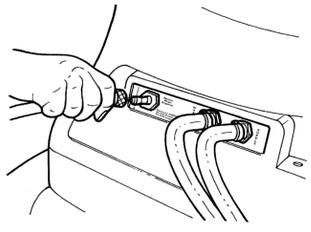


3. Connect *DT-45096* transmission oil cooling system flush and flow test tool to the vehicle 12V DC power source by connecting the red battery clip to the positive, +, battery post on the vehicle and connect the negative lead to a known good chassis ground.
4. Turn the main power switch to the ON position.



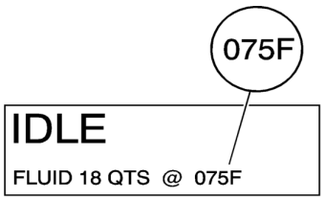
Caution: Do not overfill the supply vessel. Damage to the unit may result. To verify the fluid level, view the LCD screen display while filling the unit, to ensure the fluid level does not exceed 30 L (32 qt).

5. Fill the supply tank with the appropriate GM automatic transmission fluid through the fill port.
6. Reinstall and tighten the fill cap.

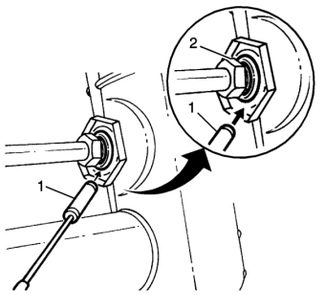


7. Connect a shop air supply hose to the quick-disconnect on the rear panel marked SUPPLY AIR.

Determine Minimum Flow Rate



1. From the machine display, identify the temperature of the automatic transmission fluid that is stored in the supply vessel of *DT-45096* flush and flow test tool.



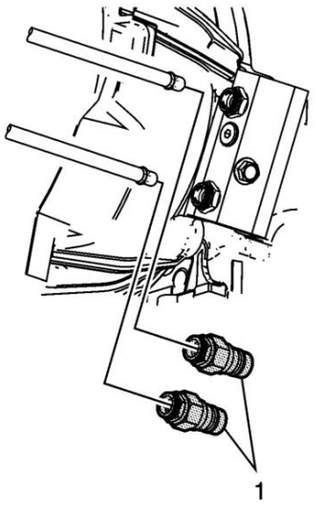
2. Determine whether the transmission oil cooler is steel or aluminum by using a magnet (1) at the cooler flange (2) at the radiator.
3. Refer to the table below. Using the temperature from step 1, locate on either the Steel MINIMUM Flow Rate table or the Aluminum MINIMUM Flow Rate table the minimum flow rate in gallons per minutes (GPM). Record the minimum flow rate in GPMs and the supply fluid temperature for further reference.

Example: Fluid temperature: 75°F Cooler type: Steel; The MINIMUM flow rate for this example would be 0.8 GPM.

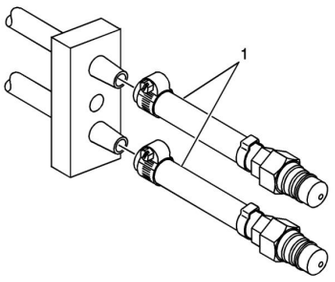
4. Inspect transmission oil cooler lines for damage or kinks that could cause restricted oil flow. Repair as needed and refer to the appropriate GM service manual procedures.

Minimum Flow Rate in Gallons Per Minute (gpm)		
Temperature Range	**Steel**	**Aluminum**
65 – 66°F	0.6 gpm	0.5 gpm
67 – 70°F	0.7 gpm	0.6 gpm
71 – 75°F	0.8 gpm	0.7 gpm
76 – 80°F	0.9 gpm	0.8 gpm
81 – 84°F	1.0 gpm	0.9 gpm
85 – 89°F	1.1 gpm	1.0 gpm
90 – 94°F	1.2 gpm	1.1 gpm
95 – 98°F	1.3 gpm	1.2 gpm
99 – 103°F	1.4 gpm	1.3 gpm
104 – 108°F	1.5 gpm	1.4 gpm
109 – 112°F	1.6 gpm	1.5 gpm
113 – 117°F	1.7 gpm	1.6 gpm
118 – 120°F	1.8 gpm	1.7 gpm

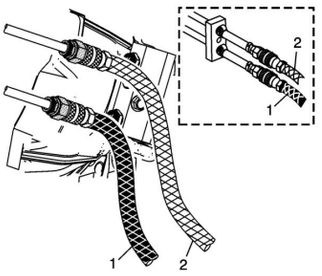
Back Flush Procedure



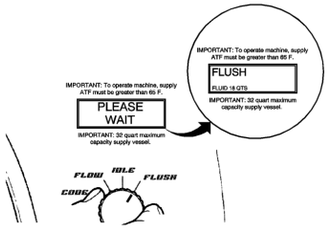
1. If equipped with bypass valve, disconnect the oil cooler lines from the bypass valve.
2. If equipped with bypass valve, connect the J-35944-200A cooler flushing adapter (1) to the vehicle transmission oil cooler supply and return lines at the transmission.



