REPAIR INSTRUCTIONS - ON VEHICLE

CONNECTOR RECONNECTION - AUTOMATIC TRANSMISSION

Special Tools

EL-35616 Terminal Test Probe Kit

For equivalent regional tools, refer to **Special Tools** .

When the condition is not currently present, but is indicated in DTC history, the cause may be intermittent. An intermittent may also be the cause when there is a customer complaint, but the symptom cannot be duplicated. Refer to the Symptom Table of the system that is suspect of causing the condition before trying to locate an intermittent condition.

Most intermittent conditions are caused by faulty electrical connections or wiring. Inspect for the following items:

- Loose, corroded, or painted terminal stud/fastener
- Wiring broken inside the insulation
- Poor connection between the male and female terminal at a connector
- A terminal not seated all the way into the connector body
- Poor terminal to wire connection - Some conditions which fall under this description are poor crimps, poor solder joints, crimping over the wire insulation rather than the wire itself, and corrosion in the wire to terminal contact area, etc.
- Pierced or damaged insulation can allow moisture to enter the wiring causing corrosion. The conductor can corrode inside the insulation, with little visible evidence. Look for swollen and stiff sections of wire in the suspect circuits.
- Wiring which has been pinched, cut, or its insulation rubbed through may cause an intermittent open or short as the bare area touches other wiring or parts of the vehicle.
- Wiring that comes in contact with hot or exhaust components
- Refer to **Inducing Intermittent Fault Conditions** in order to duplicate the conditions required, in order to verify the customer concern.
- Refer to **Testing for Electrical Intermittents** for test procedures to detect intermittent open, high resistance, short to ground, and short to voltage conditions.
- Refer to **Scan Tool Snapshot Procedure** for advanced intermittent diagnosis and Vehicle Data Recorder operation.

Testing for Terminal Fretting

Some intermittent conditions can be caused by wire terminal fretting corrosion. Fretting corrosion is a build-up of insulating, oxidized wear debris that can form when there is a small motion between electrical contacts. The oxidized wear debris can pile up enough at the electrical contact spots that the electrical resistance across the connection increases. Movement between the contacting surfaces as small as 10 to 100 microns can cause fretting. To put this in perspective, a sheet of paper is about 100 microns thick, so fretting motion is small and hard to see. Vibration and thermal expansion/contraction are the main sources that create fretting motion. Since vehicles vibrate and can experience large temperature swings, they are a good source for fretting motion. Tin, copper, nickel, and iron surfaces are all susceptible to fretting corrosion. Fretting corrosion can be difficult to see but it looks like small, dark smudges on the terminals contact surface.

To correct a fretting condition disconnect the suspect connector and add dielectric grease/lubricant (Nyogel 760G or equivalent, meeting GM specification 12345579) to both sides of the connector terminals. Then

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reconnect the connector and wipe away any excess lubricant. This will correct the additional terminal contact resistance due to the terminal fretting corrosion.

Testing for Proper Terminal Contact

It is important to test terminal contact at the component and any inline connectors before replacing a suspect component. Mating terminals must be inspected to ensure good terminal contact. A poor connection between the male and female terminal at a connector may be the result of contamination or deformation.

Contamination may be caused by the connector halves being improperly connected. A missing or damaged connector seal, damage to the connector itself, or exposing the terminals to moisture and dirt can also cause contamination. Contamination, usually in the underhood or underbody connectors, leads to terminal corrosion, causing an open circuit or intermittently open circuit.

Deformation is caused by probing the mating side of a connector terminal without the proper adapter. Always use the **EL-35616** kit when probing connectors. Other causes of terminal deformation are improperly joining the connector halves, or repeatedly separating and joining the connector halves. Deformation, usually to the female terminal contact tang, can result in poor terminal contact causing an open or intermittently open circuit.

Testing for Proper Terminal Contact in Bussed Electrical Centers

It is very important to use the correct test adapter when testing for proper terminal contact of fuses and relays in a bussed electrical center. Use the **EL-35616** kit to test for proper terminal contact. Failure to use the **EL-35616** kit can result in improper diagnosis of the bussed electrical center.

Follow the procedure below in order to test terminal contact:

1. Separate the connector halves.
2. Visually inspect the connector halves for contamination. Contamination may result in a white or green build-up within the connector body or between terminals. This causes high terminal resistance, intermittent contact, or an open circuit. An underhood or underbody connector that shows signs of contamination should be replaced in its entirety: terminals, seals, and connector body.
3. Using an equivalent male terminal/terminated lead, verify that the retention force is significantly different between a known good terminal and the suspect terminal. Replace the female terminal in question.

Flat Wire Connectors

There are no serviceable parts for flat wire connectors on the harness side or the component side.

Follow the procedure below in order to test terminal contact:

1. Remove the component in question.
2. Visually inspect each side of the connector for signs of contamination. Avoid touching either side of the connector as oil from your skin may be a source of contamination as well.
3. Visually inspect the terminal bearing surfaces of the flat wire circuits for splits, cracks, or other imperfections that could cause poor terminal contact. Visually inspect the component side connector to ensure that all of the terminals are uniform and free of damage or deformation.
4. Insert the appropriate adapter into the flat wire harness connector in order to test the circuit in question.

Control Module/Component Voltage and Grounds

Poor voltage or ground connections can cause widely varying symptoms.

- Test all control module voltage supply circuits. Many vehicles have multiple circuits supplying voltage to a control module. Other components in the system may have separate voltage supply circuits that may also need to be tested. Inspect connections at the module/component connectors, fuses, and any intermediate connections between the voltage source and the module/component. A test lamp or a DMM may indicate that voltage is present, but neither tests the ability of the circuit to carry sufficient current.

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Operate the component to test the ability of the circuit to carry sufficient current. Refer to **Circuit Testing** , or **Power Distribution Wiring Schematics** .

- Test all control module ground and system ground circuits. The control module may have multiple ground circuits. Other components in the system may have separate grounds that may also need to be tested. Inspect grounds for clean and tight connections at the grounding point (screw or stud). Inspect the connections at the component and in splice packs, where applicable. Operate the component to test the ability of the circuit to carry sufficient current. Refer to **Circuit Testing** , or **Ground Distribution Wiring Schematics** .

Temperature Sensitivity

- An intermittent condition may occur when a component/connection reaches normal operating temperature. The condition may occur only when the component/connection is cold, or only when the component/connection is hot.
- Freeze Frame, Failure Records, Snapshot, or Vehicle Data Recorder data may help with this type of intermittent condition, where applicable.
- If the intermittent is related to heat, review the data for a relationship with the following:
  - High ambient temperatures
  - Underhood/engine generated heat
  - Circuit generated heat due to a poor connection, or high electrical load
  - Higher than normal load conditions, towing, etc.
- If the intermittent is related to cold, review the data for the following:
  - Low ambient temperatures - In extremely low temperatures, ice may form in a connection or component. Inspect for water intrusion.
  - The condition only occurs on a cold start.
  - The condition goes away when the vehicle warms up.
- Information from the customer may help to determine if the trouble follows a pattern that is temperature related.
- If temperature is suspected of causing an intermittent fault condition, attempt to duplicate the condition. Refer to **Inducing Intermittent Fault Conditions** in order to duplicate the conditions required.

Electromagnetic Interference and Electrical Noise

Some electrical components/circuits are sensitive to electromagnetic interference or other types of electrical noise. Inspect for the following conditions:

- A mis-routed harness that is too close to high voltage/high current devices such as secondary ignition components, motors, generator etc. - These components may induce electrical noise on a circuit that could interfere with normal circuit operation.
- Electrical system interference caused by a malfunctioning relay, or a control module driven solenoid or switch - These conditions can cause a sharp electrical surge. Normally, the condition will occur when the malfunctioning component is operating.
- Installation of non-factory or aftermarket add on accessories such as lights, 2-way radios, amplifiers, electric motors, remote starters, alarm systems, cell phones, etc. - These accessories may create interference in other circuits while operating and the interference would disappear when the accessory is not operating. Refer to **Checking Aftermarket Accessories** .
- Test for an open diode across the A/C compressor clutch and for other open diodes. Some relays may contain a clamping diode.
- The generator may be allowing AC noise into the electrical system.

Incorrect Control Module

- There are only a few situations where reprogramming a control module is appropriate:
  - A new service control module is installed.

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- A control module from another vehicle is installed.
- Revised software/calibration files have been released for this vehicle.

NOTE: **DO NOT re-program the control module with the SAME software/calibration files that are already present in the control module. This is not an effective repair for any type of concern.**

- Verify that the control module contains the correct software/calibration. If incorrect programming is found, reprogram the control module with the most current software/calibration. Refer to **Control Module References** for replacement, setup, and programming.

TRANSMISSION SERVICE FAST LEARN PROCEDURE

Diagnostic Instructions

- Perform the Diagnostic System Check prior to using this diagnostic procedure: **Diagnostic System Check - Vehicle**
- Review the description of Strategy Based Diagnosis: **Strategy Based Diagnosis**

Description

The learn procedure performs a series of individual clutch applications which allows the control module K71 to learn initial clutch apply pressures. The control module uses the learn values for clutch control and timing of shifts.

When to Perform the Procedure

NOTE: **Failure to perform this procedure may result in poor system performance, DTCs being set, or customer dissatisfaction.**

This procedure is required when the following component has been repaired, replaced, removed, or serviced:

- K71 Transmission Control Module
- T12 Automatic Transmission Assembly
- Any condition/repair related to the following: Shift Quality
- Calibration Update or Software Update
- Clutch Assembly or Torque Converter Assembly

Reference Information

Scan Tool Reference

Control Module References

With Scan Tool

WARNING: **After releasing the parking brake, be sure the vehicle will not roll forward or backwards when removing the wheel blocks. If the vehicle is not in gear, the vehicle may move possibly causing personal injury.**

NOTE: **The Transmission Service Fast Learn procedure can also be performed through the Service Programming System (SPS) where the Transmission Fluid Temperature threshold may be displayed.**

1. Perform the following steps:
    1. Vehicle - Outside
    2. Parking Brake - Applied

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3. Drive Wheels - Blocked

2. Engine - Idling - At normal operating temperature.
3. Transmission Range - P
4. Select: Module Diagnostics
5. Select: Transmission Control Module
6. Select: Configuration/Reset Functions
7. Select: Transmission Service Fast Learn
8. Verify the scan tool parameter is not available: Transmission Fluid Temperature
   - **If the scan tool parameter is available**
   1. Engine - Idling
   2. Observe the scan tool parameter:
      - Transmission Fluid Temperature = Transmission Temperature is Above Operating Temperature - Perform the following procedure/test: Procedure 1 & Repeat step 8
      - Transmission Fluid Temperature = Transmission Temperature is Below Operating Temperature - Perform the following procedure/test: Procedure 2 & Repeat step 8
   - **Go to next step: If the scan tool parameter is not available**
9. Follow the instructions on the scan tool.

   Verify the scan tool procedure was successful.

   - **If the procedure was not successful**

     Refer to: Step 1

   - **Go to next step: If the procedure was successful**
10. All OK.

Procedure 1

1. Ignition/Vehicle - Off - For greater than 10 min
2. Engine - Idling - For 10 s

Procedure 2

WARNING: **When performing a brake torque procedure, the vehicle must be parked outdoors away from any buildings, people, or other vehicles. Failure to follow these precautions may result in severe vehicle damage, and/or serious bodily injury.**

1. Brake Pedal - Apply & Hold
2. Transmission Range - D
3. Engine Speed - 1.2k to 1.5k RPM - For 5 s
4. Engine - Idling - For 10 s
5. Transmission Range - P

Repair Instructions

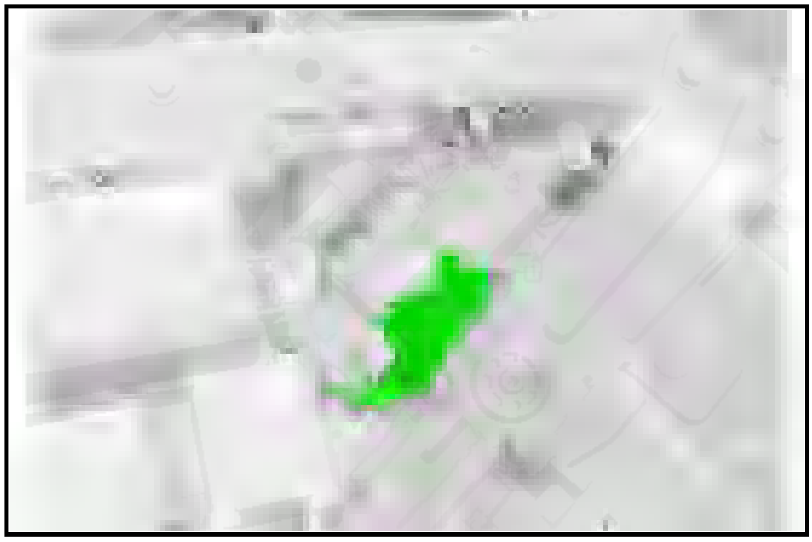
Perform the Diagnostic Repair Verification after completing the repair: **Diagnostic Repair Verification**

TRANSMISSION CONTROL MODULE REPLACEMENT

Removal Procedure

1. Disconnect the battery negative cable. **Battery Negative Cable Disconnection and Connection**

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2. 

Disconnect the transmission control module electrical connector (1).

3. 

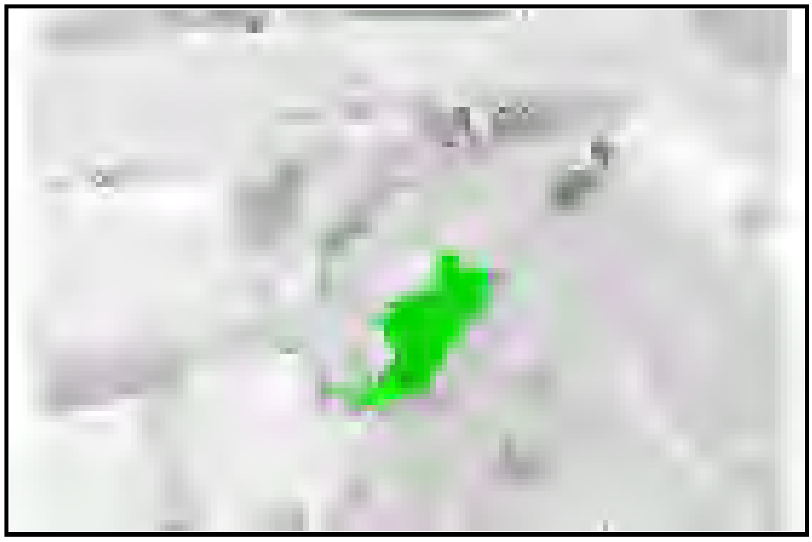
Disengage the retaining tab then remove the transmission control module (1).

Installation Procedure

1. 

Snap the transmission control module (1) into the transmission control module bracket.

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2. 

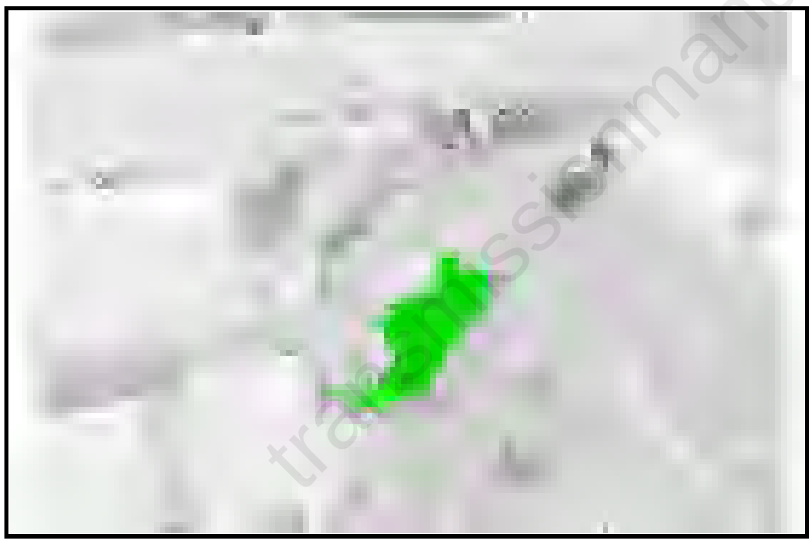
   Connect the transmission control module electrical connector (1).

3. Connect the battery negative cable. **Battery Negative Cable Disconnection and Connection**
4. Program the transmission control module, if replaced. **Control Module References**

TRANSMISSION CONTROL MODULE BRACKET REPLACEMENT

Removal Procedure

1. Disconnect the battery negative cable. **Battery Negative Cable Disconnection and Connection**

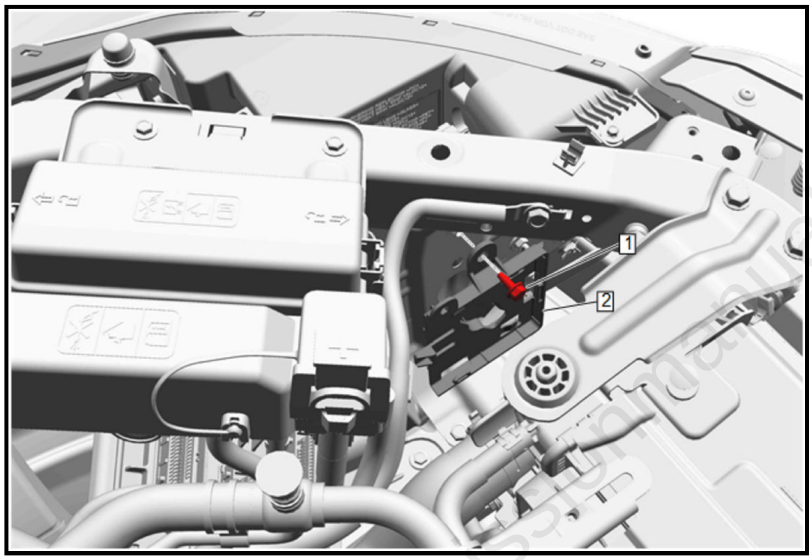
2. 

   Disconnect the transmission control module electrical connector (1).

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3. 

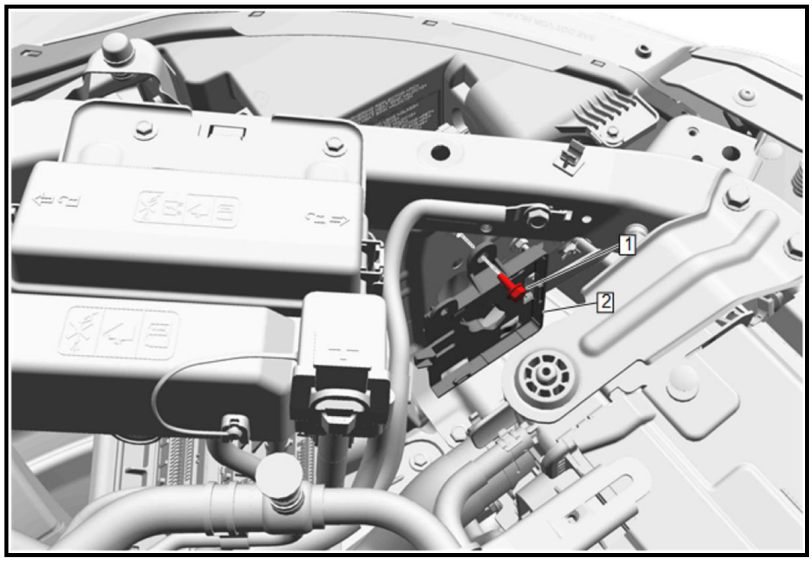
Disengage the retaining tab then remove the transmission control module (1).

4. 

Transmission Control Module Bracket Bolt (1) - Remove

5. Rotate the transmission control module bracket (2) forward a quarter of turn and remove the transmission control module bracket.

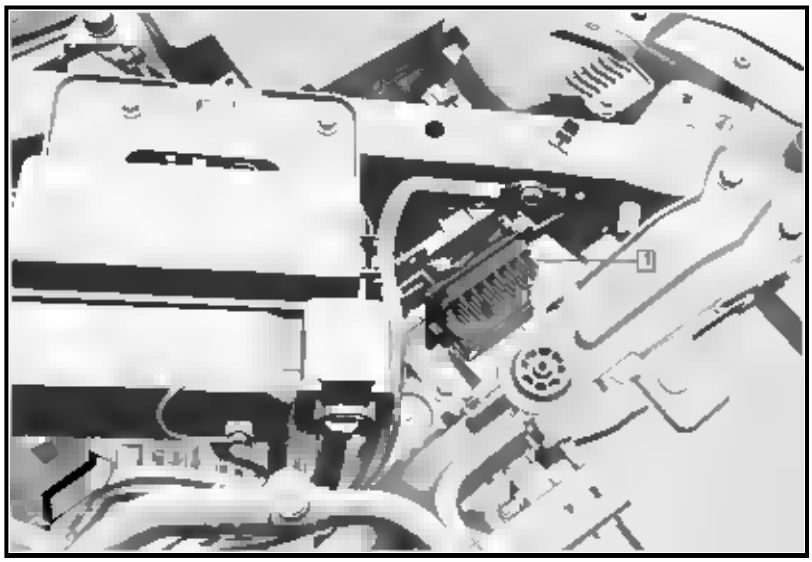
Installation Procedure

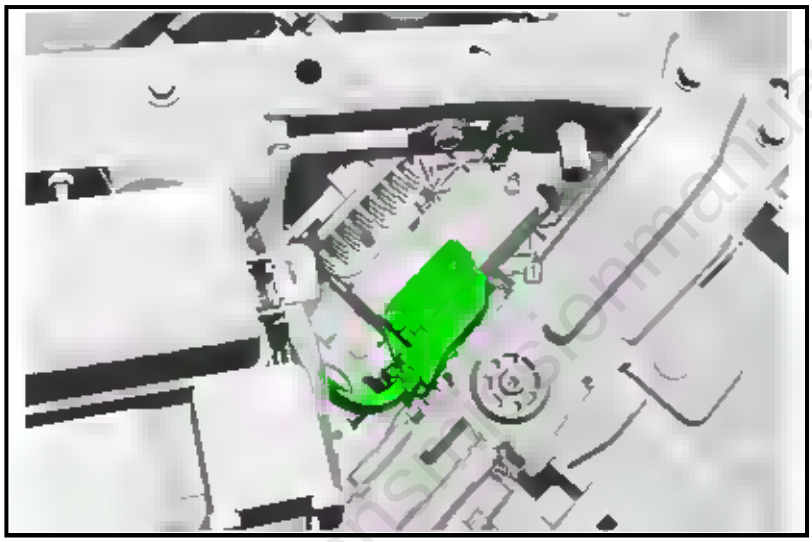
1. 

Transmission Control Module Bracket (2) - Install

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CAUTION: **Refer to Fastener Caution .**

2. Transmission Control Module Bracket Bolt (1) - Install and tighten - **Fastener Specifications**
3. 

   Snap the transmission control module (1) into the transmission control module bracket.
4. 

   Connect the transmission control module electrical connector (1).
5. Connect the battery negative cable. **Battery Negative Cable Disconnection and Connection**
6. Program the transmission control module, if replaced. **Control Module References**

AUTOMATIC TRANSMISSION CONTROL REPLACEMENT

Removal Procedure

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1. 

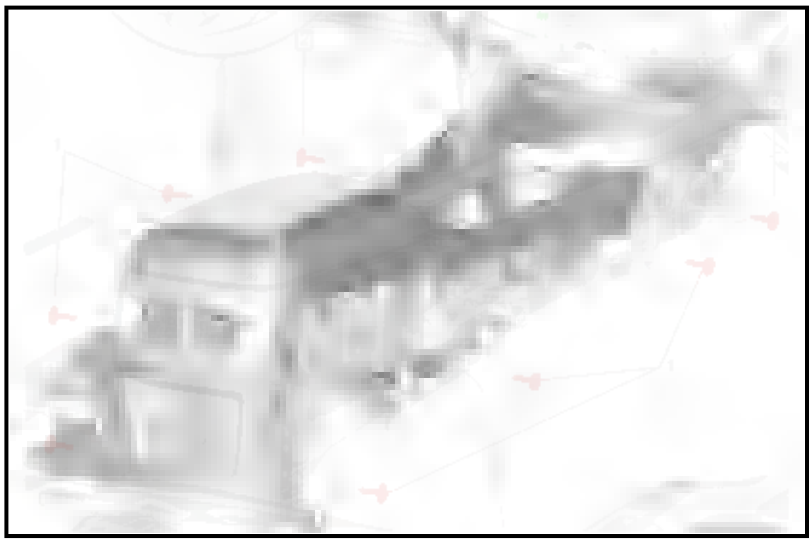
   Reposition the seat as necessary to access the retaining clips.

2. Using a flat-bladed plastic trim tool, release the retaining clips.
3. Front Floor Console Extension Panel - Left Side (1) - Remove

4. 

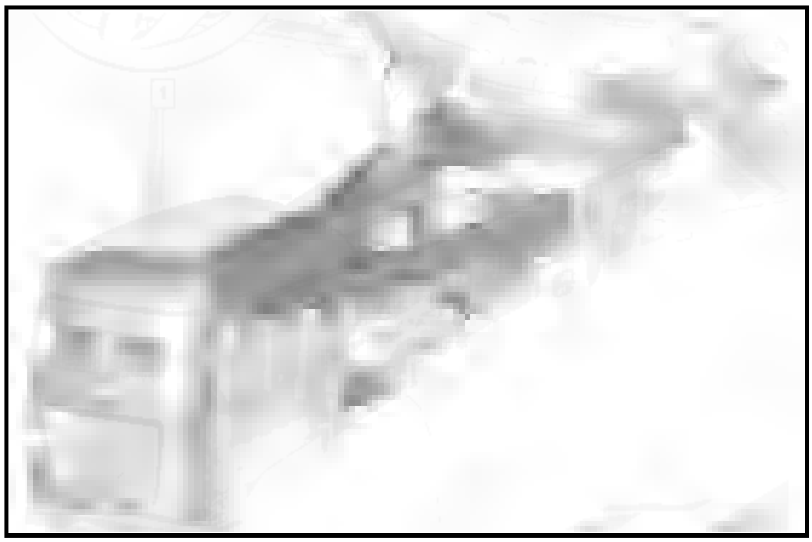
   Using a flat-bladed plastic trim tool, release the retaining clips.

5. Front Floor Console Extension Panel - Right Side (1) - Remove

6. 

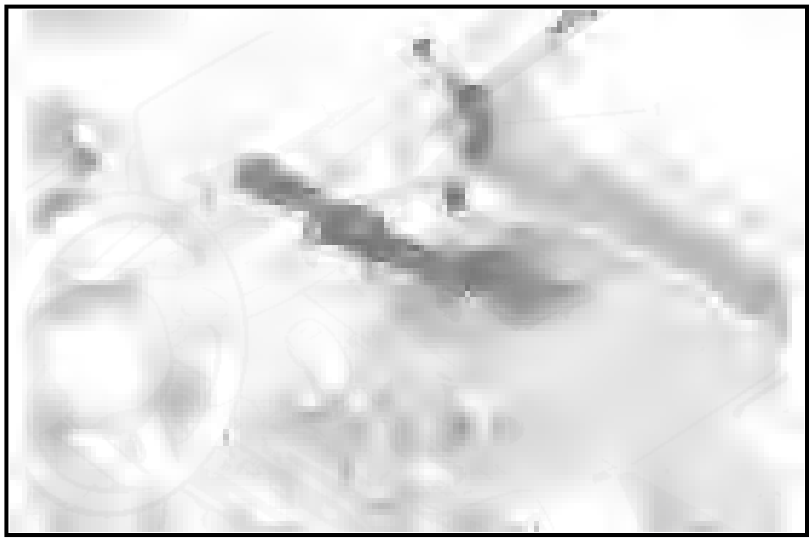
   Front Floor Console Bolt (1) - Remove [6x]

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7. Front Floor Console Bracket Bolt (2) - Remove [2x]
8. Release the tabs (3) on both sides of the front floor console.
9. 

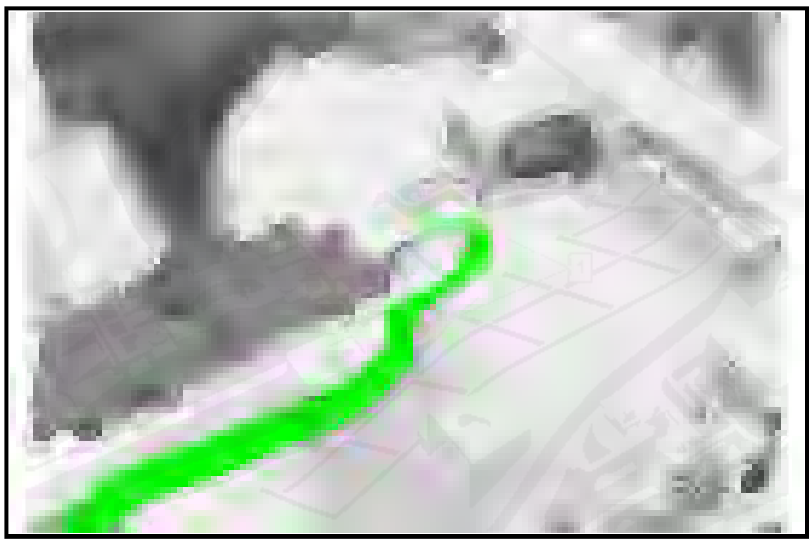
   Slide the front floor console (1) enough to clear the instrument panel lower center trim panel.

10. 

    Front Floor Console Variable 1 Liner (1) - Remove
11. Front Floor Console Trim Plate Bolt (2) - Remove [2x]
12. 

    Front Floor Console Trim Plate (1) - Remove

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13. 

    Wiring Harness Retainer (1) - Remove [2x]

14. Disconnect the electrical connector.

15. 

    Automatic Transmission Control Bolt (1) - Remove [4x]

16. Automatic Transmission Electronic Control (2) - Remove

Installation Procedure

1. 

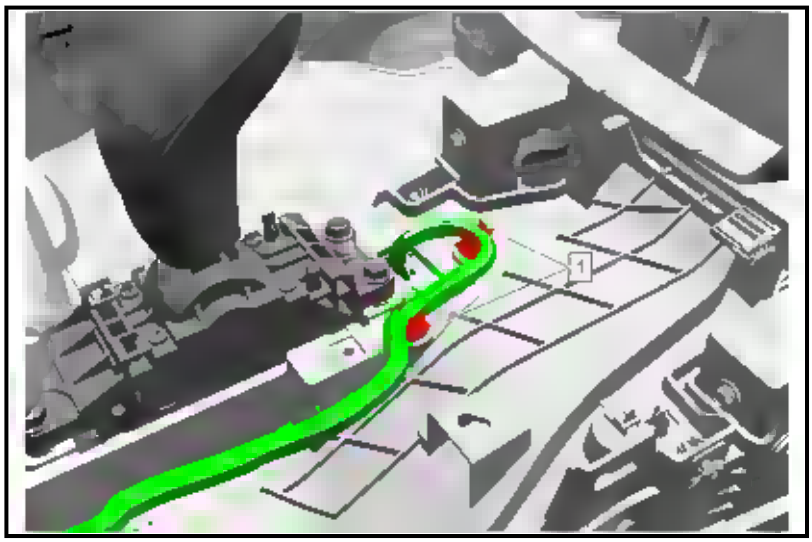
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Connect the electrical connector.

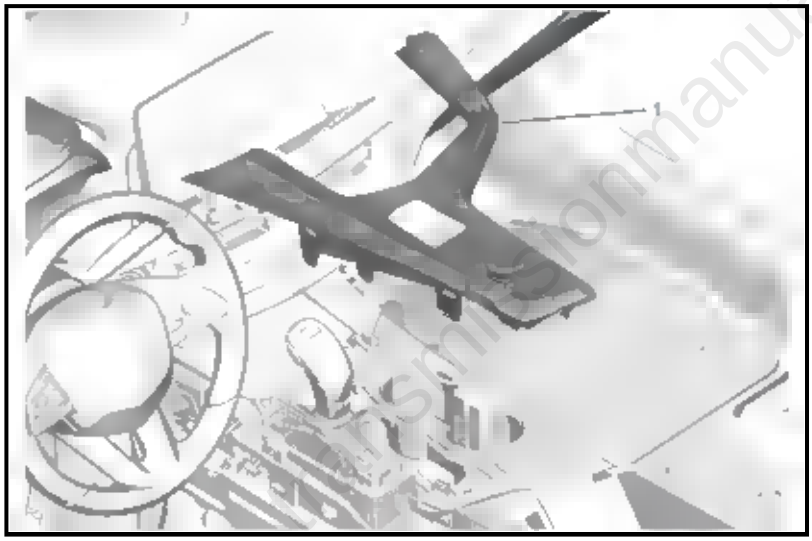
2. Automatic Transmission Electronic Control (2) - Install

CAUTION: **Refer to Fastener Caution .**

3. Automatic Transmission Control Bolt (1) - Install and tighten [4x] - **Fastener Specifications**

4. 

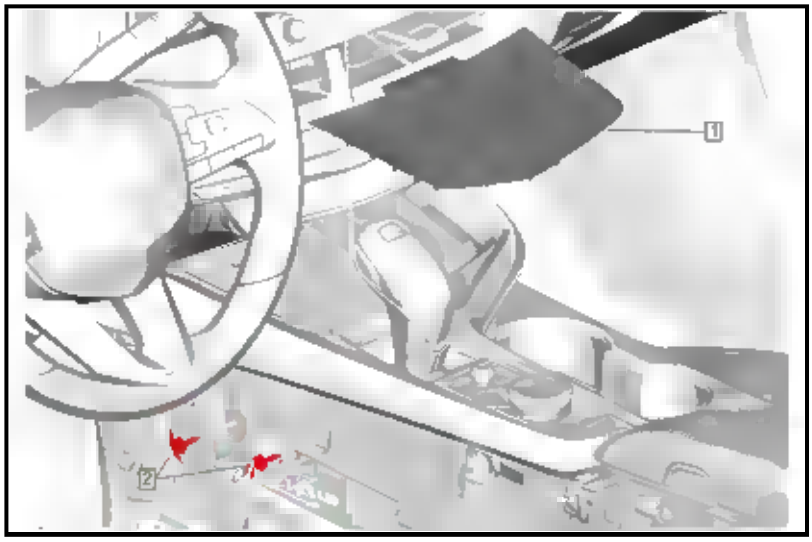
Wiring Harness Retainer (1) - Install [2x]

5. 

Connect the electrical connector.

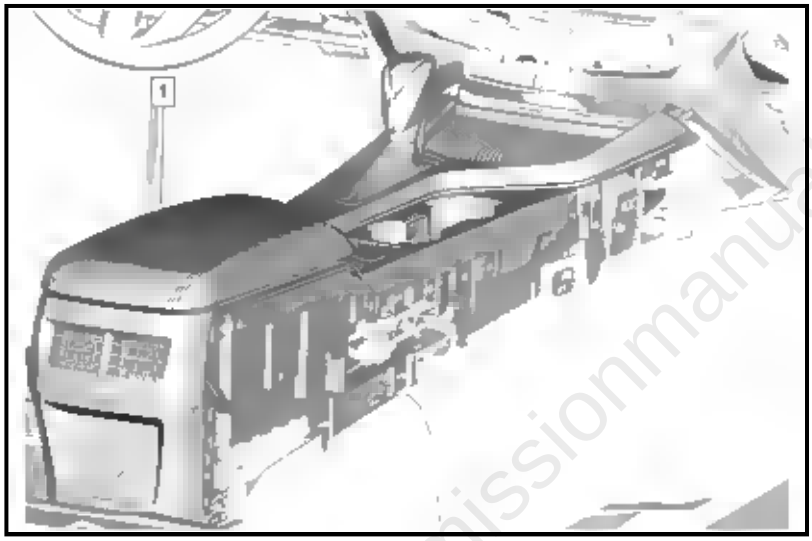
6. Front Floor Console Trim Plate (1) - Install

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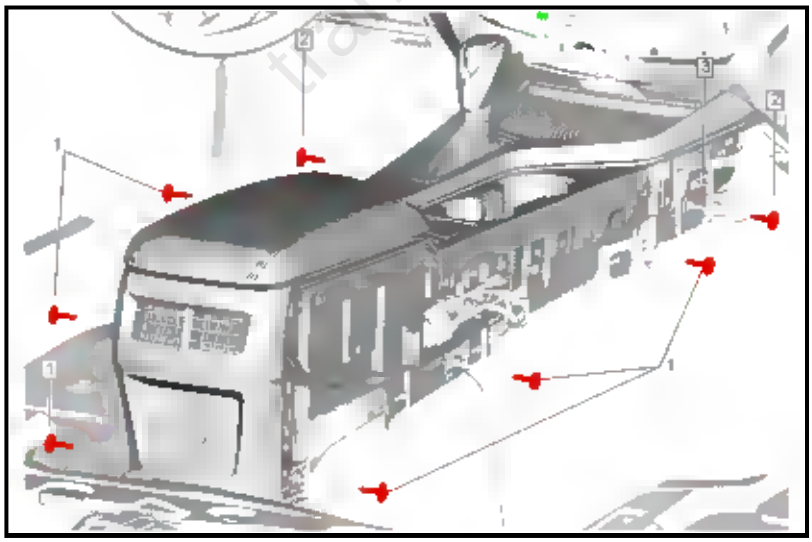
7. 

Front Floor Console Trim Plate Bolt (2) - Install and tighten [2x] - **Fastener Specifications**

8. Front Floor Console Variable 1 Liner (1) - Install

9. 

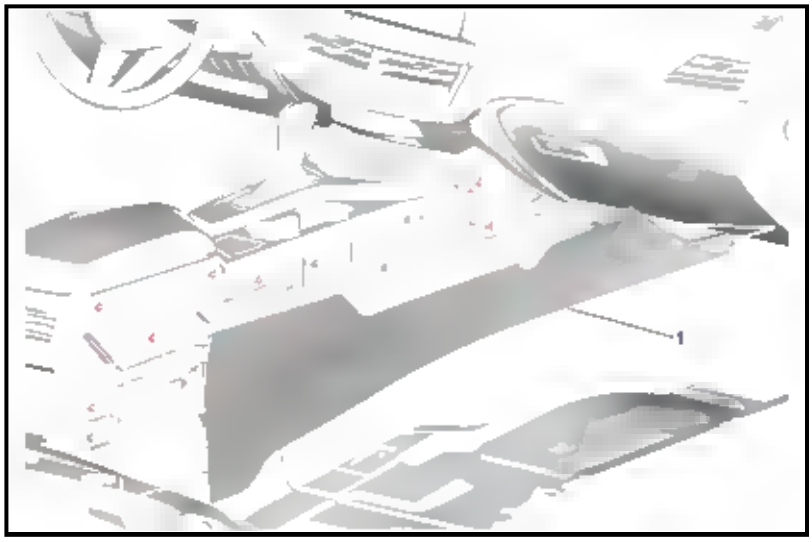
Slide the front floor console (1) back into the instrument panel.

10. 

Front Floor Console Bolt (1) - Install and tighten [6x] - **Fastener Specifications**

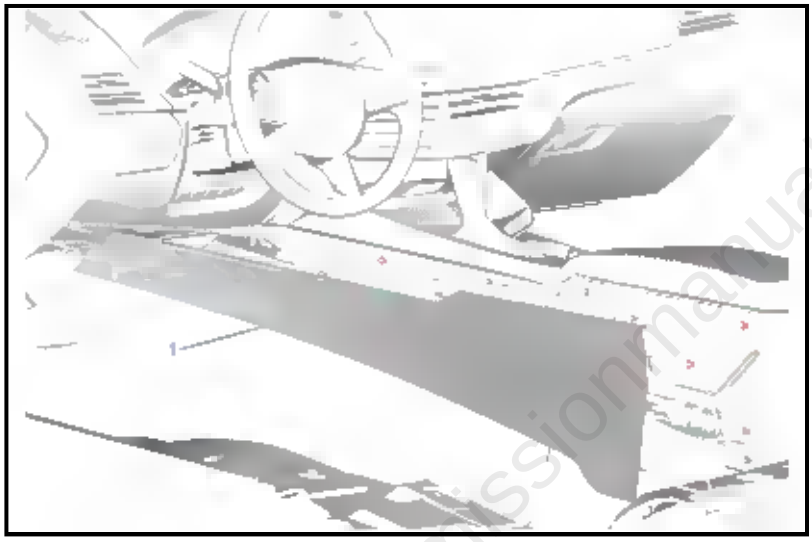
11. Front Floor Console Bracket Bolt (2) - Install and tighten [2x] - **Fastener Specifications**

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12. 

    Front Floor Console Extension Panel - Right Side (1) - Install

13. Return the seat to its original position.

14. 

    Front Floor Console Extension Panel - Left Side (1) - Install

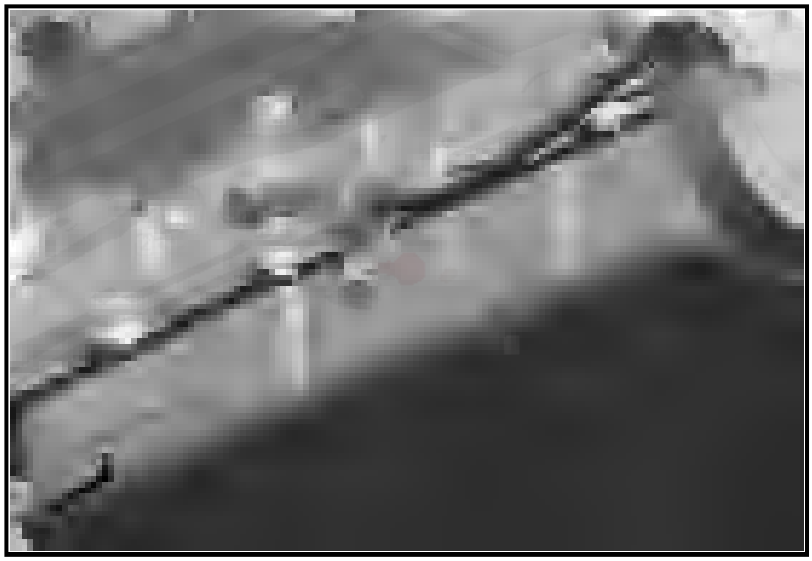
15. Return the seat to its original position.
16. If replacing the automatic transmission electronic control, perform the programing and setup procedures as necessary. **K212 Gear Shift Control Module: Programming and Setup**

ELECTRONIC TRANSMISSION RANGE SELECTOR MANUAL PARK RELEASE CABLE REPLACEMENT

Removal Procedure

1. Raise and support the vehicle. **Lifting and Jacking the Vehicle**

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2. 

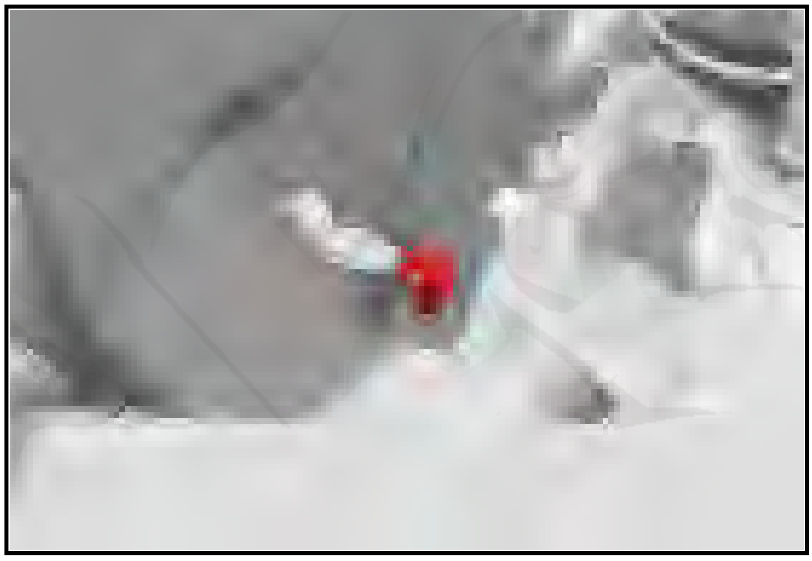
   Electronic Transmission Range Selector Manual Park Release Cable Clamp Bolt (1) - Remove

3. Electronic Transmission Range Selector Manual Park Release Cable (2) @ Transmission - Remove

4. 

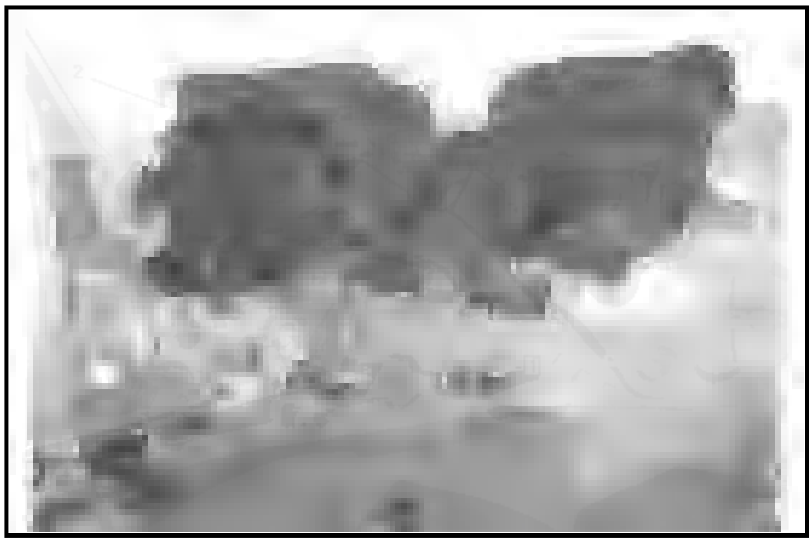
   Unclip the electronic transmission range selector manual park release cable (1) retainer from the electronic transmission range selector manual park release cable bracket.

5. Remove the electronic transmission range selector manual park release cable (2) from the transmission.

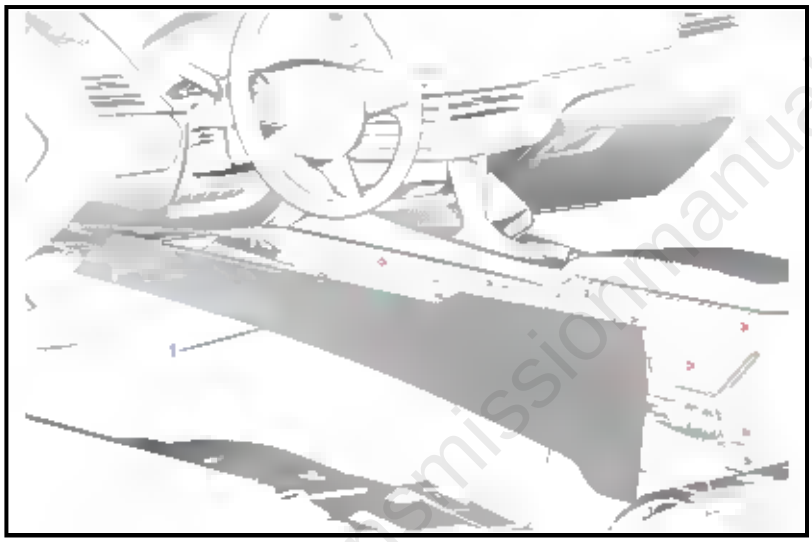
6. 

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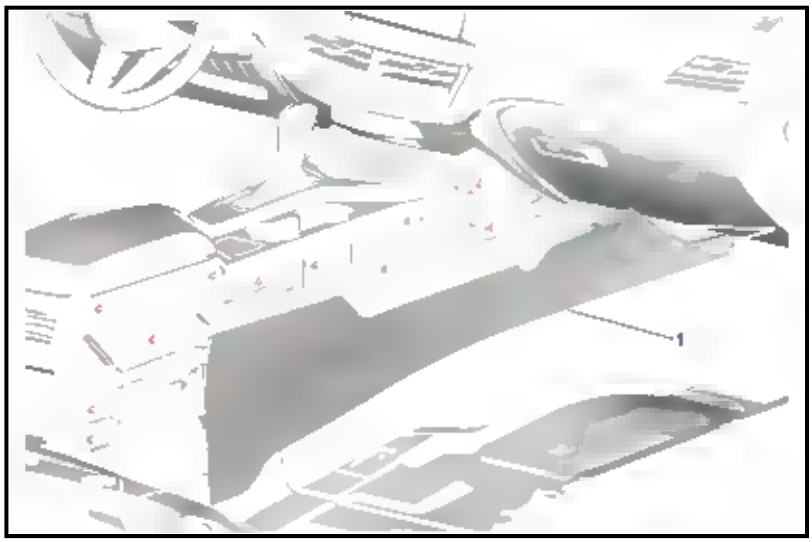
Electronic Transmission Range Selector Manual Park Release Cable Guide Nut (1) - Remove

7. Lower the vehicle.
8. 

Heater and Air Conditioning Evaporator and Blower Module (2) - Remove - **Heater and Air Conditioning Evaporator and Blower Module Removal and Installation**

9. 

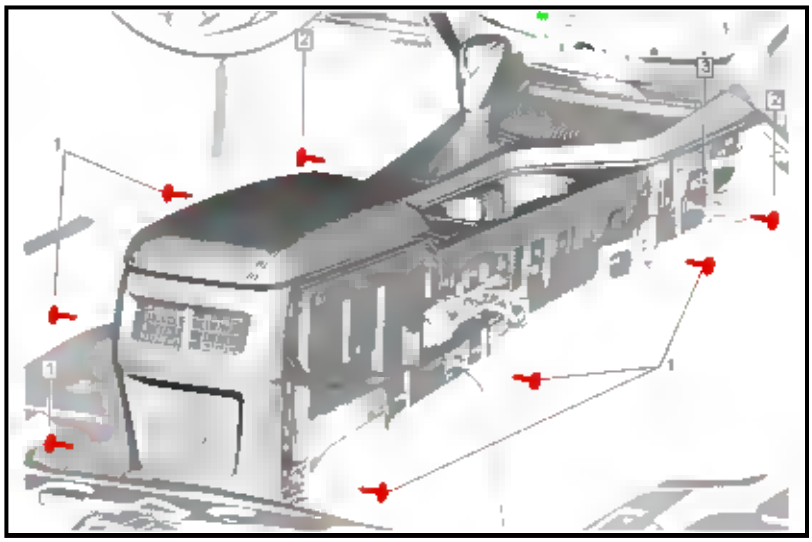
Reposition the seat as necessary to access the retaining clips.

10. Using a flat-bladed plastic trim tool, release the retaining clips.
11. Front Floor Console Extension Panel - Left Side (1) - Remove
12. 

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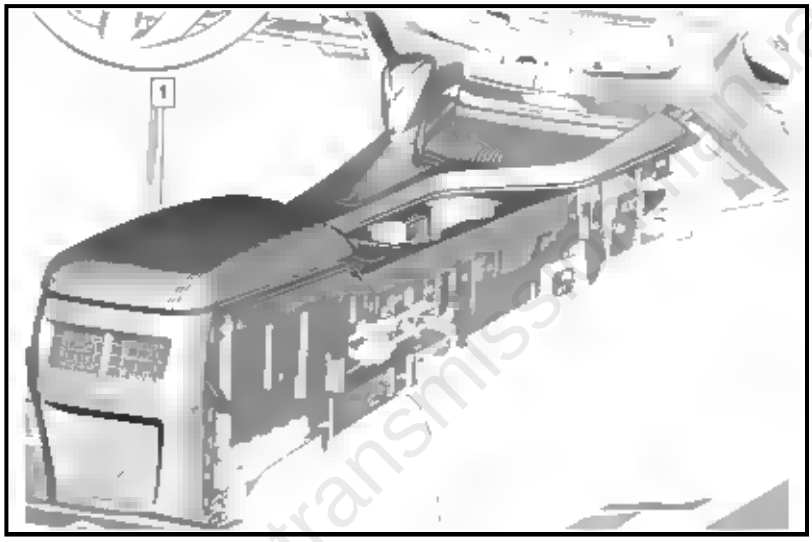
Using a flat-bladed plastic trim tool, release the retaining clips.

13. Front Floor Console Extension Panel - Right Side (1) - Remove

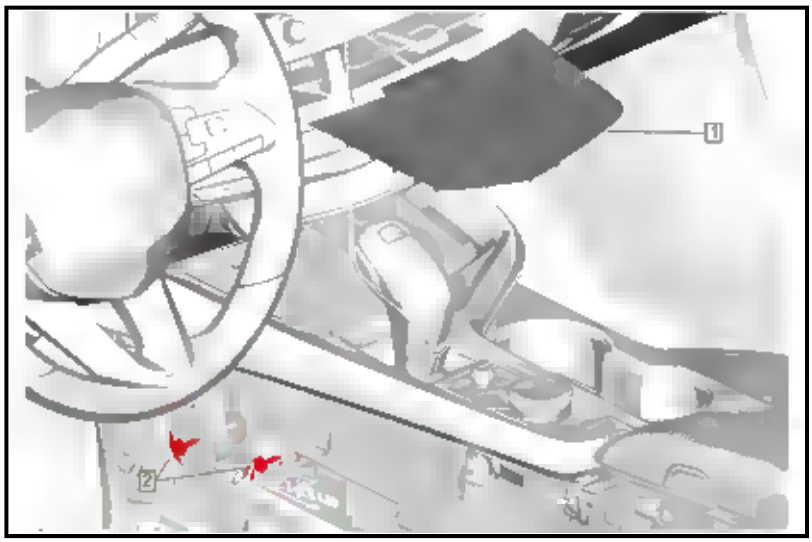
14. 

Front Floor Console Bolt (1) - Remove [6x]

15. Front Floor Console Bracket Bolt (2) - Remove [2x]
16. Release the tabs (3) on both sides of the front floor console.

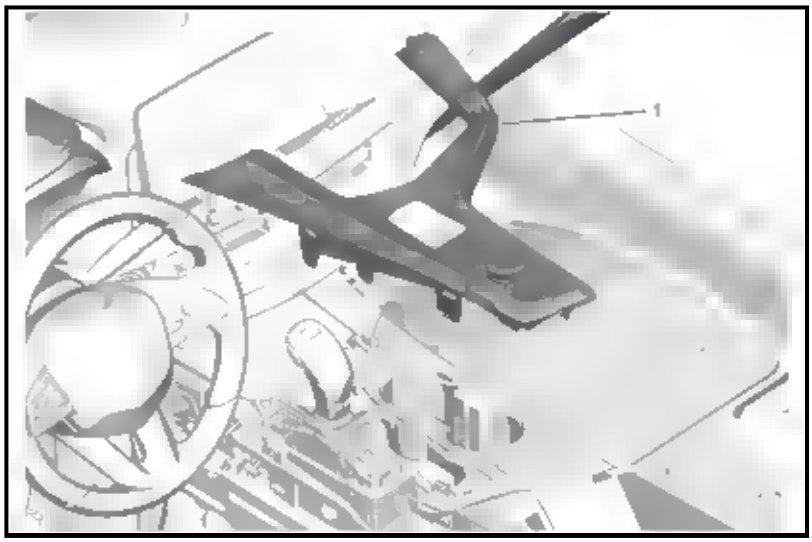
17. 

Slide the front floor console (1) enough to clear the instrument panel lower center trim panel.

18. 

Front Floor Console Variable 1 Liner (1) - Remove

19. Front Floor Console Trim Plate Bolt (2) - Remove [2x]

20. 

Front Floor Console Trim Plate (1) - Remove

21. Disconnect the electrical connector.

22. 

Automatic Transmission Control Bolt (1) - Remove [4x]

23. Automatic Transmission Electronic Control (2) - Remove
24. Disconnect the electrical connector.

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25. 

    Disconnect the front floor console wiring harness from the body wiring harness.

26. With the aid of an assistant, remove the front floor console (1) from the vehicle.

27. 

    Electronic Transmission Range Selector Manual Park Release Shift Lever Nut (1) - Remove

28. Front Floor Console Bracket Bolt (2) - Remove
29. Electronic Transmission Range Selector Manual Park Release Cable Grommet Bolt (3) - Remove [2x]
30. Using a suitable tool, remove the retainer. (4)
31. Electronic Transmission Range Selector Manual Park Release Cable (5) - Remove

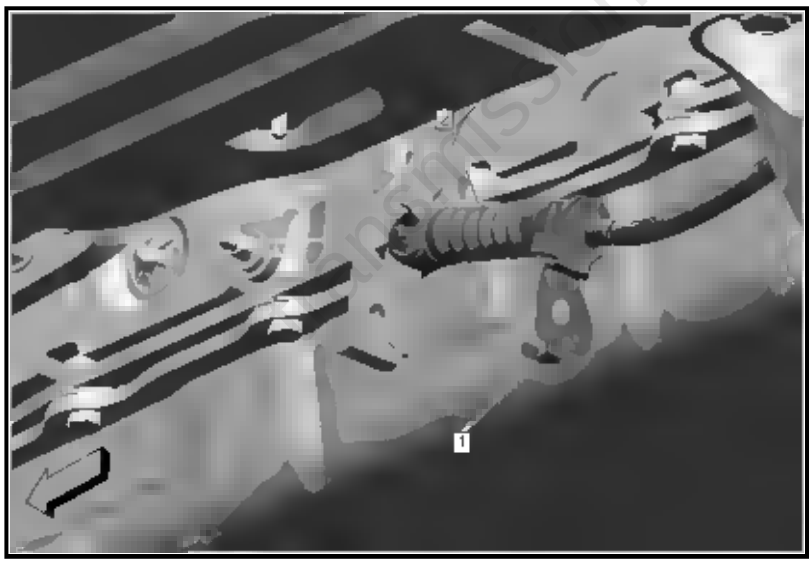
Installation Procedure

1. 

   Electronic Transmission Range Selector Manual Park Release Cable (5) - Install

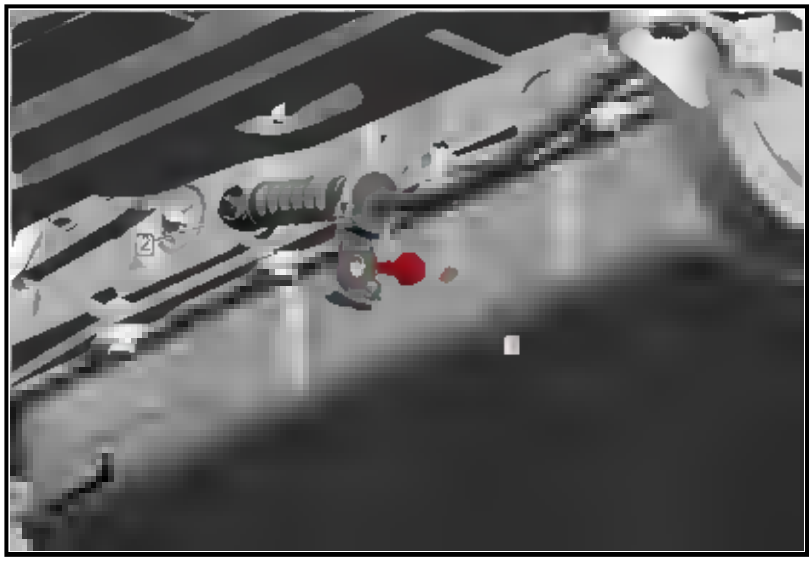
2. Install the retainer. (4)

   CAUTION: **Refer to Fastener Caution**

3. Electronic Transmission Range Selector Manual Park Release Cable Grommet Bolt (3) - Install and tighten [2x] - **Fastener Specifications**
4. Front Floor Console Bracket Bolt (2) - Install and tighten - **Fastener Specifications**
5. Electronic Transmission Range Selector Manual Park Release Shift Lever Nut (1) - Install and tighten - **Fastener Specifications**
6. Raise the vehicle.
7. 

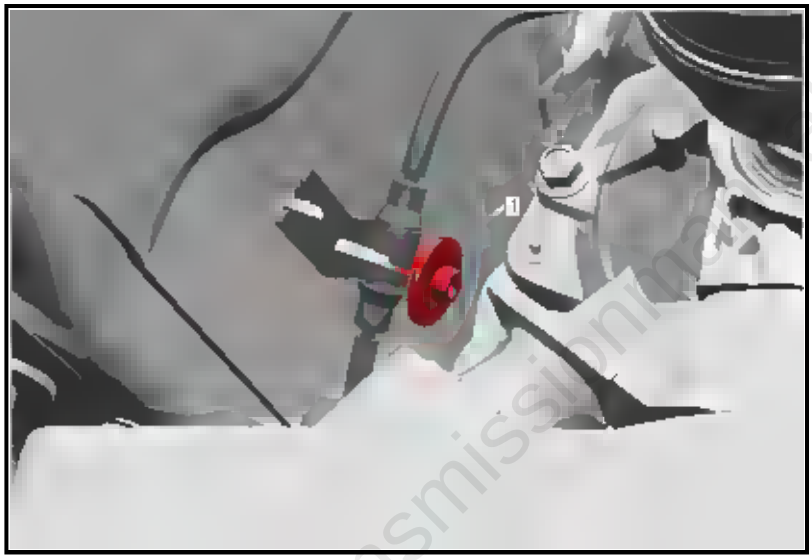
   Install the electronic transmission range selector manual park release cable (2) to the electronic transmission range selector manual park release cable bracket on the transmission.

8. Clip the electronic transmission range selector manual park release cable (1) retainer to the electronic transmission range selector manual park release cable bracket.

9. 

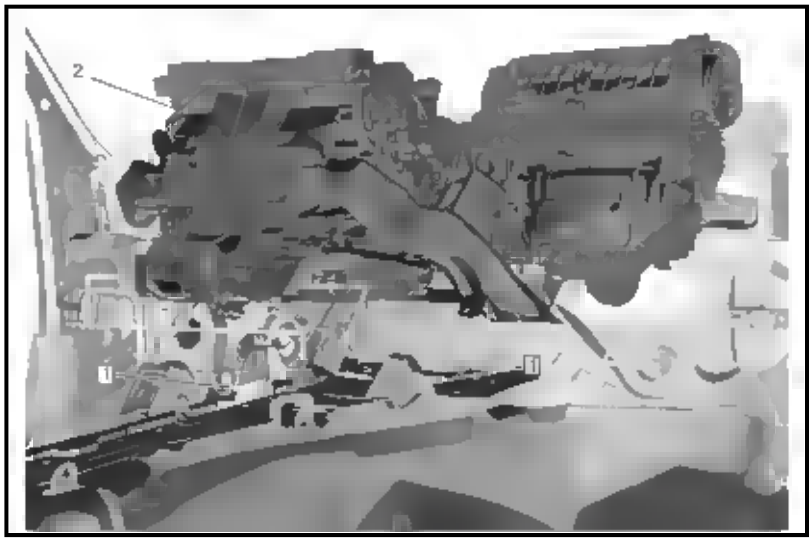
   Electronic Transmission Range Selector Manual Park Release Cable (2) @ Transmission - Install

10. Electronic Transmission Range Selector Manual Park Release Cable Clamp Bolt (1) - Install and tighten - **Fastener Specifications**

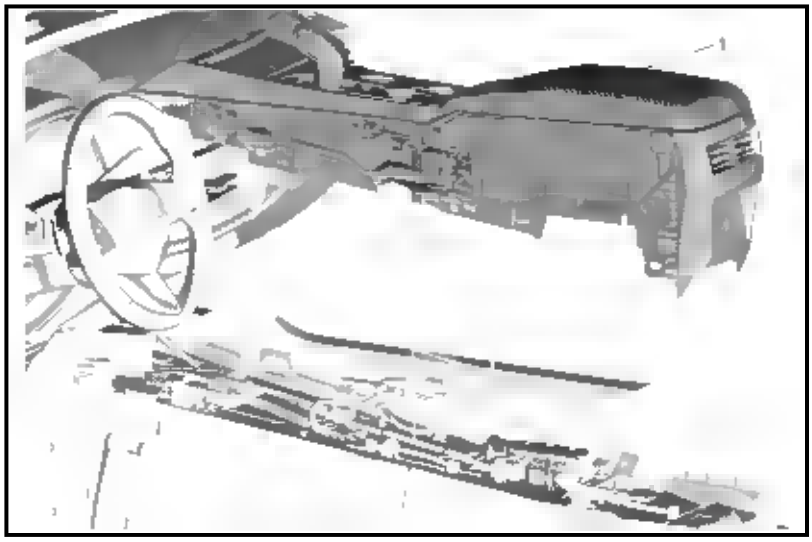
11. 

    Electronic Transmission Range Selector Manual Park Release Cable Guide Nut (1) - Install and tighten - **Fastener Specifications**

12. Lower the vehicle. **Lifting and Jacking the Vehicle**

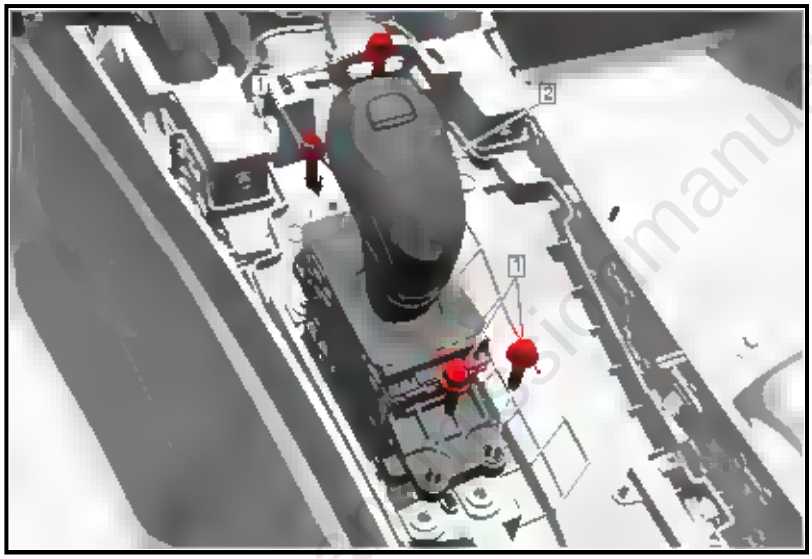
13. 

Heater and Air Conditioning Evaporator and Blower Module (2) - Install - **Heater and Air Conditioning Evaporator and Blower Module Removal and Installation**

14. 

With the aid of an assistant, install the front floor console (1) to the vehicle.

15. Connect the front floor console wiring harness to the body wiring harness.

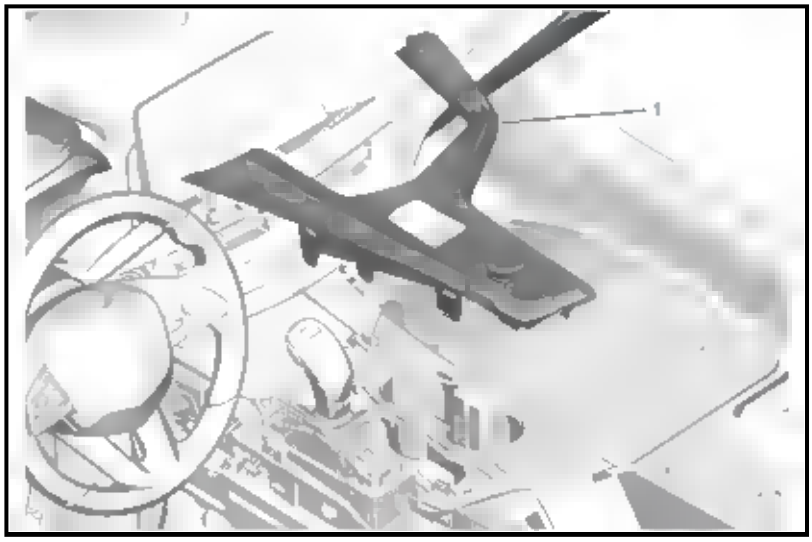
16. 

Connect the electrical connector.

17. Automatic Transmission Electronic Control (2) - Install

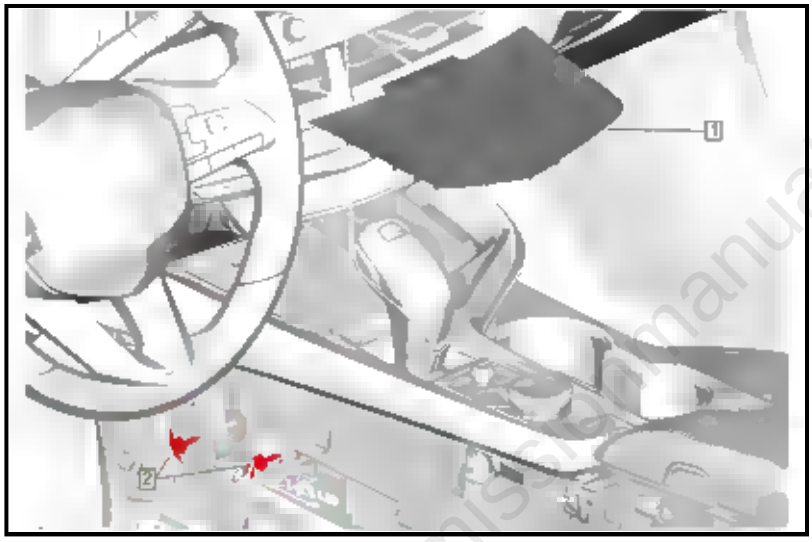
CAUTION: **Refer to Fastener Caution**

18. Automatic Transmission Control Bolt (1) - Install and tighten [4x] - **Fastener Specifications**

19. 

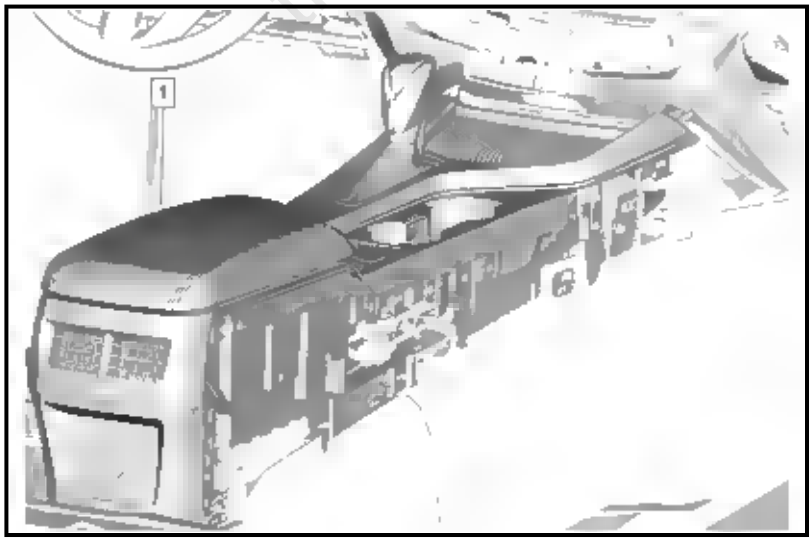
    Connect the electrical connector.

20. Front Floor Console Trim Plate (1) - Install

21. 

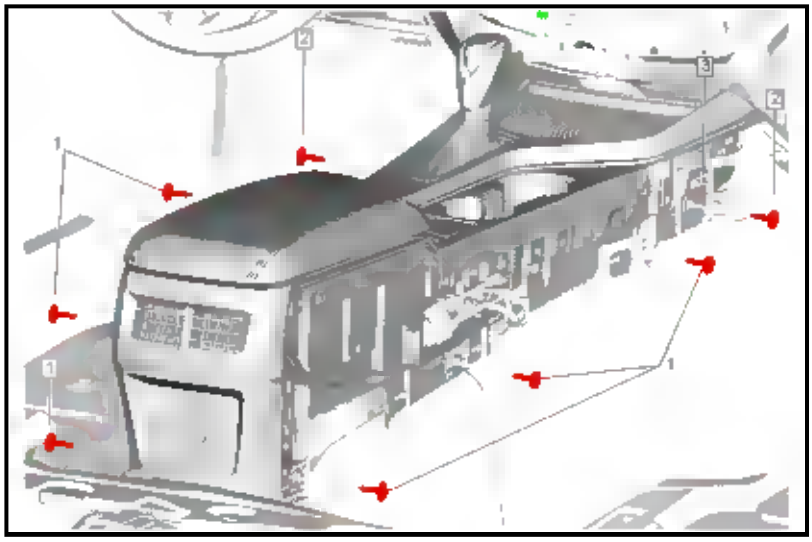
    Front Floor Console Trim Plate Bolt (2) - Install and tighten [2x] - **Fastener Specifications**

22. Front Floor Console Variable 1 Liner (1) - Install

23. 

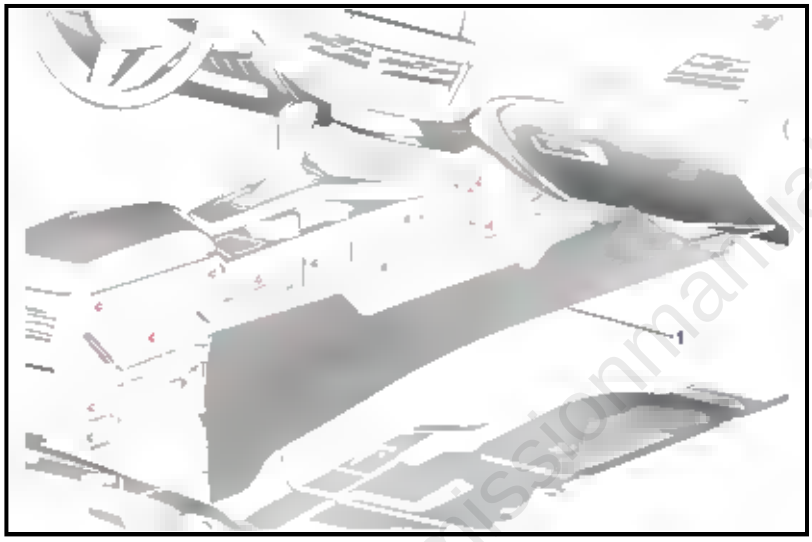
    Slide the front floor console (1) back into the instrument panel.

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24. 

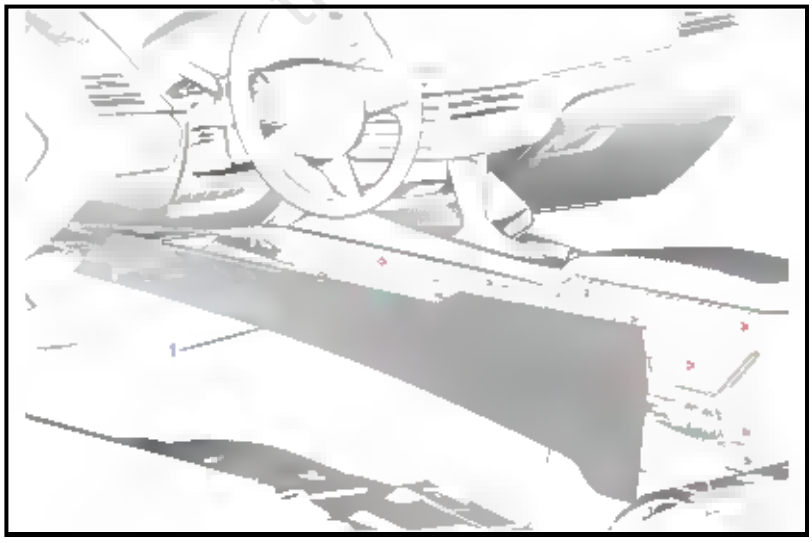
Front Floor Console Bolt (1) - Install and tighten [6x] - **Fastener Specifications**

25. Front Floor Console Bracket Bolt (2) - Install and tighten [2x] - **Fastener Specifications**

26. 

Front Floor Console Extension Panel - Right Side (1) - Install

27. Return the seat to its original position.

28. 

Front Floor Console Extension Panel - Left Side (1) - Install

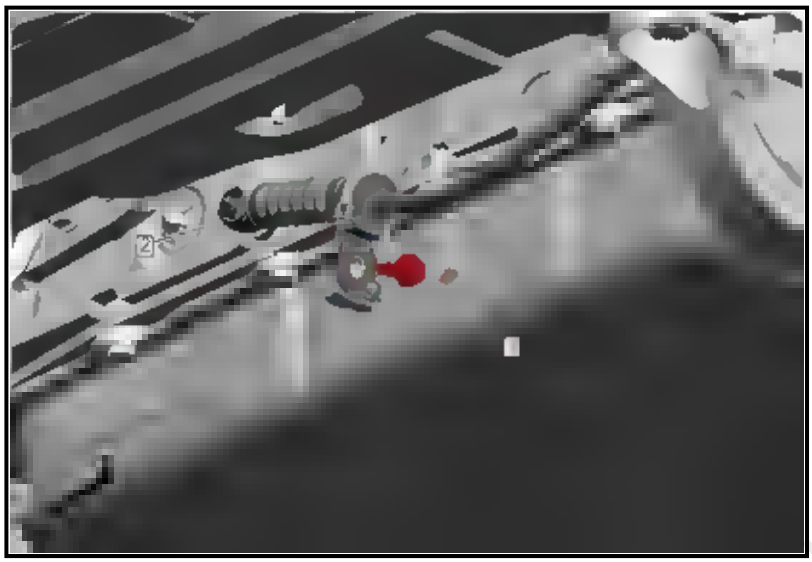
29. Return the seat to its original position.

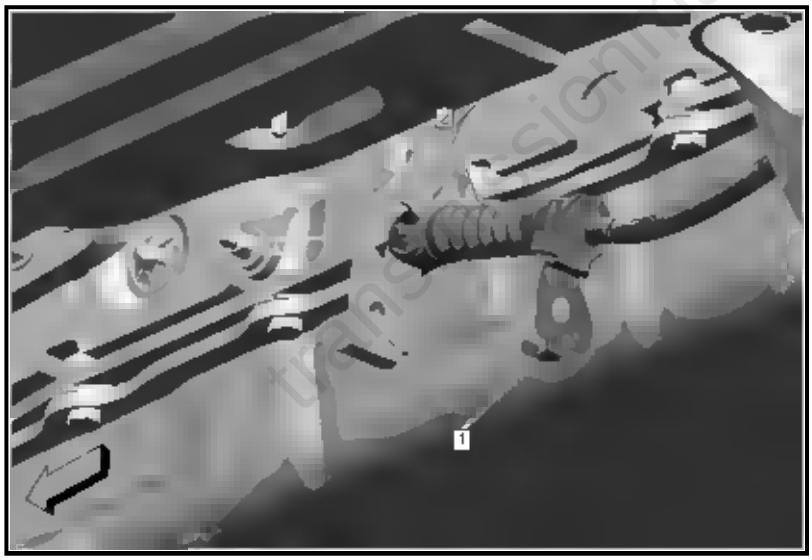
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30. Adjust the automatic transmission range selector cable. **Range Selector Lever Cable Adjustment**

ELECTRONIC TRANSMISSION RANGE SELECTOR MANUAL PARK RELEASE CABLE BRACKET REPLACEMENT

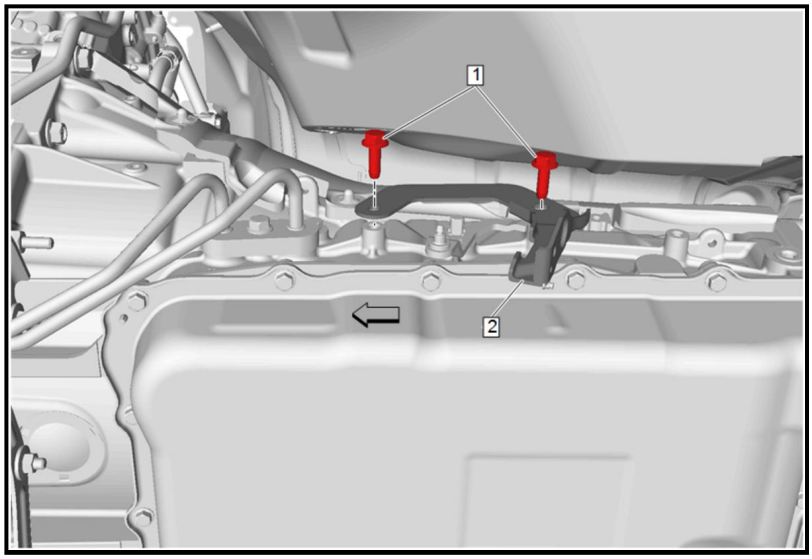
Removal Procedure

1. Raise and support the vehicle. **Lifting and Jacking the Vehicle**
2. 

   Electronic Transmission Range Selector Manual Park Release Cable Clamp Bolt (1) - Remove
3. Electronic Transmission Range Selector Manual Park Release Cable (2) @ Transmission - Remove
4. 

   Unclip the electronic transmission range selector manual park release cable (1) retainer from the electronic transmission range selector manual park release cable bracket.
5. Remove the electronic transmission range selector manual park release cable (2) from the transmission.

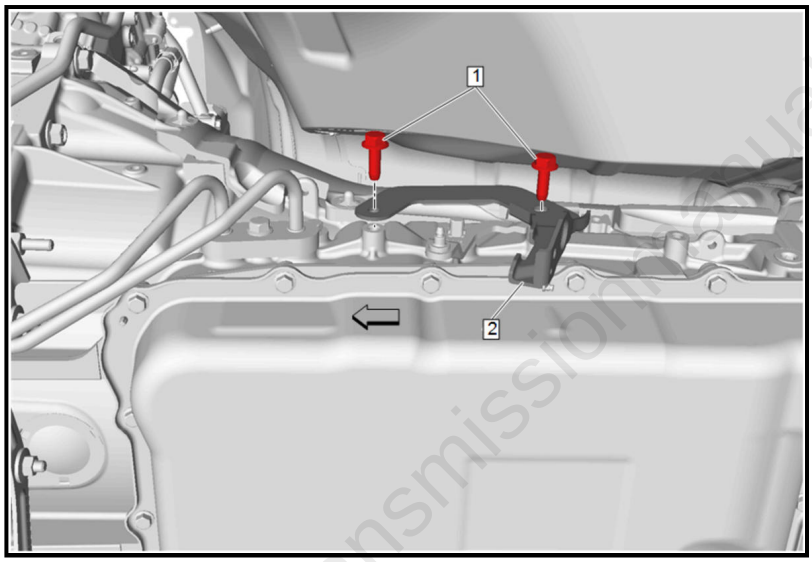
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6. 

Remove the 2 electronic transmission range selector manual park release cable bracket bolts (1).

7. Electronic Transmission Range Selector Manual Park Release Cable Bracket (1) - Remove

Installation Procedure

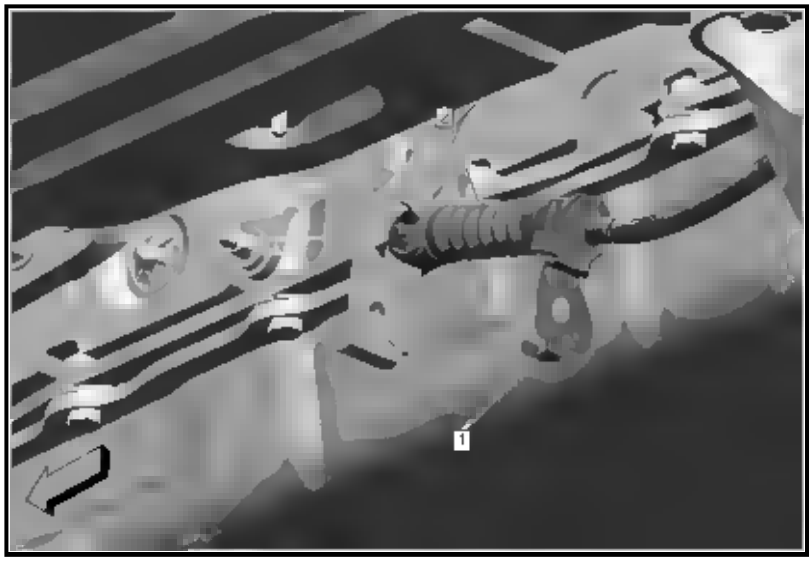
1. 

Electronic Transmission Range Selector Manual Park Release Cable Bracket (1) Â» Install

CAUTION: **Refer to Fastener Caution**

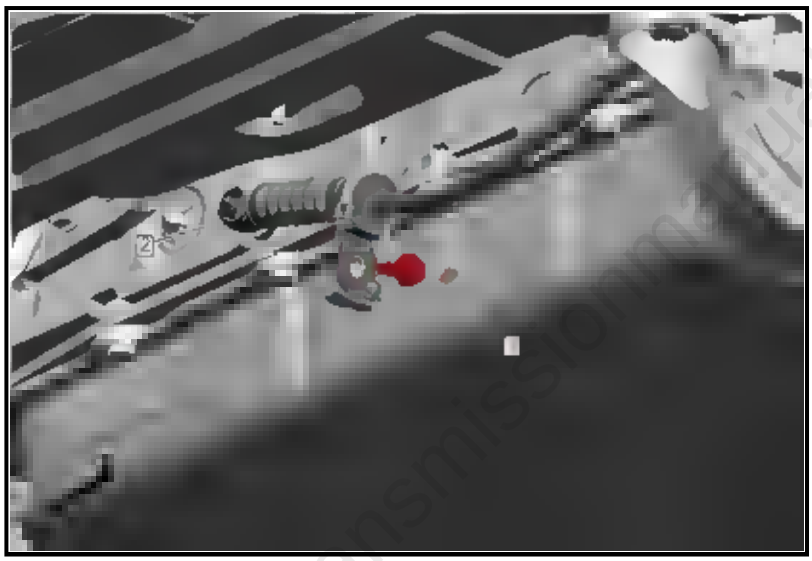
2. Install and tighten the 2 electronic transmission range selector manual park release cable bracket bolts (1). Fastener Specifications **Fastener Specifications**

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3. 

   Install the electronic transmission range selector manual park release cable (2) to the electronic transmission range selector manual park release cable bracket on the transmission.

4. Clip the electronic transmission range selector manual park release cable (1) retainer to the electronic transmission range selector manual park release cable bracket.

5. 

   Electronic Transmission Range Selector Manual Park Release Cable (2) @ Transmission - Install

6. Electronic Transmission Range Selector Manual Park Release Cable Clamp Bolt (1) - Install and tighten - **Fastener Specifications**
7. Lower the vehicle.
8. Perform the automatic transmission range selector lever cable adjustment. **Range Selector Lever Cable Adjustment**

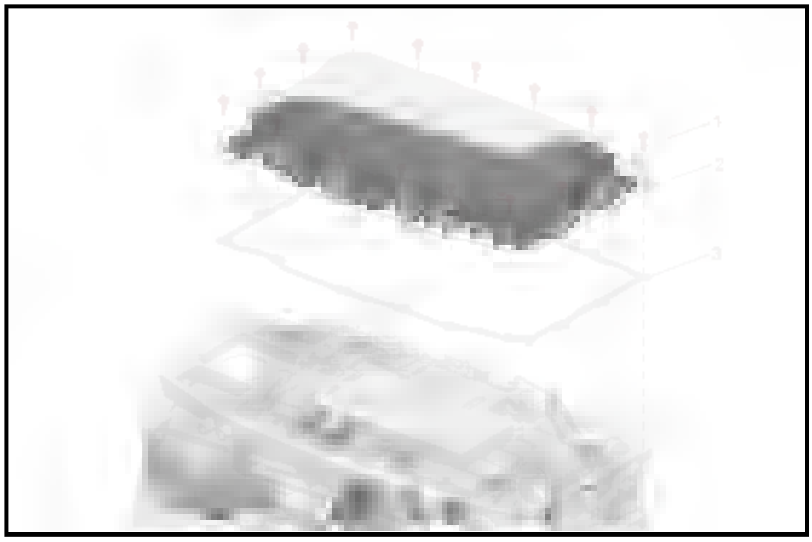
AUTOMATIC TRANSMISSION FLUID, FLUID PAN AND/OR FILTER REPLACEMENT

Single Use Fasteners and Components

- Automatic Transmission Fluid Filter Bolt [2x]

Removal Procedure

1. Raise and support the vehicle. **Lifting and Jacking the Vehicle**
2. Place a drain pan under the vehicle.

3. 

Automatic Transmission Fluid Pan Bolt (1) - Remove [16x]

4. Automatic Transmission Fluid Pan (2) - Remove

NOTE: **The fluid pan gasket is reusable. Inspect the gasket to determine if it may be reused. If the gasket is stuck to the case or pan, it should be replaced.**

5. Automatic Transmission Fluid Pan Gasket (3) - Remove

6. 

Automatic Transmission Fluid Filter Bolt (1) - Remove and DISCARD [2x]

CAUTION: **Pull the fluid filter assembly straight out to avoid damage. Do not bend or twist the filter neck.**

NOTE: **The seal should stay with the pump assembly.**

7. Automatic Transmission Fluid Filter (2) - Remove

Installation Procedure

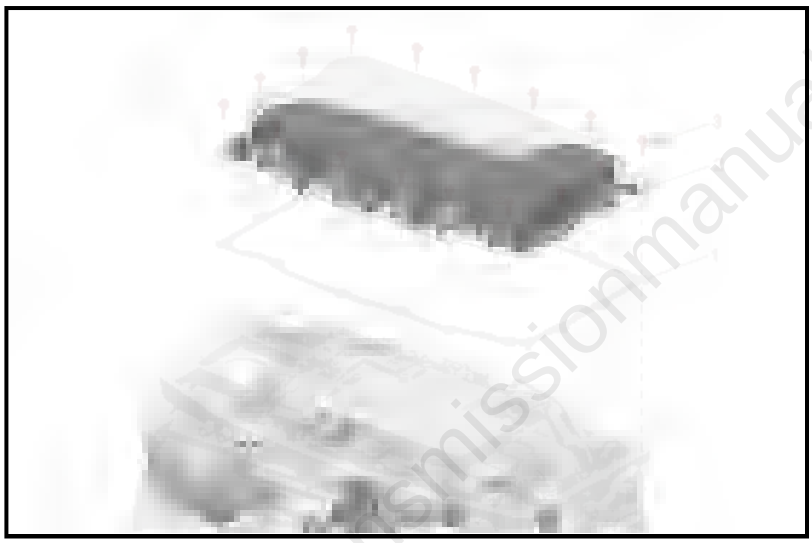
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1. 

Automatic Transmission Fluid Filter (1) - Install

CAUTION: **Refer to Fastener Caution .**

2. Automatic Transmission Fluid Filter Bolt (2) - Install NEW and tighten [2x] - **Fastener Specifications**

3. 

Automatic Transmission Fluid Pan Gasket (3) - Install

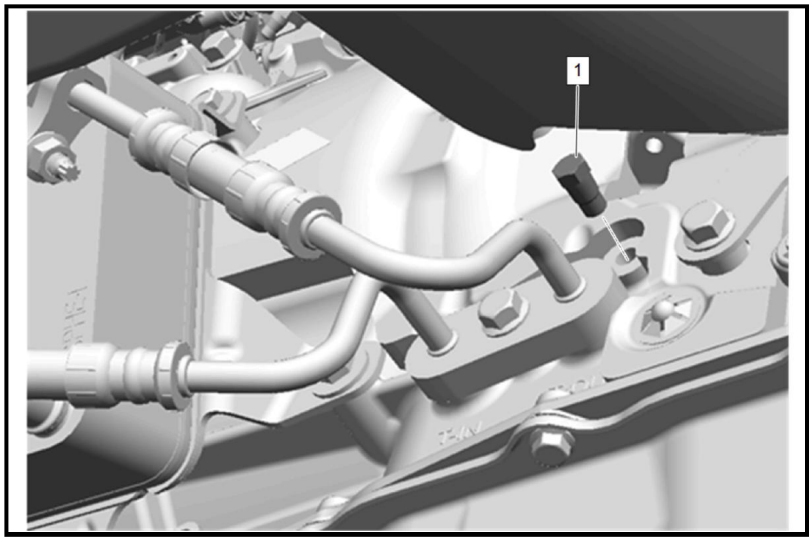
4. Automatic Transmission Fluid Pan (4) - Install
5. Automatic Transmission Fluid Pan Bolt (5) - Install and tighten in sequence [16x] - **Fastener Specifications**
6. Remove the drain pan.
7. Lower the vehicle.
8. Fill the transmission to the proper level with NEW transmission fluid. **Transmission Fluid Level and Condition Check**

AUTOMATIC TRANSMISSION FLUID PRESSURE TEST HOLE PLUG REPLACEMENT

Removal Procedure

1. Raise and support the vehicle. **Lifting and Jacking the Vehicle**

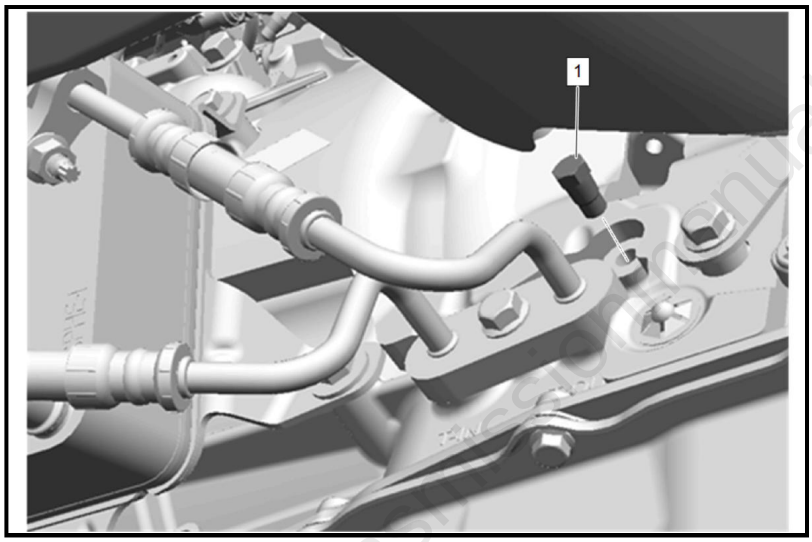
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2. 

Clean the surrounding area of the automatic transmission fluid pressure test hole plug (1).

3. Automatic Transmission Fluid Pressure Test Hole Plug (1) - Remove

Installation Procedure

1. 

Prepare the automatic transmission fluid pressure test hole plug (1) for installation as follows:

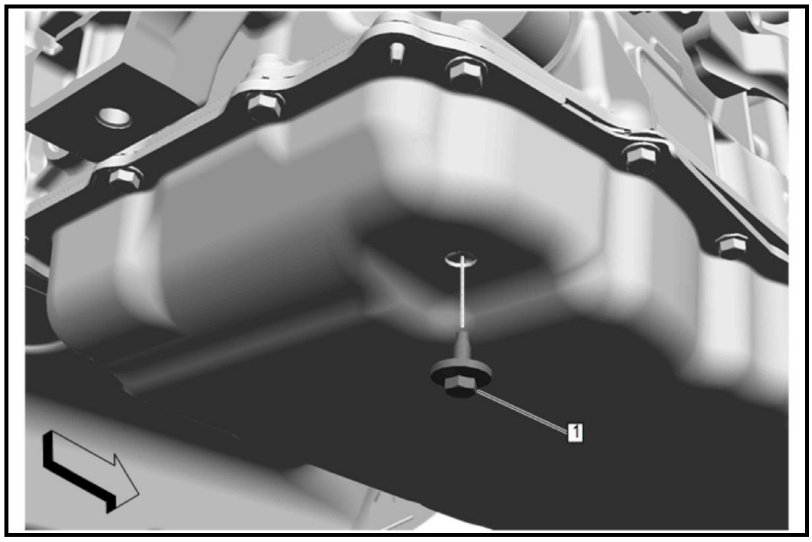
1. Remove all traces of the adhesive patch from the plug and the mating threads using the appropriate tools.
2. Clean the threads of the plug and mating threads with denatured alcohol or equivalent and allow to dry.
3. Apply thread locking adhesive to the plug. **Adhesives, Fluids, Lubricants, and Sealers**
4. Ensure there are no gaps in the thread locking adhesive once applied to the plug.

CAUTION: **Refer to Component Fastener Tightening Caution .**

2. Automatic Transmission Fluid Pressure Test Hole Plug (1) - Install and tighten - **Fastener Specifications**
3. Check the transmission fluid level and condition and correct as necessary. **Transmission Fluid Level and Condition Check**
4. Lower the vehicle. **Lifting and Jacking the Vehicle**

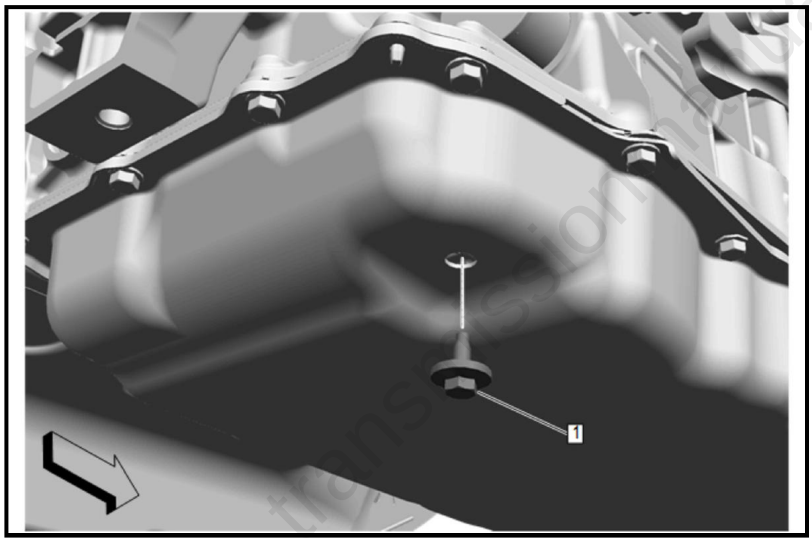
TRANSMISSION OIL LEVEL CHECK PLUG REPLACEMENT

Removal Procedure

1. Raise and support the vehicle. **Lifting and Jacking the Vehicle**
2. Place a drain pan under the vehicle.
3. 

   Clean the surrounding area of the transmission oil level check plug.
4. Transmission Oil Level Check Plug (1) - Remove

Installation Procedure

1. 

   CAUTION: **Refer to Component Fastener Tightening Caution .**

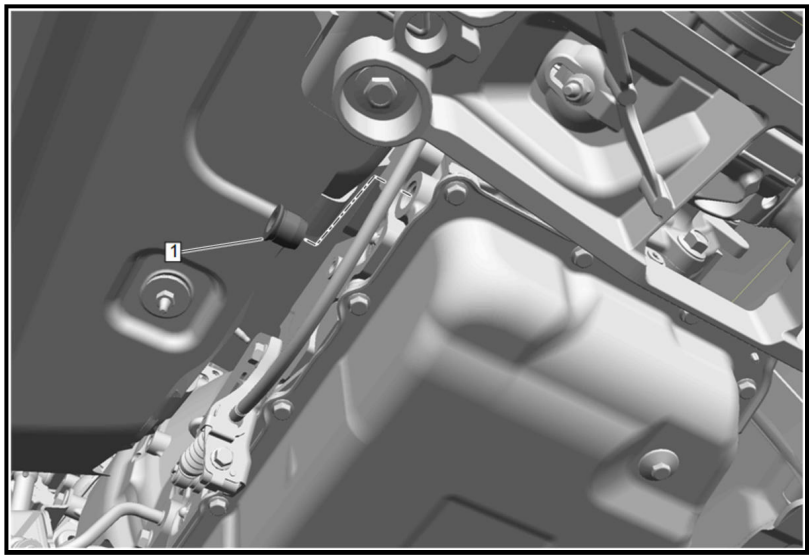
   Transmission Oil Level Check Plug (1) - Install and tighten - **Fastener Specifications**
2. Remove the drain pan.
3. Lower the vehicle.
4. Check the transmission fluid level and condition and correct as necessary. **Transmission Fluid Level and Condition Check**

AUTOMATIC TRANSMISSION CASE HOLE PLUG REPLACEMENT

Removal Procedure

1. Raise and support the vehicle. **Lifting and Jacking the Vehicle**

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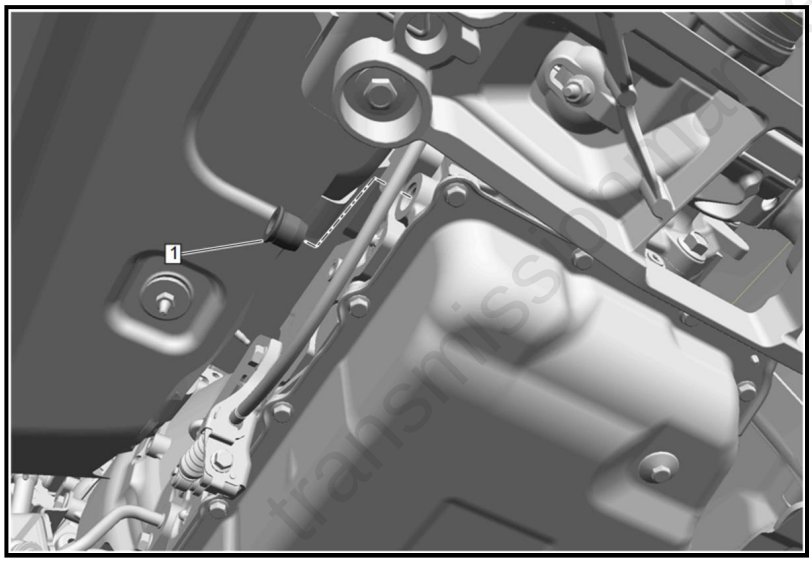
2. 