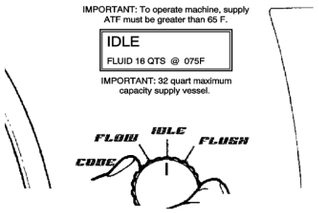
3. If not equipped with the bypass valve, connect the DT-45096-30 cooler flush adapter (1) to the vehicle transmission oil cooler supply and return lines at the transmission.



4. Connect the black supply hose (1) to the return line, bottom connector of the transmission, and the clear waste hose (2) to the feed line, top connector of the transmission, to the vehicle cooler lines. This is the reverse flow – backflush direction.

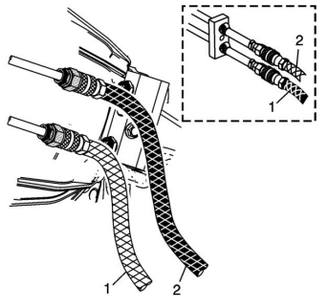


5. Turn the main function switch to the FLUSH position. Allow the machine to operate for 30 seconds.

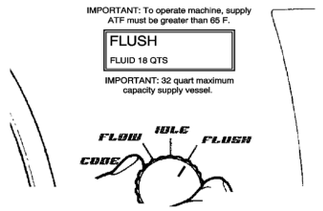


6. Turn the main function switch to the IDLE position and allow the supply vessel pressure to dissipate.

Forward Flush

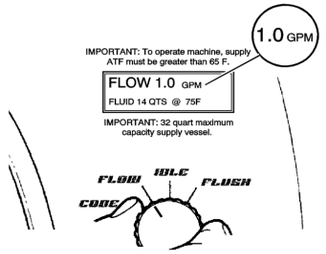


1. Disconnect the supply and waste hoses from the vehicle cooler lines. Reverse the supply hose (2) and waste hose (1) to provide a normal flow direction.



2. Turn the main function switch to the FLUSH position and allow machine to operate for 30 seconds.

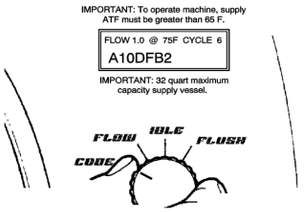
Flow Test



Note: If the flow rate is less than 0.5 gpm, the LCD displays an error message. Refer to the Troubleshooting section of the operation manual.

1. Turn the main function switch to the FLOW position and allow the oil to flow for 15 seconds. Observe and note the flow rate; this is the TESTED flow rate.
2. Compare the TESTED flow rate to the MINIMUM flow rate information previously recorded.
   - If the TESTED flow rate is equal to or greater than the MINIMUM flow rate recorded, the oil cooling system is functioning properly. Perform Code Recording Procedure.
   - If the TESTED flow rate is less than the MINIMUM flow rate previously recorded, repeat the back flush and forward flush procedures.
3. If the TESTED flow rate is less than the MINIMUM flow rate after the second test, perform Code Recording Procedure.
   1. Replace the transmission oil cooler.
   2. Reconnect supply and waste hoses to the cooler lines in the normal flow direction. Perform Flow Test.
   3. Perform Code Recording Procedure.

Code Recording Procedure



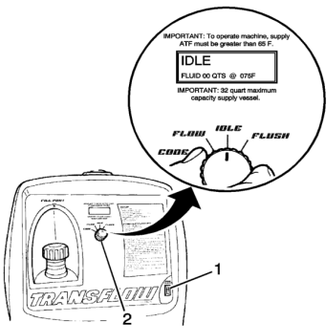
1. Turn the main function switch to the CODE position.

Note:

- If power is interrupted prior to the recording of the seven-character code, the code will be lost and the flow rate test will need to be repeated.
- The flow test must run for a minimum of 8–10 seconds and be above 0.5 GPM for a code to be generated.

2. Record TESTED flow rate, temperature, cycle and seven-character flow code information on repair order.

Clean-up

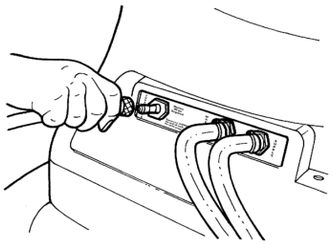


1. Turn the main function switch (2) to the IDLE position and allow the supply vessel pressure to dissipate.
2. Turn the main power switch (1) to the OFF position.

Note:

- A small amount of water may drain from the bottom of the unit when the air supply is disconnected. This is a normal operation of the built-in water separator.
- If the fluid in the *DT-45096* transmission oil cooling system flush and flow test tool is different than what is used in the transmission, use compressed air to blow the residual transmission fluid out of the oil cooler and lines.

3. Disconnect the supply and waste hoses and the 12-volt power source from the vehicle.



4. Disconnect the air supply hose from *DT-45096* flush and flow test tool.
5. Remove the *DT-45096-30* or the *J-35944-200A* adapters.
6. Dispose of the waste automatic transmission fluid in accordance with all applicable federal, state, and local requirements.