   Clean the surrounding area of the automatic transmission case hole plug (1).

3. Automatic Transmission Case Hole Plug (1) - Remove

Installation Procedure

1. Check the transmission fluid level and condition and correct as necessary. **Transmission Fluid Level and Condition Check**

2. 

   Prepare the automatic transmission case hole plug (1) for installation as follows:

   1. Remove all traces of the adhesive patch from the plug and the mating threads using the appropriate tools.
   2. Clean the threads of the plug and mating threads with denatured alcohol or equivalent and allow to dry.
   3. Apply thread locking adhesive to the plug. **Adhesives, Fluids, Lubricants, and Sealers**
   4. Ensure there are no gaps in the thread locking adhesive once applied to the plug.

   CAUTION: **Refer to Component Fastener Tightening Caution .**

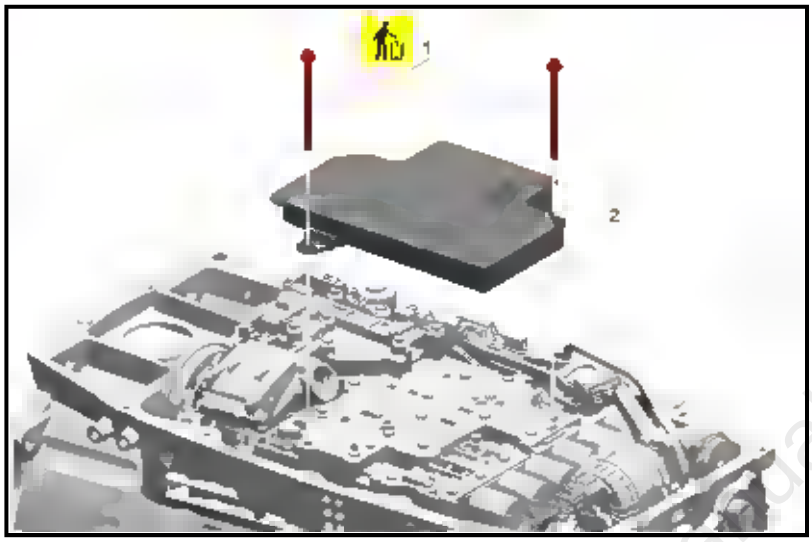
3. Automatic Transmission Case Hole Plug (1) - Install and tighten - **Fastener Specifications**
4. Lower the vehicle. **Lifting and Jacking the Vehicle**

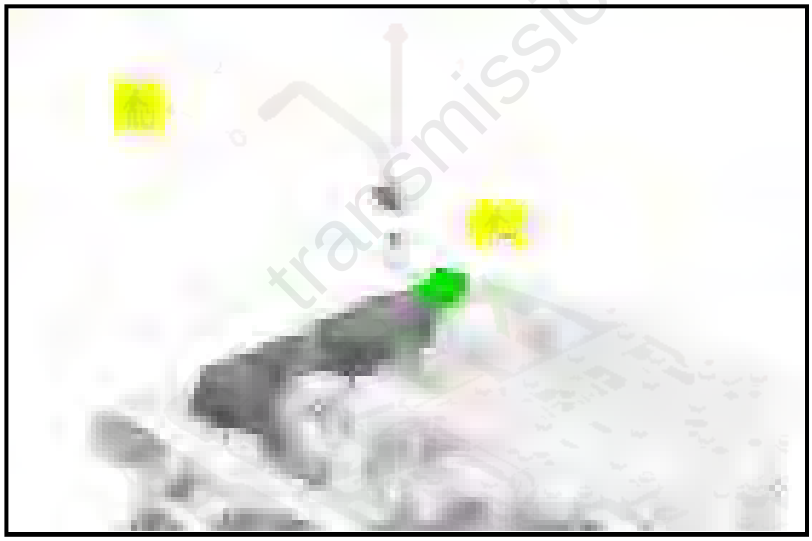
MANUAL SHIFT SHAFT REPLACEMENT (ALL WHEEL DRIVE)

Single Use Fasteners and Components

- Automatic Transmission Fluid Filter Bolt [2x]
- Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal
- Automatic Transmission Auxiliary Fluid Pump Seal
- Control Valve Solenoid Body Bolt [3x]
- Manual Shift Shaft Pin

Removal Procedure

1. Raise and support the vehicle. **Lifting and Jacking the Vehicle**
2. 

   Automatic Transmission Fluid Filter (2) - Remove - **Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement**
3. 

   Control Valve Upper Body Bolt (1) - Remove
4. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe (2) - Remove
5. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal (3) - Remove and DISCARD
6. Automatic Transmission Auxiliary Fluid Pump Seal (4) - Remove and DISCARD

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7. 

NOTE: **The bolts are marked by arrows in the valve body casting.**

Control Valve Solenoid Body Bolt (1) - Remove [2x]

8. Control Valve Solenoid Body Bolt (2) - Remove and DISCARD [3x]
9. Control Valve Solenoid Body Bolt (3) - Remove [2x]
10. 

Park Inhibitor Solenoid (1) - Remove

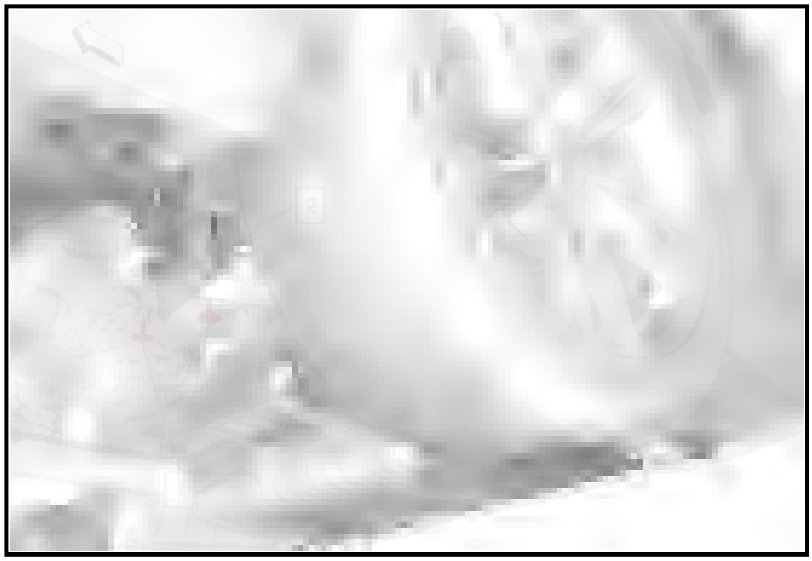
11. Disconnect the main control wiring harness connector as shown.

NOTE: **The automatic transmission fluid pump seal should stay with the control valve body assembly.**

NOTE: **Do not disassemble the control valve body assembly. The internal parts are NOT serviceable.**

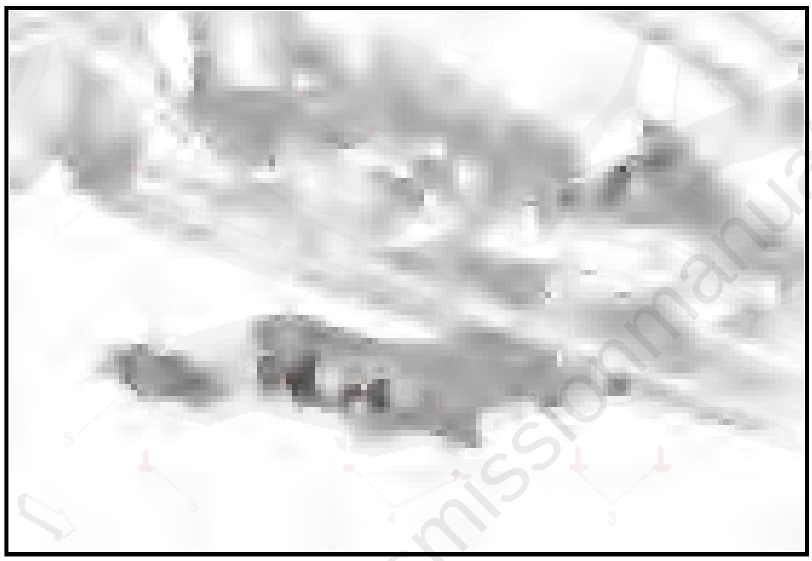
12. Control Valve Body Assembly (2) - Remove

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13. 

    Rear Tire Front Air Deflector Bolt (1) - Remove [2x]

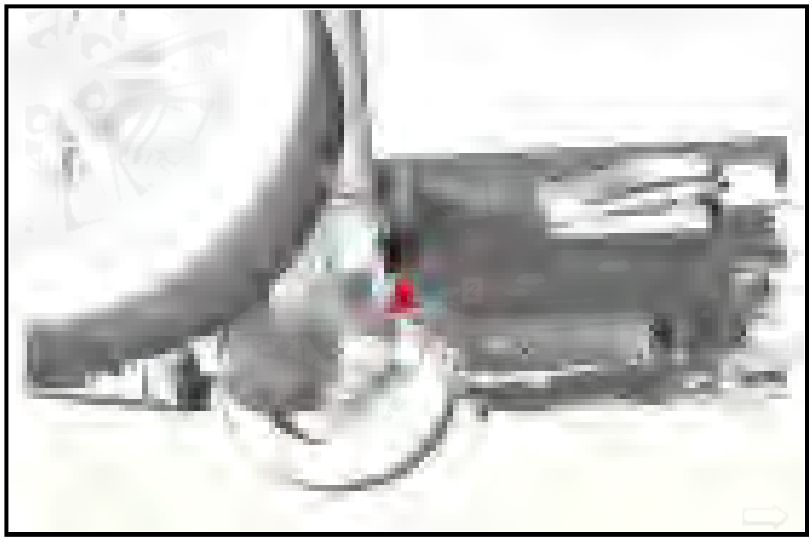
14. Rear Tire Front Air Deflector - Left Side (2) - Remove

15. 

    Rear Wheelhouse Liner Screw (1) - Remove

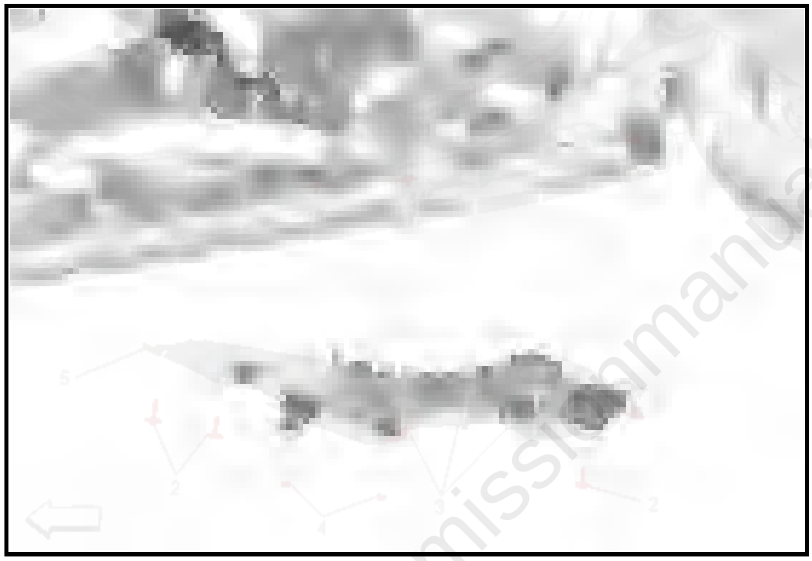
16. Underbody Rear Air Deflector Plastic Nut (2) - Remove [3x]
17. Underbody Rear Air Deflector Bolt (3) - Remove [3x]
18. Underbody Rear Air Deflector Nut (4) - Remove [2x]
19. Underbody Rear Air Deflector - Left Side (5) - Remove

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20. 

Rear Tire Front Air Deflector Bolt (2) - Remove [2x]

21. Rear Tire Front Air Deflector - Right Side (1) - Remove

22. 

Rear Wheelhouse Liner Screw (1) - Remove

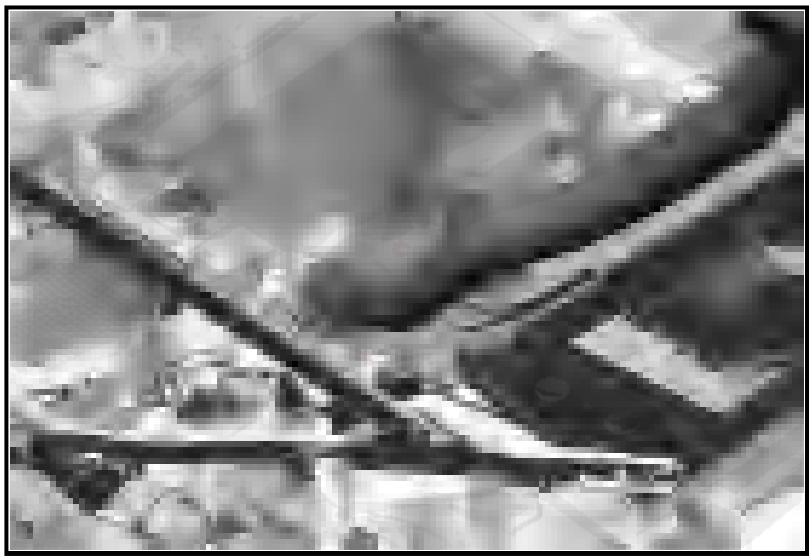
23. Underbody Rear Air Deflector Bolt (2) - Remove [3x]
24. Underbody Rear Air Deflector Plastic Nut (3) - Remove [3x]
25. Underbody Rear Air Deflector Nut (4) - Remove [2x]
26. Underbody Rear Air Deflector - Right Side (5) - Remove

27. 

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Floor Panel Number 4 Cross Bar Reinforcement Bolt (2) - Remove [6x]

28. Floor Panel Reinforcement (1) - Remove

29. 

Catalytic Converter Nut (1) - Remove [2x]

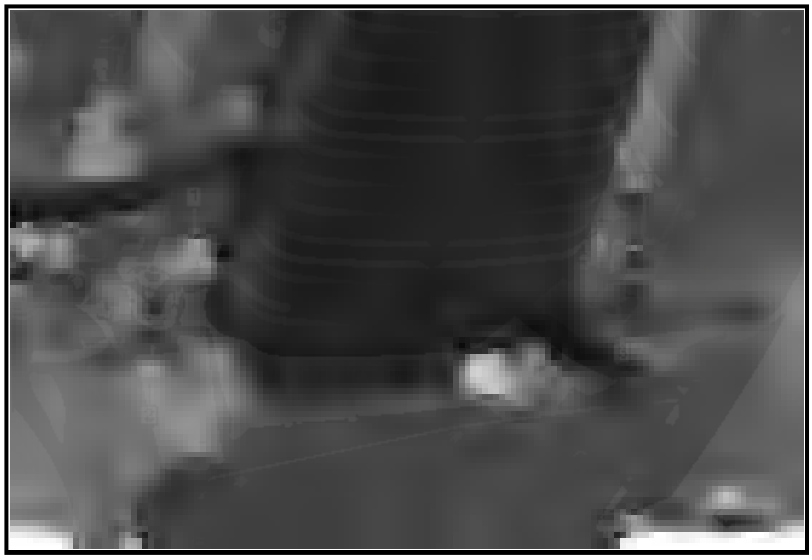
30. 

Electrical Connector (1) @ Exhaust Control Valve Actuator - Disconnect [2x]

31. 

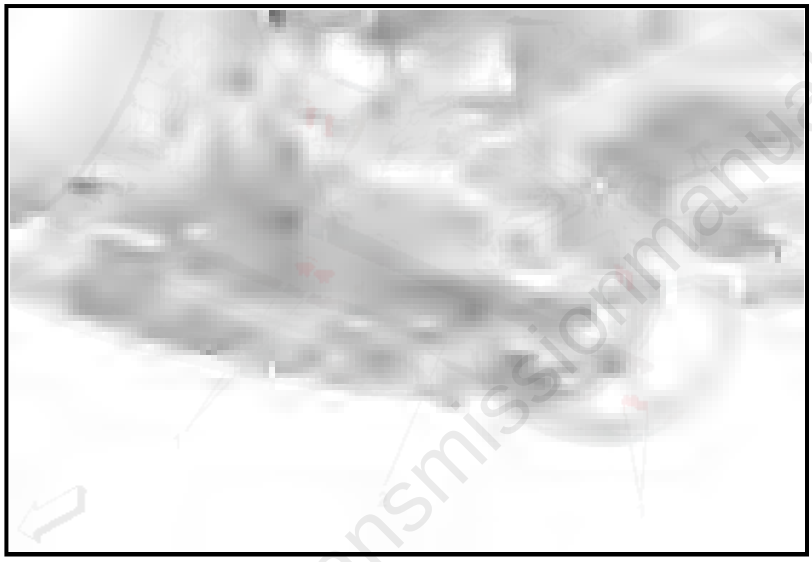
Exhaust Muffler (1) @ Exhaust Intermediate Pipe Insulator-Left Side (2) - Separate

32. Exhaust Muffler (1) @ Exhaust Rear Muffler Insulator-Left Side (3) - Separate

33. 

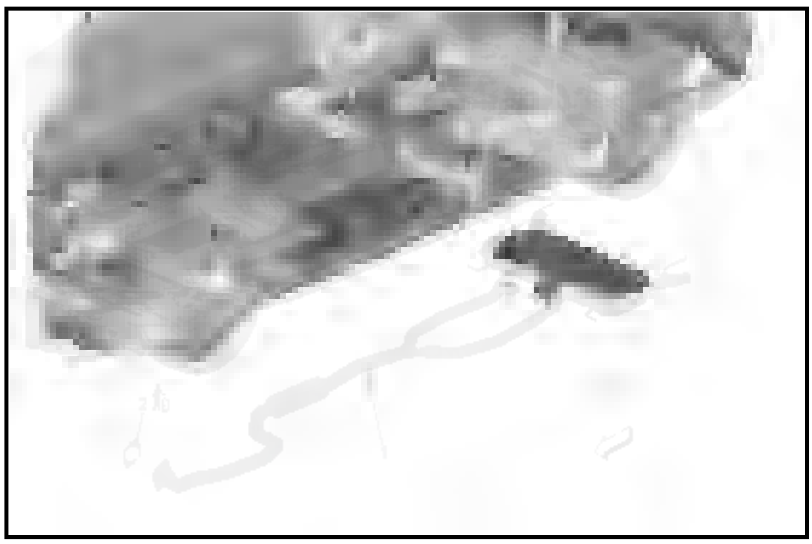
Exhaust Muffler (1) @ Exhaust Intermediate Pipe Insulator-Right Side (2) - Separate

34. Exhaust Muffler (1) @ Exhaust Rear Muffler Insulator-Right Side (3) - Separate

35. 

{If equipped} Front Crossmember Brace Nut (1) - Remove [4x]

36. {If equipped} Front Crossmember Brace (2) - Remove

37. 

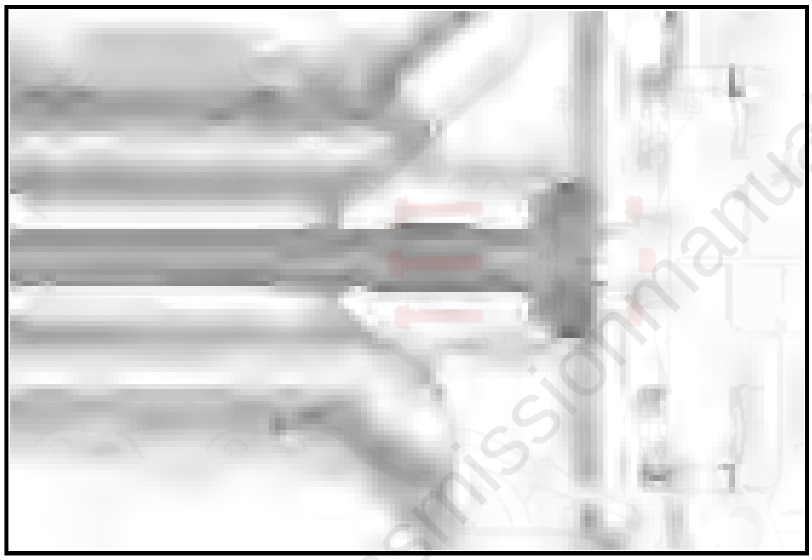
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Exhaust Muffler (1) - Remove

38. Catalytic Converter Gasket (2) - Remove and DISCARD

39. 

Propeller Shaft Hub Clamp (1) - Remove and DISCARD

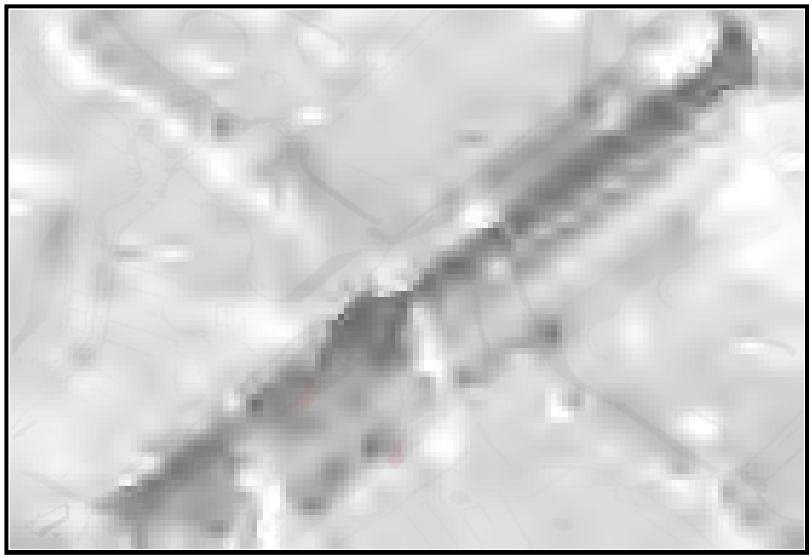
40. 

Mark (2) the relationship of the propeller shaft to the rear differential flange using a paint pen.

CAUTION: **When removing the propeller shaft, do not remove the propeller shaft coupler from the propeller shaft assembly. The only bolts that should be removed are those that mount each coupler to the transmission output flange, and to the rear drive axle input flange. Failure to properly remove the propeller shaft assembly may cause coupler damage, resulting in necessary replacement of the entire propeller shaft.**

41. Rear Propeller Shaft Nut (3) - Remove [3x]
42. Rear Propeller Shaft Bolt (1) - Remove [3x]
43. Support and secure the propeller shaft to a suitable hydraulic jack stand.

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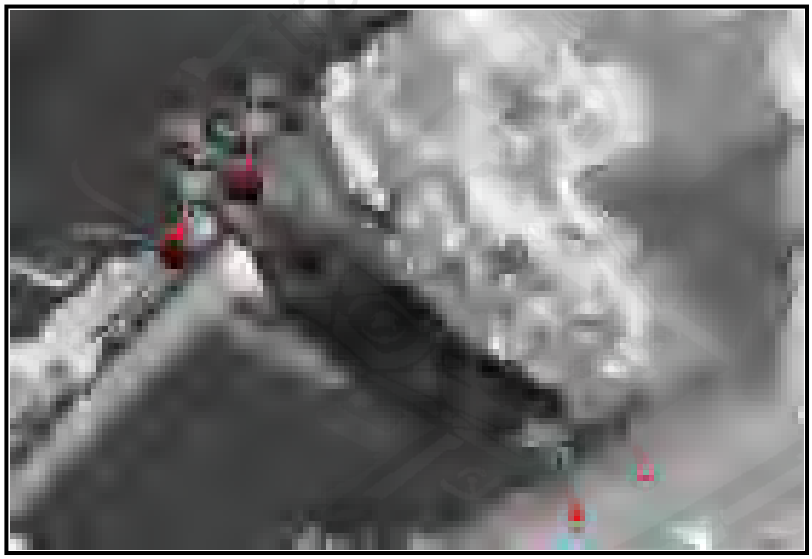
44. 

Propeller Shaft Bearing Support Bolt (1) - Remove [2x]

45. 

Propeller Shaft (1) - Remove

46. Support the rear of the transmission using a suitable jack.

47. 

Remove the 4 transmission mount bracket bolts (1) then lower the transmission enough to remove the manual shaft.

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48. 

    Manual Shift Shaft Pin (1) - Remove and DISCARD

49. Manual Shift Shaft (2) - Remove
50. Park Release Lever (3) - Remove
51. Park Pawl Actuator Assembly (4) - Remove

Installation Procedure

1. 

    Park Pawl Actuator Assembly (1) - Install

2. Park Release Lever (2) - Install
3. Manual Shift Shaft (3) - Install

    NOTE: **Install the NEW pin so equal amounts stick out from either side of the manual shaft.**

4. Manual Shift Shaft Pin (4) - Install NEW

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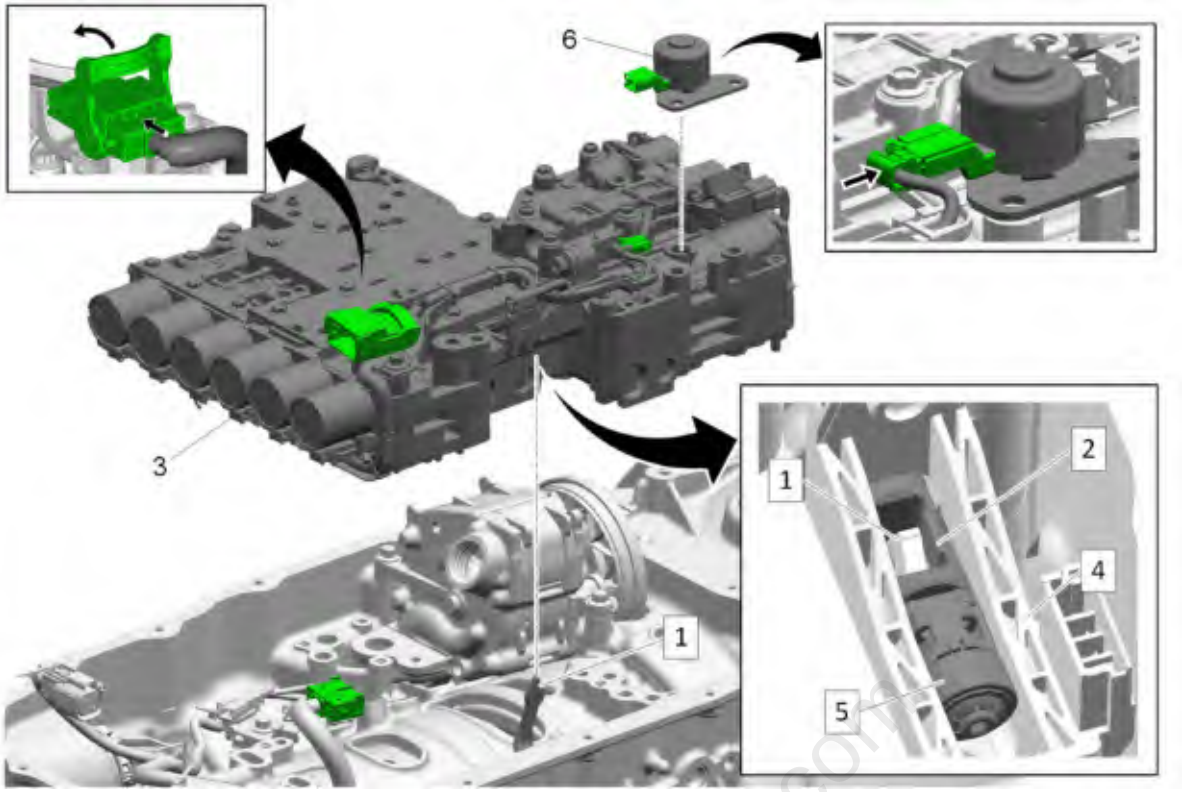
5. 

Fig. 1: Identifying Control Valve Assembly Installation Components
Courtesy of GENERAL MOTORS COMPANY

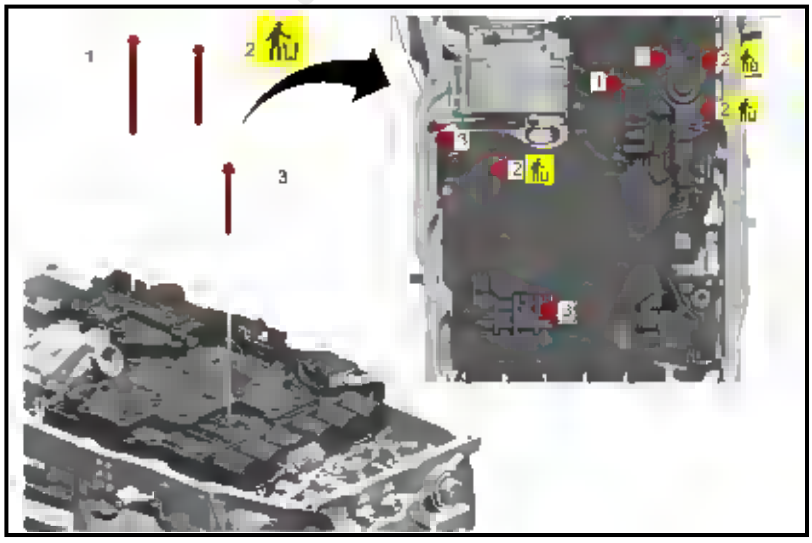
NOTE: **Ensure the automatic transmission fluid pump seal is in the control valve body.**

Control Valve Body Assembly (1) - Install

6. Install the control valve body assembly into the case. The locating pins on the bottom of the control valve body assembly will hold the control valve body assembly in place while installing bolts.

NOTE: **Ensure the wiring harness is not pinched anywhere after valve body installation.**

7. Connect the main control wiring harness connector as shown.
8. Park Inhibitor Solenoid (2) - Install

9. 

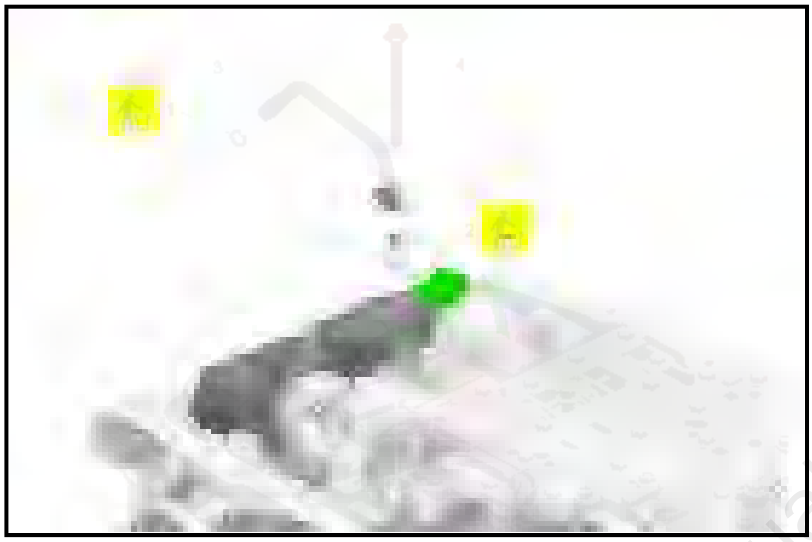
Clean the bolt holes and ensure they are free from any old sealant. Allow to dry before installing NEW bolts.

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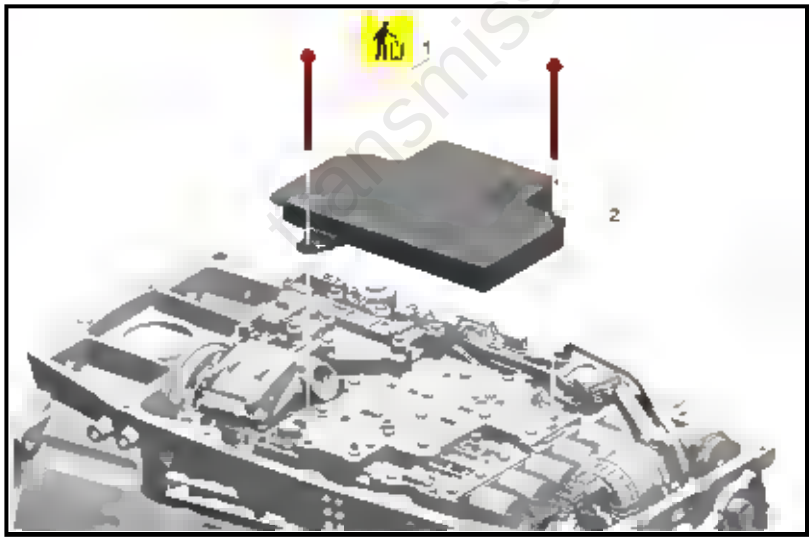
CAUTION: **Refer to Fastener Caution**

10. Control Valve Solenoid Body Bolt (1) - Install and tighten in sequence [2x] - **Fastener Specifications**

NOTE: **The bolts are marked by arrows in the valve body casting.**

11. Control Valve Solenoid Body Bolt (2) Install NEW and tighten in sequence [3x] - **Fastener Specifications**
12. Control Valve Solenoid Body Bolt (3) Install and tighten in sequence [2x] - **Fastener Specifications**
13. 

    Automatic Transmission Auxiliary Fluid Pump Seal (1) - Install NEW

14. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal (2) - Install NEW
15. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe (3) - Install
16. Control Valve Upper Body Bolt (4) - Install and tighten - **Fastener Specifications**
17. 

    Automatic Transmission Fluid Filter (2) - Install - **Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement**

18. Remove the drain pan.

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19. 

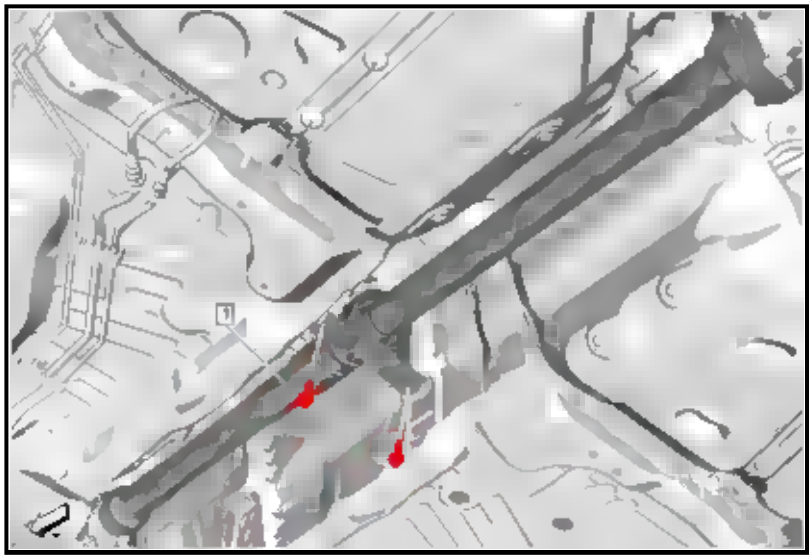
    Raise the rear of the transmission then hand start the 4 transmission mount bracket bolts (1).

20. Transmission Mount Bracket Bolt (1) - Tighten - **Fastener Specifications**
21. Remove the transmission jack.
22. 

    Apply a thin layer of grease to the transmission output shaft splines (1). **Adhesives, Fluids, Lubricants, and Sealers**

23. Loosely install a NEW propeller shaft hub clamp (3) to the propeller shaft joint boot.
24. Support and secure the propeller shaft (2) to a suitable hydraulic jack stand.
25. Propeller Shaft (2) - Install

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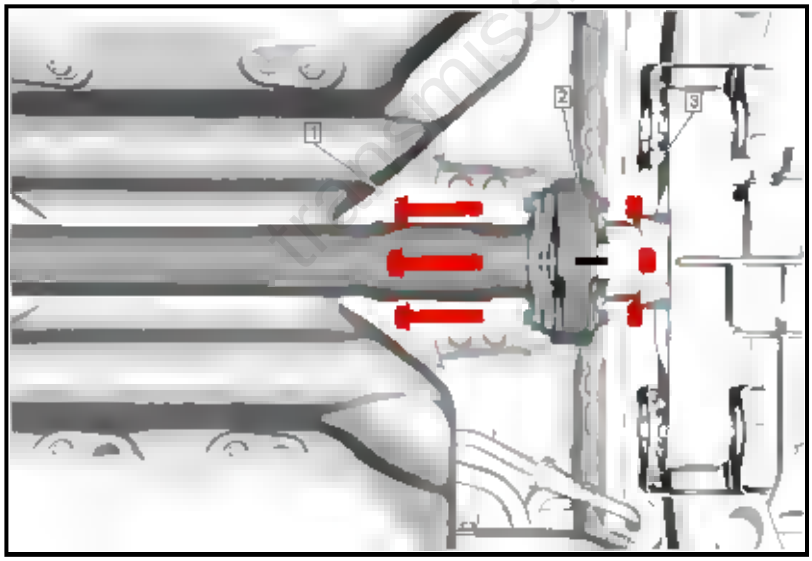
26. 

Prepare the 2 propeller shaft bearing support bolts (1) for installation as follows:

1. Remove any loose cured adhesive from the external threads of the components using a lint free cloth.
2. Thread the cleaned components into the internal mating threads and remove to loosen trapped cured adhesive.
3. Apply thread locking adhesive to the external threads of the components. **Adhesives, Fluids, Lubricants, and Sealers**
4. Ensure there are no gaps in the thread locking adhesive once applied to the component.

CAUTION: **Refer to Fastener Caution .**

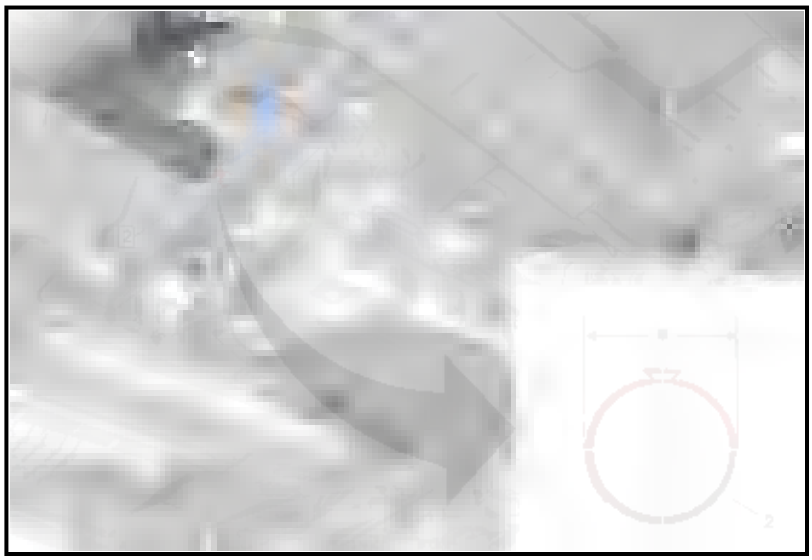
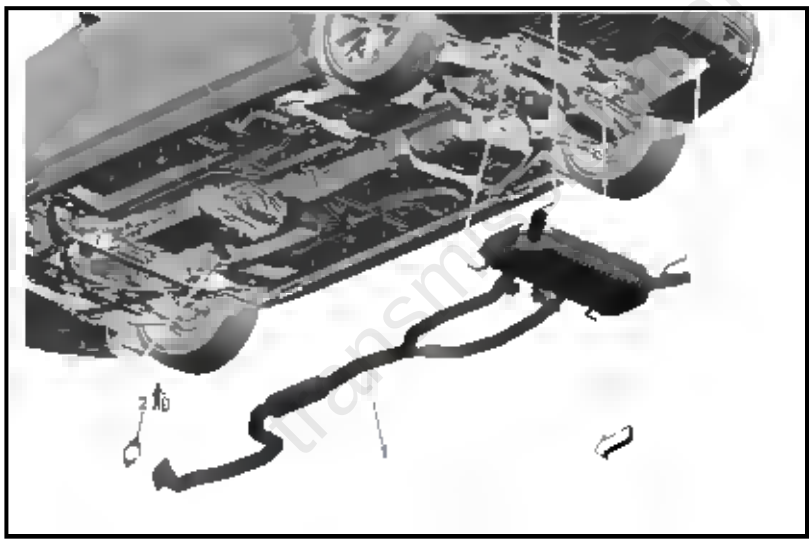
27. Propeller Shaft Bearing Support Bolt (1) - Install and tighten [2x] - **Fastener Specifications**
28. Remove the hydraulic jack stand supporting the propeller shaft.

29. 

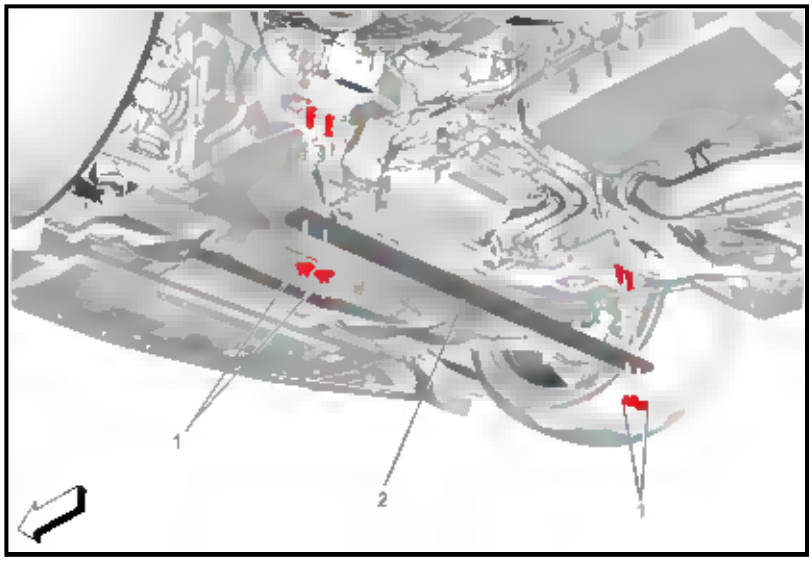
Prepare the 3 rear propeller shaft bolts (1) and nuts (3) for installation as follows:

1. Remove any loose cured adhesive from the external threads of the components using a lint free cloth.
2. Thread the cleaned components into the internal mating threads and remove to loosen trapped cured adhesive.
3. Apply thread locking adhesive to the external threads of the components. **Adhesives, Fluids, Lubricants, and Sealers**
4. Ensure there are no gaps in the thread locking adhesive once applied to the component.

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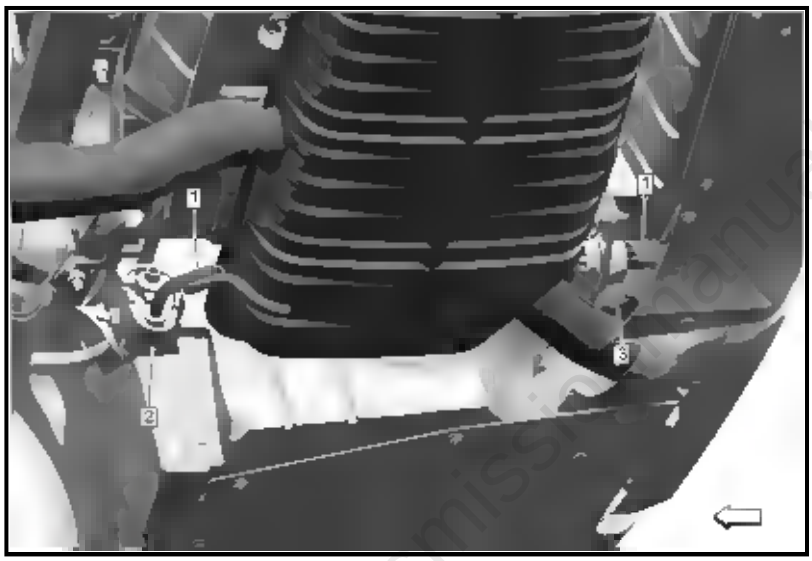
30. Align the relationship marks (2) made on the propeller shaft and the rear differential flange.
31. Rear Propeller Shaft Bolt (1) - Install [3x]
32. Rear Propeller Shaft Nut (3) - Loosely install [3x]
33. Rear Propeller Shaft Bolt (1) - Tighten [3x] - **Fastener Specifications**
34. 
35. Ensure that the drive shaft boot is completely seated in the output shaft groove prior to crimping the propeller shaft hub clamp (2).
36. Using the **DT-35910** Drive Axle Seal Clamp Pliers (1), crimp the propeller shaft hub clamp (2) until the final crimped outer diameter (a) is 39 - 41 mm (1.54 - 1.61 in).
37. 

    Catalytic Converter Gasket (2) - Install NEW
38. Exhaust Muffler (1) - Install

39. 

{If equipped} Front Crossmember Brace (2) - Install

40. {If equipped} Front Crossmember Brace Nut (1) - Install and tighten [4x] - **Fastener Specifications**

41. 

Exhaust Muffler (1) @ Exhaust Rear Muffler Insulator-Right Side (3) - Install

42. Exhaust Muffler (1) @ Exhaust Intermediate Pipe Insulator-Right Side (2) - Install

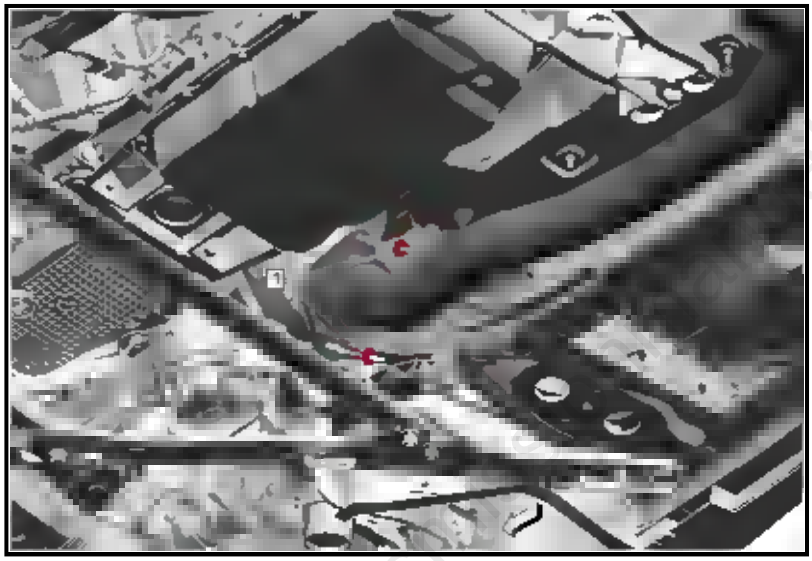
43. 

Exhaust Muffler (1) @ Exhaust Rear Muffler Insulator-Left Side (3) - Install

44. Exhaust Muffler (1) @ Exhaust Intermediate Pipe Insulator-Left Side (2) - Install

45. 

Electrical Connector (1) @ Exhaust Control Valve Actuator - Connect [2x]

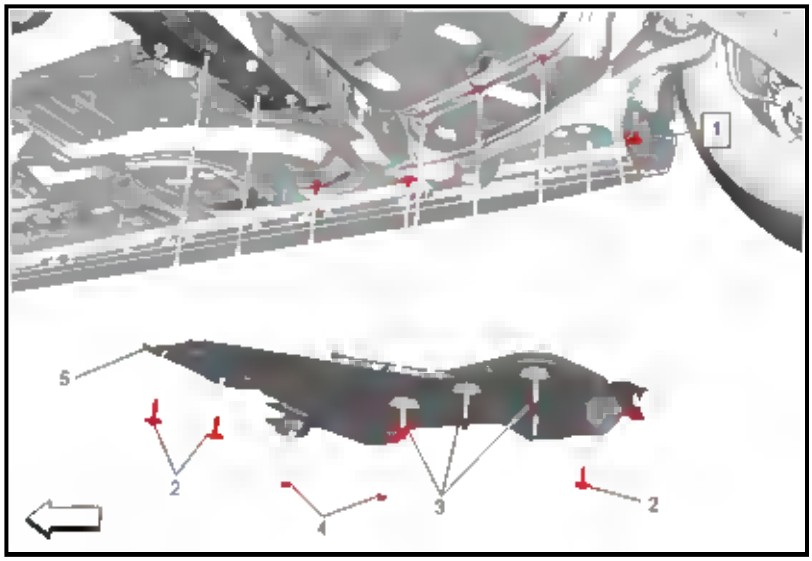
46. 

Catalytic Converter Nut (1) - Install [2x] - **Fastener Specifications**

47. 

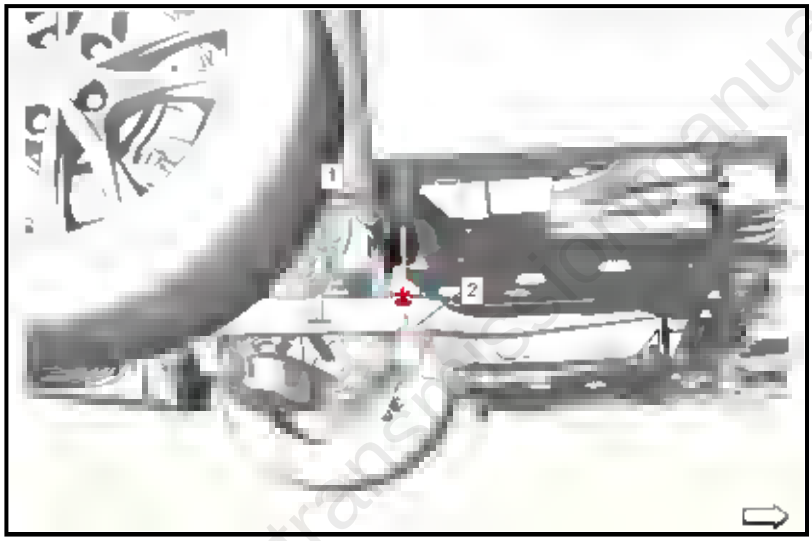
Floor Panel Reinforcement (2) - Install

48. Floor Panel Number 4 Cross Bar Reinforcement Bolt (1) - Install and tighten [6x] - **Fastener Specifications**

49. 