Transmission Service Fast Learn Procedure

The transmission service fast learn is a procedure that is performed after any 8L45/90 transmission repair. The service fast learn procedure performs a series of tests which allow the transmission control module (TCM) to learn individual clutch apply pressures. These learn pressure values are used by the TCM for clutch control and timing of shifts. The scan tool is used to perform the transmission service fast learn procedure.

The service fast learn procedure must be performed when any of the following repairs has been made to the transmission.

- Pressure regulating solenoid replacement
- Valve body repair or replacement
- Any service/repair in response to a shift quality concern
- Any internal transmission service, repair, overhaul, or replacement
- Torque converter replacement

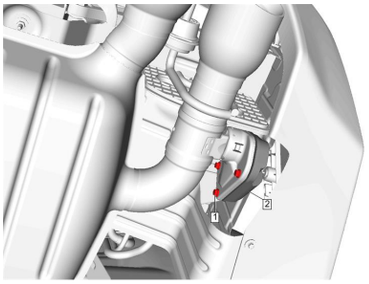
- TCM replacement
- Transmission assembly replacement
- Reprogramming Transmission Control Module

Failure to perform the procedure may result in poor transmission performance, DTCs being set, or customer dissatisfaction. Perform the service fast learn procedure in the exact sequence as listed below.

1. If a pressure regulating solenoid, TCM or transmission assembly was replaced, refer to and perform the Solenoid Valve Characterization Reprogramming.
2. Ignition ON, clear the DTCs with a scan tool.
3. Ignition OFF, and all vehicle systems OFF. It may take up to 2 minutes for all vehicle control modules to power down.

   Note: If the transmission fluid temperature is not between 75°C (167°F) and 85°C (185°F) the scan tool will not allow you to perform the service fast learn procedure.
4. Engine running, transmission in drive position with brake applied. Perform the service fast learn procedure with a scan tool. Follow the instructions on the scan tool.
5. Ignition OFF for 2 minutes.

Exhaust Control Valve Actuator Replacement (Rear Valves with Performance Exhaust)



Exhaust Control Valve Actuator Replacement	
Callout	**Component Name**
Preliminary Procedure Refer to Lifting and Jacking the Vehicle	
1	Exhaust Control Valve Actuator Fastener [3x] **Caution:** Refer to Fastener Caution. **Tighten** **6 N·m (53 lb in)**
2	Exhaust Control Valve Actuator **Procedure** 1. Disconnect the electrical connector. 2. Perform the exhaust flow control valve actuator re-learn procedure. Refer to Exhaust Flow Control Valve Learn

Engine Coolant/Water in Transmission

Caution: The antifreeze or water will deteriorate the seals, gaskets and the glue that bonds the clutch material to the pressure plate. Both conditions may cause damage to the transmission.

If antifreeze or water has entered the transmission, perform the following:

1. Disassemble the transmission.
2. Replace all of the rubber type seals. The coolant will attack the seal material which will cause leakage.
3. Replace the composition-faced clutch plate assemblies. The facing material may separate from the steel center portion.
4. Replace all of the nylon parts – washers.
5. Replace the torque converter.
6. Thoroughly clean and rebuild the transmission, using new gaskets and oil filter.
7. Flush the cooler lines after the transmission cooler has been properly repaired or replaced.

Fluid Leak Diagnosis

General Method

1. Verify that the leak is transmission fluid.

   Caution: Do not clean using brake cleaner or other reactive solvents as these solvents can damage rubber gaskets, seals and bushings.

2. Thoroughly clean the suspected leak area using a rag.

   Note: Do not idle vehicle, this will not actuate transmission systems, and do not drive the vehicle on the freeway as this will splatter oil inhibiting leak diagnosis.

3. Operate the vehicle for 15–20 minutes under city driving conditions until normal operating temperatures are reached.
4. Park the vehicle over clean paper or cardboard.
5. Shut OFF the engine.
6. Look for fluid spots on the paper.
7. Make the necessary repairs.

Powder Method

Caution: Do not clean using brake cleaner or other reactive solvents as these solvents can damage rubber gaskets, seals and bushings.

1. Thoroughly clean the suspected leak area using a rag.
2. Apply an aerosol type powder, such as foot powder, to the suspected leak area.

   Note: Do not idle vehicle, this will not actuate transmission systems, and do not drive the vehicle on the freeway as this will splatter oil inhibiting leak diagnosis.

3. Operate the vehicle for 15–20 minutes under city driving conditions until normal operating temperatures are reached.
4. Shut OFF the engine.
5. Inspect the suspected leak area.
6. Trace the leak path through the powder in order to find the source of the leak.
7. Make the necessary repairs.

Dye and Black Light Method

A fluid dye and black light kit is available from various tool manufacturers.

1. Follow the manufacturer's instructions in order to determine the amount of dye to use.
2. Detect the leak with the black light.
3. Make the necessary repairs.