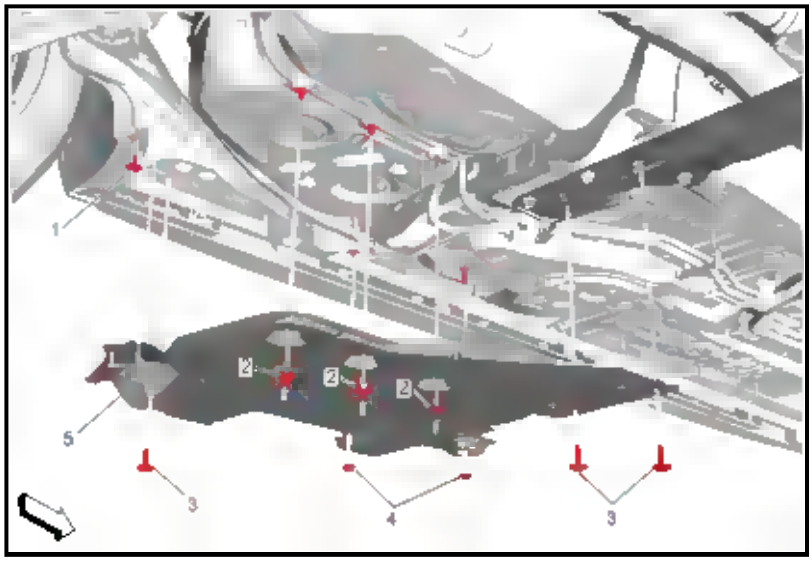
Underbody Rear Air Deflector - Right Side (5) - Install

50. Underbody Rear Air Deflector Plastic Nut (3) - Install and tighten [3x] - **Fastener Specifications**
51. Underbody Rear Air Deflector Bolt (2) - Install and tighten [3x] - **Fastener Specifications**
52. Underbody Rear Air Deflector Nut (4) - Install and tighten [2x] - **Fastener Specifications**
53. Rear Wheelhouse Liner Screw (1) - Install and tighten - **Fastener Specifications**

54. 

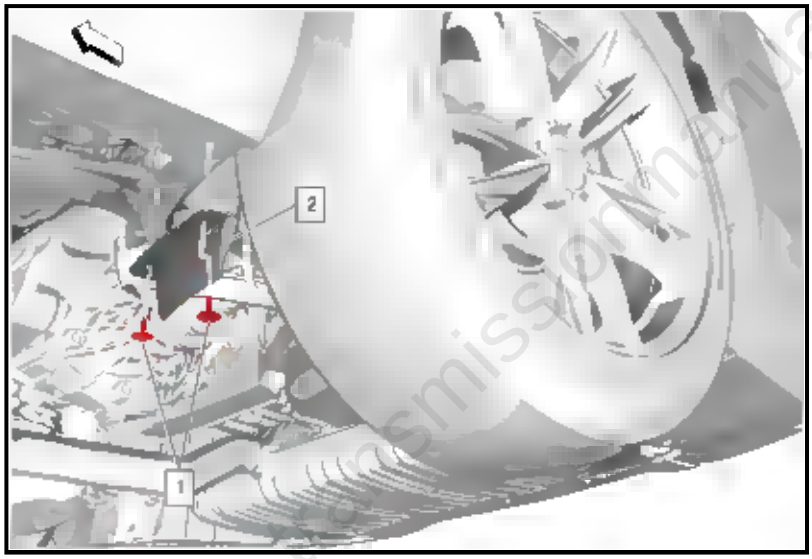
Rear Tire Front Air Deflector - Right Side (1) - Install

55. Rear Tire Front Air Deflector Bolt (2) - Install and tighten [2x] - **Fastener Specifications**

56. 

Underbody Rear Air Deflector - Left Side (5) - Install

57. Underbody Rear Air Deflector Plastic Nut (2) - Install and tighten [3x] - **Fastener Specifications**
58. Underbody Rear Air Deflector Bolt (3) - Install and tighten [3x] - **Fastener Specifications**
59. Underbody Rear Air Deflector Nut (4) - Install and tighten [2x] - **Fastener Specifications**
60. Rear Wheelhouse Liner Screw (1) - Install and tighten - **Fastener Specifications**

61. 

Rear Tire Front Air Deflector - Left Side (2) - Install

62. Rear Tire Front Air Deflector Bolt (1) - Install and tighten [2x] - **Fastener Specifications**
63. Inspect the exhaust system for leaks.
64. Remove the support and lower the vehicle.
65. Fill the transmission to the proper level with NEW transmission fluid. **Transmission Fluid Level and Condition Check**
66. Perform the solenoid valve characterization reprogramming procedure. **Q77 Transmission Control Solenoid Valve Characterization Programming (10L60)**

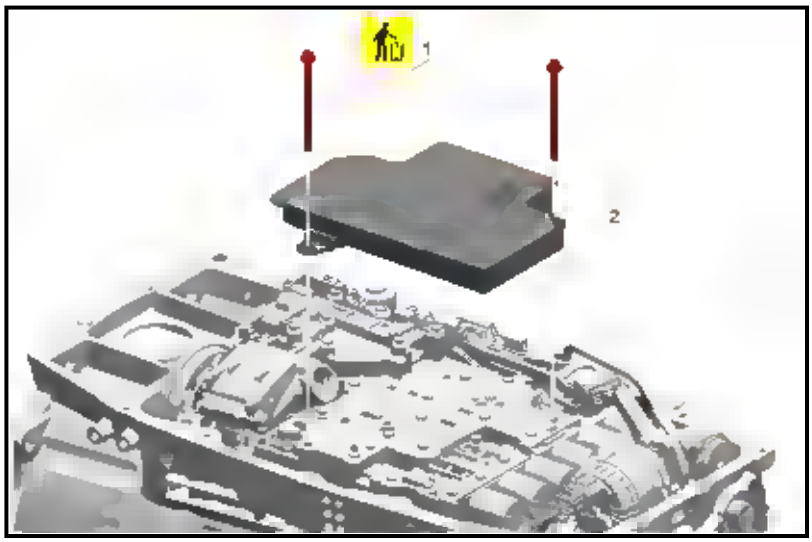
MANUAL SHIFT SHAFT REPLACEMENT (REAR WHEEL DRIVE)

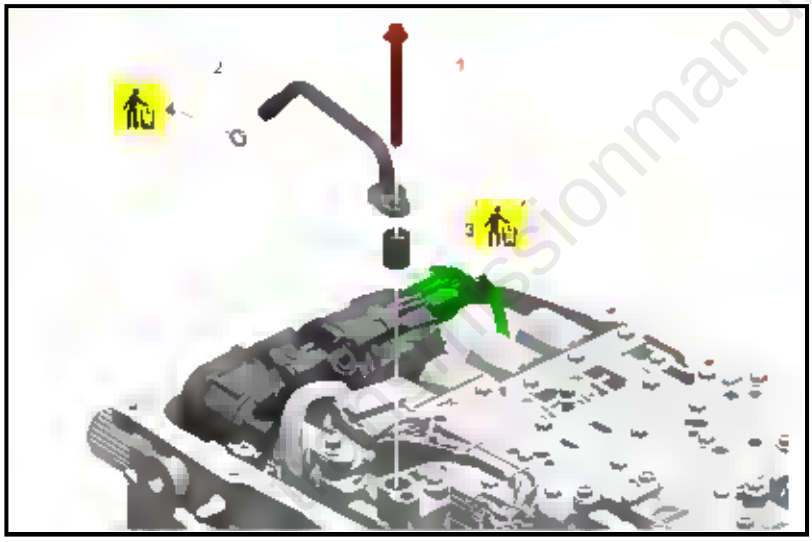
Single Use Fasteners and Components

- Automatic Transmission Fluid Filter Bolt [2x]
- Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal
- Automatic Transmission Auxiliary Fluid Pump Seal

- Control Valve Solenoid Body Bolt [3x]
- Manual Shift Shaft Pin

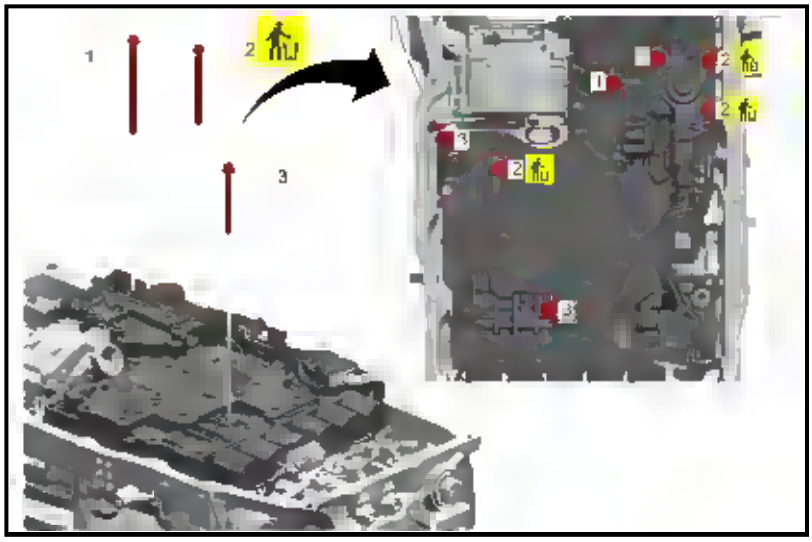
Removal Procedure

1. Raise and support the vehicle. **Lifting and Jacking the Vehicle**
2. 

   Automatic Transmission Fluid Filter (2) - Remove - **Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement**
3. 

   Control Valve Upper Body Bolt (1) - Remove
4. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe (2) - Remove
5. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal (3) - Remove and DISCARD
6. Automatic Transmission Auxiliary Fluid Pump Seal (4) - Remove and DISCARD

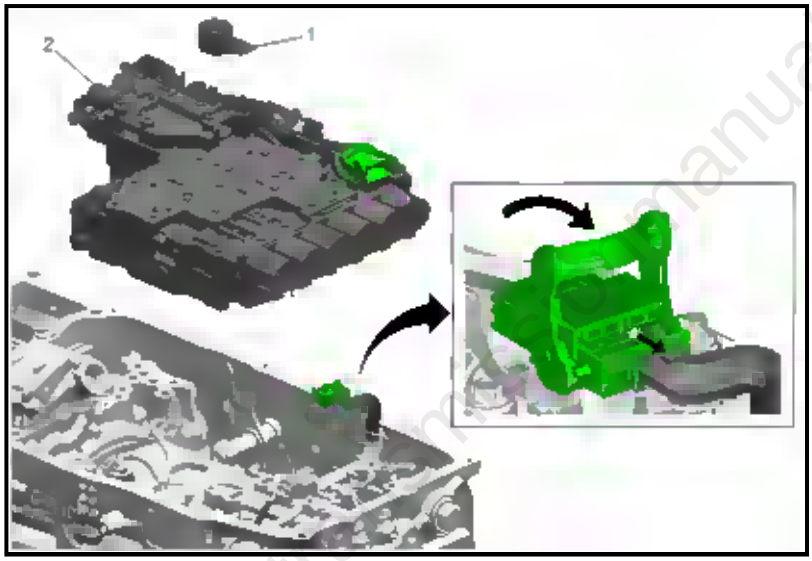
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7. 

NOTE: **The bolts are marked by arrows in the valve body casting.**

Control Valve Solenoid Body Bolt (1) - Remove [2x]

8. Control Valve Solenoid Body Bolt (2) - Remove and DISCARD [3x]
9. Control Valve Solenoid Body Bolt (3) - Remove [2x]

10. 

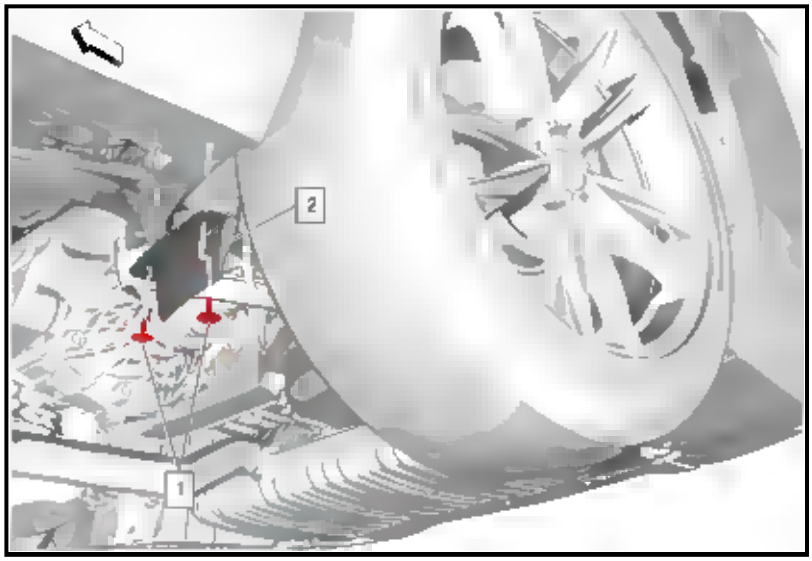
Park Inhibitor Solenoid (1) - Remove

11. Disconnect the main control wiring harness connector as shown.

NOTE: **The automatic transmission fluid pump seal should stay with the control valve body assembly.**

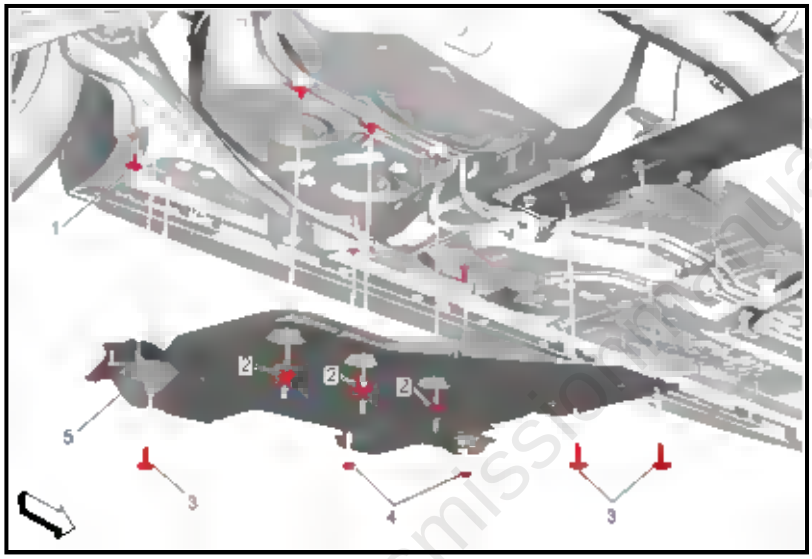
NOTE: **Do not disassemble the control valve body assembly. The internal parts are NOT serviceable.**

12. Control Valve Body Assembly (2) - Remove

13. 

Rear Tire Front Air Deflector Bolt (1) - Remove [2x]

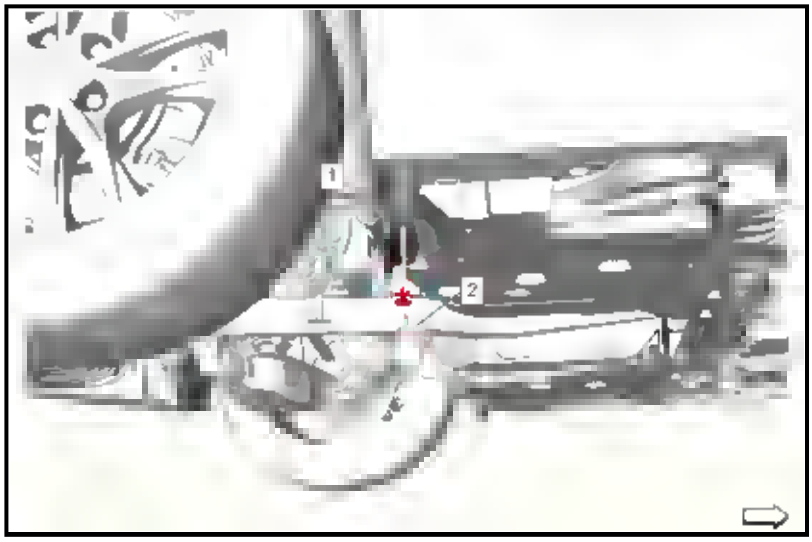
14. Rear Tire Front Air Deflector - Left Side (2) - Remove

15. 

Rear Wheelhouse Liner Screw (1) - Remove

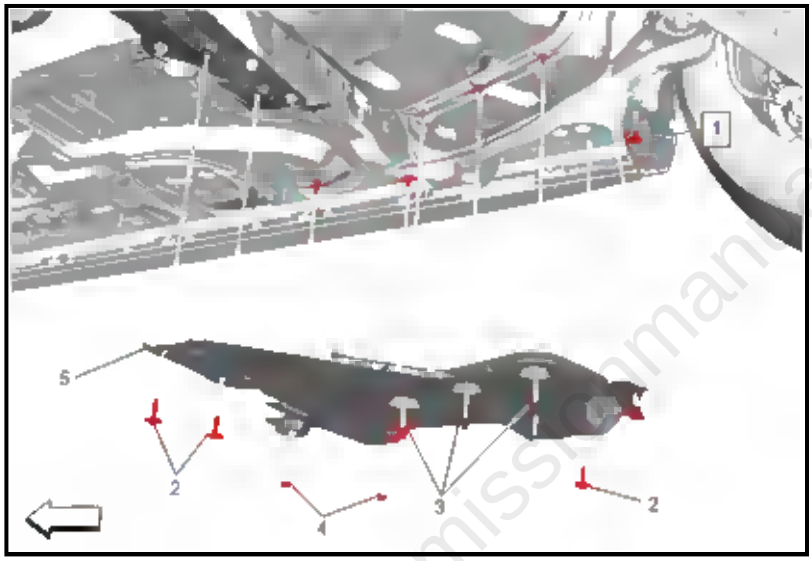
16. Underbody Rear Air Deflector Plastic Nut (2) - Remove [3x]
17. Underbody Rear Air Deflector Bolt (3) - Remove [3x]
18. Underbody Rear Air Deflector Nut (4) - Remove [2x]
19. Underbody Rear Air Deflector - Left Side (5) - Remove

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20. 

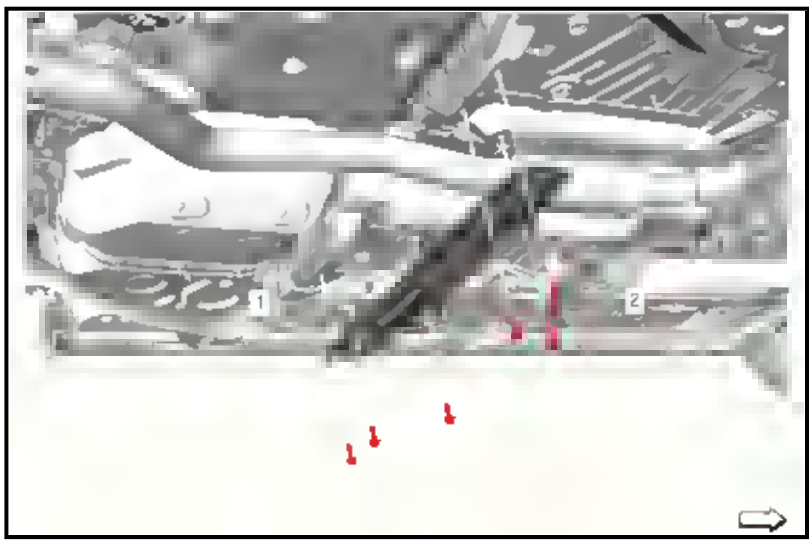
Rear Tire Front Air Deflector Bolt (2) - Remove [2x]

21. Rear Tire Front Air Deflector - Right Side (1) - Remove

22. 

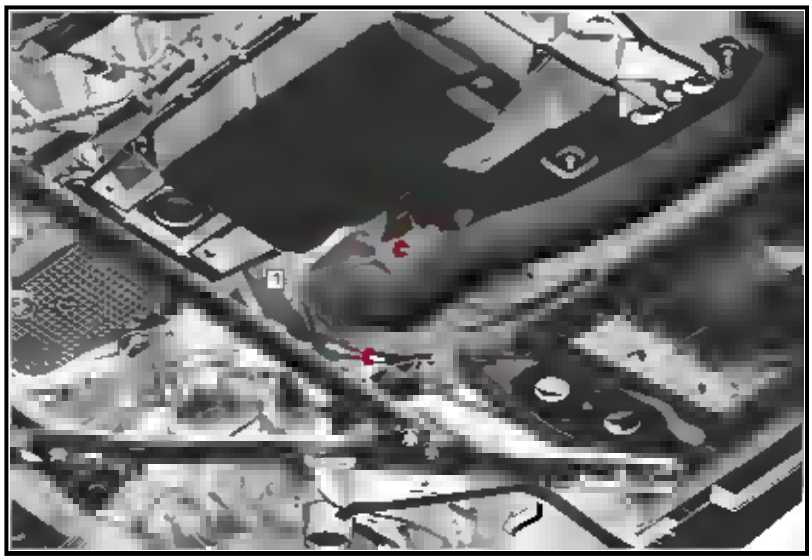
Rear Wheelhouse Liner Screw (1) - Remove

23. Underbody Rear Air Deflector Bolt (2) - Remove [3x]
24. Underbody Rear Air Deflector Plastic Nut (3) - Remove [3x]
25. Underbody Rear Air Deflector Nut (4) - Remove [2x]
26. Underbody Rear Air Deflector - Right Side (5) - Remove

27. 

Floor Panel Number 4 Cross Bar Reinforcement Bolt (2) - Remove [6x]

28. Floor Panel Reinforcement (1) - Remove

29. 

Catalytic Converter Nut (1) - Remove [2x]

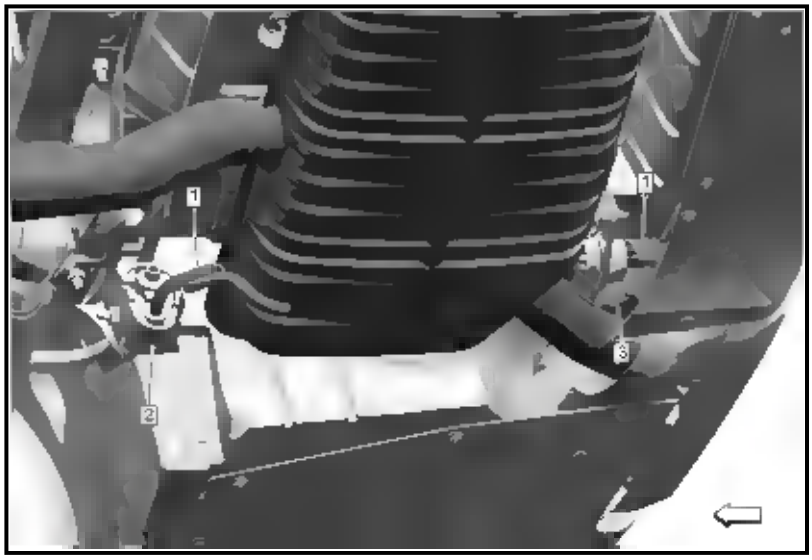
30. 

Electrical Connector (1) @ Exhaust Control Valve Actuator - Disconnect [2x]

31. 

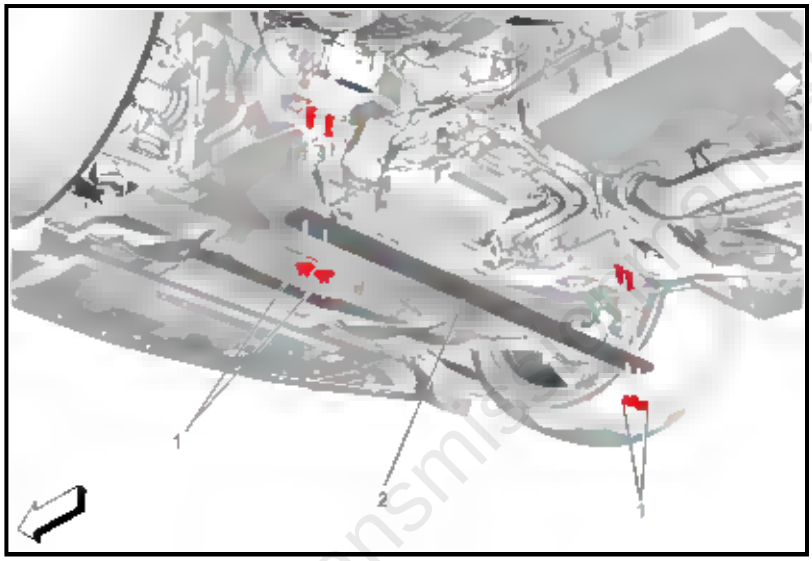
Exhaust Muffler (1) @ Exhaust Intermediate Pipe Insulator-Left Side (2) - Separate

32. Exhaust Muffler (1) @ Exhaust Rear Muffler Insulator-Left Side (3) - Separate

33. 

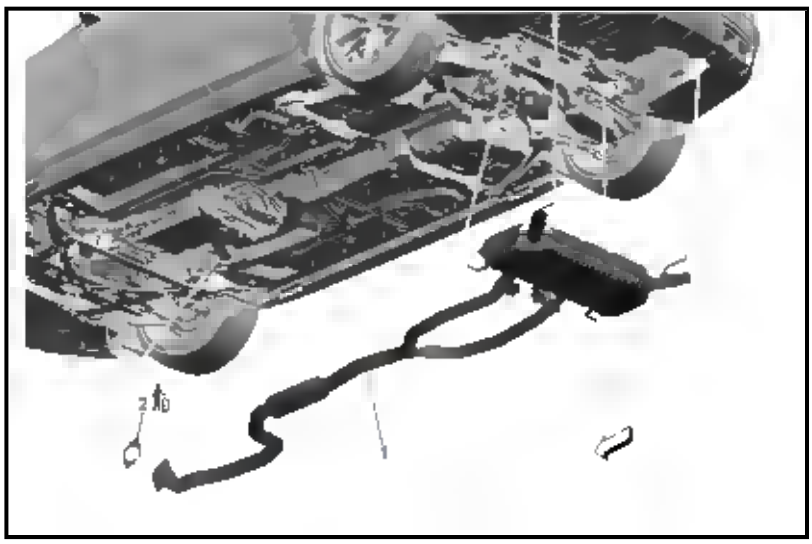
Exhaust Muffler (1) @ Exhaust Intermediate Pipe Insulator-Right Side (2) - Separate

34. Exhaust Muffler (1) @ Exhaust Rear Muffler Insulator-Right Side (3) - Separate

35. 

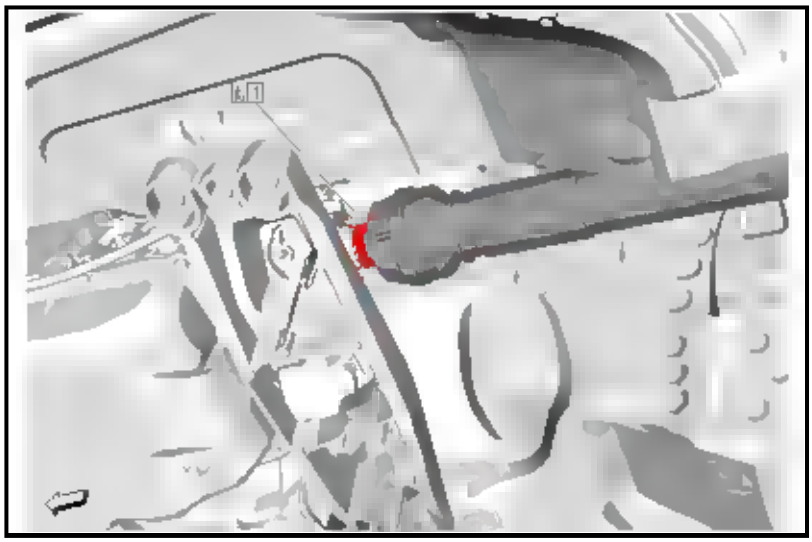
{If equipped} Front Crossmember Brace Nut (1) - Remove [4x]

36. {If equipped} Front Crossmember Brace (2) - Remove

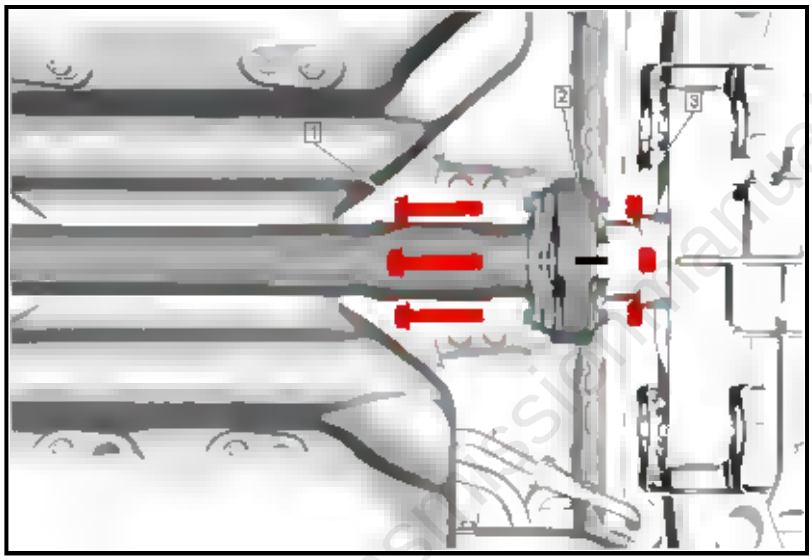
37. 

Exhaust Muffler (1) - Remove

38. Catalytic Converter Gasket (2) - Remove and DISCARD

39. 

Propeller Shaft Hub Clamp (1) - Remove and DISCARD

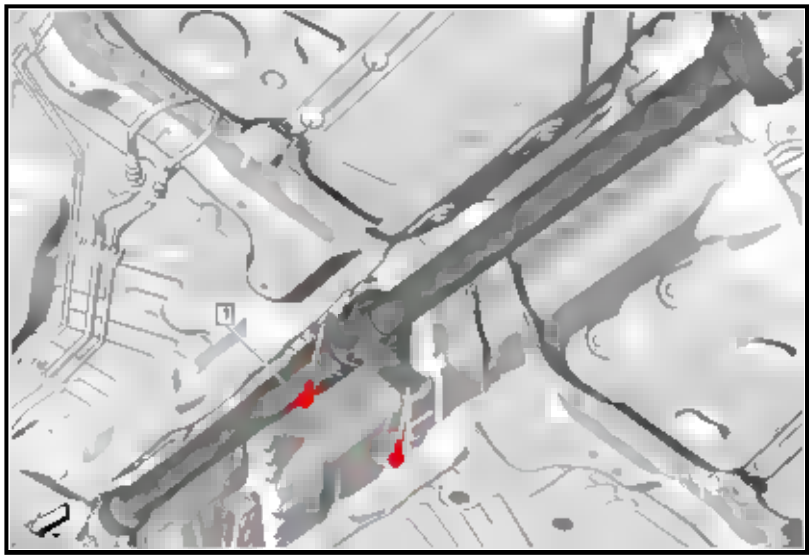
40. 

Mark (2) the relationship of the propeller shaft to the rear differential flange using a paint pen.

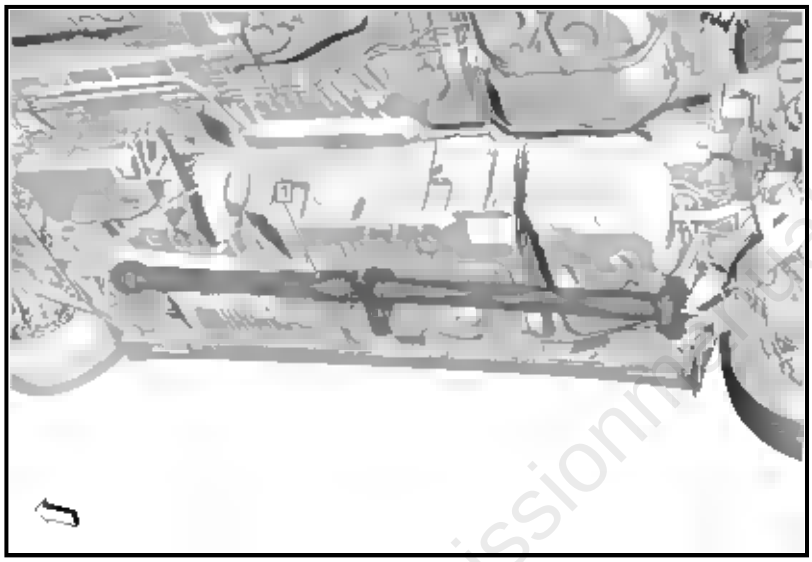
CAUTION: **When removing the propeller shaft, do not remove the propeller shaft coupler from the propeller shaft assembly. The only bolts that should be removed are those that mount each coupler to the transmission output flange, and to the rear drive axle input flange. Failure to properly remove the propeller shaft assembly may cause coupler damage, resulting in necessary replacement of the entire propeller shaft.**

41. Rear Propeller Shaft Nut (3) - Remove [3x]
42. Rear Propeller Shaft Bolt (1) - Remove [3x]
43. Support and secure the propeller shaft to a suitable hydraulic jack stand.

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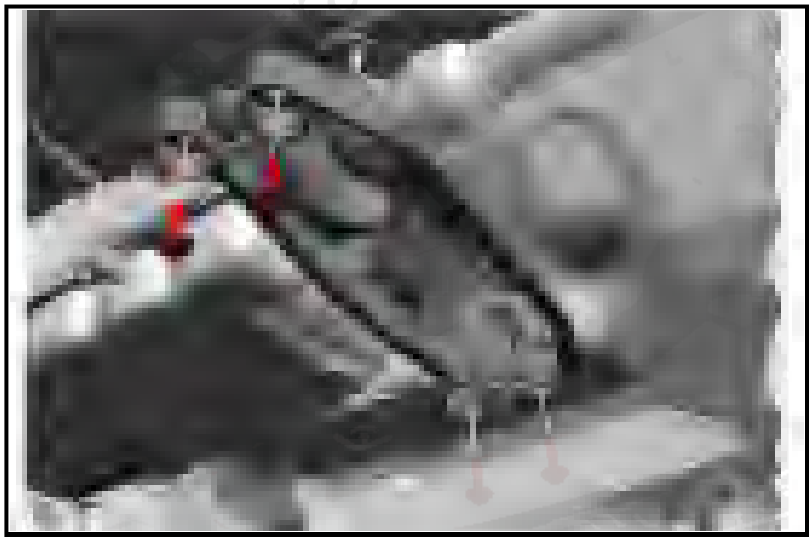
44. 

Propeller Shaft Bearing Support Bolt (1) - Remove [2x]

45. 

Propeller Shaft (1) - Remove

46. Using a suitable jack stand, support the rear of the transmission.

47. 

Transmission Mount Bracket Bolt (1) - Remove [4x]

48. 

Manual Shift Shaft Pin (1) - Remove and DISCARD

49. Manual Shift Shaft (2) - Remove
50. Park Release Lever (3) - Remove
51. Park Pawl Actuator Assembly (4) - Remove

Installation Procedure

1. 

Park Pawl Actuator Assembly (1) - Install

2. Park Release Lever (2) - Install
3. Manual Shift Shaft (3) - Install

NOTE: **Install the NEW pin so equal amounts stick out from either side of the manual shaft.**

4. Manual Shift Shaft Pin (4) - Install NEW

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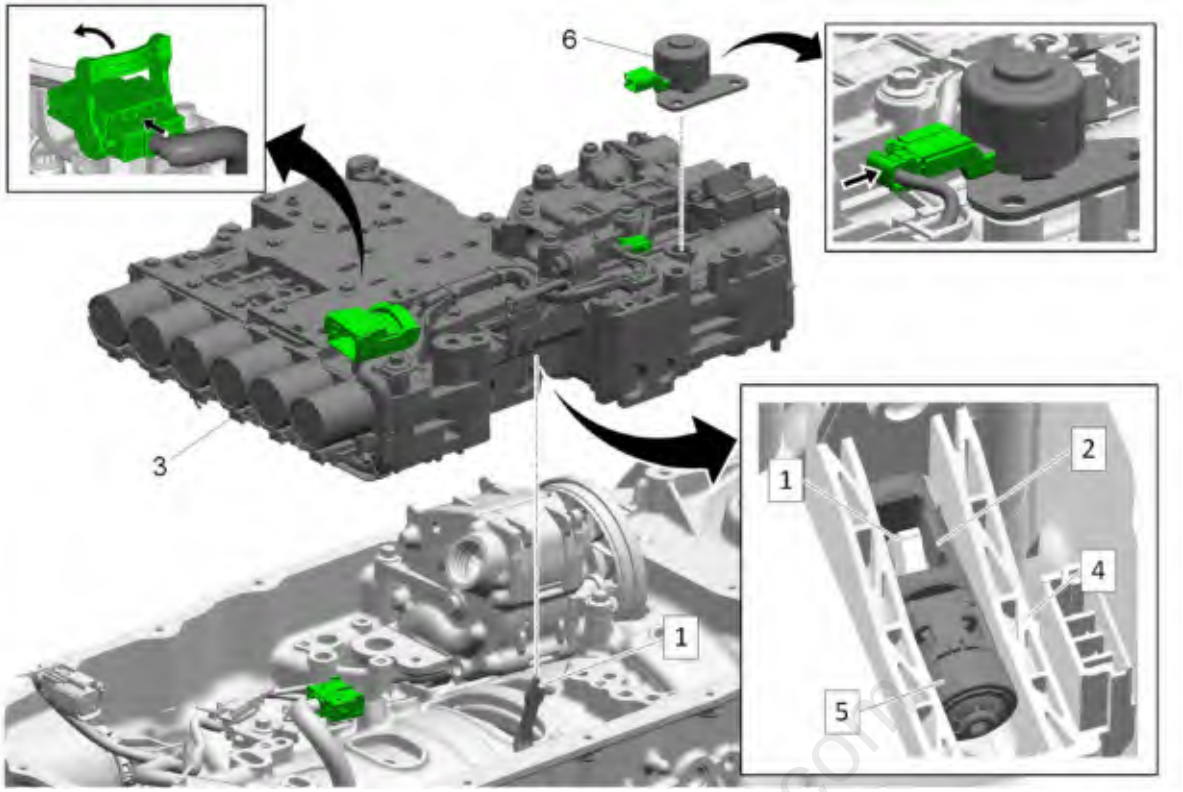
5. 

Fig. 2: Identifying Control Valve Assembly Installation Components
Courtesy of GENERAL MOTORS COMPANY

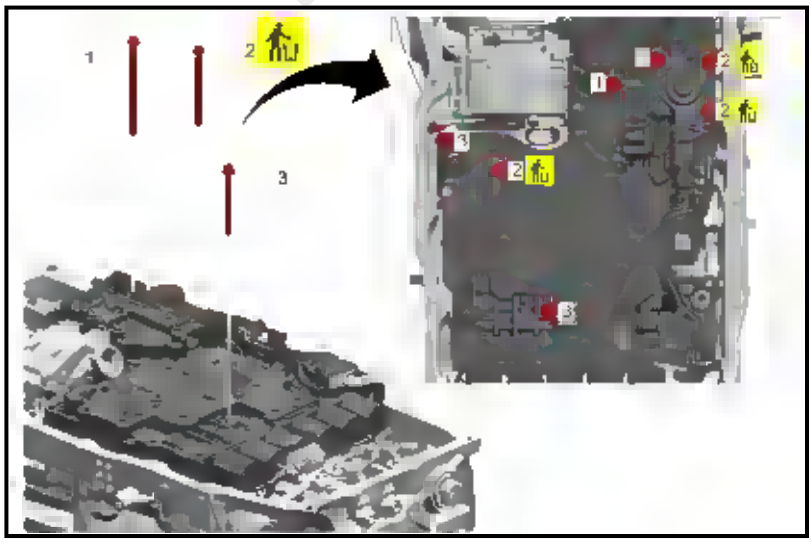
NOTE: **Ensure the automatic transmission fluid pump seal is in the control valve body.**

Control Valve Body Assembly (1) - Install

6. Install the control valve body assembly into the case. The locating pins on the bottom of the control valve body assembly will hold the control valve body assembly in place while installing bolts.

NOTE: **Ensure the wiring harness is not pinched anywhere after valve body installation.**

7. Connect the main control wiring harness connector as shown.
8. Park Inhibitor Solenoid (2) - Install

9. 

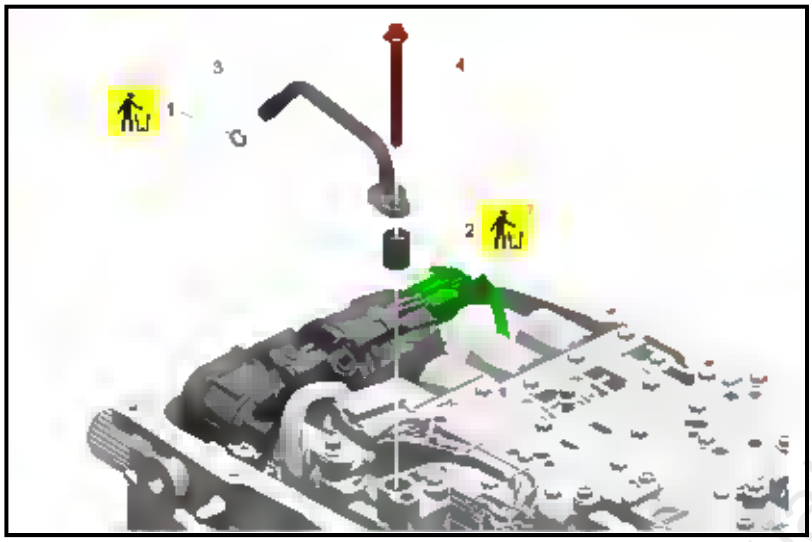
Clean the bolt holes and ensure they are free from any old sealant. Allow to dry before installing NEW bolts.

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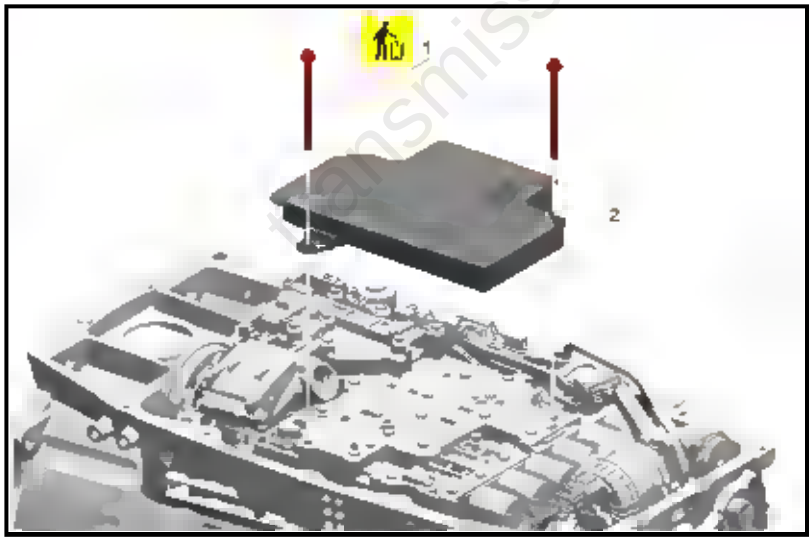
CAUTION: **Refer to Fastener Caution**

10. Control Valve Solenoid Body Bolt (1) - Install and tighten in sequence [2x] - **Fastener Specifications**

NOTE: **The bolts are marked by arrows in the valve body casting.**

11. Control Valve Solenoid Body Bolt (2) Install NEW and tighten in sequence [3x] - **Fastener Specifications**
12. Control Valve Solenoid Body Bolt (3) Install and tighten in sequence [2x] - **Fastener Specifications**
13. 

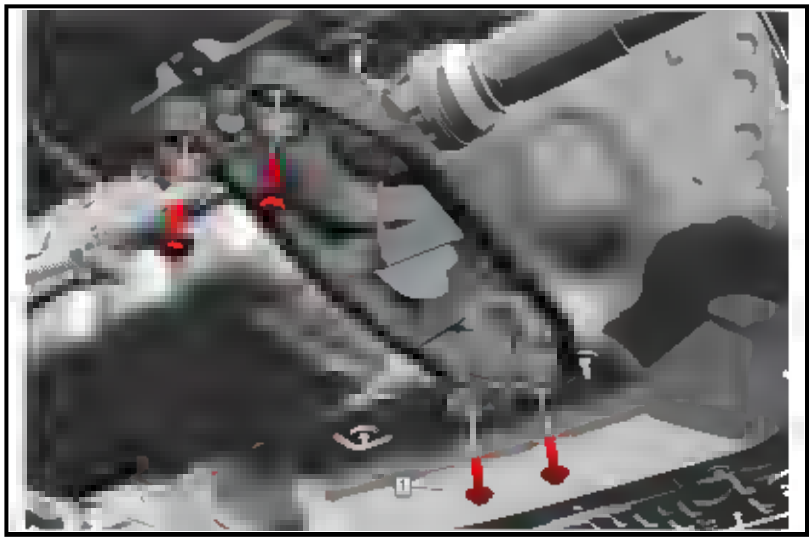
    Automatic Transmission Auxiliary Fluid Pump Seal (1) - Install NEW

14. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal (2) - Install NEW
15. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe (3) - Install
16. Control Valve Upper Body Bolt (4) - Install and tighten - **Fastener Specifications**
17. 

    Automatic Transmission Fluid Filter (2) - Install - **Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement**

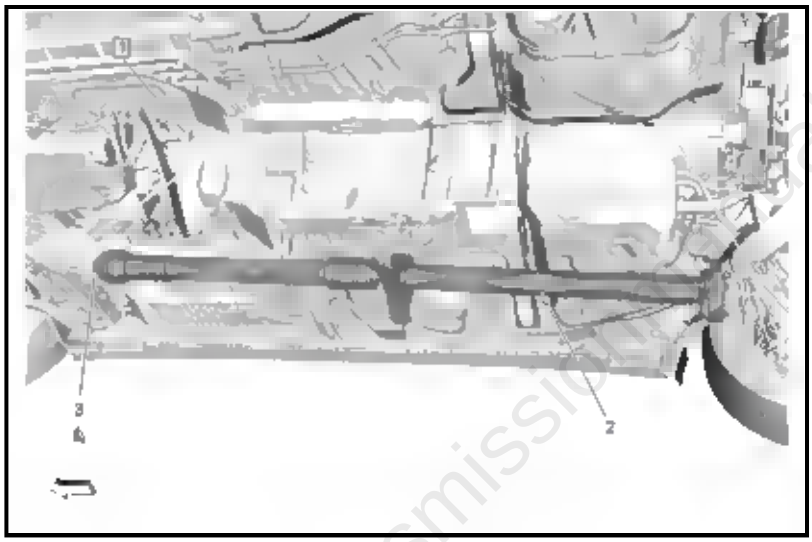
18. Remove the drain pan.

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19. 

    Raise the rear of the transmission then hand start the 4 transmission mount bracket bolts (1).

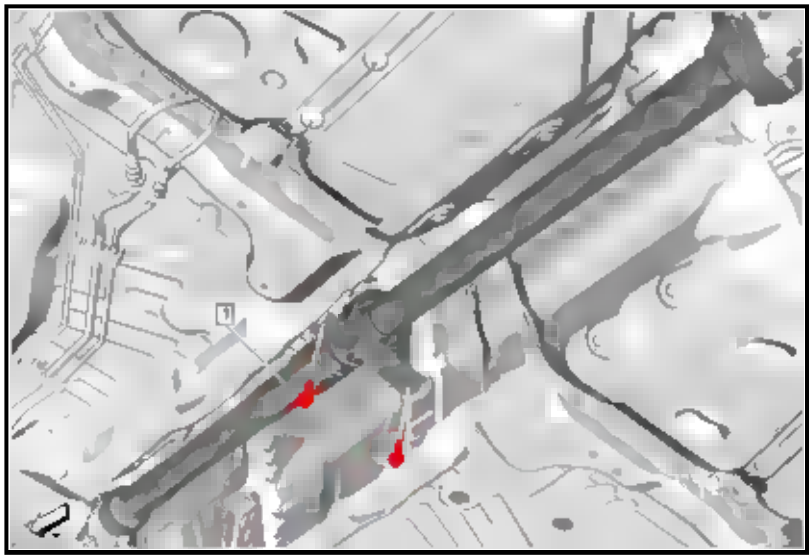
20. Transmission Mount Bracket Bolt (1) - Tighten [4x] - **Fastener Specifications**
21. Remove the jack stand.

22. 

    Apply a thin layer of grease to the transmission output shaft splines (1). **Adhesives, Fluids, Lubricants, and Sealers**

23. Loosely install a NEW propeller shaft hub clamp (3) to the propeller shaft joint boot.
24. Support and secure the propeller shaft (2) to a suitable hydraulic jack stand.
25. Propeller Shaft (2) - Install

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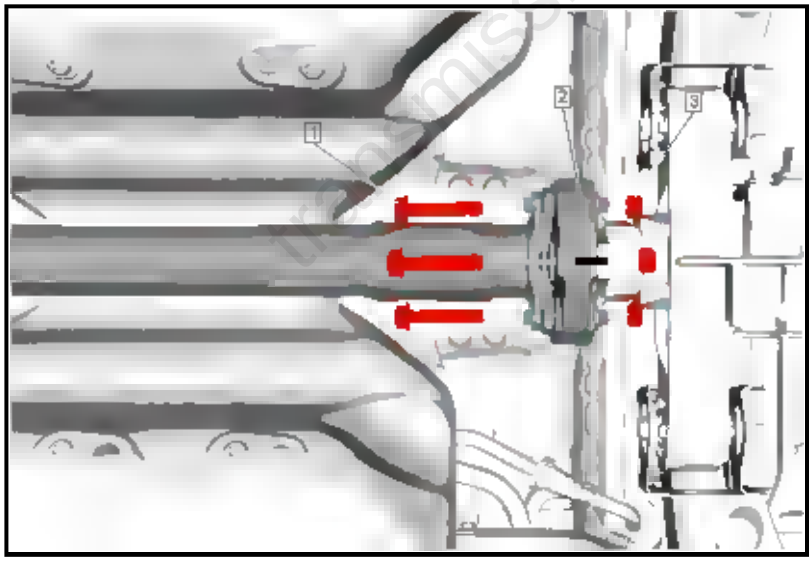
26. 

Prepare the 2 propeller shaft bearing support bolts (1) for installation as follows:

1. Remove any loose cured adhesive from the external threads of the components using a lint free cloth.
2. Thread the cleaned components into the internal mating threads and remove to loosen trapped cured adhesive.
3. Apply thread locking adhesive to the external threads of the components. **Adhesives, Fluids, Lubricants, and Sealers**
4. Ensure there are no gaps in the thread locking adhesive once applied to the component.