Find the Cause of the Leak

Pinpoint the leak and trace the leak back to the source. You must determine the cause of the leak in order to repair the leak properly. For example, if you replace a gasket, but the sealing flange is bent, the new gasket will not repair the leak. You must also repair the bent flange. Before you attempt to repair a leak, check for the following conditions, and make repairs as necessary:

Gaskets

- Fluid level/pressure is too high
- Plugged vent or drain-back holes
- Improperly tightened fasteners
- Dirty or damaged threads
- Warped flanges or sealing surface
- Scratches, burrs, or other damage to the sealing surface
- Damaged or worn gasket
- Cracking or porosity of the component
- Improper sealant used, where applicable
- Incorrect gasket

Seals

- Fluid level/pressure is too high
- Plugged vent or drain-back holes
- Damaged seal bore
- Damaged or worn seal
- Improper installation
- Cracks in component
- Manual or output shaft surface is scratched, nicked, or damaged
- Loose or worn bearing causing excess seal wear

Possible Points of Fluid Leaks

Transmission Oil Pan

- Incorrectly tightened oil pan bolts
- Improperly installed or damaged oil pan gasket
- Damaged oil pan or mounting face
- Incorrect oil pan gasket

Case Leak

- Damaged vehicle speed sensor seal
- Damaged manual shaft seal
- Loose or damaged oil cooler connector fittings
- Worn or damaged propeller shaft oil seal
- Loose line pressure pipe plug
- Porous casting warped torque converter housing

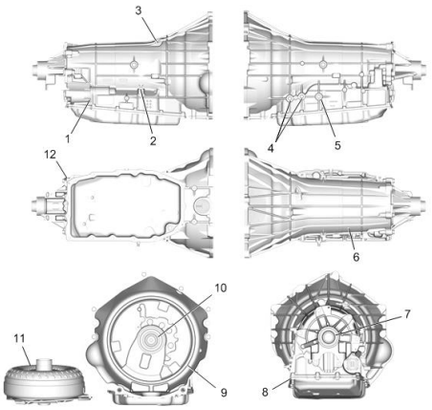
Leak at the Torque Converter End

- Converter leak in the weld area
- Converter seal lip cut. Check the converter hub for damage
- Converter seal bushing moved forward and damaged
- Converter seal garter spring missing from the seal
- Porous casting of the transmission case or the oil pump

Leak at the Vent Pipe

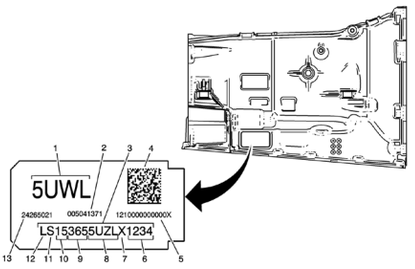
- Overfilled system
- Water or coolant in the fluid; The fluid will appear milky
- Transmission case porous
- Incorrect fluid level indicator
- Plugged vent
- Drain-back holes plugged
- Mispositioned oil pump to case gasket, if equipped

Leak Inspection Points



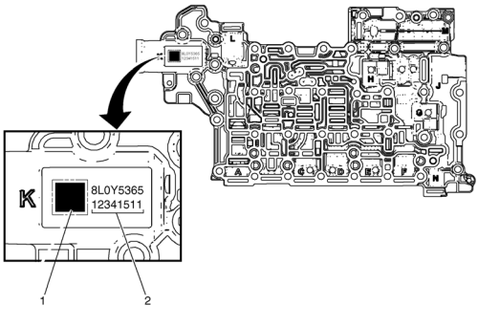
1. A/Trans Wiring Harness
2. Transmission Fluid Fill Tube Plug
3. A/Trans Vent
4. Transmission Cooler Pipe Fitting Seal
5. Manual Shift Shaft Seal
6. A/Trans Case Assembly
7. Propeller Shaft Transmission Flange Fluid Seal
8. A/Trans Fluid Pan Gasket
9. A/Trans Case Front Cover Seal
10. Torque Converter Fluid Seal
11. Torque Converter
12. A/Trans Case Extension Seal

Transmission Identification Information



1. Broadcast Code
2. Source DUNS Number
3. Transmission Unique Number (TUN)
4. 2D Machine Readable Matrix
5. VPPS Code
6. Part Sequence Number
7. Site ID
8. Broadcast Code
9. Julian Date
10. Year of Build
11. Shift ID
12. Line Plant ID
13. GM Part Number

Control Valve Solenoid Body Identification Information



1. Data Matrix
2. Part Unique Number (PUN)

Exhaust Flow Control Valve Learn (Tail Pipe Exhaust Flow Control Valve)

Procedures Requiring an Exhaust Flow Control Valve Learn

The calibration procedure for the exhaust flow control valve actuator may be required after certain service procedures are performed. Some of these procedures are as follows:

- Replacement of the chassis control module.
- Replacement of the exhaust flow control valve actuator.