CAUTION: **Refer to Fastener Caution .**

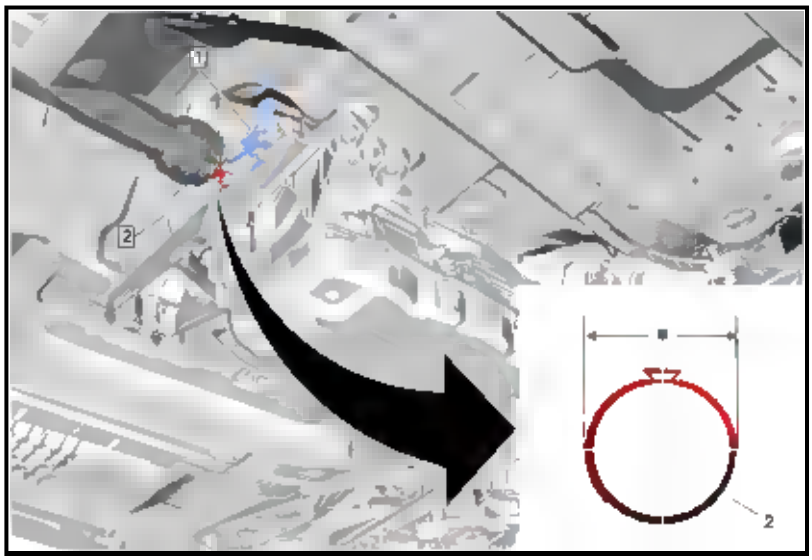
27. Propeller Shaft Bearing Support Bolt (1) - Install and tighten [2x] - **Fastener Specifications**
28. Remove the hydraulic jack stand supporting the propeller shaft.

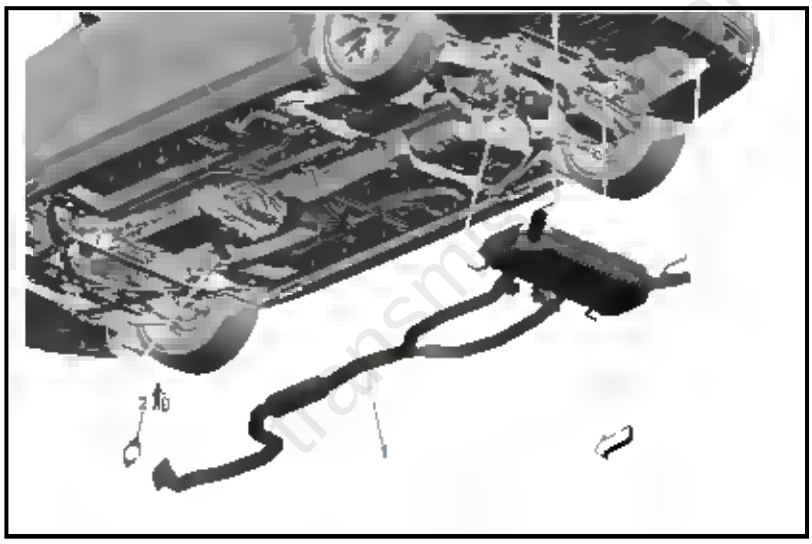
29. 

Prepare the 3 rear propeller shaft bolts (1) and nuts (3) for installation as follows:

1. Remove any loose cured adhesive from the external threads of the components using a lint free cloth.
2. Thread the cleaned components into the internal mating threads and remove to loosen trapped cured adhesive.
3. Apply thread locking adhesive to the external threads of the components. **Adhesives, Fluids, Lubricants, and Sealers**
4. Ensure there are no gaps in the thread locking adhesive once applied to the component.

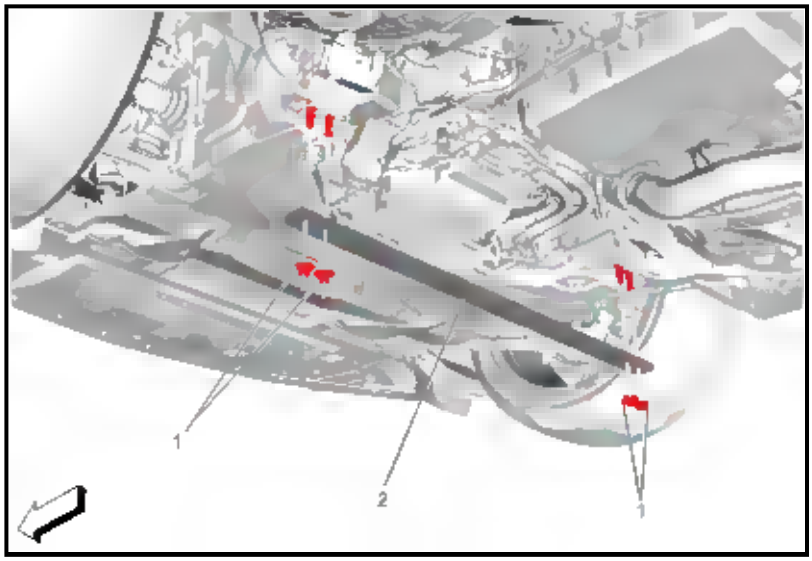
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30. Align the relationship marks (2) made on the propeller shaft and the rear differential flange.
31. Rear Propeller Shaft Bolt (1) - Install [3x]
32. Rear Propeller Shaft Nut (3) - Loosely install [3x]
33. Rear Propeller Shaft Bolt (1) - Tighten [3x] - **Fastener Specifications**
34. 

35. Ensure that the drive shaft boot is completely seated in the output shaft groove prior to crimping the propeller shaft hub clamp (2).
36. Using the **DT-35910** Drive Axle Seal Clamp Pliers (1), crimp the propeller shaft hub clamp (2) until the final crimped outer diameter (a) is 39 - 41 mm (1.54 - 1.61 in).
37. 

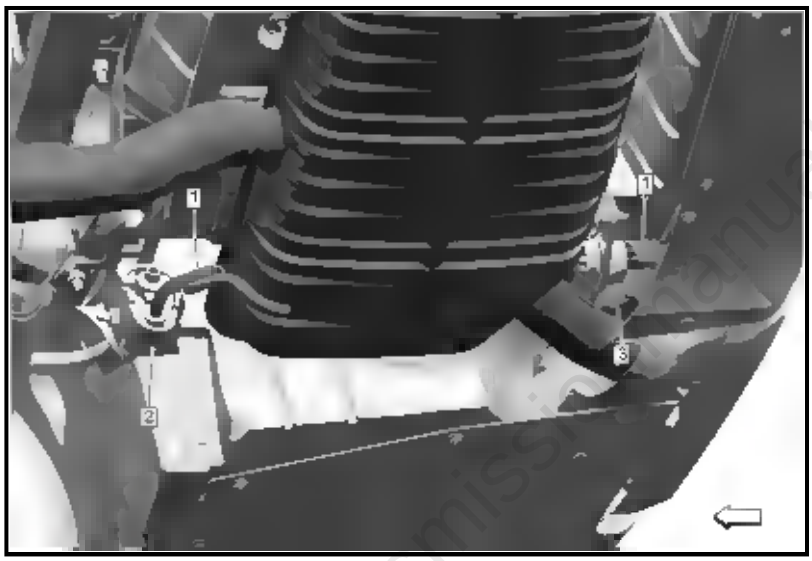
    Catalytic Converter Gasket (2) - Install NEW

38. Exhaust Muffler (1) - Install

39. 

{If equipped} Front Crossmember Brace (2) - Install

40. {If equipped} Front Crossmember Brace Nut (1) - Install and tighten [4x] - **Fastener Specifications**

41. 

Exhaust Muffler (1) @ Exhaust Rear Muffler Insulator-Right Side (3) - Install

42. Exhaust Muffler (1) @ Exhaust Intermediate Pipe Insulator-Right Side (2) - Install

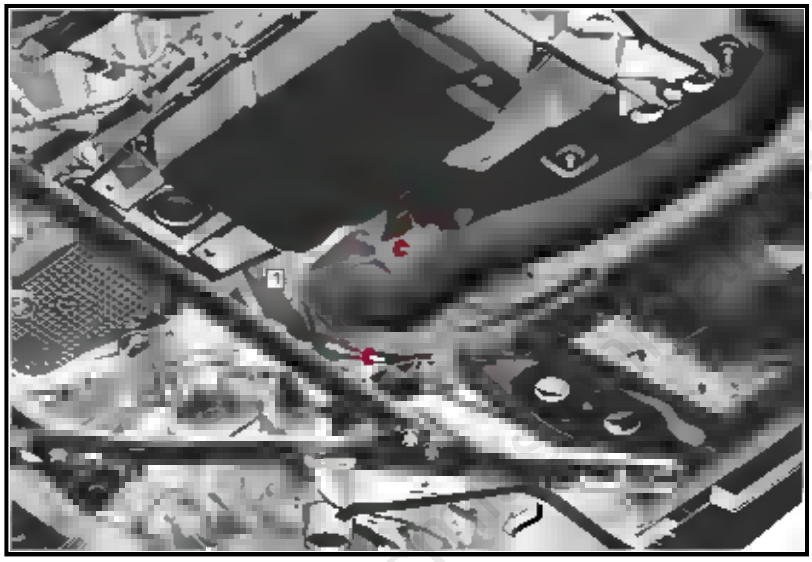
43. 

Exhaust Muffler (1) @ Exhaust Rear Muffler Insulator-Left Side (3) - Install

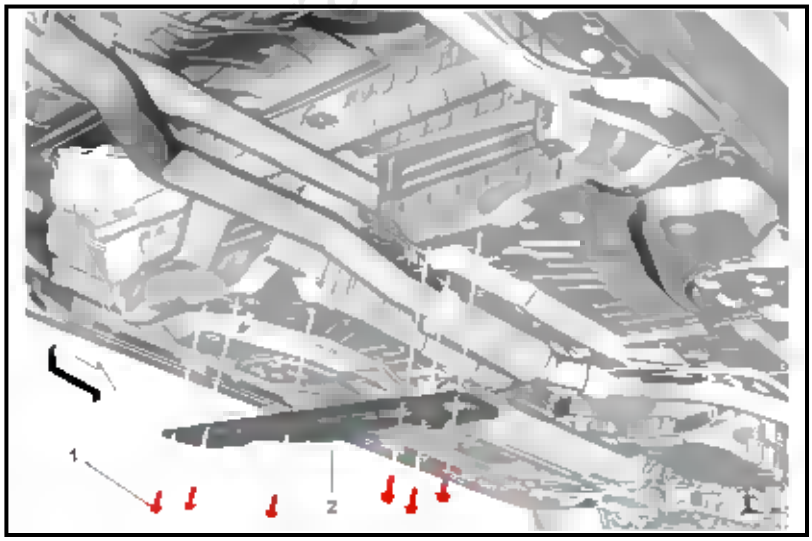
44. Exhaust Muffler (1) @ Exhaust Intermediate Pipe Insulator-Left Side (2) - Install

45. 

Electrical Connector (1) @ Exhaust Control Valve Actuator - Connect [2x]

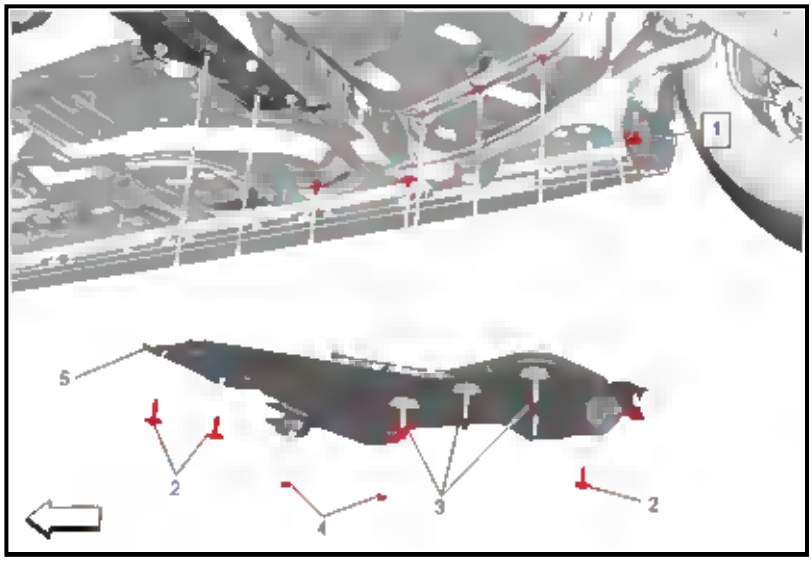
46. 

Catalytic Converter Nut (1) - Install [2x] - **Fastener Specifications**

47. 

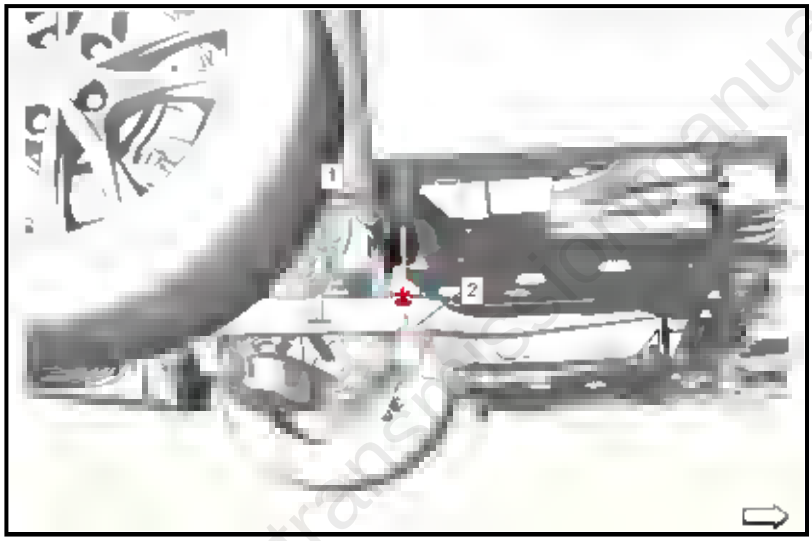
Floor Panel Reinforcement (2) - Install

48. Floor Panel Number 4 Cross Bar Reinforcement Bolt (1) - Install and tighten [6x] - **Fastener Specifications**

49. 

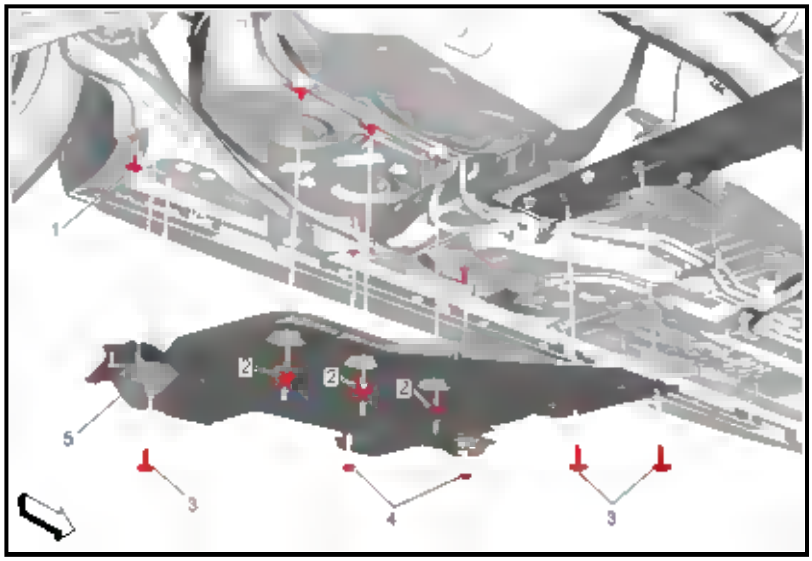
Underbody Rear Air Deflector - Right Side (5) - Install

50. Underbody Rear Air Deflector Plastic Nut (3) - Install and tighten [3x] - **Fastener Specifications**
51. Underbody Rear Air Deflector Bolt (2) - Install and tighten [3x] - **Fastener Specifications**
52. Underbody Rear Air Deflector Nut (4) - Install and tighten [2x] - **Fastener Specifications**
53. Rear Wheelhouse Liner Screw (1) - Install and tighten - **Fastener Specifications**

54. 

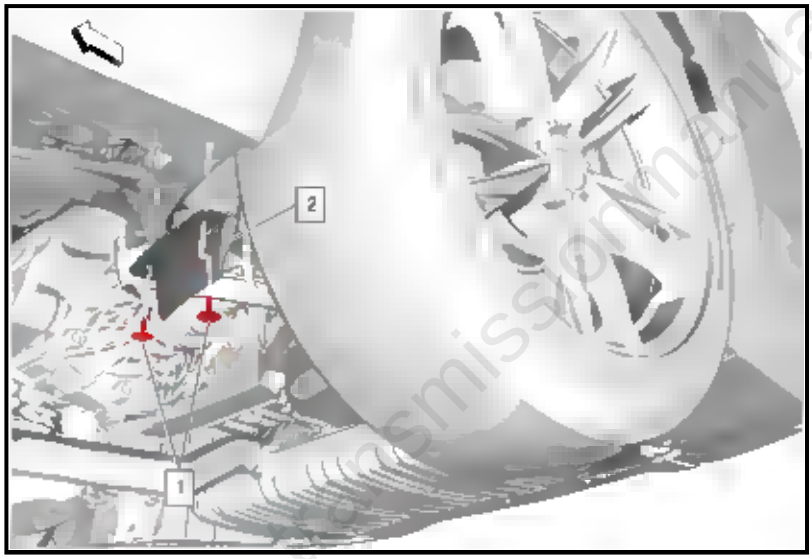
Rear Tire Front Air Deflector - Right Side (1) - Install

55. Rear Tire Front Air Deflector Bolt (2) - Install and tighten [2x] - **Fastener Specifications**

56. 

    Underbody Rear Air Deflector - Left Side (5) - Install

57. Underbody Rear Air Deflector Plastic Nut (2) - Install and tighten [3x] - **Fastener Specifications**
58. Underbody Rear Air Deflector Bolt (3) - Install and tighten [3x] - **Fastener Specifications**
59. Underbody Rear Air Deflector Nut (4) - Install and tighten [2x] - **Fastener Specifications**
60. Rear Wheelhouse Liner Screw (1) - Install and tighten - **Fastener Specifications**

61. 

    Rear Tire Front Air Deflector - Left Side (2) - Install

62. Rear Tire Front Air Deflector Bolt (1) - Install and tighten [2x] - **Fastener Specifications**
63. Inspect the exhaust system for leaks.
64. Remove the support and lower the vehicle.
65. Fill the transmission to the proper level with NEW transmission fluid. **Transmission Fluid Level and Condition Check**
66. Perform the solenoid valve characterization reprogramming procedure. **Q77 Transmission Control Solenoid Valve Characterization Programming (10L60)**

MANUAL SHIFT SHAFT SEAL REPLACEMENT

Single Use Fasteners and Components

- Automatic Transmission Fluid Filter Bolt [2x]
- Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal
- Automatic Transmission Auxiliary Fluid Pump Seal

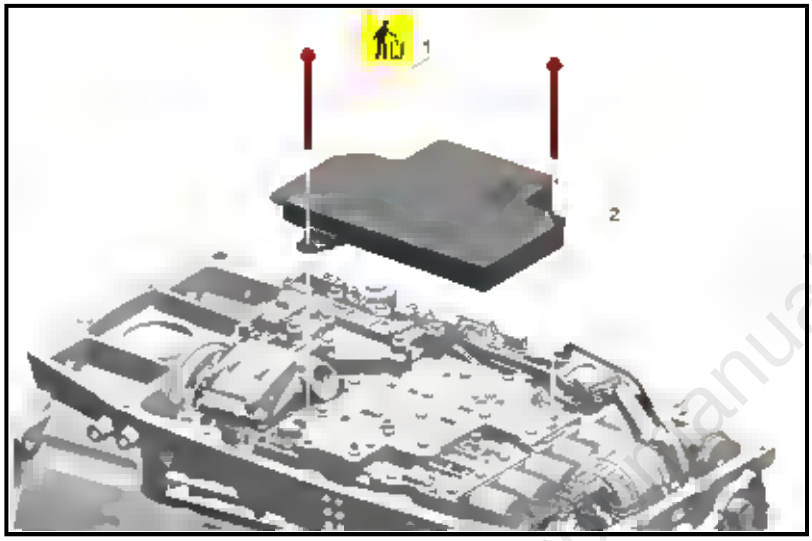
- Catalytic Converter Gasket
- Control Valve Solenoid Body Bolt [3x]
- Manual Shift Shaft Pin
- Manual Shift Shaft Seal
- Propeller Shaft Hub Clamp

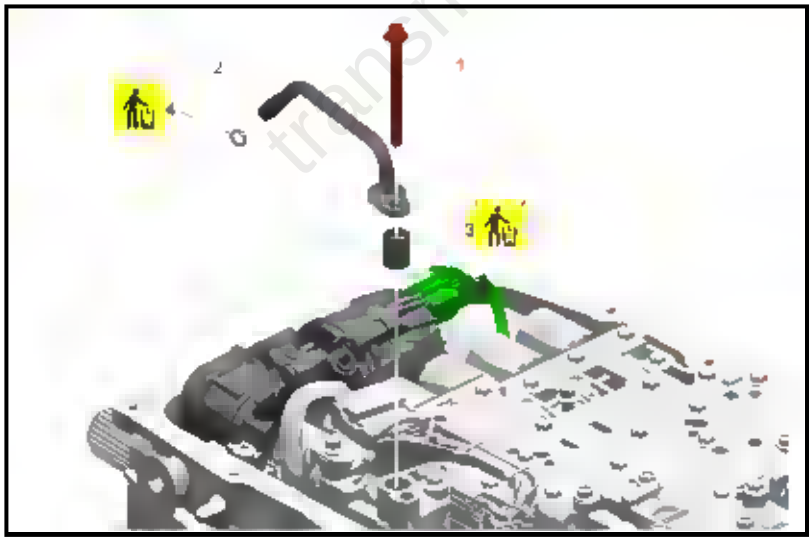
Special Tools

- **DT-47770** Seal Installer

Equivalent regional tools: **Special Tools**

Removal Procedure

1. Raise and support the vehicle. **Lifting and Jacking the Vehicle**
2. 

   Automatic Transmission Fluid Filter (2) - Remove - **Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement**
3. 

   Control Valve Upper Body Bolt (1) - Remove
4. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe (2) - Remove
5. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal (3) - Remove and DISCARD
6. Automatic Transmission Auxiliary Fluid Pump Seal (4) - Remove and DISCARD

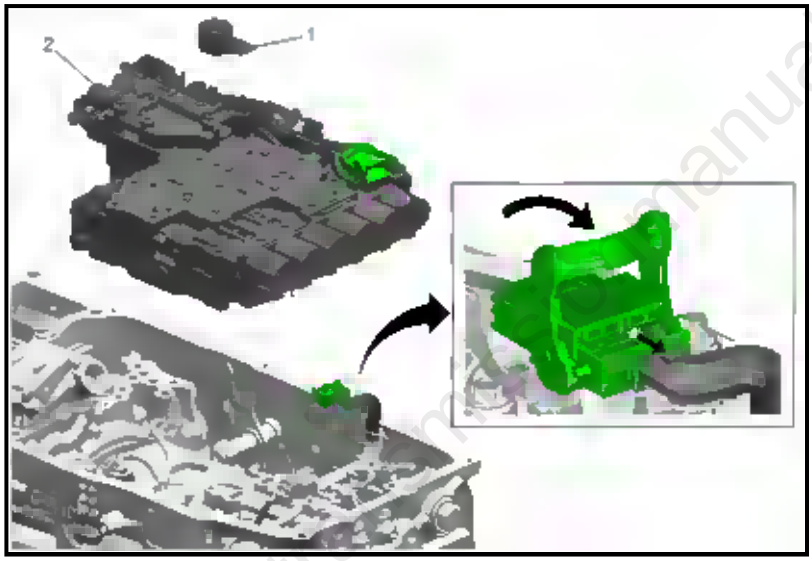
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7. 

NOTE: **The bolts are marked by arrows in the valve body casting.**

Control Valve Solenoid Body Bolt (1) - Remove [2x]

8. Control Valve Solenoid Body Bolt (2) - Remove and DISCARD [3x]
9. Control Valve Solenoid Body Bolt (3) - Remove [2x]

10. 

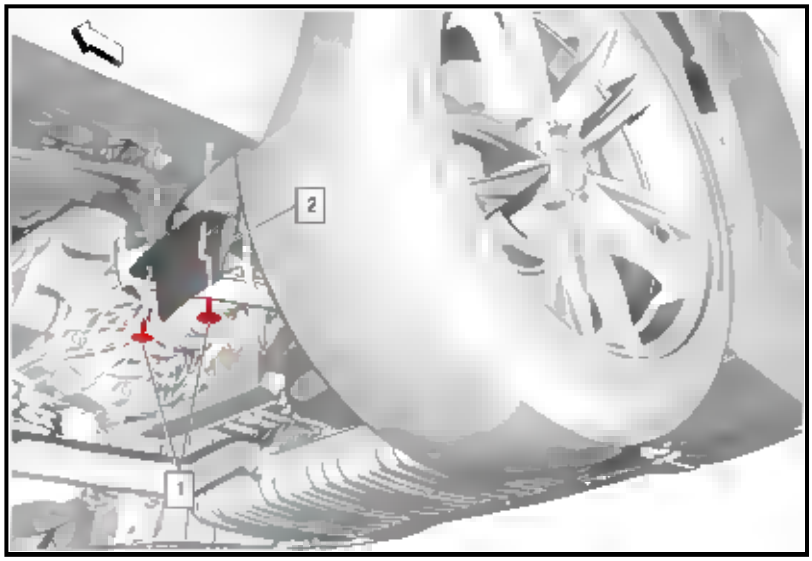
Park Inhibitor Solenoid (1) - Remove

11. Disconnect the main control wiring harness connector as shown.

NOTE: **The automatic transmission fluid pump seal should stay with the control valve body assembly.**

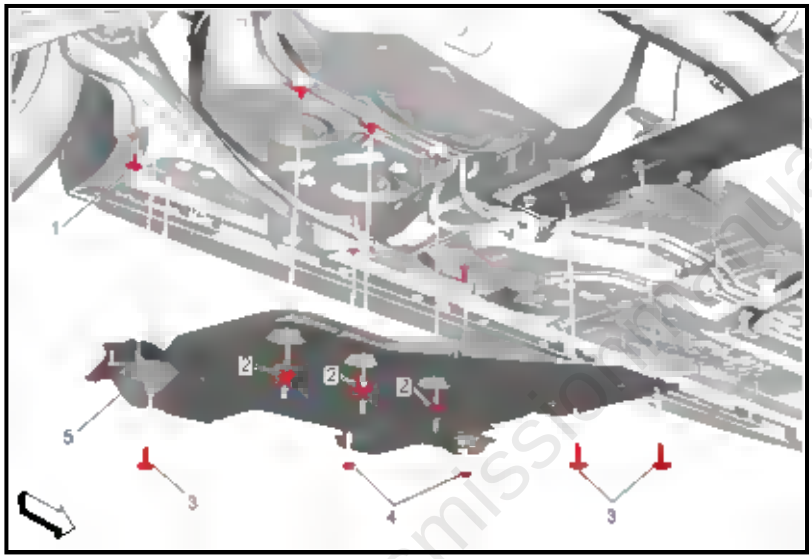
NOTE: **Do not disassemble the control valve body assembly. The internal parts are NOT serviceable.**

12. Control Valve Body Assembly (2) - Remove

13. 

Rear Tire Front Air Deflector Bolt (1) - Remove [2x]

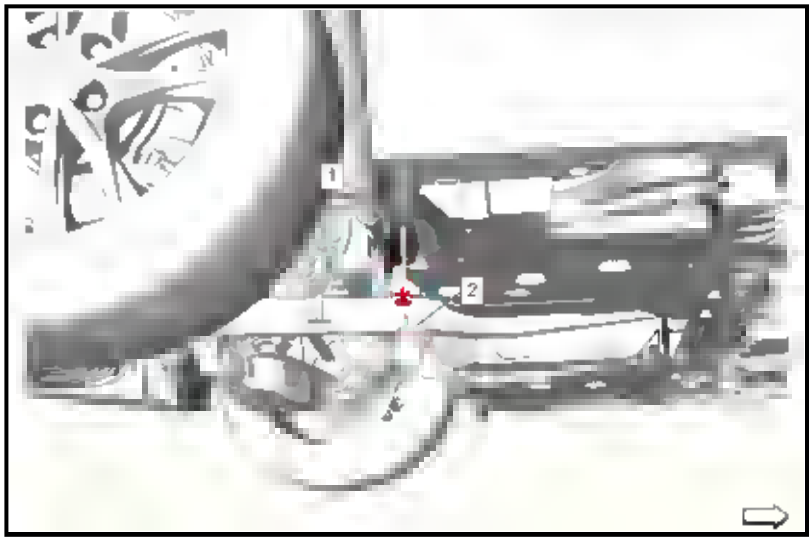
14. Rear Tire Front Air Deflector - Left Side (2) - Remove

15. 

Rear Wheelhouse Liner Screw (1) - Remove

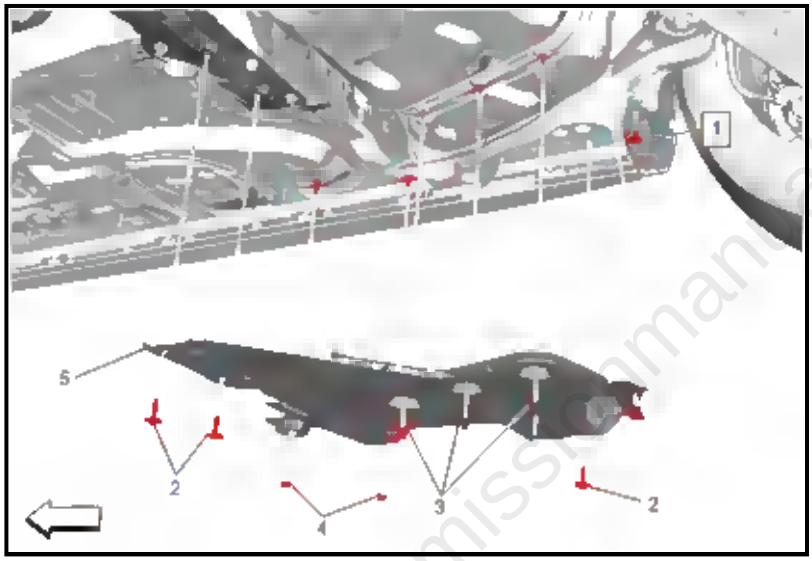
16. Underbody Rear Air Deflector Plastic Nut (2) - Remove [3x]
17. Underbody Rear Air Deflector Bolt (3) - Remove [3x]
18. Underbody Rear Air Deflector Nut (4) - Remove [2x]
19. Underbody Rear Air Deflector - Left Side (5) - Remove

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20. 

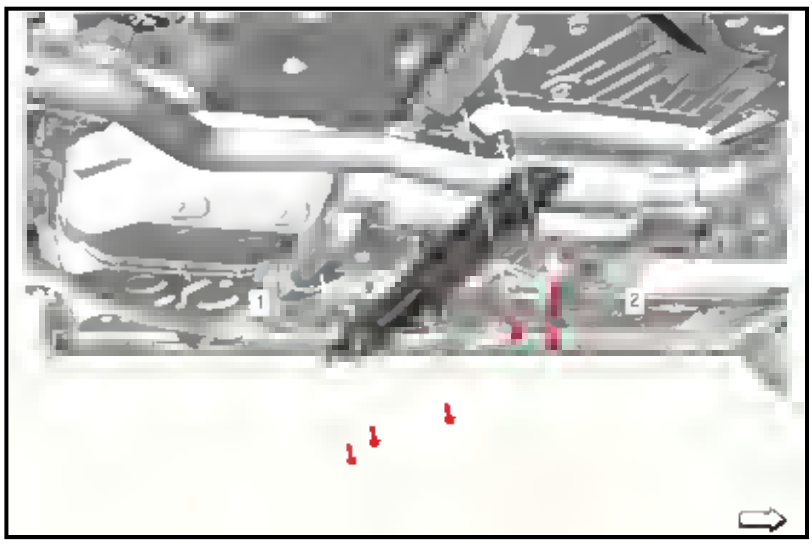
Rear Tire Front Air Deflector Bolt (2) - Remove [2x]

21. Rear Tire Front Air Deflector - Right Side (1) - Remove

22. 

Rear Wheelhouse Liner Screw (1) - Remove

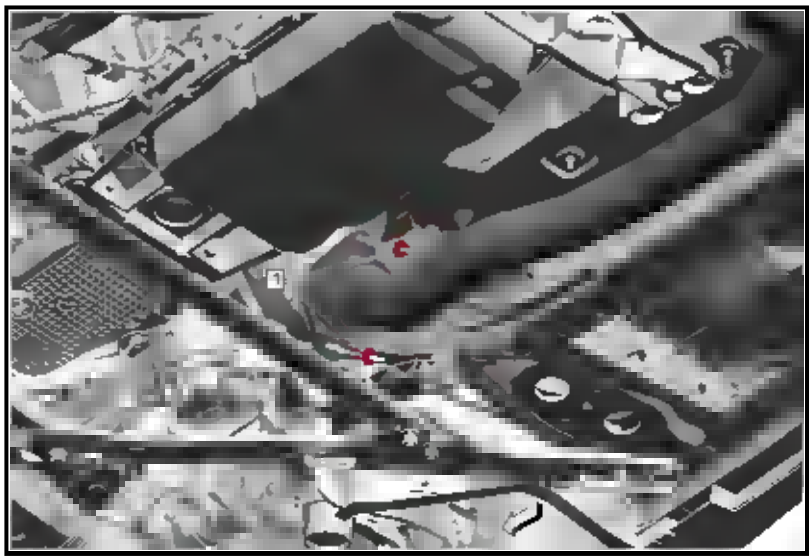
23. Underbody Rear Air Deflector Bolt (2) - Remove [3x]
24. Underbody Rear Air Deflector Plastic Nut (3) - Remove [3x]
25. Underbody Rear Air Deflector Nut (4) - Remove [2x]
26. Underbody Rear Air Deflector - Right Side (5) - Remove

27. 

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Floor Panel Number 4 Cross Bar Reinforcement Bolt (2) - Remove [6x]

28. Floor Panel Reinforcement (1) - Remove

29. 

Catalytic Converter Nut (1) - Remove [2x]

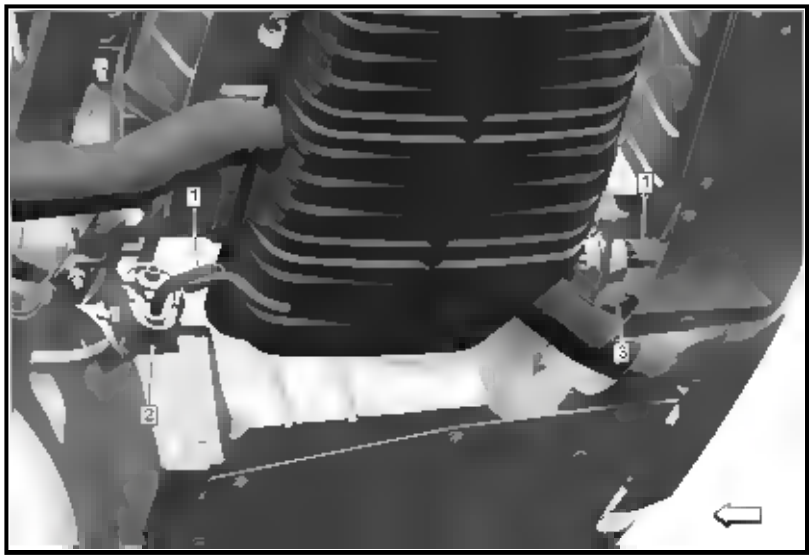
30. 

Electrical Connector (1) @ Exhaust Control Valve Actuator - Disconnect [2x]

31. 

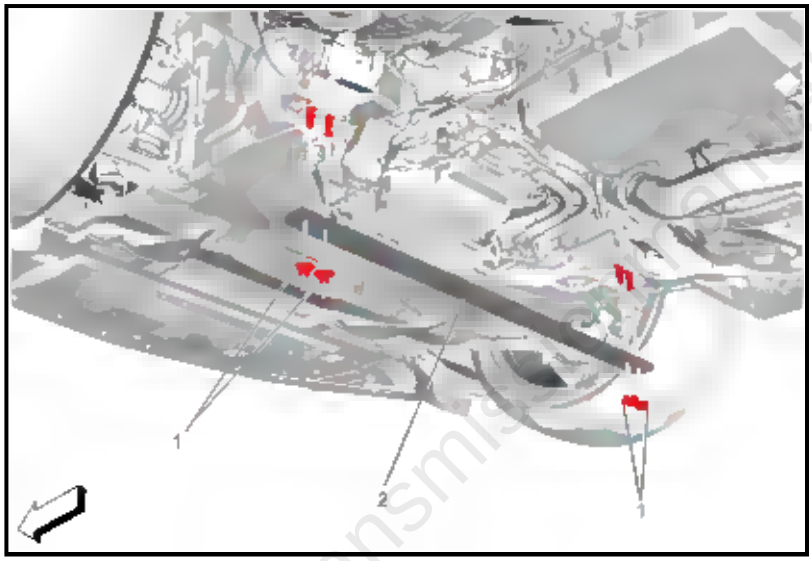
Exhaust Muffler (1) @ Exhaust Intermediate Pipe Insulator-Left Side (2) - Separate

32. Exhaust Muffler (1) @ Exhaust Rear Muffler Insulator-Left Side (3) - Separate

33. 

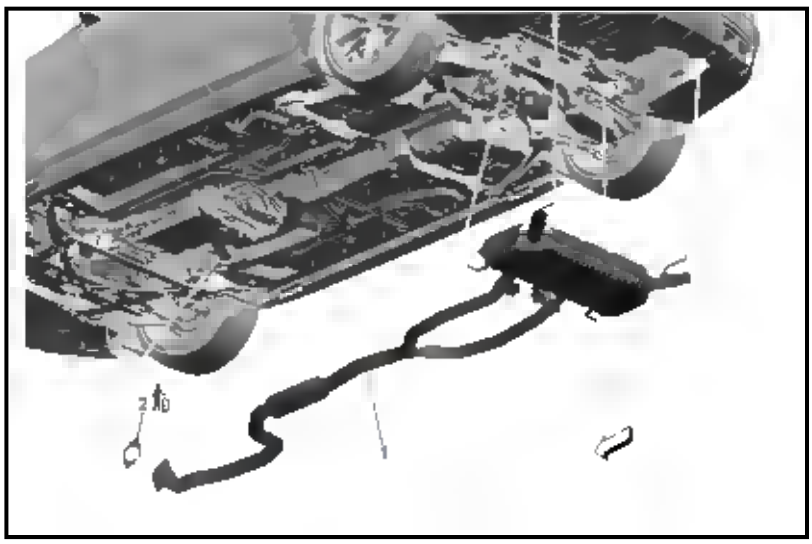
Exhaust Muffler (1) @ Exhaust Intermediate Pipe Insulator-Right Side (2) - Separate

34. Exhaust Muffler (1) @ Exhaust Rear Muffler Insulator-Right Side (3) - Separate

35. 

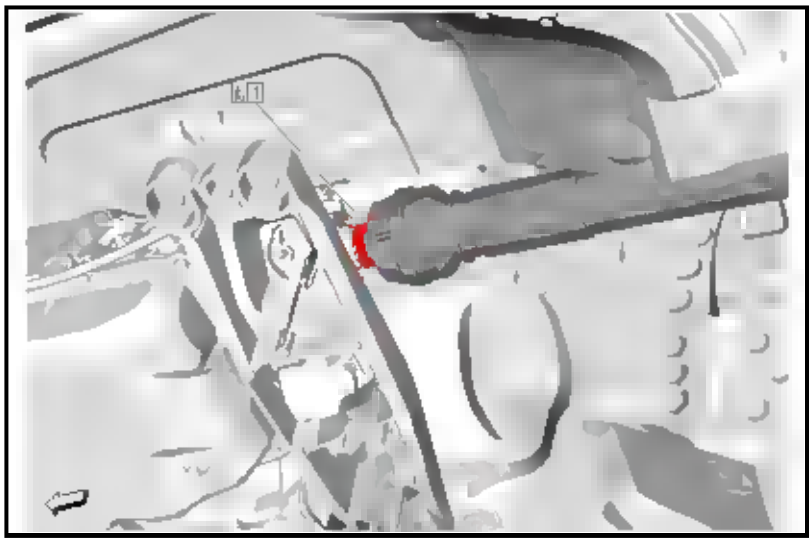
{If equipped} Front Crossmember Brace Nut (1) - Remove [4x]

36. {If equipped} Front Crossmember Brace (2) - Remove

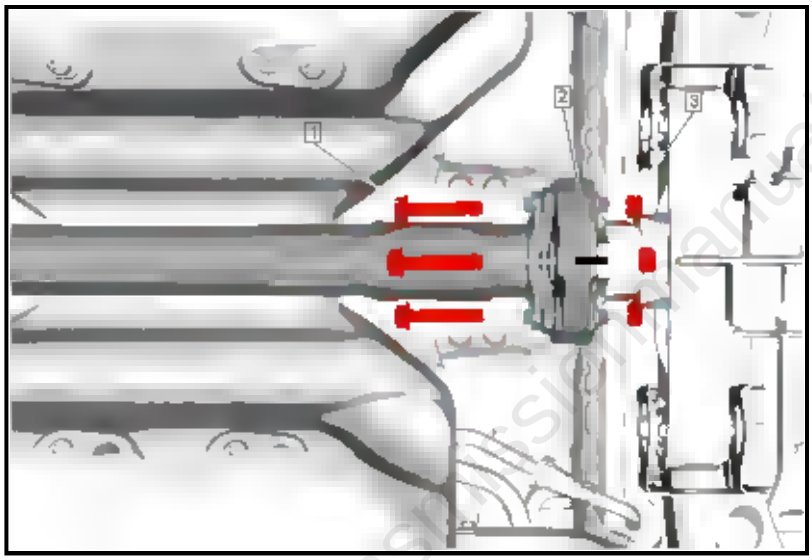
37. 

Exhaust Muffler (1) - Remove

38. Catalytic Converter Gasket (2) - Remove and DISCARD

39. 

Propeller Shaft Hub Clamp (1) - Remove and DISCARD

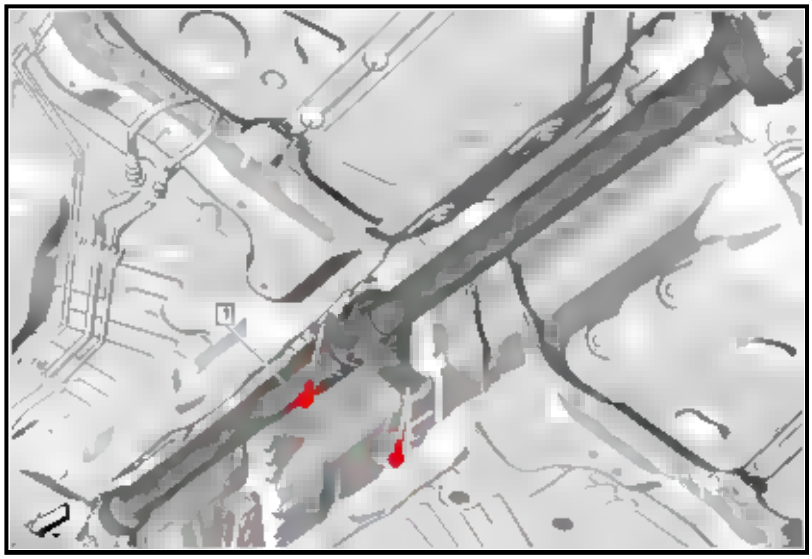
40. 

Mark (2) the relationship of the propeller shaft to the rear differential flange using a paint pen.

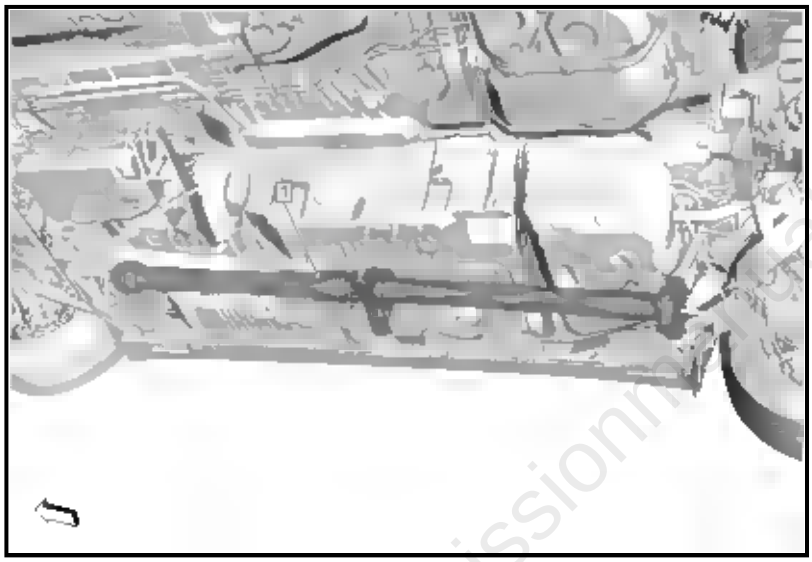
CAUTION: **When removing the propeller shaft, do not remove the propeller shaft coupler from the propeller shaft assembly. The only bolts that should be removed are those that mount each coupler to the transmission output flange, and to the rear drive axle input flange. Failure to properly remove the propeller shaft assembly may cause coupler damage, resulting in necessary replacement of the entire propeller shaft.**

41. Rear Propeller Shaft Nut (3) - Remove [3x]
42. Rear Propeller Shaft Bolt (1) - Remove [3x]
43. Support and secure the propeller shaft to a suitable hydraulic jack stand.

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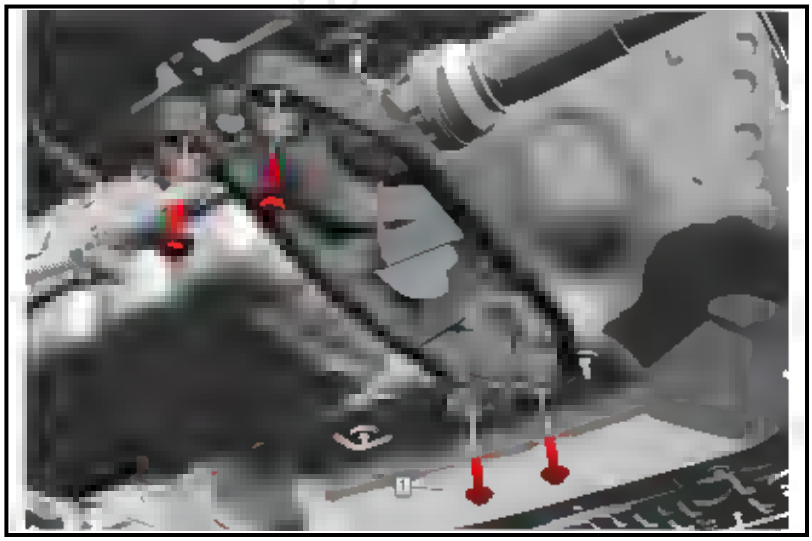
44. 

Propeller Shaft Bearing Support Bolt (1) - Remove [2x]

45. 

Propeller Shaft (1) - Remove

46. Using a suitable jack stand, support the rear of the transmission.

47. 

Transmission Mount Bracket Bolt (1) - Remove [4x]

48. 

Manual Shift Shaft Pin (1) - Remove and DISCARD

49. Manual Shift Shaft (2) - Remove
50. Park Release Lever (3) - Remove
51. Park Pawl Actuator Assembly (4) - Remove

52. 

CAUTION: **Do not damage the case bore during removal of the manual shift shaft seal.**

Using an appropriate tool, remove and DISCARD the manual shift shaft seal. (1).

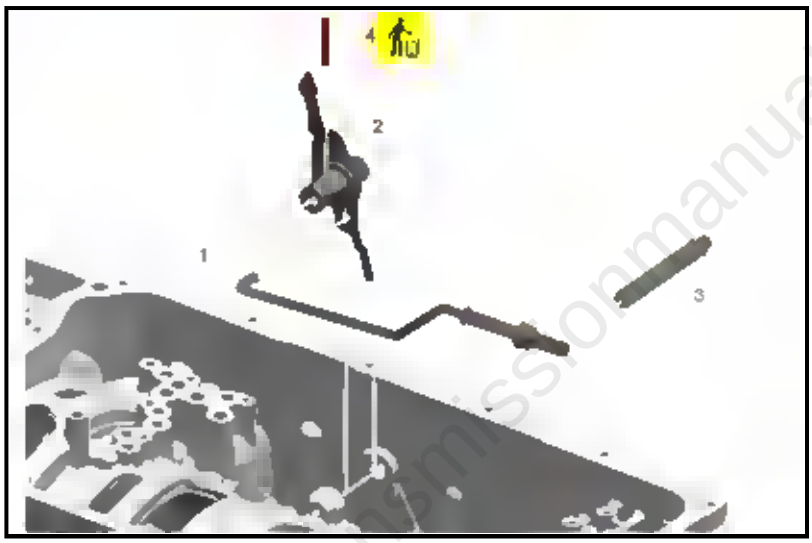
Installation Procedure

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1. 

CAUTION: **When installing the seal, ensure the seal lip is firmly seated against the case bore surface. Do not allow the seal lip to be crushed, or a leak may result.**

Use the **DT-47770** Seal Installer (1), install a NEW manual shift shaft seal (2). **Fastener Specifications**

2. 