Exhaust Flow Control Valve Learn Procedure

The exhaust flow control valve learn procedure is performed with a scan tool using the following steps:

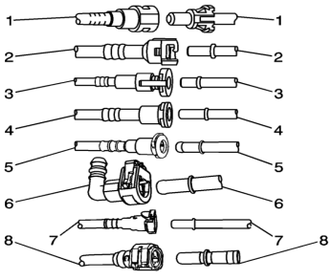
1. Place the vehicle on a level surface.
2. Connect a scan tool to the data link connector.
3. Turn the ignition ON, with the engine OFF.
4. Select Exhaust Flow Control Valve Learn in the Chassis Control Module Configuration/Reset Function list.
5. Follow the scan tool directions to complete the calibration procedure.
6. Perform the scan tool Exhaust Flow Control Valve test in the chassis control module control function list.
7. Clear any DTCs that may have set.
8. Road test the vehicle and verify proper operation of the exhaust flow control system.

Plastic Collar Quick Connect Fitting Service

Removal Procedure

Warning: Refer to Gasoline/Gasoline Vapors Warning.

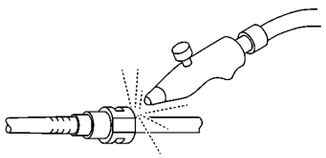
Note: If servicing a fuel system, insure the fuel pressure has been relieved.



Note: There are several types of plastic collar fuel and evaporative emission quick connect fittings used on this vehicle.

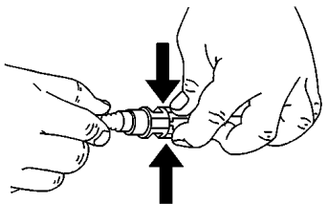
- Bartholomew (1)
- Q Release (2)
- Squeeze to Release (3)
- Sliding Retainer (4)
- Global Connect (5)
- TI Loc (6)
- Safe Lock (7)
- Plastic Connector (8)

The following instructions apply to all of these types of plastic collar quick connect fittings except where indicated.

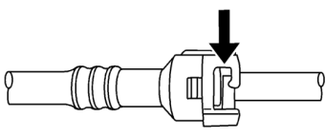


Warning: Always apply a few drops of clean engine oil to the male pipe ends before connecting the fuel pipe fittings. This will ensure proper reconnection and prevent a possible fuel leak. Always replace O-rings.

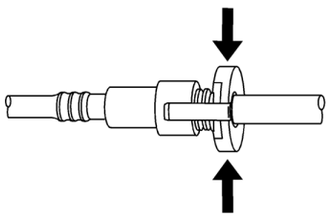
1. Using compressed air, blow any dirt out of the quick-connect fitting.



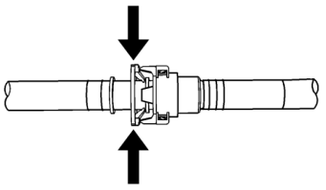
2. This step applies to Bartholomew style connectors ONLY. Squeeze the plastic quick-connect fitting release tabs.



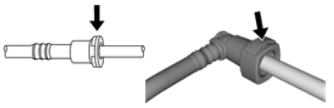
3. This step applies to Q Release style connectors ONLY. Release the fitting by pushing the tab toward the other side of the slot in the fitting.



4. This step applies to Squeeze to Release style connectors ONLY. Squeeze where indicated by arrows on both sides of the plastic ring surrounding the quick-connect fitting.

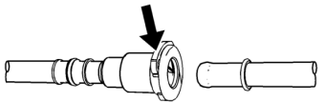


5. This step applies to Squeeze to Release style connectors ONLY. Push in the male side slightly in order to slide the retainer away from the retainers, squeeze where indicated by arrows on both sides of the plastic ring surrounding the quick-connect fitting.

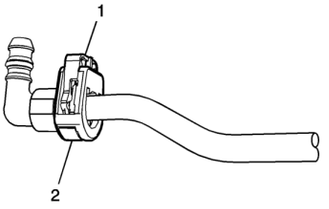


Note: There are two variants of sliding retainer style connectors shown above, both have the same release and installation procedure.

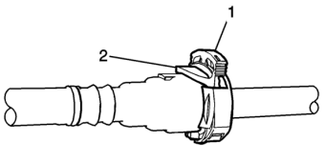
6. This step applies to Sliding Retainer style connectors ONLY. Release the fitting by pressing on one side of the release tab causing it to push in slightly. If the tab doesn't move try pressing the tab in from the opposite side. The tab will only move in one direction.



7. This step applies to the Global Connector style only. Push the connector toward the tube in order to release the pressure. Press and hold down the release mechanism, and pull the connector straight out.

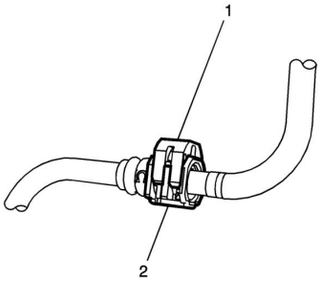


8. This step applies to the TI Loc style only. Push the connector toward the tube in order to release the pressure. Release the redundant latch (1) with two fingers or a flat bladed tool. Then press and hold down the bottom release mechanism (2) and pull the connector straight out.



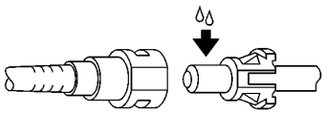
Warning: Refer to Relieving Fuel Pressure Warning.

9. This step applies to the Safe Lock style only. Push the connector toward the tube in order to release the pressure. Release the second latch (1) with two fingers. Then press and hold down the bottom release mechanism (2) and pull the connector straight out.



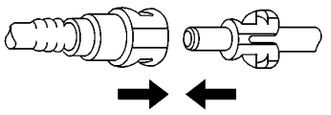
10. This step applies to the Plastic Connector style 8, push the connector toward the tube in order to release the pressure. Press the latch (1) inward in order to release the pipe, while pulling the connector (2) straight out.
11. Using a clean shop towel, wipe off the male pipe end.
12. Inspect both ends of the fitting for dirt and burrs.
13. Clean or replace components as necessary.

Installation Procedure

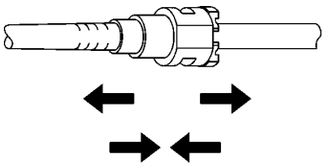


Warning: Always apply a few drops of clean engine oil to the male pipe ends before connecting the fuel pipe fittings. This will ensure proper reconnection and prevent a possible fuel leak. Always replace O-rings.

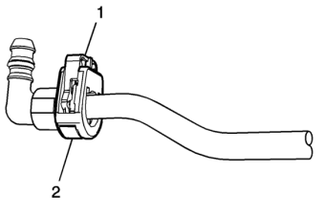
1. Apply a few drops of clean engine oil to the male pipe end.



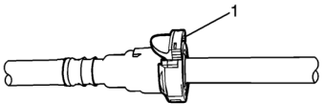
2. Push both sides of the quick-connect fitting together in order to cause the retaining feature to snap into place.



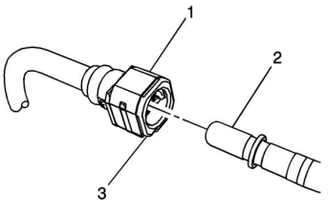
3. Pull on both sides of the quick-connect fitting to make sure the connection is secure.



4. Insert the tube in the connector until the retainer snaps in place.
5. Push down on the redundant latch (1) until it is fully engaged and snapped into position.



6. Insert the tube in the connector until the retainer snaps in place.
7. Push down on the second latch (1) in order to secure the connection.



8. For the plastic connector type 8, depress the latch (1) while inserting the connector (3) on to the pipe (2) .
9. Move the latch (1) upward in order to secure the connection.
10. Inspect for leaks using the following procedure:
    1. Turn the ignition ON, with the engine OFF for 2 seconds.
    2. Turn the ignition OFF, for 10 seconds.
    3. Turn the ignition ON, with the engine OFF for 2 seconds.
    4. Turn the ignition OFF.
    5. Inspect for leaks.

Cooling System Draining and Filling (Static Fill)

Special Tools

J 26568 Coolant and Battery Fluid Tester

For equivalent regional tools Special Tools.

Draining Procedure

Warning: To avoid being burned, do not remove the radiator cap or surge tank cap while the engine is hot. The cooling system will release scalding fluid and steam under pressure if radiator cap or surge tank cap is removed while the engine and radiator are still hot.

1. Remove the coolant pressure cap from the radiator.
2. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
3. Remove the front compartment air deflector if equipped. Refer to Front Compartment Air Deflector Replacement.
4. Place a clean drain pan under the radiator drain cock.
5. Loosen the radiator drain cock.
6. Drain the cooling system.
7. Lower the vehicle.
8. Inspect the coolant.
9. Follow the appropriate procedure based on the condition of the coolant.
   - Normal in appearance—Follow the filling procedure.
   - Discolored—Follow the flush procedure. Refer to Flushing.
10. Tighten the radiator drain cock.
11. Install the front compartment air deflector if equipped. Refer to Front Compartment Air Deflector Replacement.
12. Lower the vehicle.

Filling Procedure

Caution: The procedure below must be followed. Improper coolant level could result in a low or high coolant level condition, causing engine damage.

Note: Use a 50/50 mixture of DEX-COOL antifreeze and clean drinkable water.

1. Slowly fill the radiator with a 50/50 coolant mixture until the coolant level is just below the radiator fill neck. Refer to Approximate Fluid Capacities.
2. Allow 30 seconds for the coolant level to stabilize and continue to fill the radiator until the level stabilizes for at least 2 minutes.
3. Start the engine and allow to the engine to idle.
4. Slowly fill the coolant mixture until the level stabilizes at the just below the top of radiator fill neck for at least 2 minutes.
5. Install the coolant pressure cap.
6. Allow the engine to idle until the engine reaches normal operating temperature.
7. Shut the engine OFF.
8. Allow the engine to cool.
9. Remove the coolant pressure cap and top off the engine coolant in the radiator.
10. Inspect the concentration of the engine coolant using the J 26568 coolant and battery fluid tester.
11. Install coolant pressure cap.
12. Inspect and if necessary, fill the coolant reservoir bottle.
13. Rinse away any excess coolant from the engine and the engine compartment
14. Inspect the cooling system for leaks.
15. Top off the coolant reservoir if necessary.
16. Install the front compartment air deflector if equipped. Refer to Front Compartment Air Deflector Replacement.