Park Pawl Actuator Assembly (1) - Install

3. Park Release Lever (2) - Install
4. Manual Shift Shaft (3) - Install

NOTE: **Install the NEW pin so equal amounts stick out from either side of the manual shaft.**

5. Manual Shift Shaft Pin (4) - Install NEW

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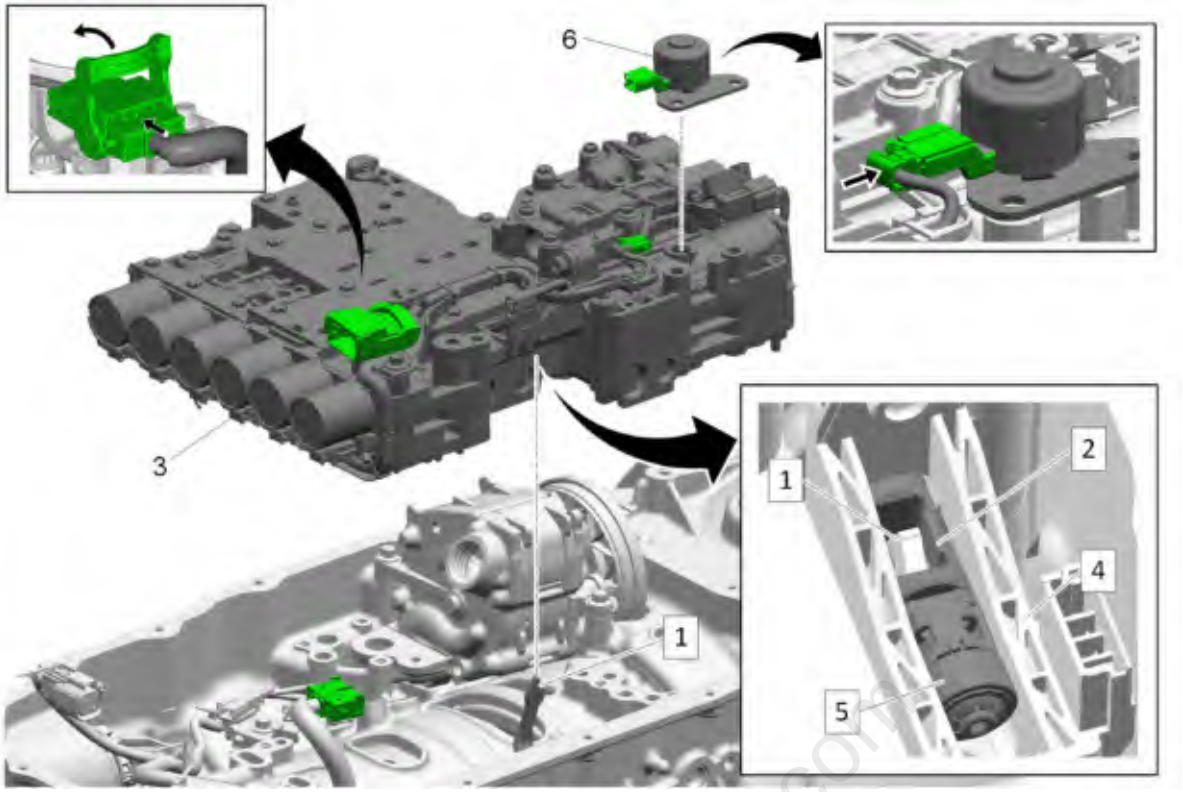
6. 

Fig. 3: Identifying Control Valve Assembly Installation Components
Courtesy of GENERAL MOTORS COMPANY

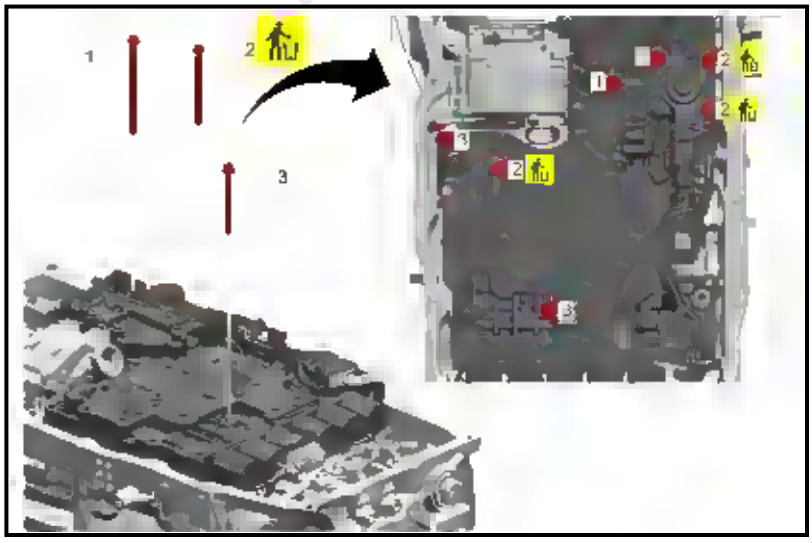
NOTE: **Ensure the automatic transmission fluid pump seal is in the control valve body.**

Control Valve Body Assembly (1) - Install

7. Install the control valve body assembly into the case. The locating pins on the bottom of the control valve body assembly will hold the control valve body assembly in place while installing bolts.

NOTE: **Ensure the wiring harness is not pinched anywhere after valve body installation.**

8. Connect the main control wiring harness connector as shown.
9. Park Inhibitor Solenoid (2) - Install

10. 

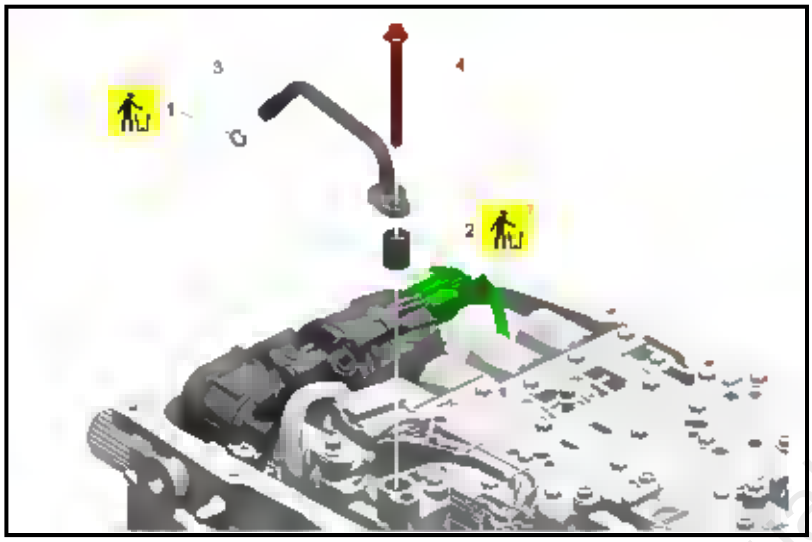
Clean the bolt holes and ensure they are free from any old sealant. Allow to dry before installing NEW bolts.

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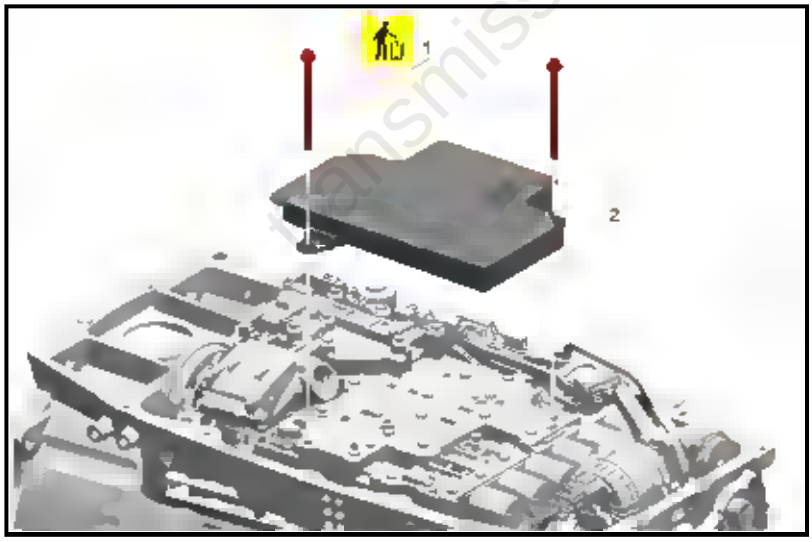
CAUTION: **Refer to Fastener Caution**

11. Control Valve Solenoid Body Bolt (1) - Install and tighten in sequence [2x] - **Fastener Specifications**

NOTE: **The bolts are marked by arrows in the valve body casting.**

12. Control Valve Solenoid Body Bolt (2) Install NEW and tighten in sequence [3x] - **Fastener Specifications**
13. Control Valve Solenoid Body Bolt (3) Install and tighten in sequence [2x] - **Fastener Specifications**
14. 

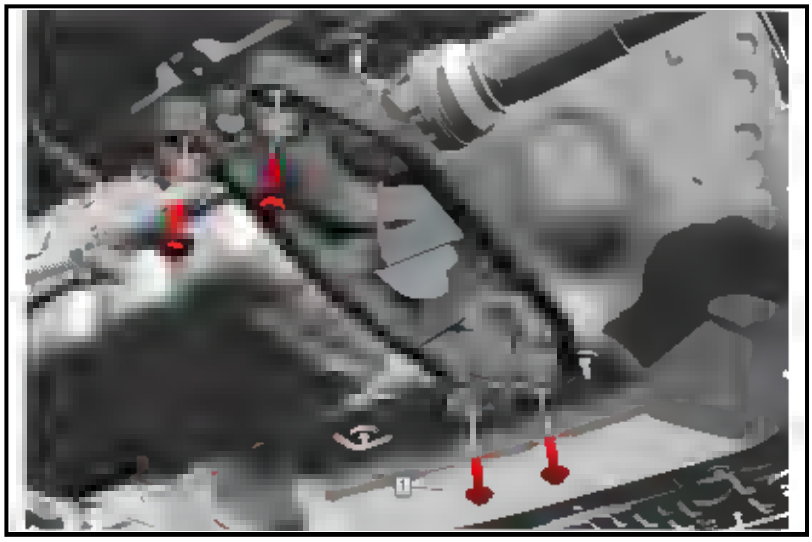
    Automatic Transmission Auxiliary Fluid Pump Seal (1) - Install NEW

15. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal (2) - Install NEW
16. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe (3) - Install
17. Control Valve Upper Body Bolt (4) - Install and tighten - **Fastener Specifications**
18. 

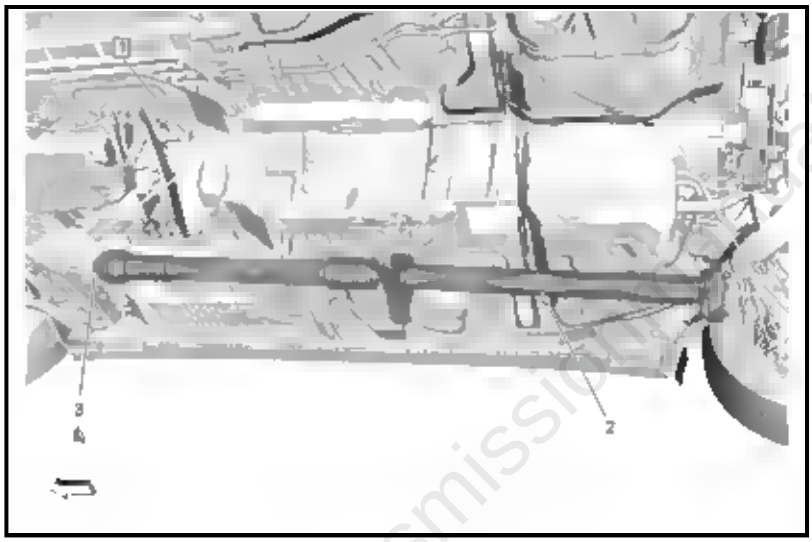
    Automatic Transmission Fluid Filter (2) - Install - **Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement**

19. Remove the drain pan.

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20. 

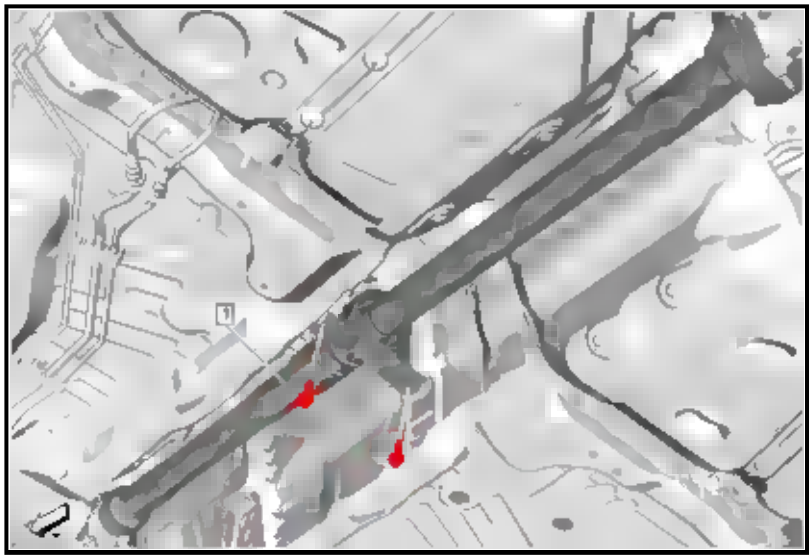
    Raise the rear of the transmission then hand start the 4 transmission mount bracket bolts (1).

21. Transmission Mount Bracket Bolt (1) - Tighten [4x] - **Fastener Specifications**
22. Remove the jack stand.
23. 

    Apply a thin layer of grease to the transmission output shaft splines (1). **Adhesives, Fluids, Lubricants, and Sealers**

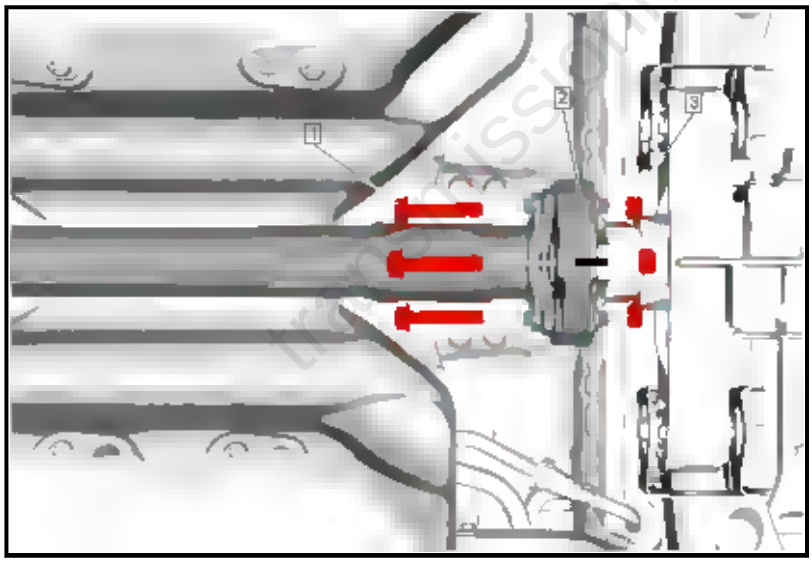
24. Loosely install a NEW propeller shaft hub clamp (3) to the propeller shaft joint boot.
25. Support and secure the propeller shaft (2) to a suitable hydraulic jack stand.
26. Propeller Shaft (2) - Install

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27. 

Prepare the 2 propeller shaft bearing support bolts (1) for installation as follows:

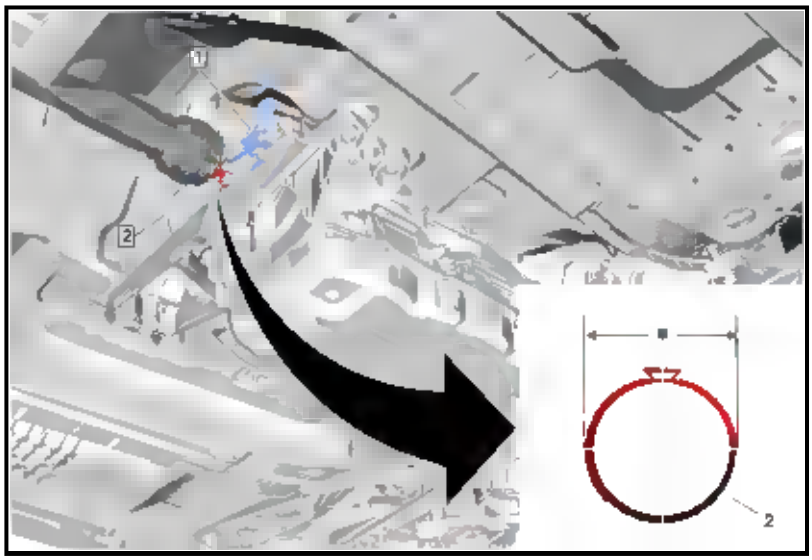
1. Remove any loose cured adhesive from the external threads of the components using a lint free cloth.
2. Thread the cleaned components into the internal mating threads and remove to loosen trapped cured adhesive.
3. Apply thread locking adhesive to the external threads of the components. **Adhesives, Fluids, Lubricants, and Sealers**
4. Ensure there are no gaps in the thread locking adhesive once applied to the component.

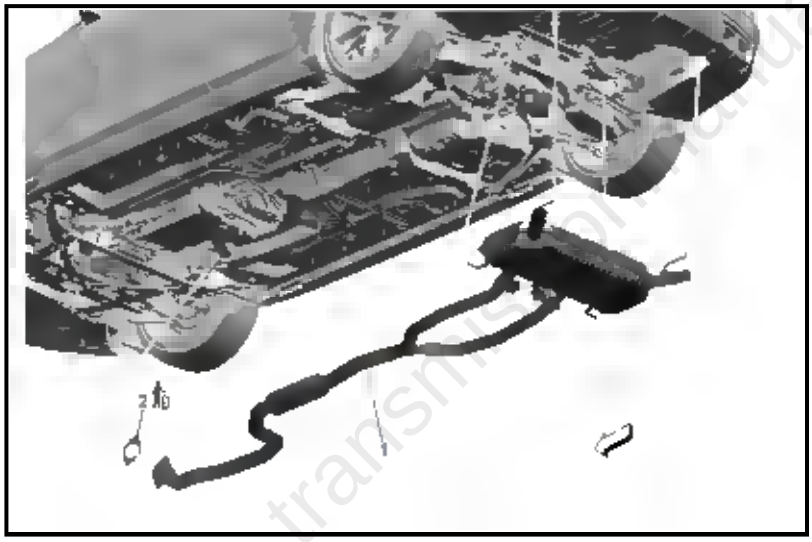
28. Propeller Shaft Bearing Support Bolt (1) - Install and tighten [2x] - **Fastener Specifications**
29. Remove the hydraulic jack stand supporting the propeller shaft.
30. 

Prepare the 3 rear propeller shaft bolts (1) and nuts (3) for installation as follows:

1. Remove any loose cured adhesive from the external threads of the components using a lint free cloth.
2. Thread the cleaned components into the internal mating threads and remove to loosen trapped cured adhesive.
3. Apply thread locking adhesive to the external threads of the components. **Adhesives, Fluids, Lubricants, and Sealers**
4. Ensure there are no gaps in the thread locking adhesive once applied to the component.

31. Align the relationship marks (2) made on the propeller shaft and the rear differential flange.
32. Rear Propeller Shaft Bolt (1) - Install [3x]

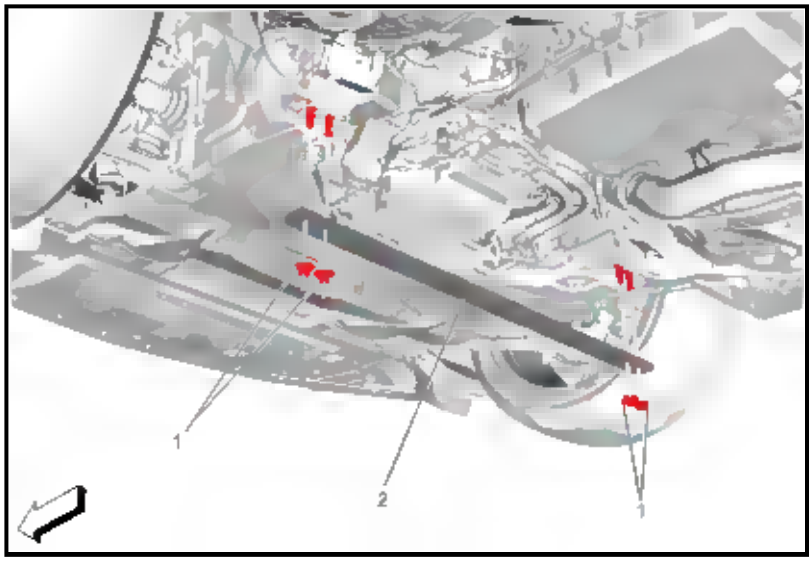
33. Rear Propeller Shaft Nut (3) - Loosely install [3x]
34. Rear Propeller Shaft Bolt (1) - Tighten [3x] - **Fastener Specifications**
35. 

36. Ensure that the drive shaft boot is completely seated in the output shaft groove prior to crimping the propeller shaft hub clamp (2).
37. Using the **DT-35910** Drive Axle Seal Clamp Pliers (1), crimp the propeller shaft hub clamp (2) until the final crimped outer diameter (a) is 39 - 41 mm (1.54 - 1.61 in).
38. 

    Catalytic Converter Gasket (2) - Install NEW

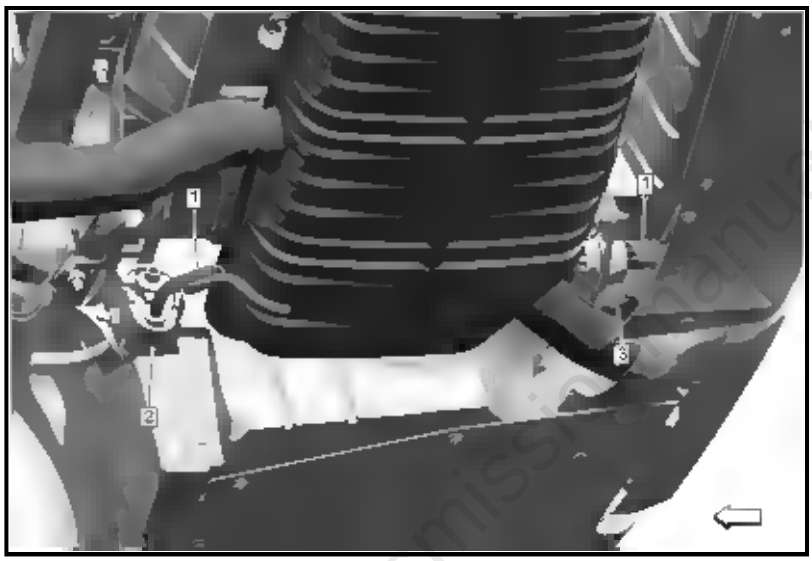
39. Exhaust Muffler (1) - Install

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40. 

{If equipped} Front Crossmember Brace (2) - Install

41. {If equipped} Front Crossmember Brace Nut (1) - Install and tighten [4x] - **Fastener Specifications**

42. 

Exhaust Muffler (1) @ Exhaust Rear Muffler Insulator-Right Side (3) - Install

43. Exhaust Muffler (1) @ Exhaust Intermediate Pipe Insulator-Right Side (2) - Install

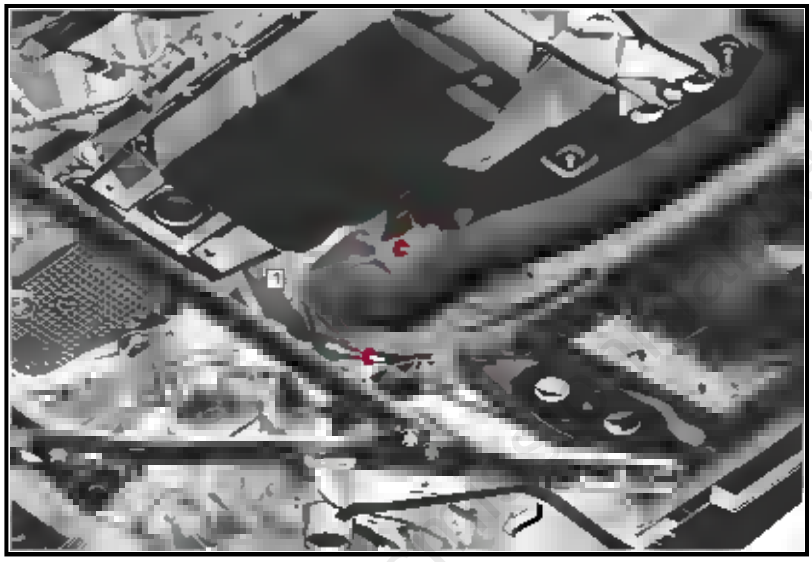
44. 

Exhaust Muffler (1) @ Exhaust Rear Muffler Insulator-Left Side (3) - Install

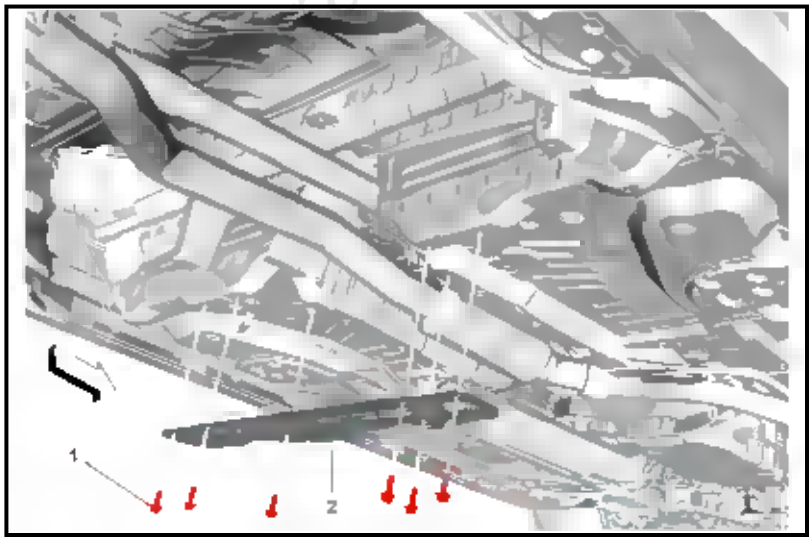
45. Exhaust Muffler (1) @ Exhaust Intermediate Pipe Insulator-Left Side (2) - Install

46. 

Electrical Connector (1) @ Exhaust Control Valve Actuator - Connect [2x]

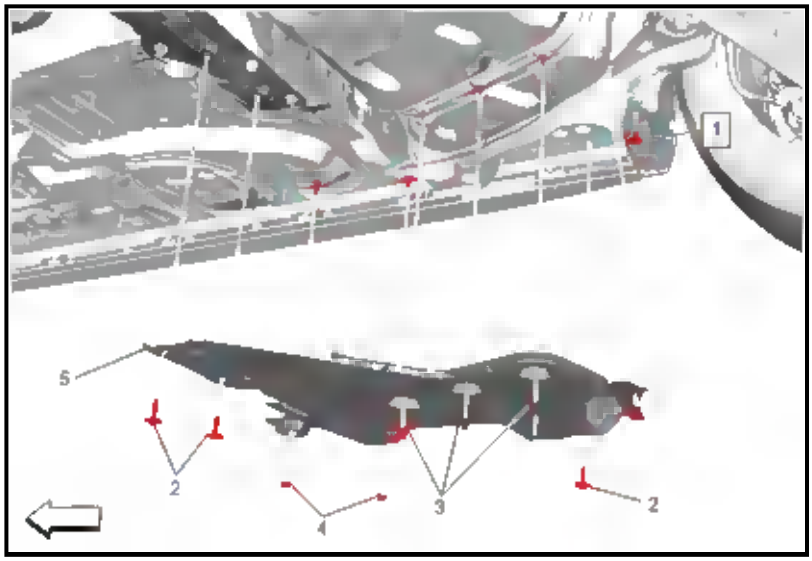
47. 

Catalytic Converter Nut (1) - Install and tighten [2x] - **Fastener Specifications**

48. 

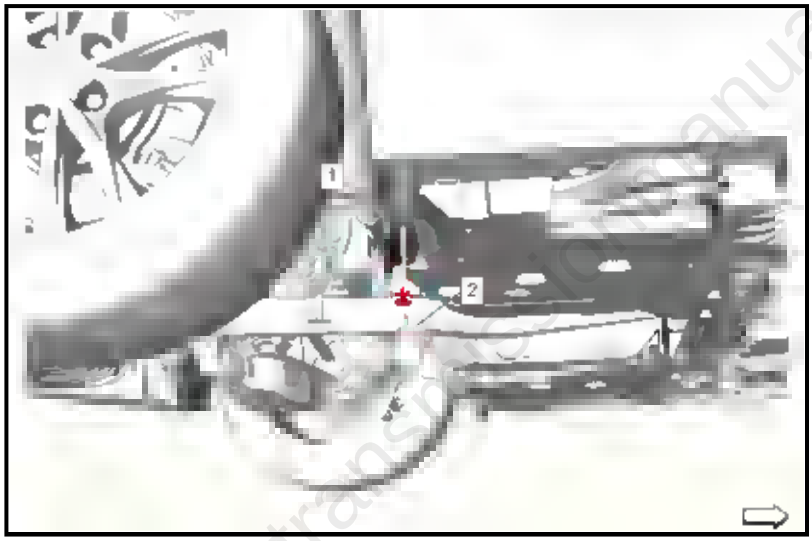
Floor Panel Reinforcement (2) - Install

49. Floor Panel Number 4 Cross Bar Reinforcement Bolt (1) - Install and tighten [6x] - **Fastener Specifications**

50. 

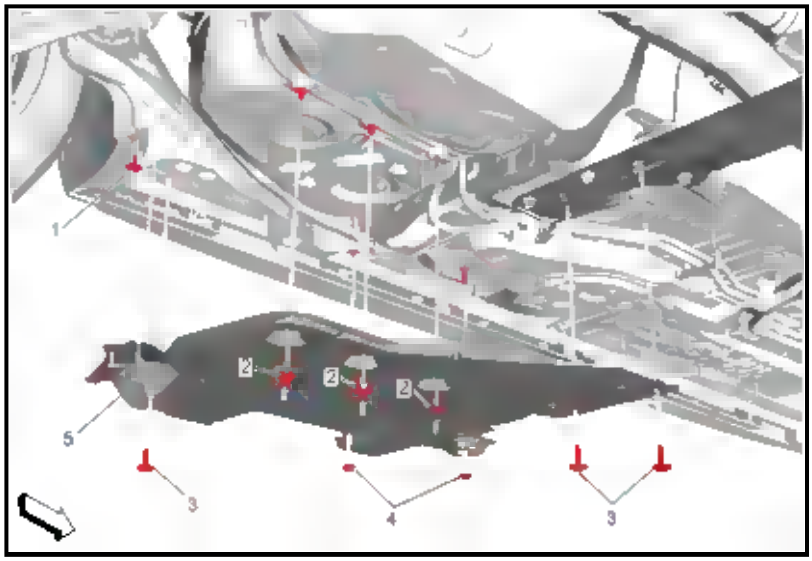
Underbody Rear Air Deflector - Right Side (5) - Install

51. Underbody Rear Air Deflector Plastic Nut (3) - Install and tighten [3x] - **Fastener Specifications**
52. Underbody Rear Air Deflector Bolt (2) - Install and tighten [3x] - **Fastener Specifications**
53. Underbody Rear Air Deflector Nut (4) - Install and tighten [2x] - **Fastener Specifications**
54. Rear Wheelhouse Liner Screw (1) - Install and tighten - **Fastener Specifications**

55. 

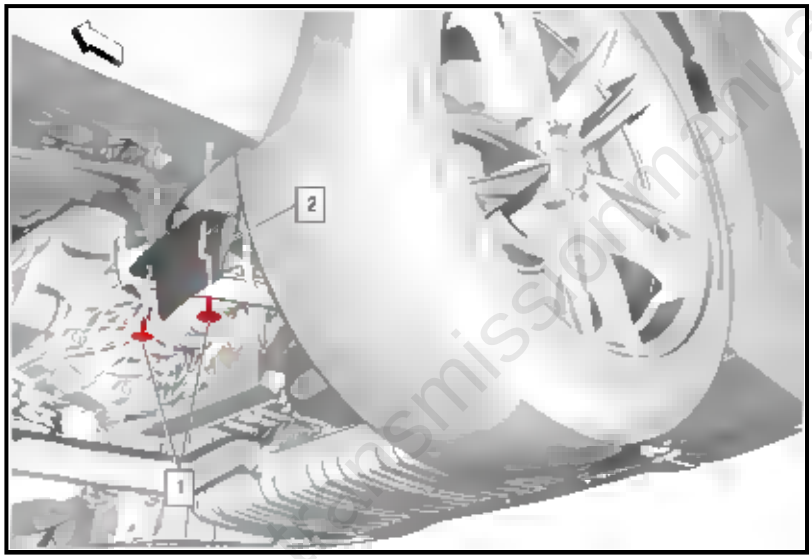
Rear Tire Front Air Deflector - Right Side (1) - Install

56. Rear Tire Front Air Deflector Bolt (2) - Install and tighten [2x] - **Fastener Specifications**

57. 

Underbody Rear Air Deflector - Left Side (5) - Install

58. Underbody Rear Air Deflector Plastic Nut (2) - Install and tighten [3x] - **Fastener Specifications**
59. Underbody Rear Air Deflector Bolt (3) - Install and tighten [3x] - **Fastener Specifications**
60. Underbody Rear Air Deflector Nut (4) - Install and tighten [2x] - **Fastener Specifications**
61. Rear Wheelhouse Liner Screw (1) - Install and tighten - **Fastener Specifications**

62. 

Rear Tire Front Air Deflector - Left Side (2) - Install

63. Rear Tire Front Air Deflector Bolt (1) - Install and tighten [2x] - **Fastener Specifications**
64. Inspect the exhaust system for leaks.
65. Remove the support and lower the vehicle.
66. Fill the transmission to the proper level with NEW transmission fluid. **Transmission Fluid Level and Condition Check**
67. Perform the solenoid valve characterization reprogramming procedure. **Q77 Transmission Control Solenoid Valve Characterization Programming (10L60)**

AUTOMATIC TRANSMISSION MANUAL SHIFT AUXILIARY POSITION SWITCH REPLACEMENT - LEFT SIDE

Removal Procedure

WARNING: **Refer to SIR Warning .**

WARNING: **Refer to SIR Inflator Module Handling and Storage Warning .**

WARNING: **After installation of the steering wheel airbag module to the steering wheel, slightly pull the module outward. If there is no give on the airbag module then it is secured correctly. If the airbag module is not fully attached personal injury could result.**

1. Disable the SIR system. **SIR Disabling and Enabling**
2. 

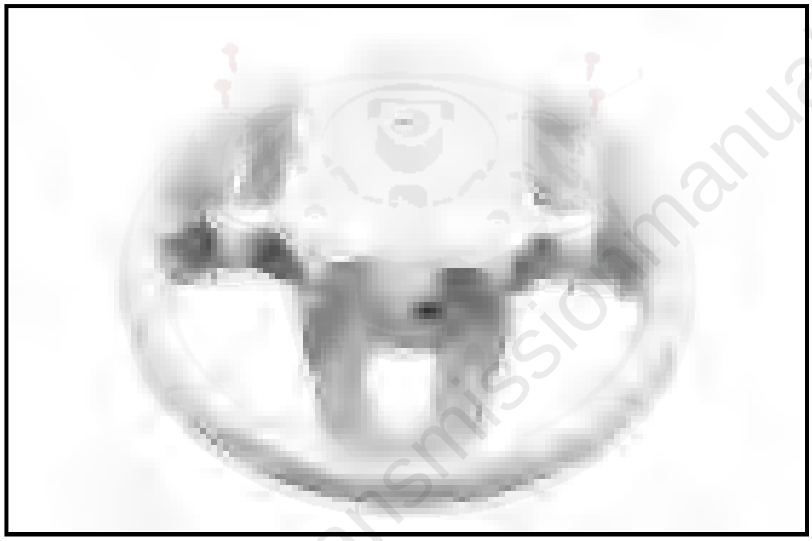
   Use a flat bladed plastic trim tool to depress the steering wheel airbag access hole cover detents to remove the 2 steering wheel airbag access hole covers (1).
3. 

   Steering Wheel Airbag Bolt (1) - Remove [2x]
4. Release the connector position assurance (CPA) retainer.
5. Disconnect the electrical connectors.
6. Steering Wheel Airbag (2) - Remove

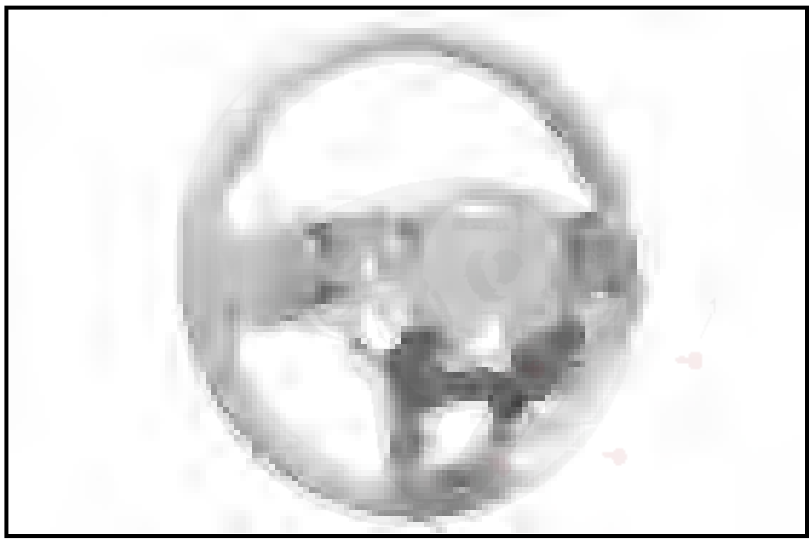
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7. 

   Loosen the steering wheel bolt (1) so that 2 - 3 threads are engaged.

8. Wiggle the steering wheel until the wheel disengages completely.
9. Steering Wheel Bolt (1) - Remove
10. Steering Wheel (2) - Remove
11. 

    Steering Wheel Bolt (1) @ Automatic Transmission Manual Shift Auxiliary Position Switch - Remove [4x]

12. 

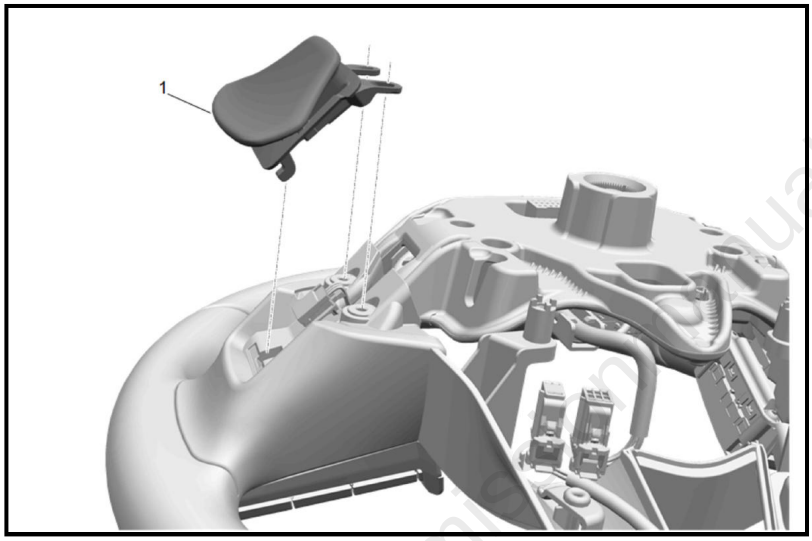
    Steering Wheel Bolt (1) @ Steering Wheel Shroud - Remove [4x]

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13. 

    Steering Wheel Shroud (1) - Remove

14. Disconnect the electrical connectors.

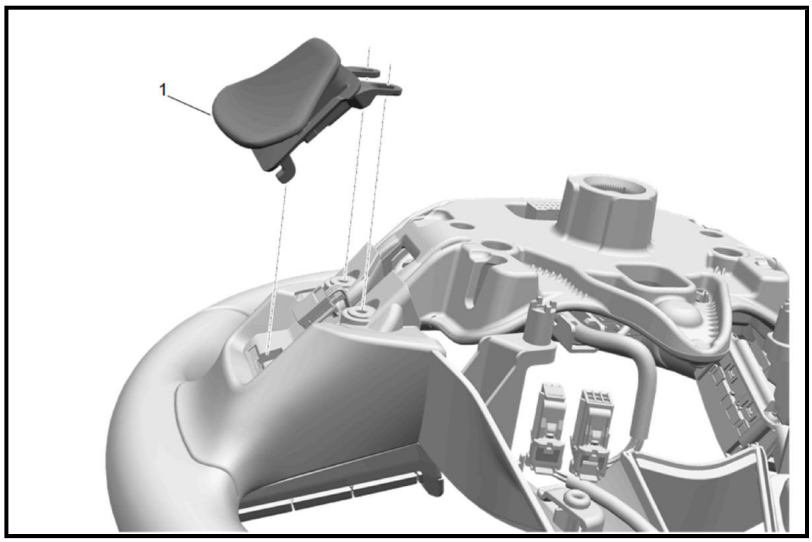
15. 

    Automatic Transmission Manual Shift Auxiliary Position Switch-Left Side (1) - Remove

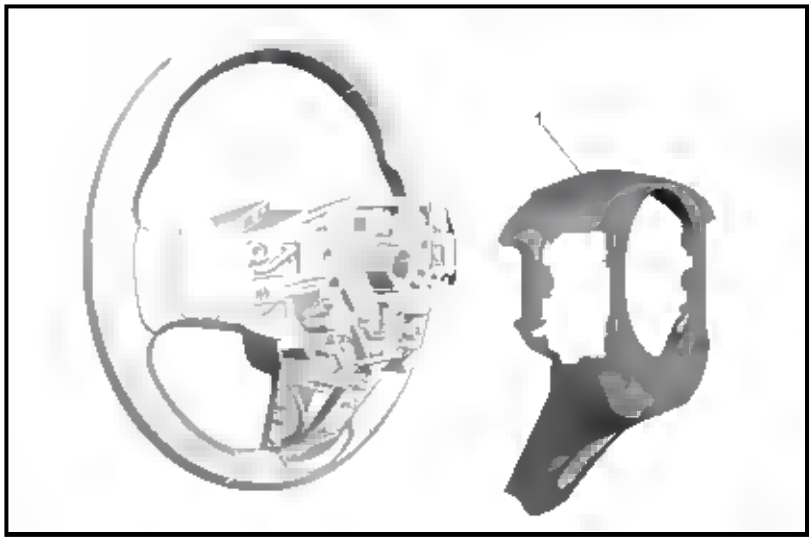
16. Disconnect the electrical connector.

Installation Procedure

1. Connect the electrical connector.

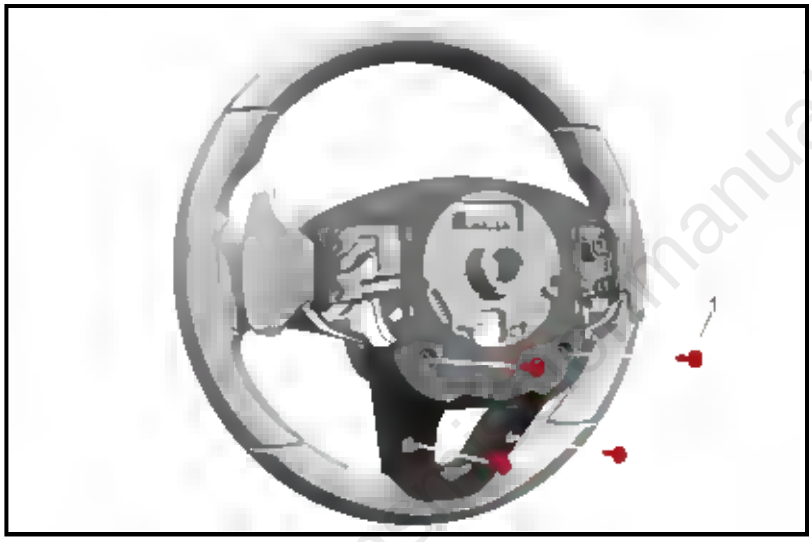
2. 

Automatic Transmission Manual Shift Auxiliary Position Switch-Left Side (1) - Install

3. 

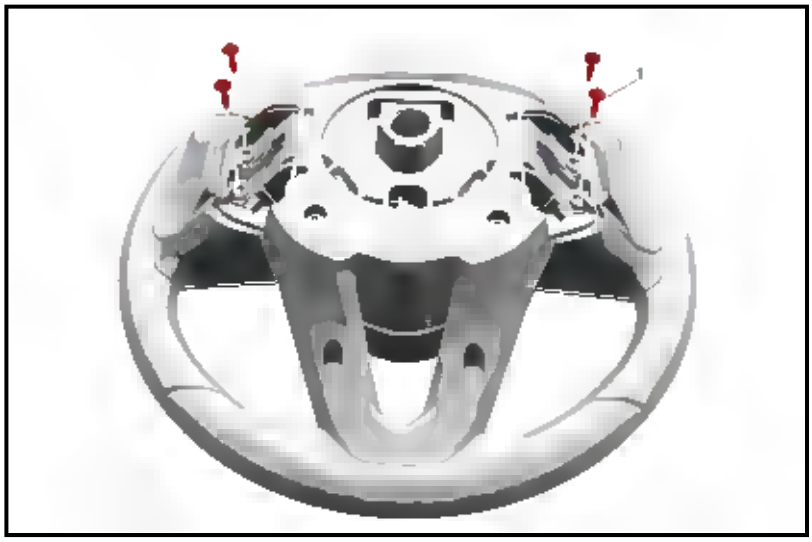
Steering Wheel Shroud (1) - Install

4. Connect the electrical connectors.

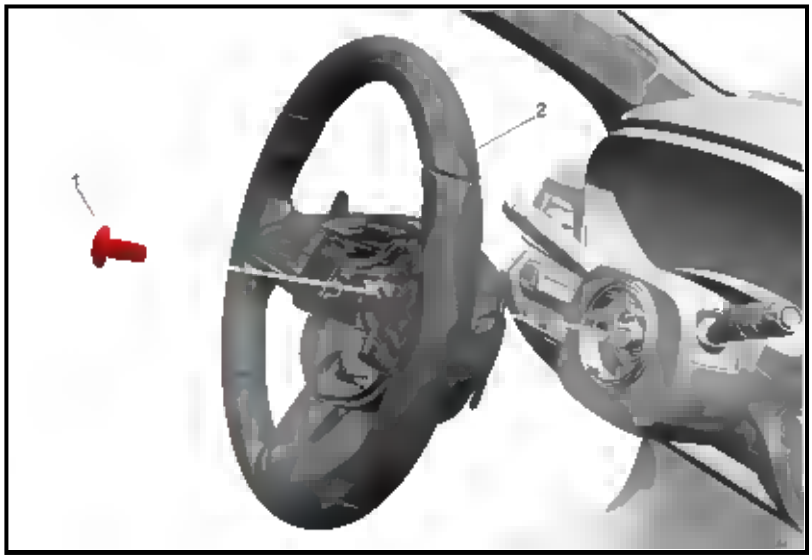
5. 

CAUTION: **Fastener Caution** .

Steering Wheel Bolt (1) @ Steering Wheel Shroud - Install and tighten [4x] - **Fastener Specifications**

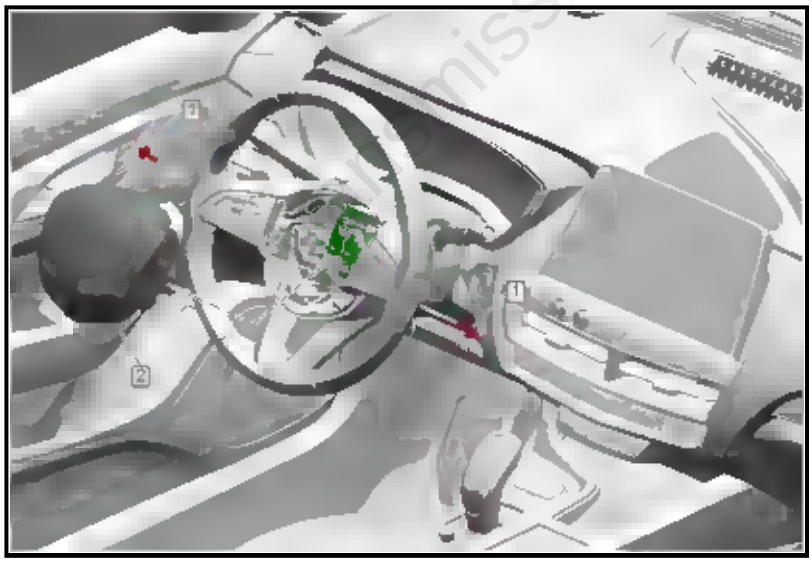
6. 

Steering Wheel Bolt (1) @ Automatic Transmission Manual Shift Auxiliary Position Switch - Install and tighten [4x] - refer to **Fastener Specifications** .

7. 

   Steering Wheel (2) - Install

8. Prepare the steering wheel bolt (1) for installation as follows:
   1. Remove any loose cured adhesive from the external threads of the component using a lint free cloth.
   2. Thread the cleaned component into the internal mating threads and remove to loosen trapped cured adhesive.
   3. Apply thread locking adhesive to the external threads of the component. **Adhesives, Fluids, Lubricants, and Sealers**
   4. Ensure there are no gaps in the thread locking adhesive once applied to the component.
9. Steering Wheel Bolt (1) - Install and tighten - **Fastener Specifications**

10. 

    Connect the electrical connectors.

11. Install any connector position assurance (CPA) devices or secondary locks.
12. Steering Wheel Airbag (2) - Install
13. Steering Wheel Airbag Bolt (1) - Install and tighten [2x] - **Fastener Specifications**

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14. 

    Install the 2 steering wheel airbag access hole covers (1).

15. Enable the SIR System. **SIR Disabling and Enabling**

AUTOMATIC TRANSMISSION MANUAL SHIFT AUXILIARY POSITION SWITCH REPLACEMENT - RIGHT SIDE

Removal Procedure

WARNING: **Refer to SIR Warning .**

WARNING: **Refer to SIR Inflator Module Handling and Storage Warning .**

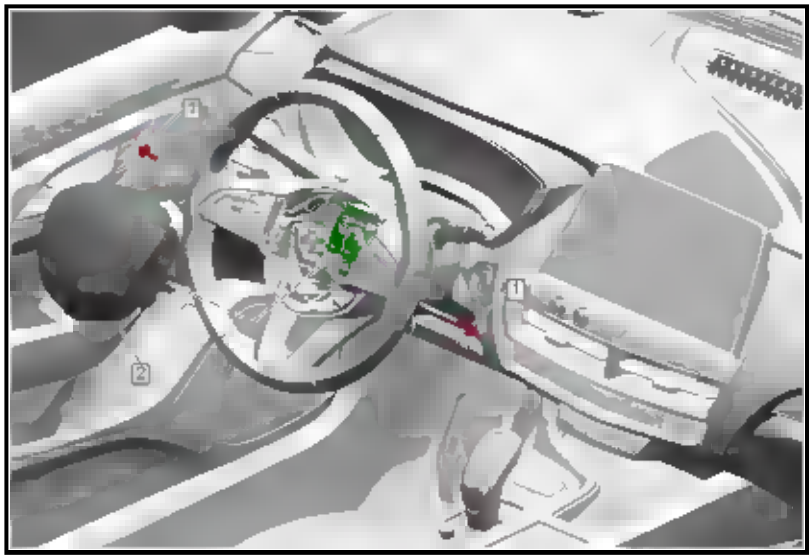
WARNING: **After installation of the steering wheel airbag module to the steering wheel, slightly pull the module outward. If there is no give on the airbag module then it is secured correctly. If the airbag module is not fully attached personal injury could result.**

1. Disable the SIR system. **SIR Disabling and Enabling**

2. 

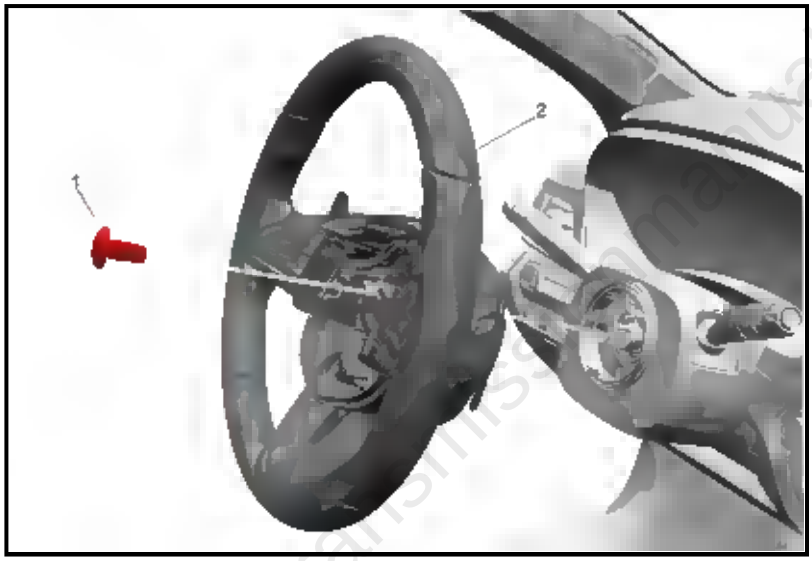
    Use a flat bladed plastic trim tool to depress the steering wheel airbag access hole cover detents to remove the 2 steering wheel airbag access hole covers (1).

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3. 

   Steering Wheel Airbag Bolt (1) - Remove [2x]

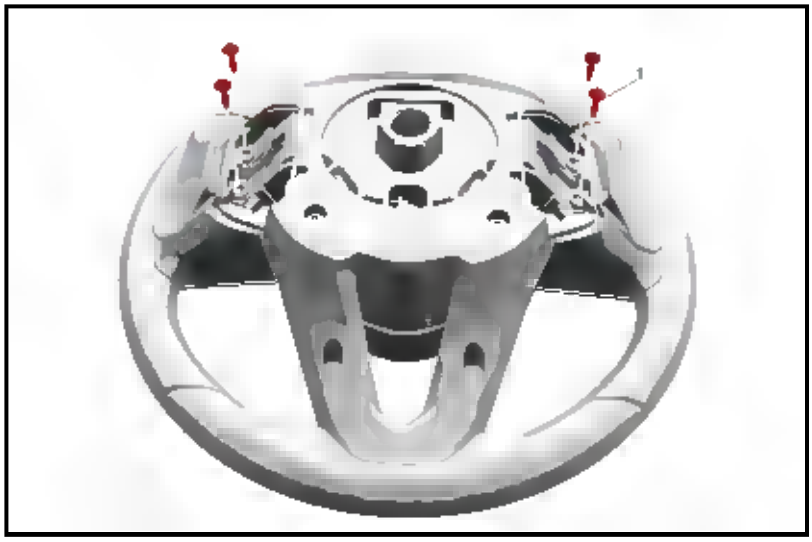
4. Release the connector position assurance (CPA) retainer.
5. Disconnect the electrical connectors.
6. Steering Wheel Airbag (2) - Remove

7. 

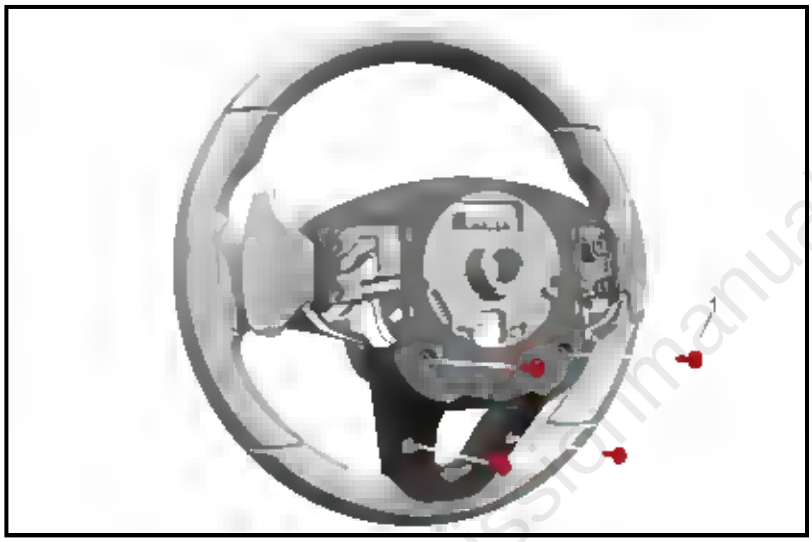
   Loosen the steering wheel bolt (1) so that 2 - 3 threads are engaged.

8. Wiggle the steering wheel until the wheel disengages completely.
9. Steering Wheel Bolt (1) - Remove
10. Steering Wheel (2) - Remove

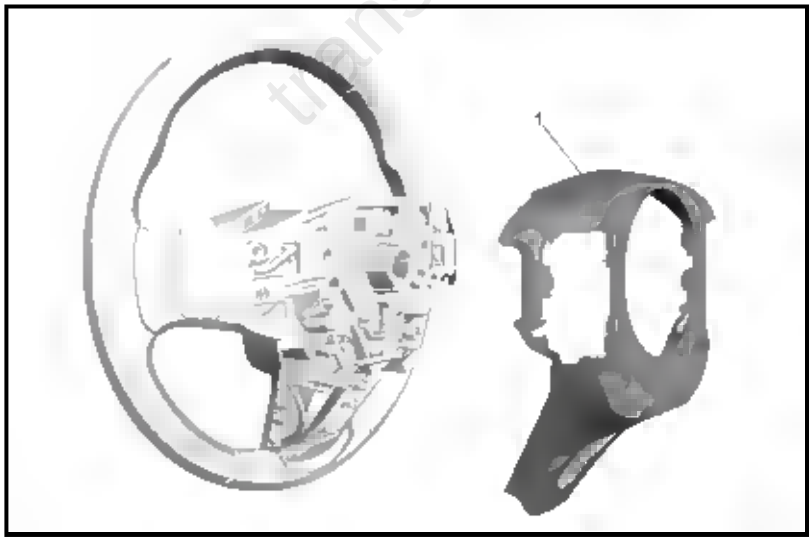
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11. 

Steering Wheel Bolt (1) @ Automatic Transmission Manual Shift Auxiliary Position Switch - Remove [4x]

12. 

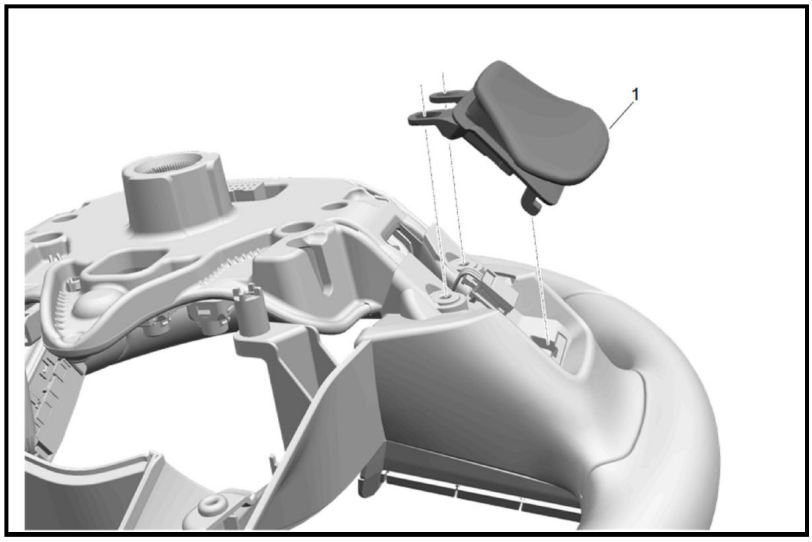
Steering Wheel Bolt (1) @ Steering Wheel Shroud - Remove [4x]

13. 

Steering Wheel Shroud (1) - Remove

14. Disconnect the electrical connectors.

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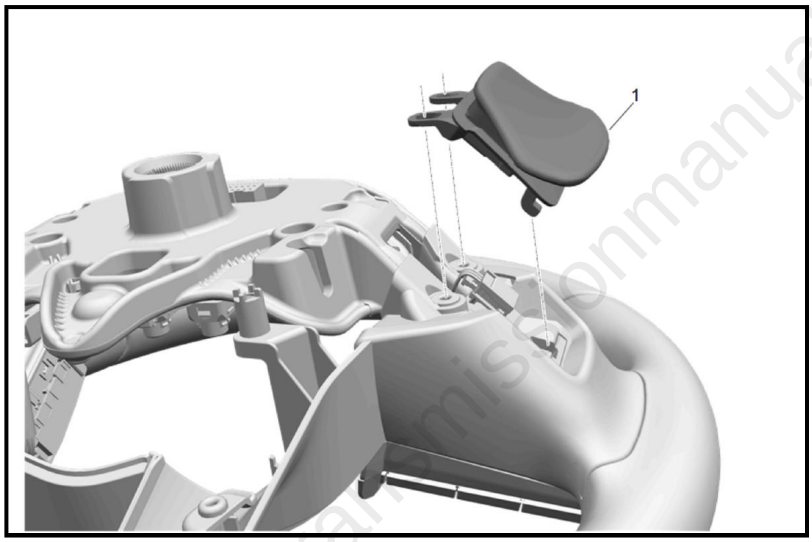
15. 

Automatic Transmission Manual Shift Auxiliary Position Switch-Right Side (1) - Remove

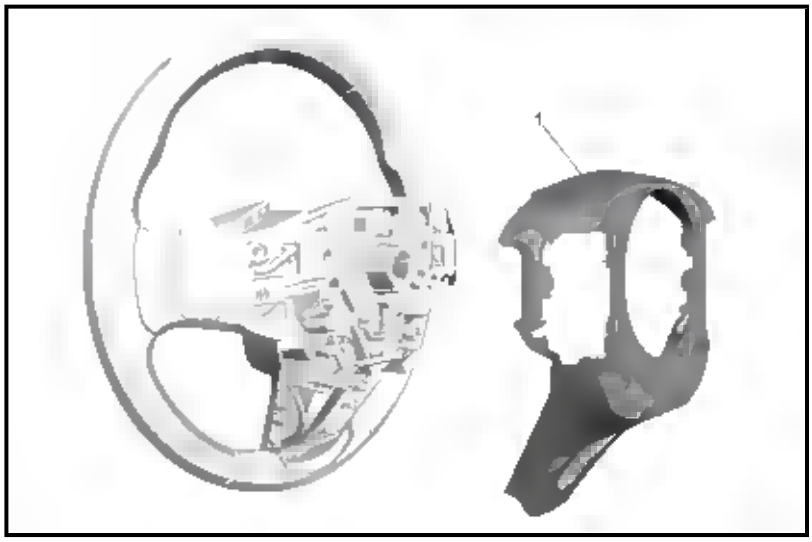
16. Disconnect the electrical connector.

Installation Procedure

1. Connect the electrical connector.

2. 

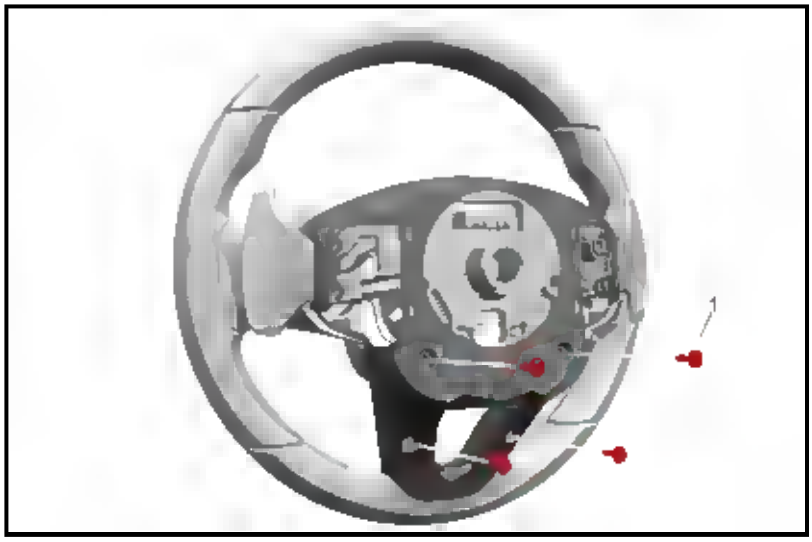
Automatic Transmission Manual Shift Auxiliary Position Switch-Right Side (1) - Install

3. 

Steering Wheel Shroud (1) - Install

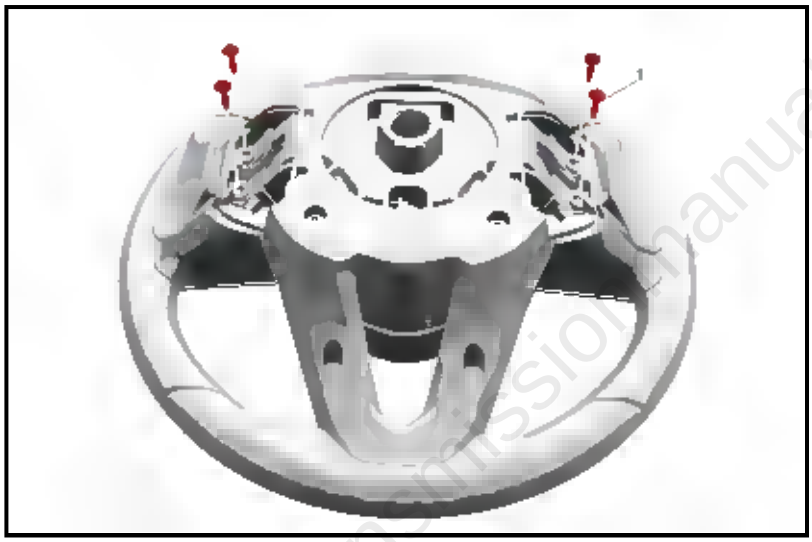
transmissionmanuals.com

4. Connect the electrical connectors.

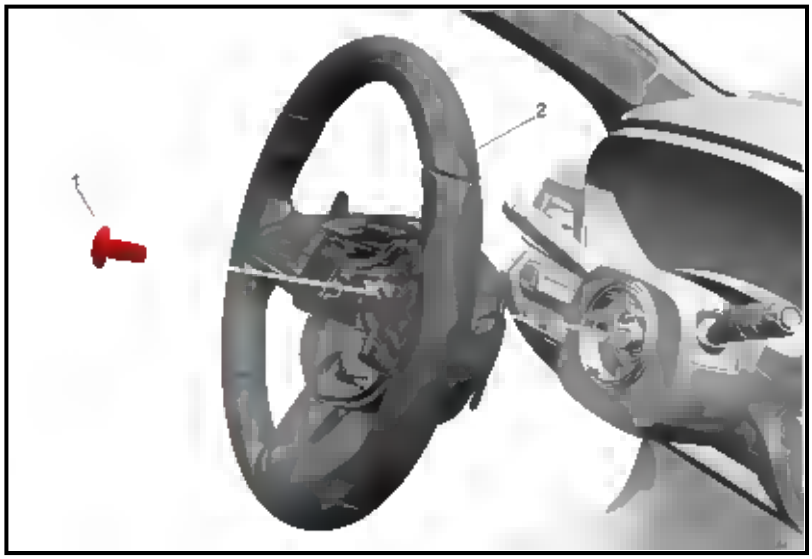
5. 

CAUTION: **Fastener Caution** .

Steering Wheel Bolt (1) @ Steering Wheel Shroud - Install and tighten [4x] - **Fastener Specifications**

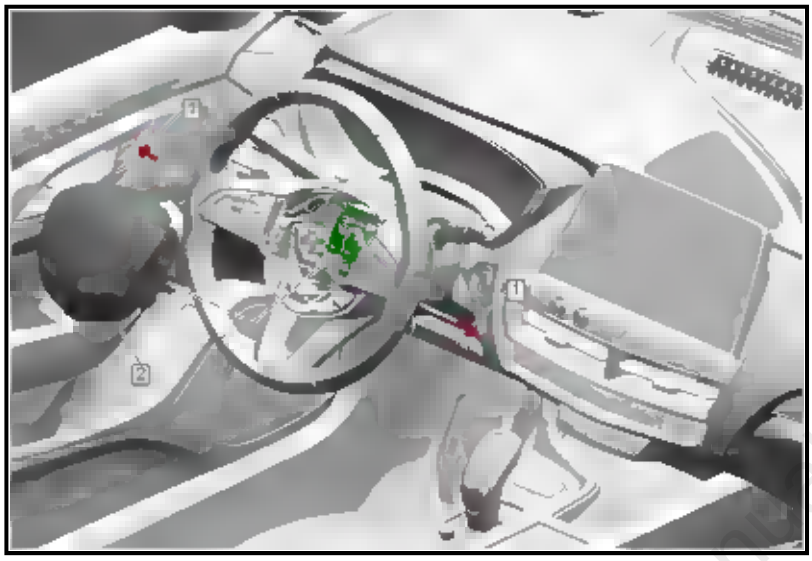
6. 

Steering Wheel Bolt (1) @ Automatic Transmission Manual Shift Auxiliary Position Switch - Install and tighten [4x] - refer to **Fastener Specifications** .

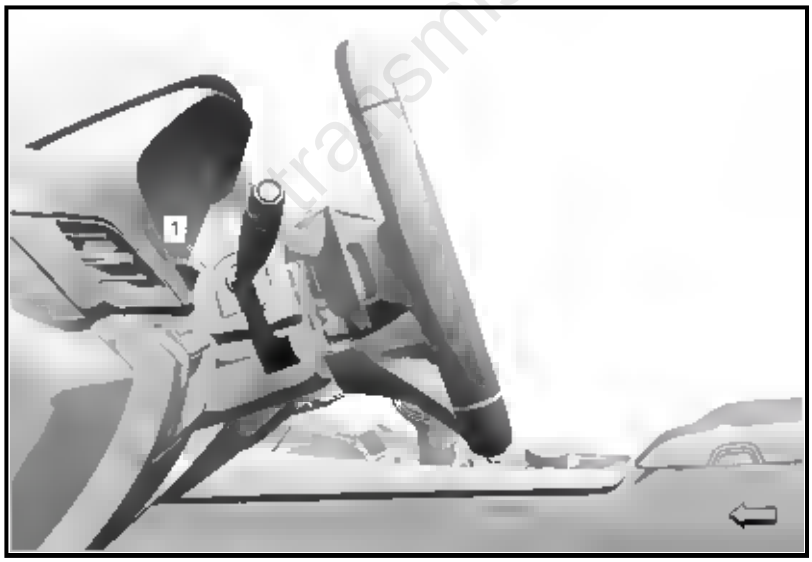
7. 

Steering Wheel (2) - Install

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8. Prepare the steering wheel bolt (1) for installation as follows:
    1. Remove any loose cured adhesive from the external threads of the component using a lint free cloth.
    2. Thread the cleaned component into the internal mating threads and remove to loosen trapped cured adhesive.
    3. Apply thread locking adhesive to the external threads of the component. **Adhesives, Fluids, Lubricants, and Sealers**
    4. Ensure there are no gaps in the thread locking adhesive once applied to the component.
9. Steering Wheel Bolt (1) - Install and tighten - **Fastener Specifications**
10. 

    Connect the electrical connectors.

11. Install any connector position assurance (CPA) devices or secondary locks.
12. Steering Wheel Airbag (2) - Install
13. Steering Wheel Airbag Bolt (1) - Install and tighten [2x] - **Fastener Specifications**
14. 

    Install the 2 steering wheel airbag access hole covers (1).

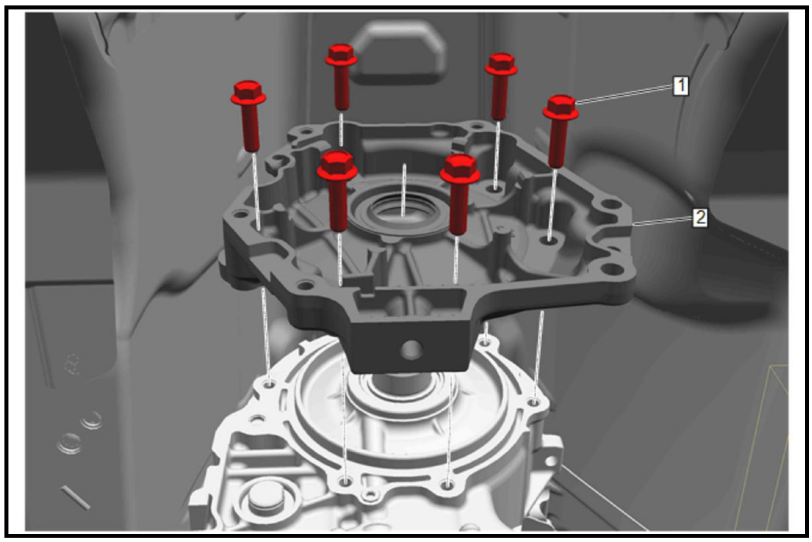
15. Enable the SIR System. **SIR Disabling and Enabling**

AUTOMATIC TRANSMISSION CASE EXTENSION REPLACEMENT (ALL WHEEL DRIVE)

Removal Procedure

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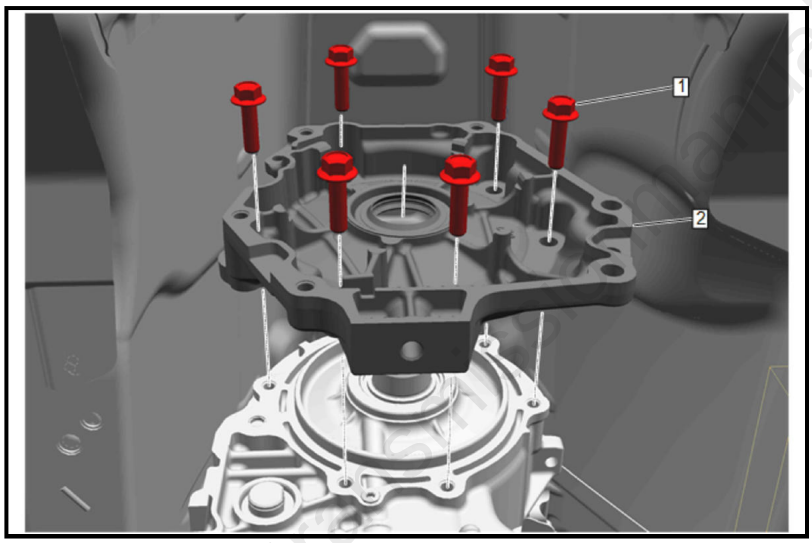
1. Transfer Case - Remove - **Transfer Case Assembly Replacement**

2. 

   Automatic Transmission Case Extension Bolt (1) - Remove [6x]

3. Automatic Transmission Case Extension (2) - Remove

Installation Procedure

1. 

   Automatic Transmission Case Extension (2) - Install

   CAUTION: **Refer to Fastener Caution .**

2. Automatic Transmission Case Extension Bolt (1) - Install and tighten in sequence [6x] - **Fastener Specifications**
3. Transfer Case - Install - **Transfer Case Assembly Replacement**
4. If necessary, check the transmission fluid level and condition. **Transmission Fluid Level and Condition Check**

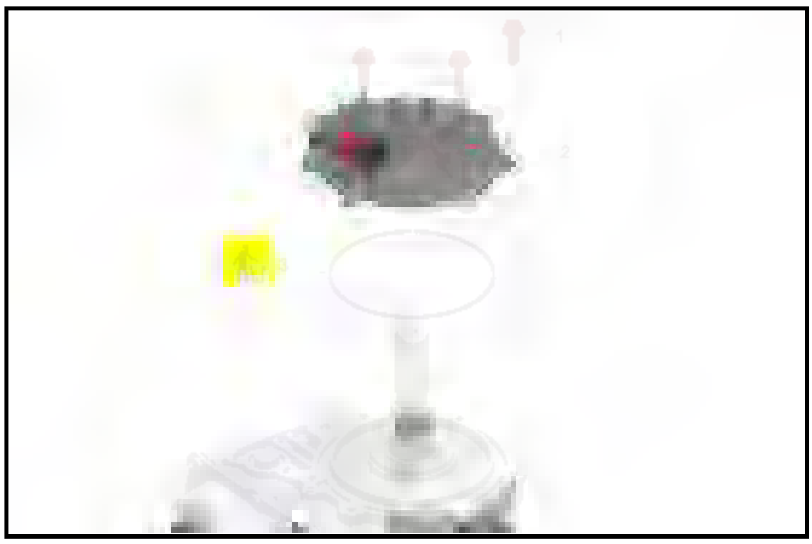
AUTOMATIC TRANSMISSION CASE EXTENSION REPLACEMENT (REAR WHEEL DRIVE)

Single Use Fasteners and Components

- Automatic Transmission Case Extension Seal

Removal Procedure

1. Transmission - Remove - **Transmission Replacement (Rear Wheel Drive)**

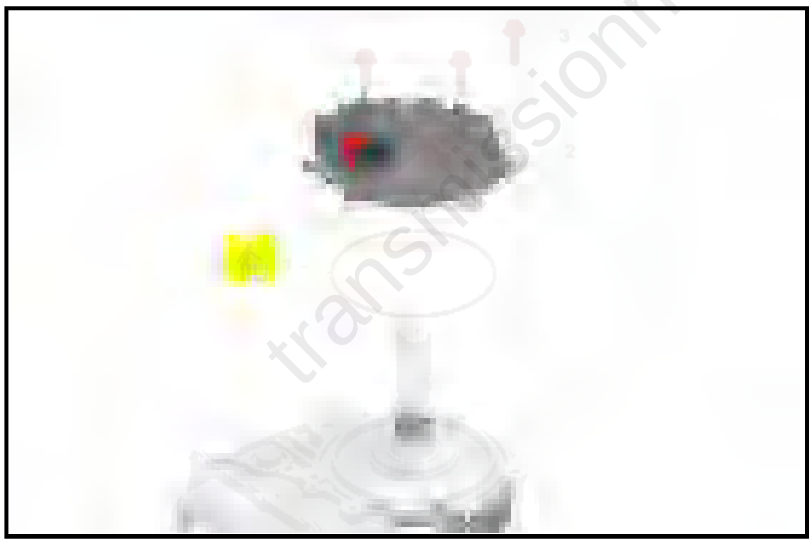
2. 

CAUTION: **Before removing the automatic transmission case extension, place the transmission in a vertical position with the case extension facing up. Failure to do so may result in damage to the transmission output shaft bearing and/or sleeve.**

Automatic Transmission Case Extension Bolt (1) - Remove [6x]

3. Allow any remaining transmission fluid to drain from the case extension.
4. Automatic Transmission Case Extension (2) - Remove
5. Automatic Transmission Case Extension Seal (3) - Remove and DISCARD

Installation Procedure

1. 

Automatic Transmission Case Extension Seal (1) - Install NEW

2. Lubricate the inside diameter of the output shaft seal before installing the extension onto the transmission. **Adhesives, Fluids, Lubricants, and Sealers**

CAUTION: **Before installing the transmission case extension to the transmission case, make certain all internal transmission components including the stator shaft support assembly and output carrier are in place. Failure to do so may result in damage to the transmission.**

3. Automatic Transmission Case Extension (2) - Install
4. Automatic Transmission Case Extension Bolt (3) - Install and hand tighten [6x]

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CAUTION: Refer to Fastener Caution

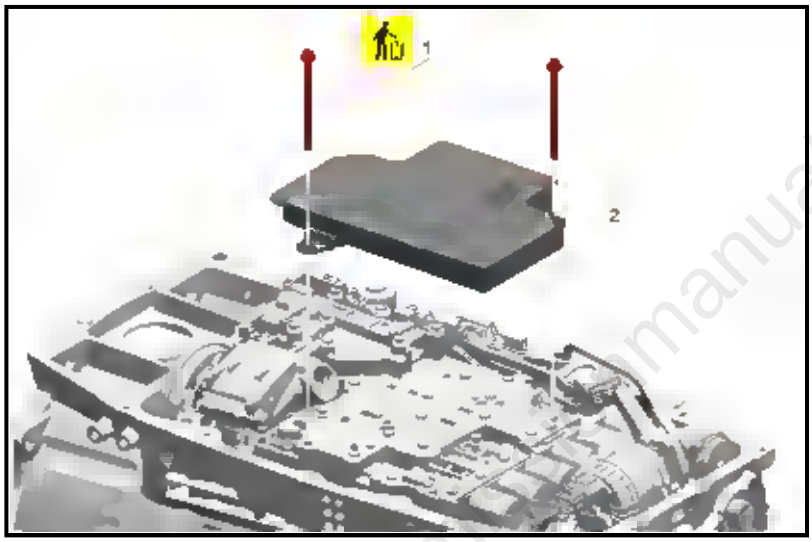
5. Automatic Transmission Case Extension Bolt (3) - Tighten in sequence - **Fastener Specifications**
6. Transmission - Install - **Transmission Replacement (Rear Wheel Drive)**

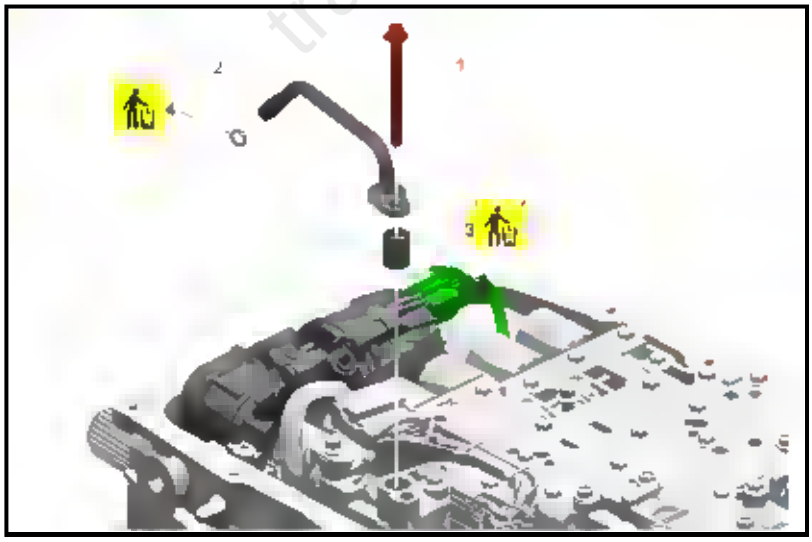
CONTROL VALVE BODY REPLACEMENT

Single Use Fasteners and Components

- Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal
- Automatic Transmission Auxiliary Fluid Pump Seal
- Automatic Transmission Fluid Filter Bolt [2x]
- Control Valve Solenoid Body Bolt [3x]

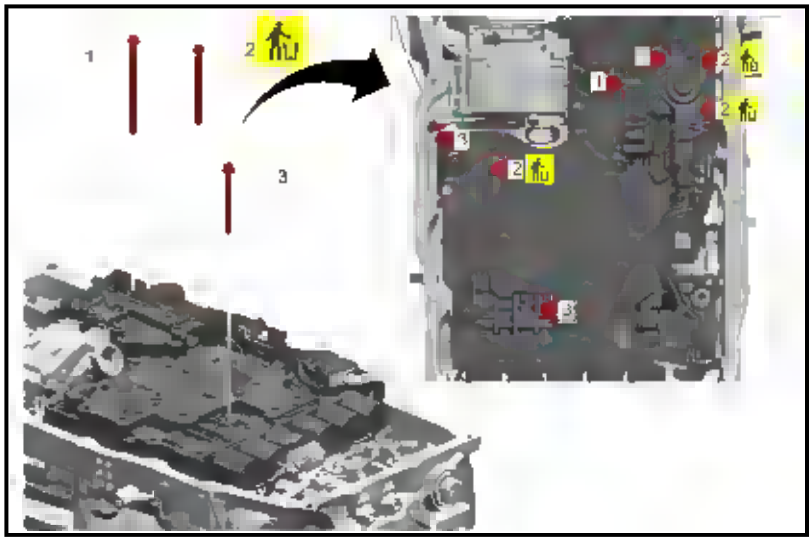
Removal Procedure

1. Raise and support the vehicle. **Lifting and Jacking the Vehicle**
2. Place a drain pan under the vehicle.
3. 

   Automatic Transmission Fluid Filter (2) - Remove - **Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement**
4. 

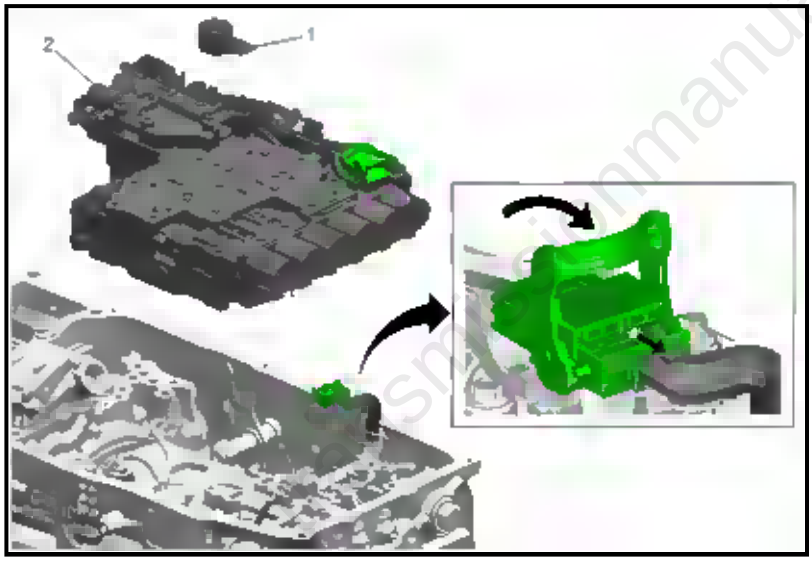
   Control Valve Upper Body Bolt (1) - Remove
5. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe (2) - Remove
6. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal (3) - Remove and DISCARD

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7. Automatic Transmission Auxiliary Fluid Pump Seal (4) - Remove and DISCARD
8. 

NOTE: **The bolts are marked by arrows in the valve body casting.**

Control Valve Solenoid Body Bolt (1) - Remove [2x]

9. Control Valve Solenoid Body Bolt (2) - Remove and DISCARD [3x]
10. Control Valve Solenoid Body Bolt (3) - Remove [2x]
11. 

Park Inhibitor Solenoid (1) - Remove

12. Disconnect the main control wiring harness connector as shown.

NOTE: **The automatic transmission fluid pump seal should stay with the control valve body assembly.**

NOTE: **Do not disassemble the control valve body assembly. The internal parts are NOT serviceable.**

13. Control Valve Body Assembly (2) - Remove

Installation Procedure

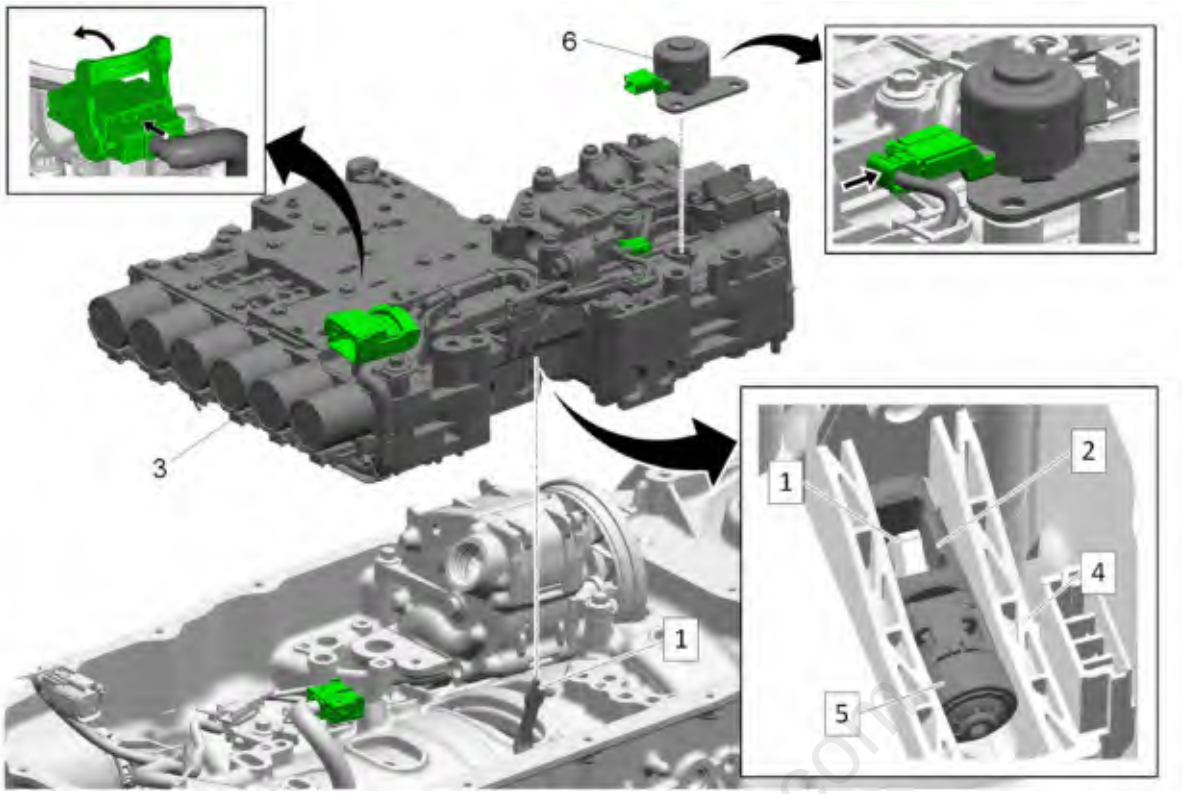
1. 

Fig. 4: Identifying Control Valve Assembly Installation Components
Courtesy of GENERAL MOTORS COMPANY

NOTE: **Ensure the automatic transmission fluid pump seal is in the control valve body.**

Control Valve Body Assembly (1) - Install

NOTE: **The locating pins on the bottom of the control valve body assembly will hold the control valve body assembly in place while installing bolts.**

2. Install the control valve body assembly into the case.

NOTE: **Ensure the wiring harness is not pinched anywhere after valve body installation.**

3. Connect the main control wiring harness connector as shown.
4. Park Inhibitor Solenoid (2) - Install

5. 

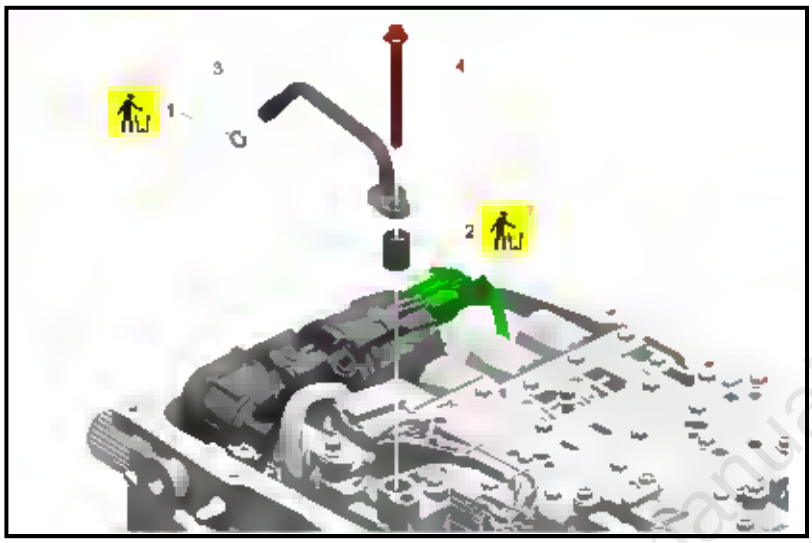
transmissionmanuals.com

Clean the bolt holes and ensure they are free from any old sealant. Allow to dry before installing NEW bolts.

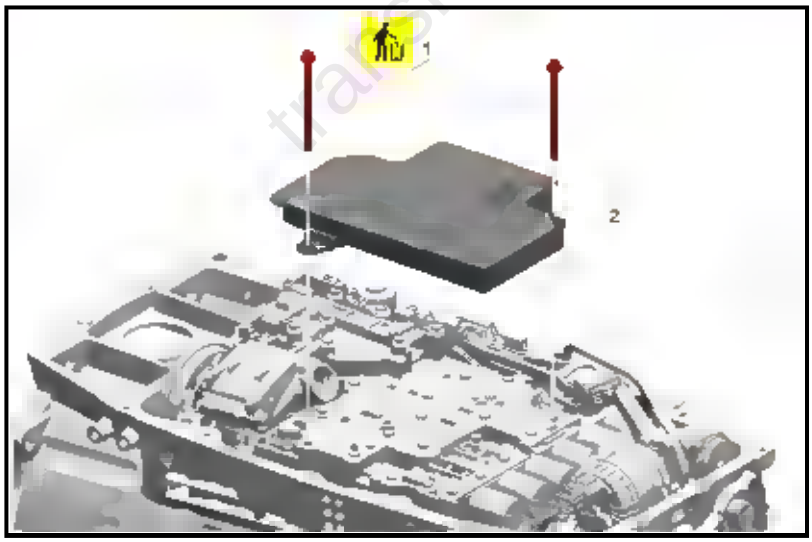
CAUTION: **Refer to Fastener Caution**

6. Control Valve Solenoid Body Bolt (1) - Install and tighten in sequence [2x] - **Fastener Specifications**

NOTE: **The bolts are marked by arrows in the valve body casting.**

7. Control Valve Solenoid Body Bolt (2) Install NEW and tighten in sequence [3x] - **Fastener Specifications**
8. Control Valve Solenoid Body Bolt (3) Install and tighten in sequence [2x] - **Fastener Specifications**
9. 

Automatic Transmission Auxiliary Fluid Pump Seal (1) - Install NEW

10. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal (2) - Install NEW
11. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe (3) - Install
12. Control Valve Upper Body Bolt (4) - Install and tighten - **Fastener Specifications**
13. 

Automatic Transmission Fluid Filter (2) - Install - **Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement**

14. Remove the drain pan.
15. Lower the vehicle.

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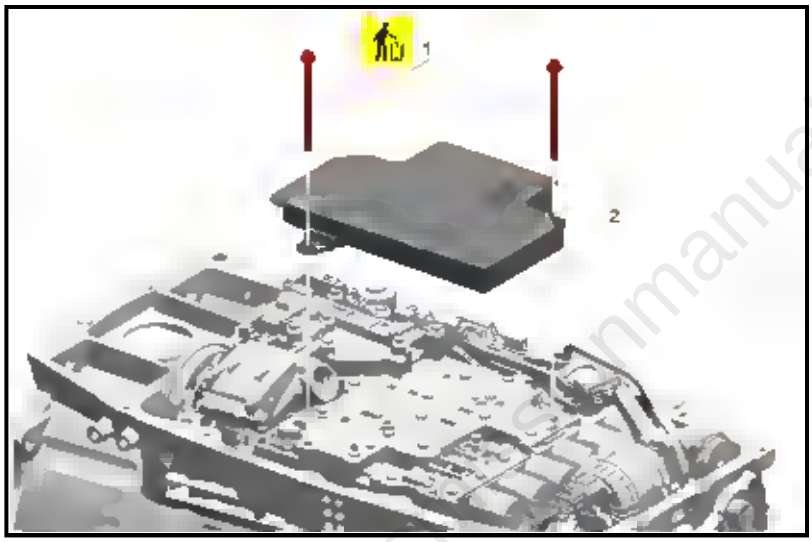
16. Fill the transmission to the proper level with NEW transmission fluid. **Transmission Fluid Level and Condition Check**
17. Perform the solenoid valve characterization reprogramming procedure. **Q77 Transmission Control Solenoid Valve Characterization Programming (10L60)**

AUTOMATIC TRANSMISSION FLUID PUMP REPLACEMENT

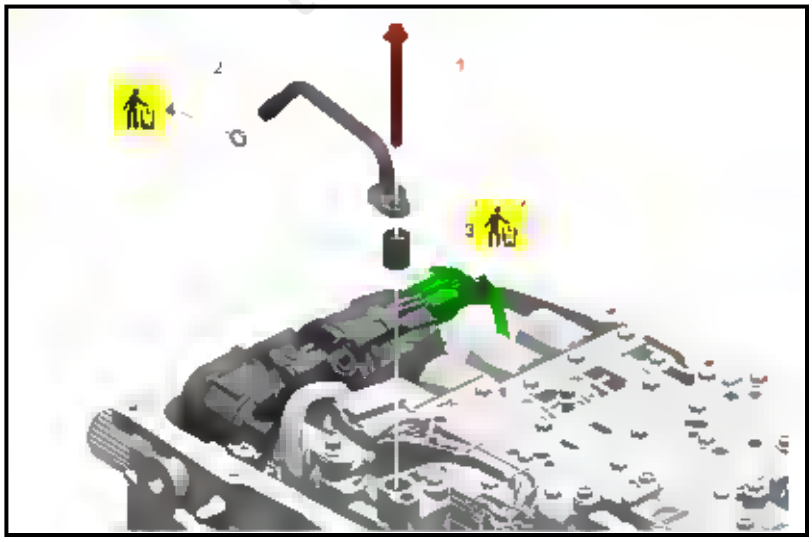
Single Use Fasteners and Components

- Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal
- Automatic Transmission Auxiliary Fluid Pump Seal
- Automatic Transmission Fluid Filter Bolt [2x]
- Automatic Transmission Fluid Pump Seal [2x]
- Control Valve Solenoid Body Bolt [3x]

Removal Procedure

1. Raise and support the vehicle. **Lifting and Jacking the Vehicle**
2. Place a drain pan under the vehicle.
3. 

   Automatic Transmission Fluid Filter (2) - Remove - **Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement**

4. 

   Control Valve Upper Body Bolt (1) - Remove

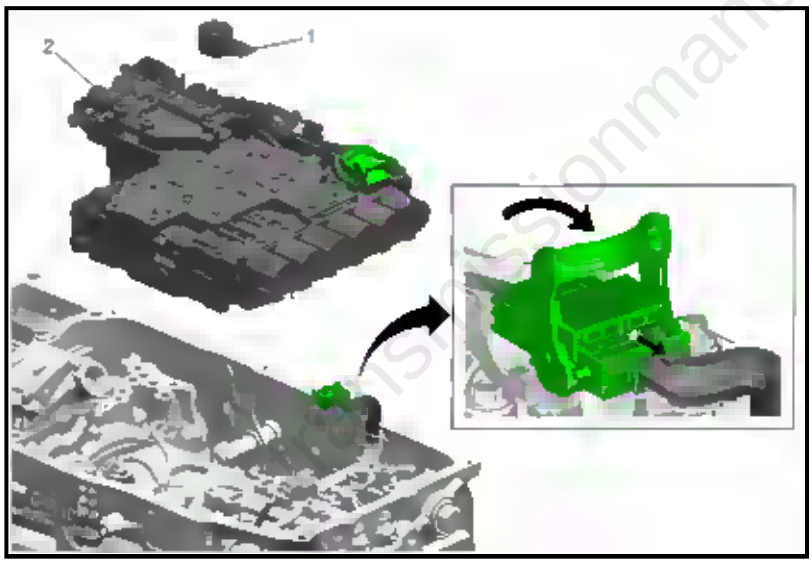
5. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe (2) - Remove

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6. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal (3) - Remove and DISCARD
7. Automatic Transmission Auxiliary Fluid Pump Seal (4) - Remove and DISCARD
8. 

NOTE: **The bolts are marked by arrows in the valve body casting.**

Control Valve Solenoid Body Bolt (1) - Remove [2x]

9. Control Valve Solenoid Body Bolt (2) - Remove and DISCARD [3x]
10. Control Valve Solenoid Body Bolt (3) - Remove [2x]
11. 

Park Inhibitor Solenoid (1) - Remove

12. Disconnect the main control wiring harness connector as shown.

NOTE: **The automatic transmission fluid pump seal should stay with the control valve body assembly.**

NOTE: **Do not disassemble the control valve body assembly. The internal parts are NOT serviceable.**

13. Control Valve Body Assembly (2) - Remove

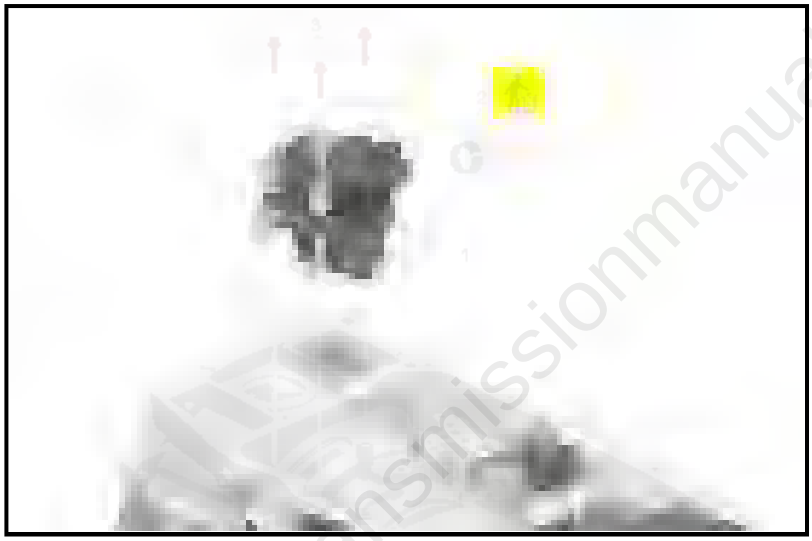
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14. 