Flushing

Note:

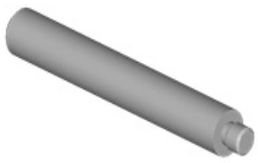
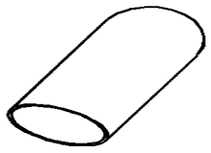
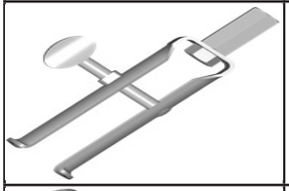
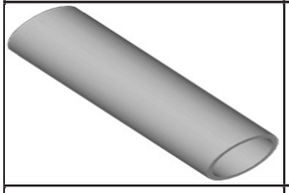
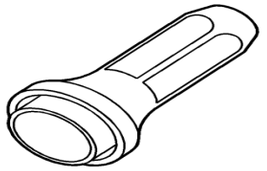
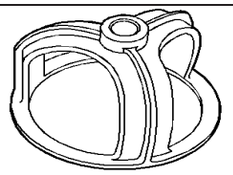
- When the cooling system becomes contaminated, the cooling system should be flushed thoroughly to remove the contaminants before the engine is seriously damaged.
- This procedure is effective in removing contaminants caused by the use of improper coolants, coolant at the end of its life, or some liquid chemical flushing agents. This procedure is NOT effective for removing debris contamination caused by component failure, or the use of ‘stop leak’ additives. When the system is contaminated by this type of debris, use the system flow diagrams to identify components that may need replacement to restore proper system flow.
- Do not use chemical flush agents.
- Store used coolant in the proper manner, such as in a used engine coolant holding tank. Do not pour used coolant down a drain. Ethylene glycol antifreeze is a very toxic chemical. Do not dispose of coolant into the sewer system or ground water. This is illegal and ecologically unsound.
- Various methods and equipment can be used to flush the cooling system. If special equipment is used, such as a back flusher, follow the manufacturer's instruction. Always remove the thermostat before flushing the cooling system.

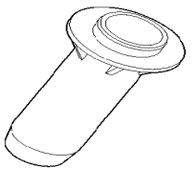
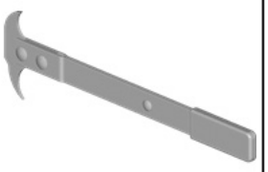
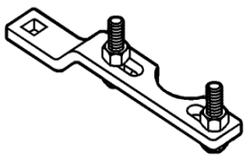
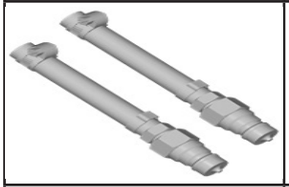
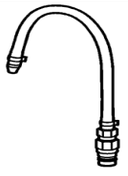
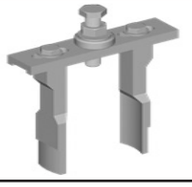
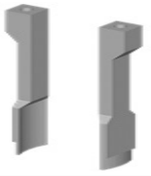
1. Drain the cooling system. Cooling System Draining and Filling.
2. Remove the radiator surge tank. Radiator Surge Tank Replacement.
3. Clean and flush the radiator surge tank with clean, drinkable water.
4. Install the radiator surge tank. Radiator Surge Tank Replacement.
5. Follow the drain and fill procedure using only clean, drinkable water. Cooling System Draining and Filling.
6. Run the engine for 20 minutes.
7. Stop the engine.
8. Drain the cooling system. Cooling System Draining and Filling
9. Repeat the procedure if necessary, until the fluid is nearly colorless.
10. Fill the cooling system. Cooling System Draining and Filling.

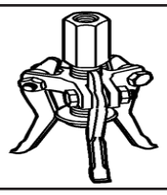
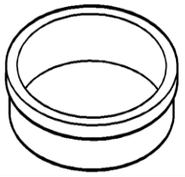
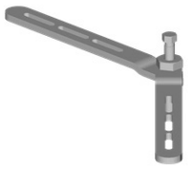
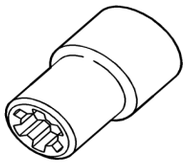
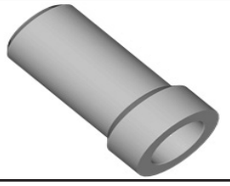
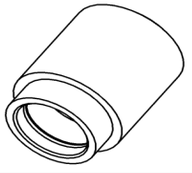
Adhesives, Fluids, Lubricants, and Sealers

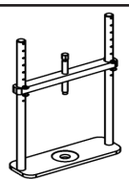
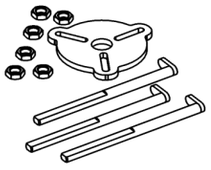
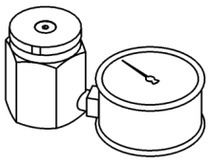
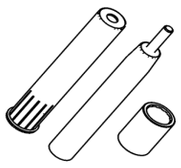
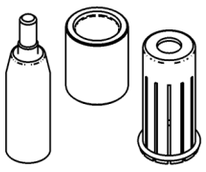
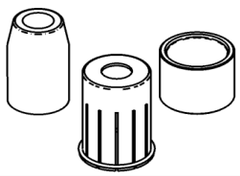
Application	Type of Material	GM Part Number	
		United States	Canada
Propeller Shaft Coupler to Drive Flange	Lubricant	1052949	—
Propeller Shaft-to-Flange Bolts	Threadlocker	89021297	10953488

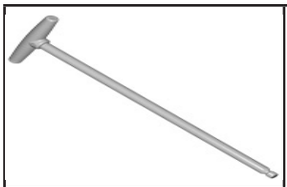
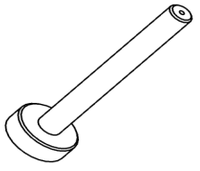
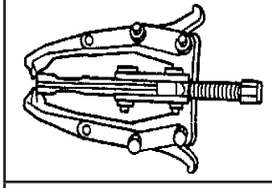
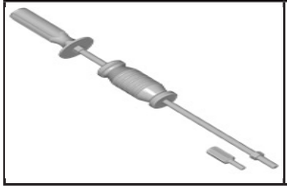
Special Tools

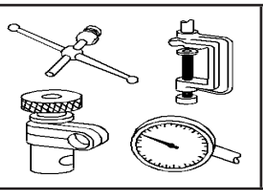
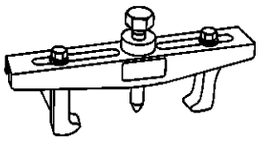
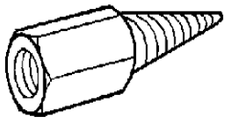
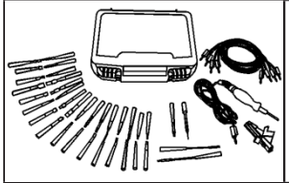
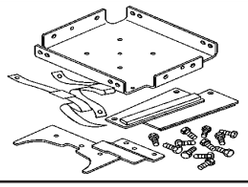
Illustration	Tool Number/Description
	*DT-8092* *GE-8092* *J-8092* Driver Handle
	*DT-03289-20* *J-3289-20* Holding Fixture (Base)
	*DT-21366* *J-21366* Converter Holding Strap
	*DT-22828* *J-22828* Input and Countershaft Race Installer
	*DT-26941* *J-26941* Bushing and Bearing Remover
	*DT-35512* *J-35512* Bearing Installer
	*DT-37212* *J-37212* Front Output Shaft Seal Installer
	*DT-38734* *J-38734* Intermediate Spring Compressor Adapter

	*DT-43772* *J-43772* Torque Converter Seal Installer
	*DT-45000* *J-45000* Seal Remover
	*DT-45012* *J-45012* Holding Fixture
	*DT-45096* *J-45096* Transmission Oil Cooling System Flush and Flow Test Tool
	*DT-45096-30* *J-45096-30* Transmission Cooler Flusher Adapters
	*DT-45096-40* *J-45096-40* Transflow Oil Fill Adapter
	*DT-45124* *J-45124* Removal Bridge
	*DT-45124-9* *J-45124-9* Puller Leg
	*DT-45201* *J-45201* Cooler Line Seal Remover

	*DT-47693-2* Compressor
	*DT-47770* Seal Installer
	*DT-47865* Bearing Remover
	*DT-47868-4* Clutch Travel Weight Adapter
	*DT-48056* Spring Compressor Bridge
	*DT-48285* Valve Body Torx Plus Socket
	*DT-48989* Holding Fixture
	*DT-50648* Case Seal Installer
	*DT-50896* Seal Installer
	*DT-50897* Bearing Installer

	*DT-50900* Clutch Travel Support Fixture
	*DT-50902* Adjustable Clutch Spring Compressor
	*DT-50903* Clutch Travel Load Gauge
	*DT-50905* Clutch Air Travel Adapter
	*DT-50906* Bearing Installer
	*DT-50910* Seal Installer
	*DT-50911* Seal Installer
	*DT-50912* Seal Installer
	*DT-50914* Solenoid Valve Retainer Remover/Installer

	*DT-50921* Output Carrier/Shaft Lifting Tool
	*DT-51087* Bearing Installer
	*DT-51088* Seal Installer
	*DT-51089* Bearing Installer
	*DT-51190* Fluid Fill Pan Adapter
	*DT-51196* Seal Installer
	*DT-51328* Clutch Compressor and Air Travel Check Rod Extension
	*EL-38522* *J-38522* Variable Signal Generator
	*EN-38416-B* *J-38416-B* Harmonic Balancer Remover
	*GE-6125-B* *J-6125-B* Slide Hammer with Adapters

	*GE-8001* *J-8001* Dial Indicator Set
	*GE-8433* *J-8433* Puller Bar
	*GE-36825-A* *J-36825-A* Output Shaft Oil Seal Remover
	*J-35616* GM-Approved Terminal Test Kit
	*J-42055* Drivetrain Support Fixture