    Automatic Transmission Fluid Pump Bolt (1) - Remove [3x]

15. Automatic Transmission Fluid Pump Seal (2) - Remove and DISCARD
16. Automatic Transmission Fluid Pump (3) - Remove

Installation Procedure

1. 

    Automatic Transmission Fluid Pump (1) - Install

2. Automatic Transmission Fluid Pump Seal (2) - Install NEW

    CAUTION: **Refer to Fastener Caution .**

3. Automatic Transmission Fluid Pump Bolt (3) - Install and tighten [3x] - **Fastener Specifications**

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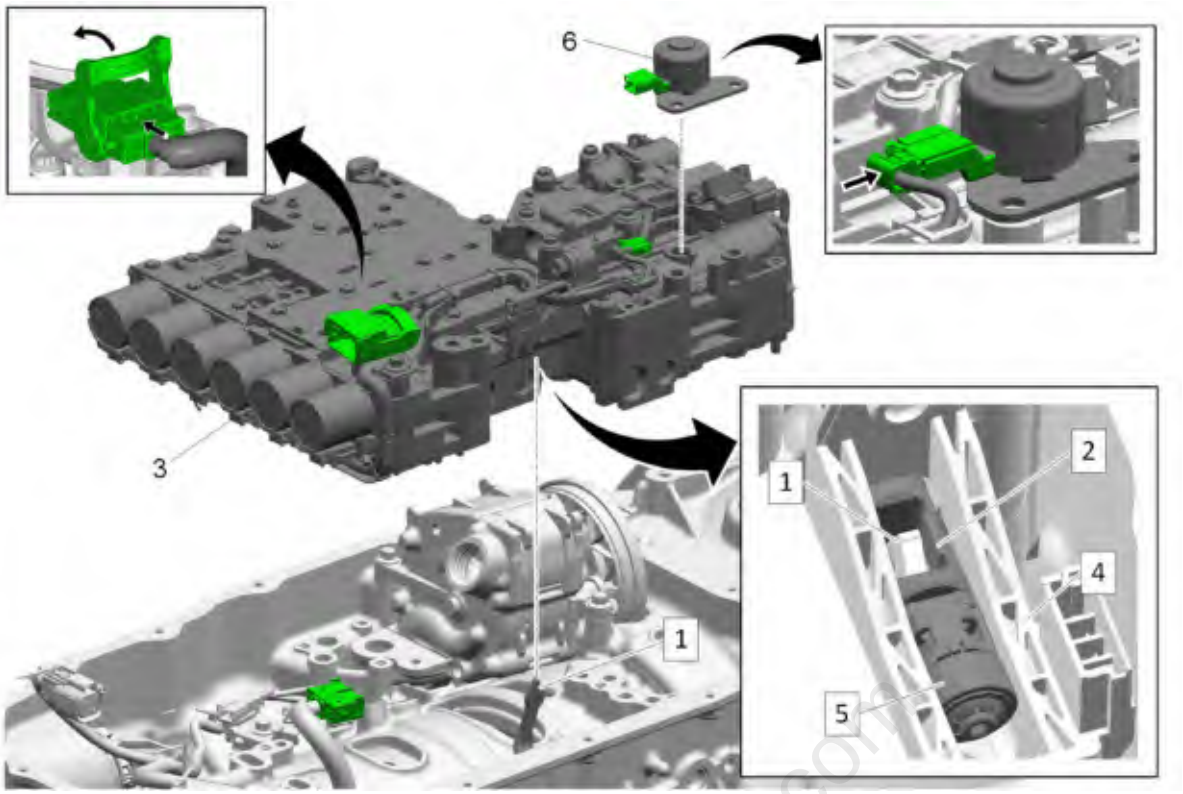
4. 

Fig. 5: Identifying Control Valve Assembly Installation Components
Courtesy of GENERAL MOTORS COMPANY

NOTE: **Ensure the automatic transmission fluid pump seal is in the control valve body.**

NOTE: **The locating pins on the bottom of the control valve body assembly will hold the control valve body assembly in place while installing bolts.**

Control Valve Body Assembly (1) - Install

5. Install the control valve body assembly into the case.

NOTE: **Ensure the wiring harness is not pinched anywhere after valve body installation.**

6. Connect the main control wiring harness connector as shown.
7. Park Inhibitor Solenoid (2) - Install

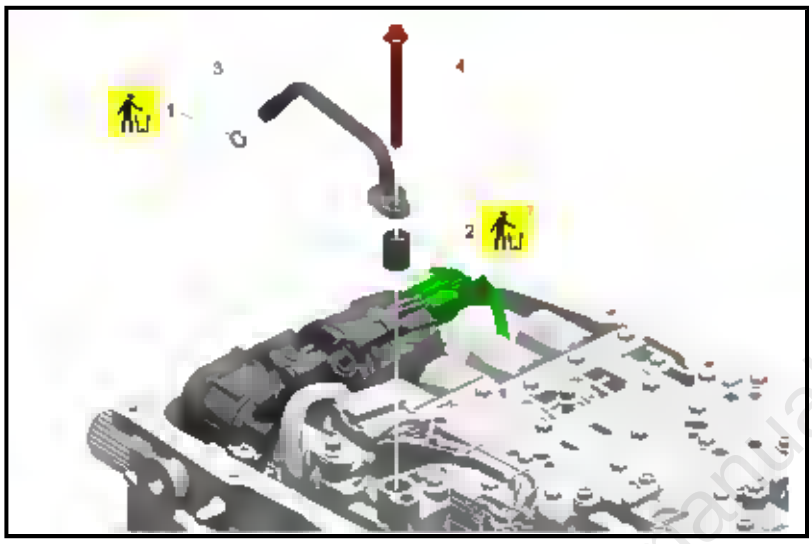
8. 

Clean the bolt holes and ensure they are free from any old sealant. Allow to dry before installing NEW bolts.

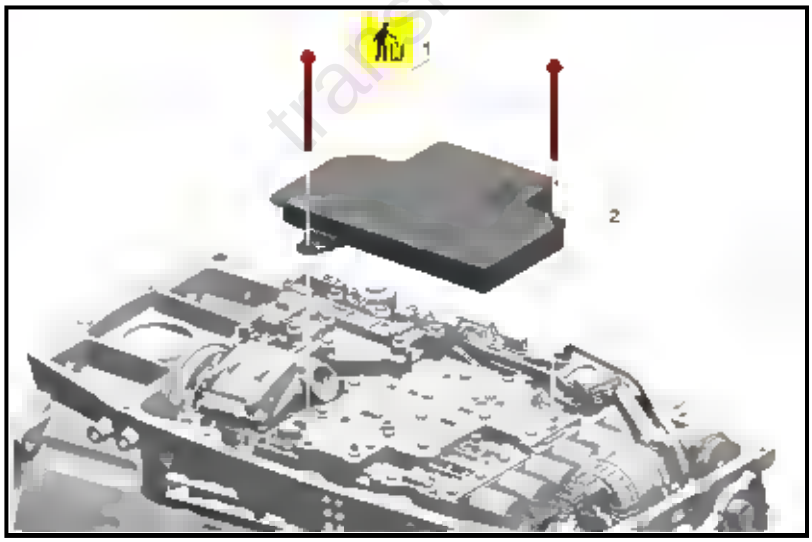
CAUTION: **Refer to Fastener Caution**

9. Control Valve Solenoid Body Bolt (1) - Install and tighten in sequence [2x] - **Fastener Specifications**

NOTE: **The bolts are marked by arrows in the valve body casting.**

10. Control Valve Solenoid Body Bolt (2) - Install NEW and tighten in sequence [3x] - **Fastener Specifications**
11. Control Valve Solenoid Body Bolt (3) - Install and tighten in sequence [2x] - **Fastener Specifications**
12. 

Automatic Transmission Auxiliary Fluid Pump Seal (1) - Install NEW

13. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal (2) - Install NEW
14. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe (3) - Install
15. Control Valve Upper Body Bolt (4) - Install and tighten - **Fastener Specifications**
16. 

Automatic Transmission Fluid Filter (2) - Install - **Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement**

17. Remove the drain pan.
18. Lower the vehicle.

19. Fill the transmission to the proper level with NEW transmission fluid. **Transmission Fluid Level and Condition Check**
20. Perform the solenoid valve characterization reprogramming procedure. **Q77 Transmission Control Solenoid Valve Characterization Programming (10L60)**

AUTOMATIC TRANSMISSION FLUID PUMP DRIVEN GEAR BAFFLE REPLACEMENT

Removal Procedure

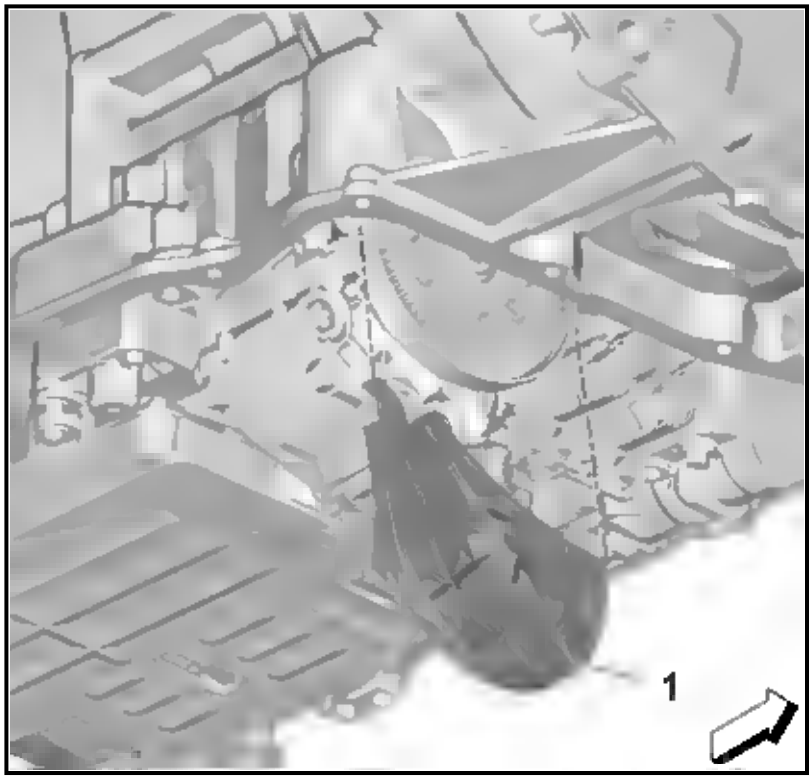
1. Remove the automatic transmission fluid pan. **Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement**
2. 

NOTE: **Only the front portion of the baffle is removed, the rear portion of the baffle remains fastened to the pump.**

Unsnap and remove the automatic transmission fluid pump driven gear baffle (1) from the automatic transmission fluid pump.

Installation Procedure

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1. 

   Snap the automatic transmission fluid pump driven gear baffle (1) to the automatic transmission fluid pump.

2. Install the automatic transmission fluid pan. **Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement**

AUTOMATIC TRANSMISSION FLUID PUMP DRIVEN GEAR REPLACEMENT

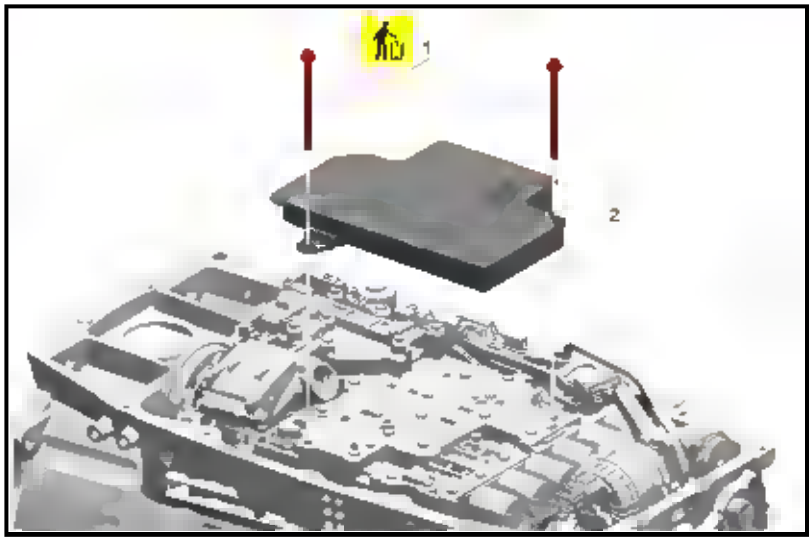
Single Use Fasteners and Components

- Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal
- Automatic Transmission Auxiliary Fluid Pump Seal
- Automatic Transmission Fluid Filter Bolt [2x]
- Automatic Transmission Fluid Pump Drive Shaft Retaining Ring
- Automatic Transmission Fluid Pump Seal [2x]
- Control Valve Solenoid Body Bolt [3x]

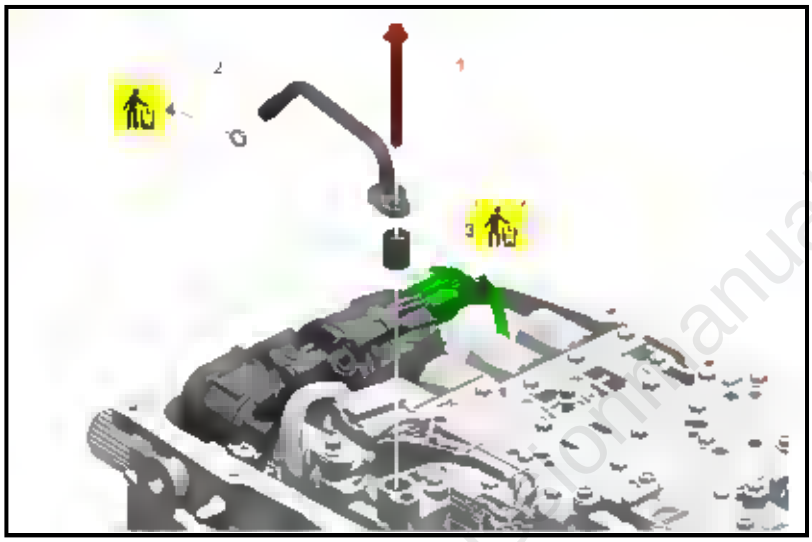
Removal Procedure

1. Raise and support the vehicle. **Lifting and Jacking the Vehicle**
2. Place a drain pan under the vehicle.

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3. 

Automatic Transmission Fluid Filter (2) - Remove - **Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement**

4. 

Control Valve Upper Body Bolt (1) - Remove

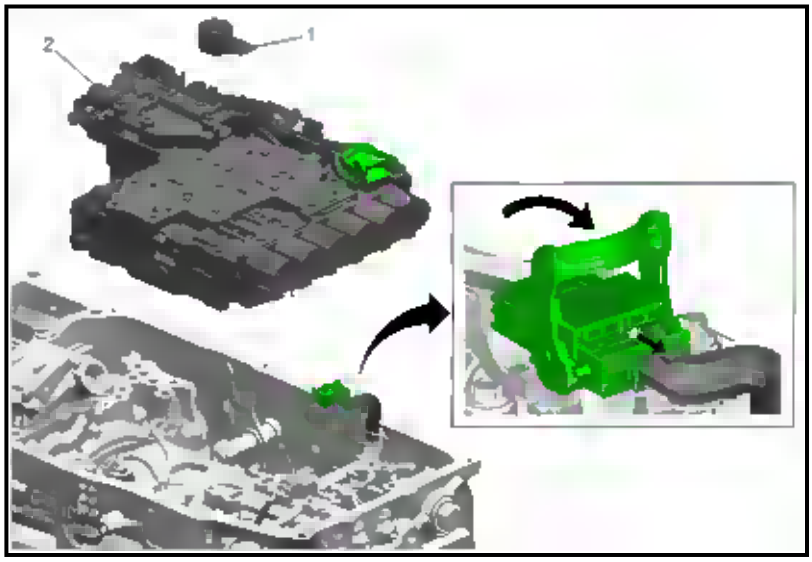
5. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe (2) - Remove
6. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal (3) - Remove and DISCARD
7. Automatic Transmission Auxiliary Fluid Pump Seal (4) - Remove and DISCARD

8. 

NOTE: **The bolts are marked by arrows in the valve body casting.**

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Control Valve Solenoid Body Bolt (1) - Remove [2x]

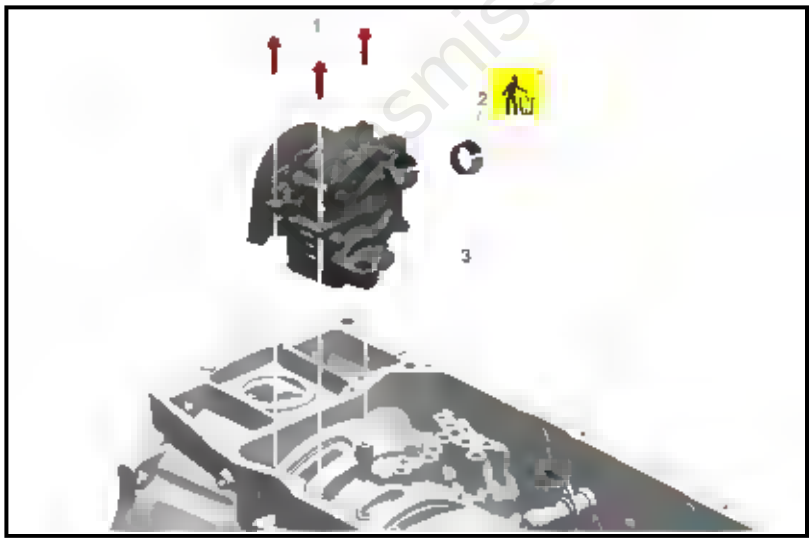
9. Control Valve Solenoid Body Bolt (2) - Remove and DISCARD [3x]
10. Control Valve Solenoid Body Bolt (3) - Remove [2x]
11. 

Park Inhibitor Solenoid (1) - Remove

12. Disconnect the main control wiring harness connector as shown.

NOTE: **The automatic transmission fluid pump seal should stay with the control valve body assembly.**

NOTE: **Do not disassemble the control valve body assembly. The internal parts are NOT serviceable.**

13. Control Valve Body Assembly (2) - Remove
14. 

Automatic Transmission Fluid Pump Bolt (1) - Remove [3x]

15. Automatic Transmission Fluid Pump Seal (2) - Remove and DISCARD
16. Automatic Transmission Fluid Pump (3) - Remove

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17. 

NOTE: **Unsnap the automatic transmission fluid pump driven gear baffle.**

Automatic Transmission Fluid Pump Driven Gear Baffle (1) - Remove

18. Automatic Transmission Fluid Pump Drive Shaft Retaining Ring (2) - Remove and DISCARD
19. Automatic Transmission Fluid Pump Driven Gear (3) - Remove

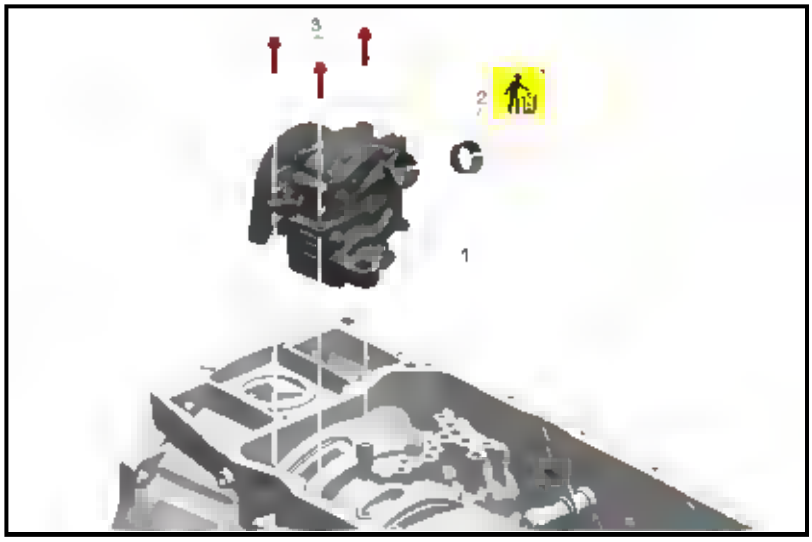
Installation Procedure

1. 

Automatic Transmission Fluid Pump Driven Gear (1) - Install

2. Automatic Transmission Fluid Pump Drive Shaft Retaining Ring (2) - Install NEW
3. Automatic Transmission Fluid Pump Driven Gear Baffle (3) - Install

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4. 

Automatic Transmission Fluid Pump (1) - Install

5. Automatic Transmission Fluid Pump Seal (2) - Install NEW

CAUTION: **Refer to Fastener Caution .**

6. Automatic Transmission Fluid Pump Bolt (3) - Install and tighten [3x] - **Fastener Specifications**

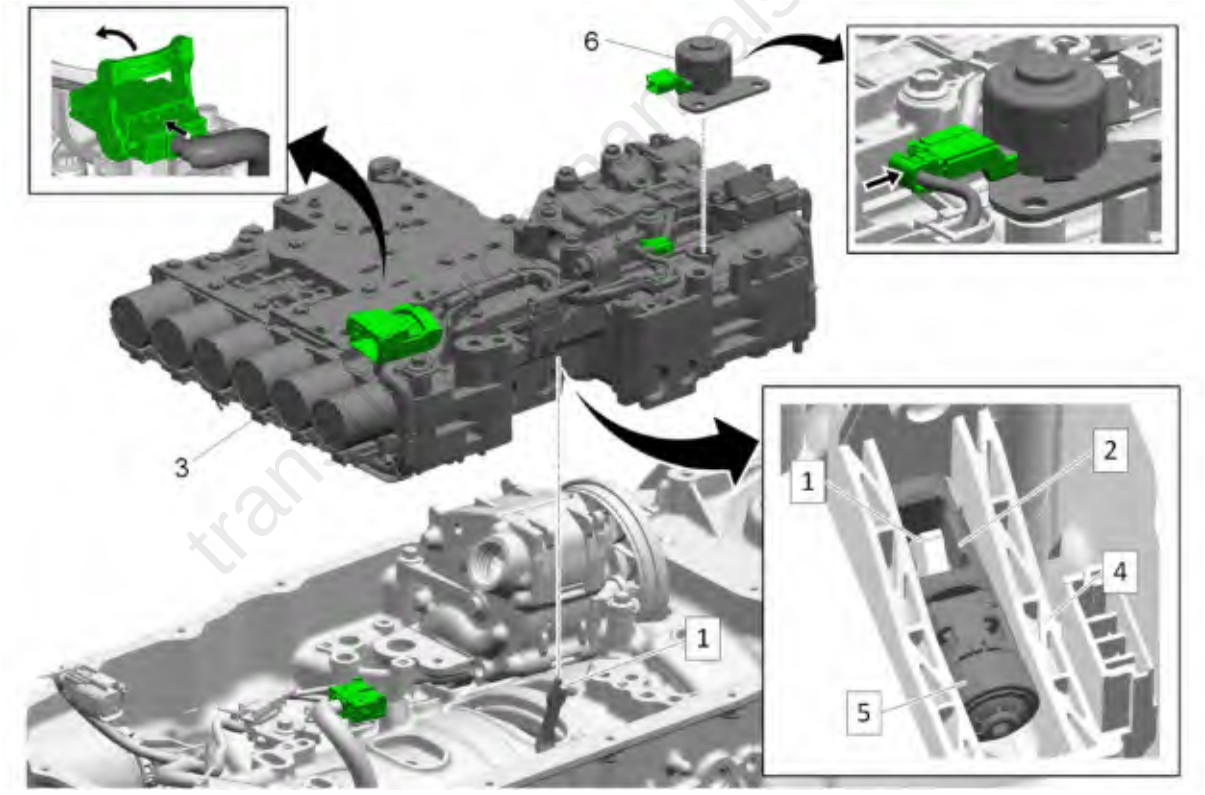
7. 

Fig. 6: Identifying Control Valve Assembly Installation Components
Courtesy of GENERAL MOTORS COMPANY

NOTE: **Ensure the automatic transmission fluid pump seal is in the control valve body.**

Control Valve Body Assembly (1) - Install

NOTE: **The locating pins on the bottom of the control valve body assembly will hold the control valve body assembly in place while installing bolts.**

8. Install the control valve body assembly into the case.

NOTE: **Ensure the wiring harness is not pinched anywhere after valve body installation.**

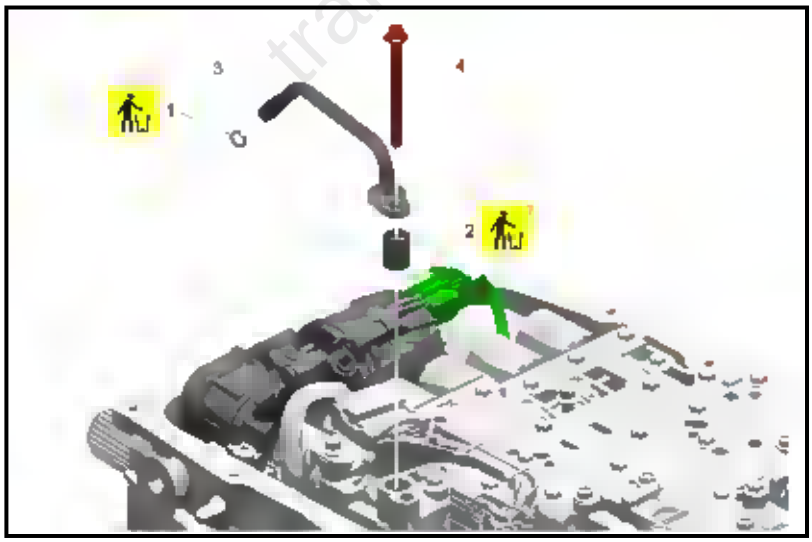
9. Connect the main control wiring harness connector as shown.
10. Park Inhibitor Solenoid (2) - Install
11. 

Clean the bolt holes and ensure they are free from any old sealant. Allow to dry before installing NEW bolts.

CAUTION: **Refer to Fastener Caution**

12. Control Valve Solenoid Body Bolt (1) - Install and tighten in sequence [2x] - **Fastener Specifications**

NOTE: **The bolts are marked by arrows in the valve body casting.**

13. Control Valve Solenoid Body Bolt (2) - Install NEW and tighten in sequence [3x] - **Fastener Specifications**
14. Control Valve Solenoid Body Bolt (3) - Install and tighten in sequence [2x] - **Fastener Specifications**
15. 

Automatic Transmission Auxiliary Fluid Pump Seal (1) - Install NEW

16. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal (2) - Install NEW
17. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe (3) - Install

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18. Control Valve Upper Body Bolt (4) - Install and tighten - **Fastener Specifications**
19. 

    Automatic Transmission Fluid Filter (2) - Install - **Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement**

20. Remove the drain pan.
21. Lower the vehicle.
22. Fill the transmission to the proper level with NEW transmission fluid. **Transmission Fluid Level and Condition Check**
23. Perform the solenoid valve characterization reprogramming procedure. **Q77 Transmission Control Solenoid Valve Characterization Programming (10L60)**

AUTOMATIC TRANSMISSION OUTPUT SPEED SENSOR REPLACEMENT

Single Use Fasteners and Components

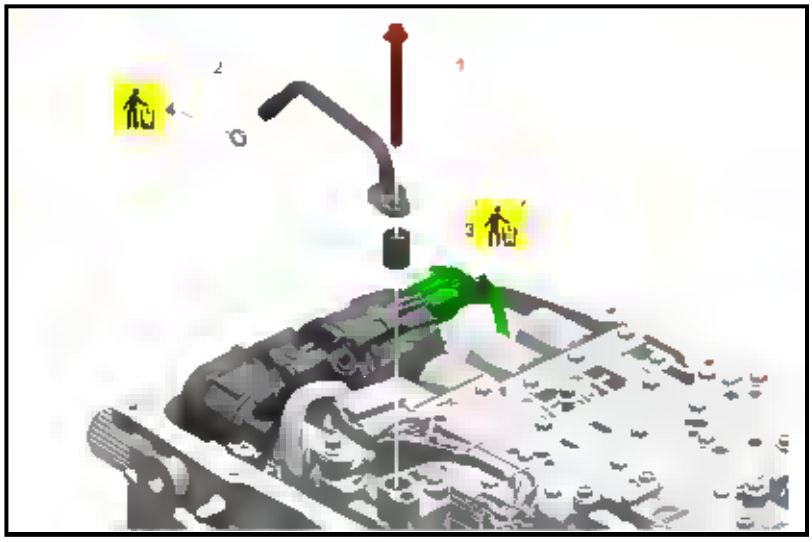
- Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal
- Automatic Transmission Auxiliary Fluid Pump Seal
- Automatic Transmission Fluid Filter Bolt [2x]
- Control Valve Solenoid Body Bolt [3x]

Removal Procedure

1. 

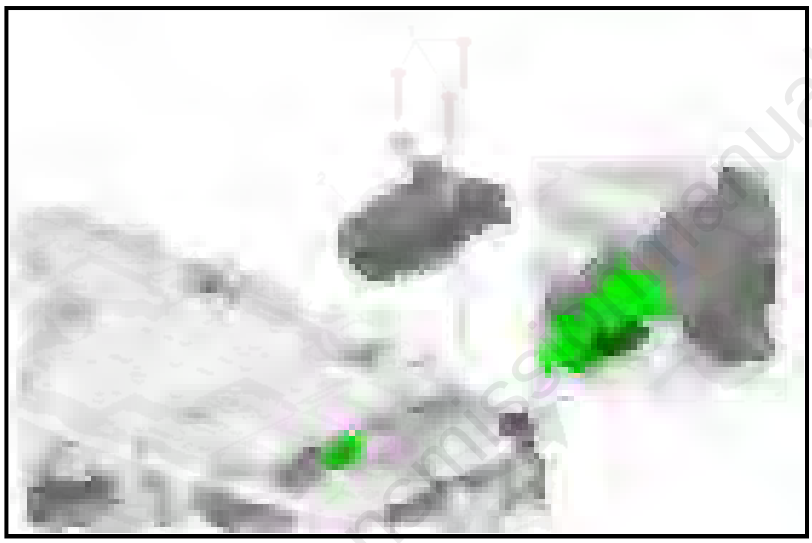
    Automatic Transmission Fluid Filter (2) - Remove - **Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement**

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2. 

Control Valve Upper Body Bolt (1) - Remove

3. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe (2) - Remove
4. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal (3) - Remove and DISCARD
5. Automatic Transmission Auxiliary Fluid Pump Seal (4) - Remove and DISCARD

6. 

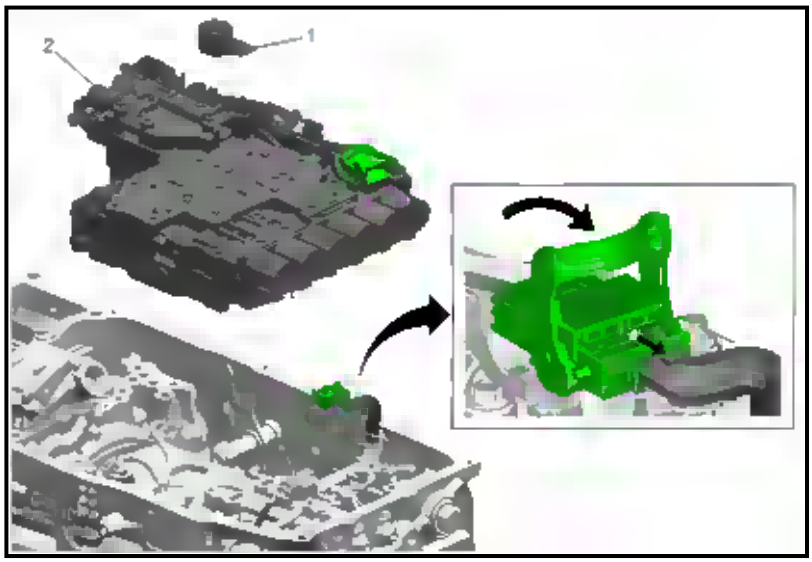
Automatic Transmission Auxiliary Fluid Pump Bolt (1) - Remove [3x]

7. Disconnect the electrical connector.
8. Automatic Transmission Auxiliary Fluid Pump (2) - Remove

9. 

NOTE: **The bolts are marked by arrows in the valve body casting.**

Control Valve Solenoid Body Bolt (1) - Remove [2x]

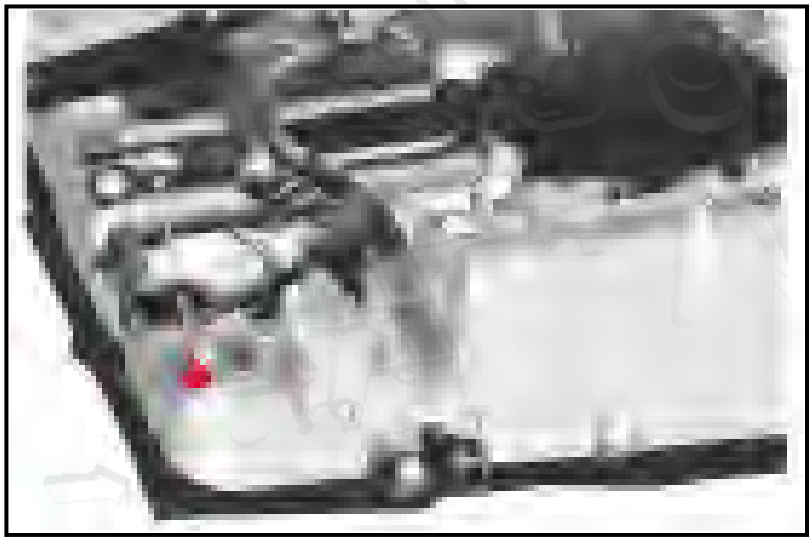
10. Control Valve Solenoid Body Bolt (2) - Remove and DISCARD [3x]
11. Control Valve Solenoid Body Bolt (3) - Remove [2x]
12. 

Park Inhibitor Solenoid (1) - Remove

13. Disconnect the main control wiring harness connector as shown.

NOTE: **The automatic transmission fluid pump seal should stay with the control valve body assembly.**

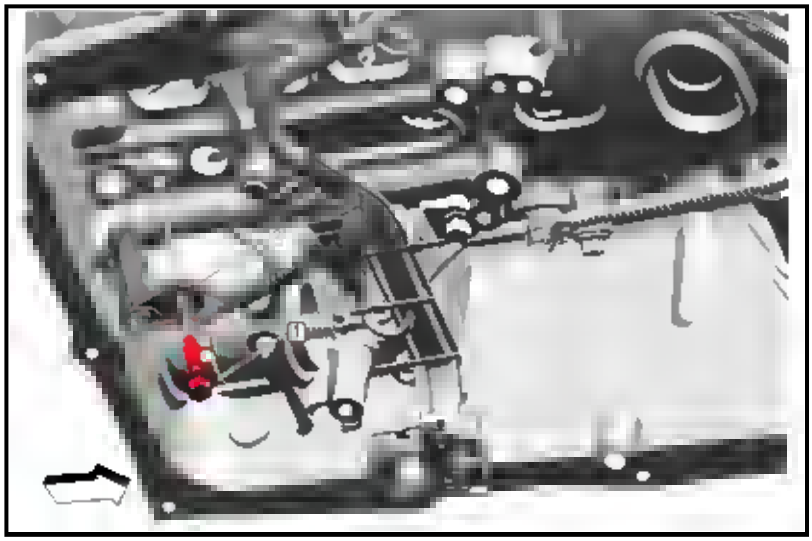
NOTE: **Do not disassemble the control valve body assembly. The internal parts are NOT serviceable.**

14. Control Valve Body Assembly (2) - Remove
15. 

Automatic Transmission Output Speed Sensor Bolt (1) - Remove

16. Automatic Transmission Output Speed Sensor (2) - Remove

Installation Procedure

1. 

Automatic Transmission Output Speed Sensor (2) - Install

CAUTION: **Refer to Fastener Caution**

2. Automatic Transmission Output Speed Sensor Bolt (1) - Install and tighten - **Fastener Specifications**

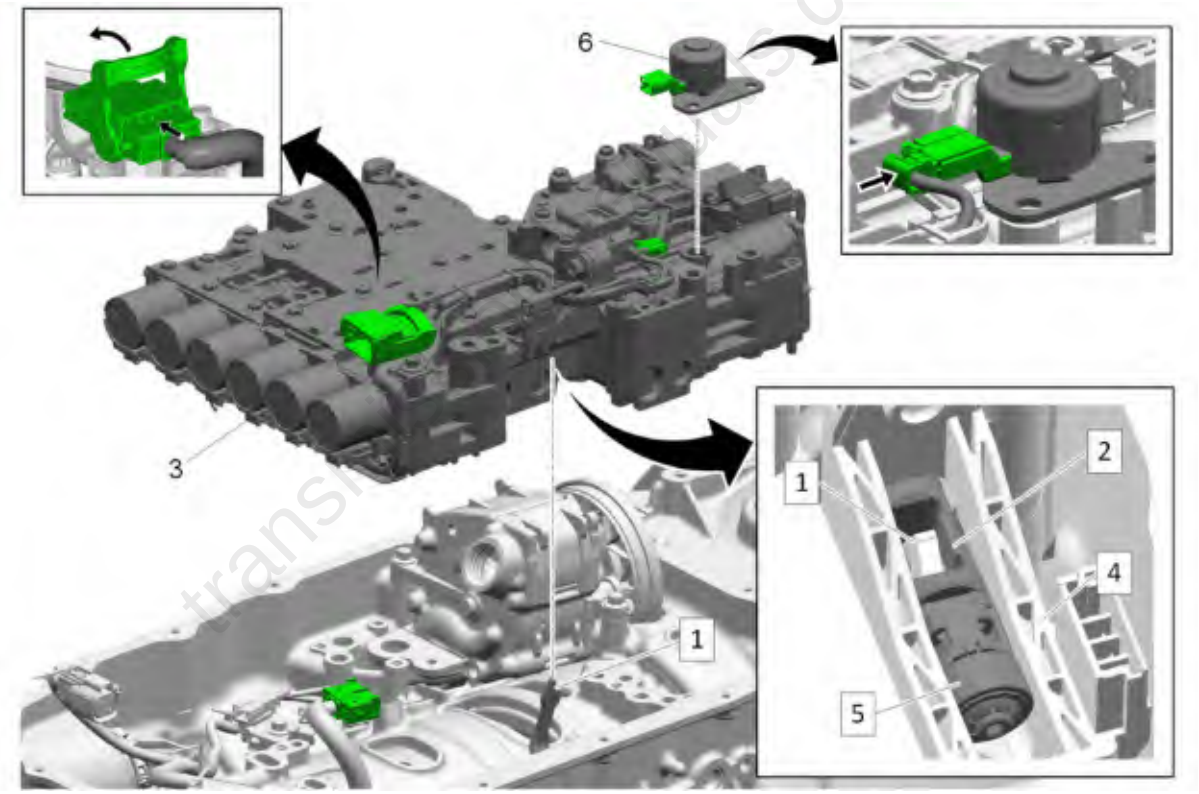
3. 

Fig. 7: Identifying Control Valve Assembly Installation Components
Courtesy of GENERAL MOTORS COMPANY

NOTE: **Ensure the automatic transmission fluid pump seal is in the control valve body.**

Control Valve Body Assembly (1) - Install

NOTE: **The locating pins on the bottom of the control valve body assembly will hold the control valve body assembly in place while installing bolts.**

4. Install the control valve body assembly into the case.

NOTE: **Ensure the wiring harness is not pinched anywhere after valve body installation.**

5. Connect the main control wiring harness connector as shown.
6. Park Inhibitor Solenoid (2) - Install
7. 

   Clean the bolt holes and ensure they are free from any old sealant. Allow to dry before installing NEW bolts.

8. Control Valve Solenoid Body Bolt (1) - Install and tighten in sequence [2x] - **Fastener Specifications**

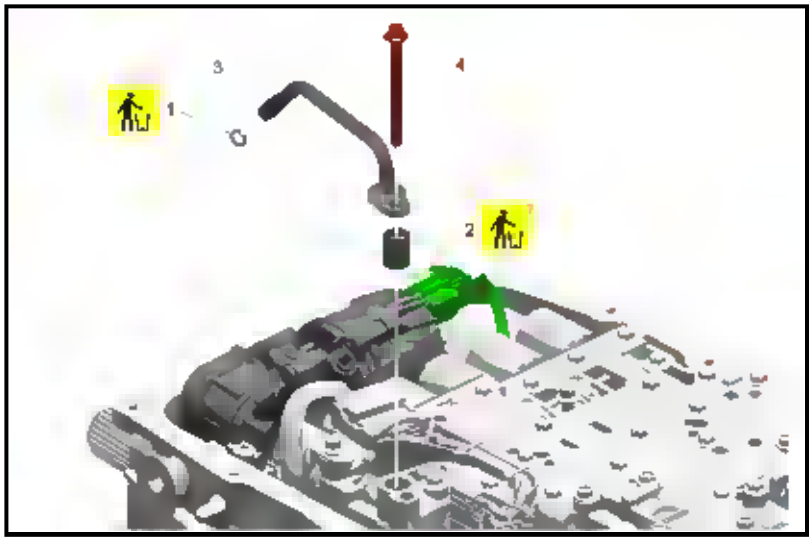
NOTE: **The bolts are marked by arrows in the valve body casting.**

9. Control Valve Solenoid Body Bolt (2) - Install NEW and tighten in sequence [3x] - **Fastener Specifications**
10. Control Valve Solenoid Body Bolt (3) - Install and tighten in sequence [2x] - **Fastener Specifications**
11. 

    Automatic Transmission Auxiliary Fluid Pump (1) - Install

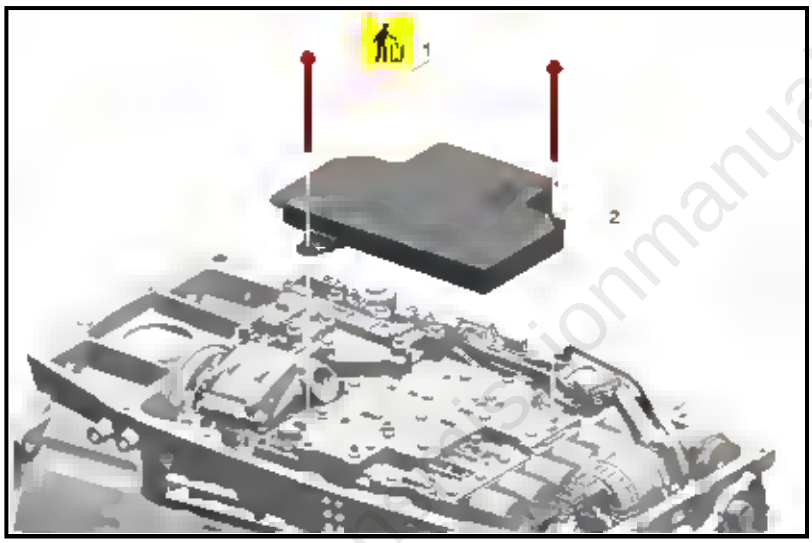
12. Connect the electrical connector.
13. Automatic Transmission Auxiliary Fluid Pump Bolt (2) - Install and tighten [3x] - **Fastener Specifications**

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14. 

    Automatic Transmission Auxiliary Fluid Pump Seal (1) - Install NEW

15. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal (2) - Install NEW
16. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe (3) - Install
17. Control Valve Upper Body Bolt (4) - Install and tighten - **Fastener Specifications**

18. 

    Automatic Transmission Fluid Filter (2) - Install - **Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement**

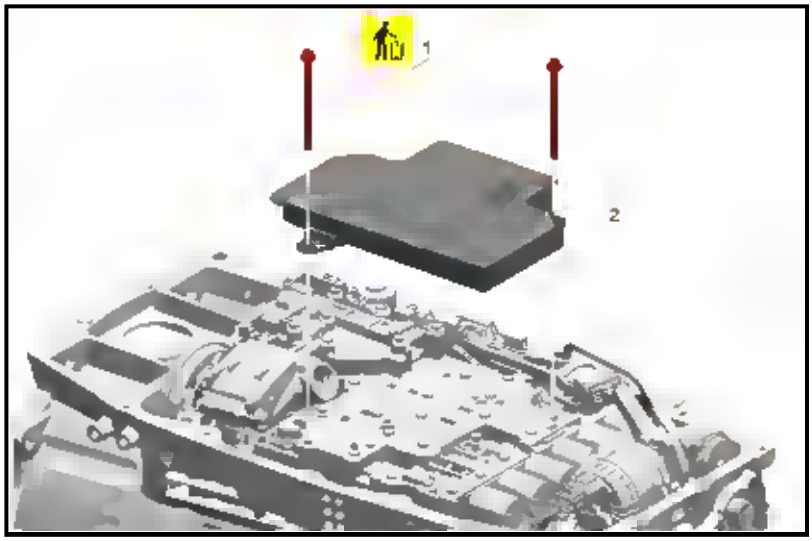
19. Perform the solenoid valve characterization reprogramming procedure. **Q77 Transmission Control Solenoid Valve Characterization Programming (10L60)**

AUTOMATIC TRANSMISSION TURBINE SPEED SENSOR REPLACEMENT

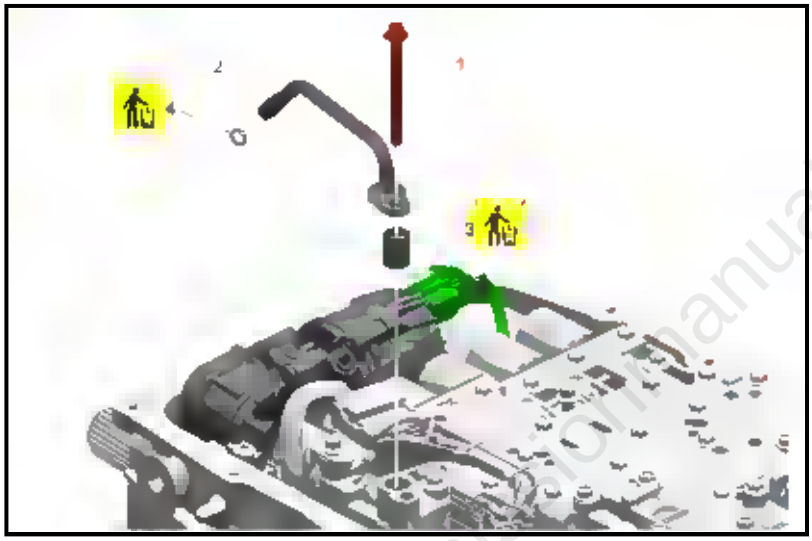
Single Use Fasteners and Components

- Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal
- Automatic Transmission Auxiliary Fluid Pump Seal
- Automatic Transmission Fluid Filter Bolt [2x]
- Control Valve Solenoid Body Bolt [3x]

Removal Procedure

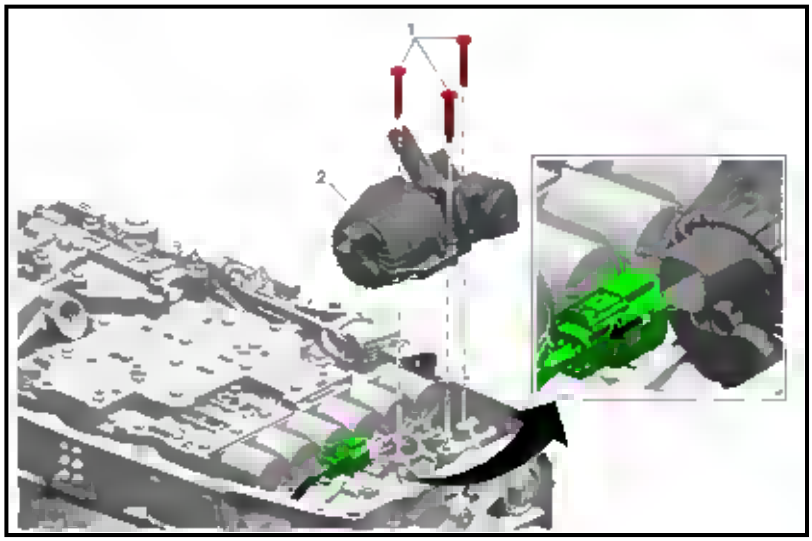
1. 

Automatic Transmission Fluid Filter (2) - Remove - **Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement**

2. 

Control Valve Upper Body Bolt (1) - Remove

3. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe (2) - Remove
4. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal (3) - Remove and DISCARD
5. Automatic Transmission Auxiliary Fluid Pump Seal (4) - Remove and DISCARD

6. 

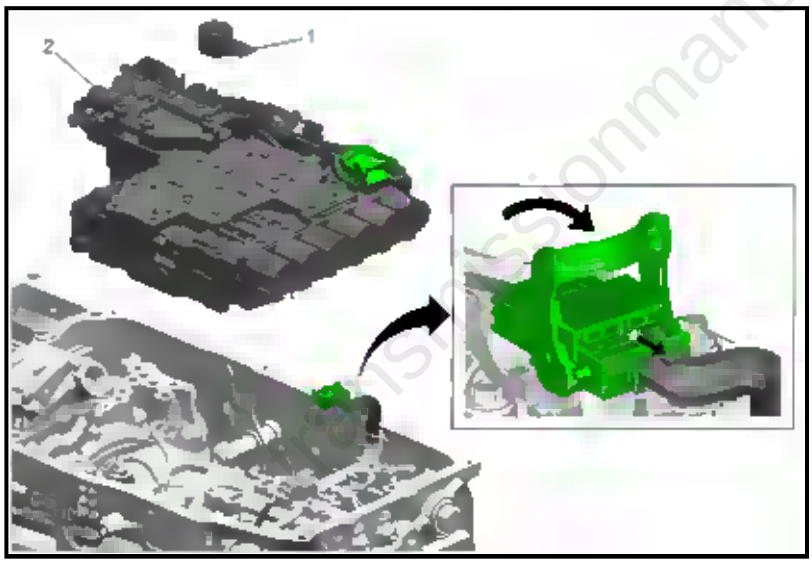
Automatic Transmission Auxiliary Fluid Pump Bolt (1) - Remove [3x]

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7. Disconnect the electrical connector.
8. Automatic Transmission Auxiliary Fluid Pump (2) - Remove
9. 

NOTE: **The bolts are marked by arrows in the valve body casting.**

Control Valve Solenoid Body Bolt (1) - Remove [2x]

10. Control Valve Solenoid Body Bolt (2) - Remove and DISCARD [3x]
11. Control Valve Solenoid Body Bolt (3) - Remove [2x]
12. 

Park Inhibitor Solenoid (1) - Remove

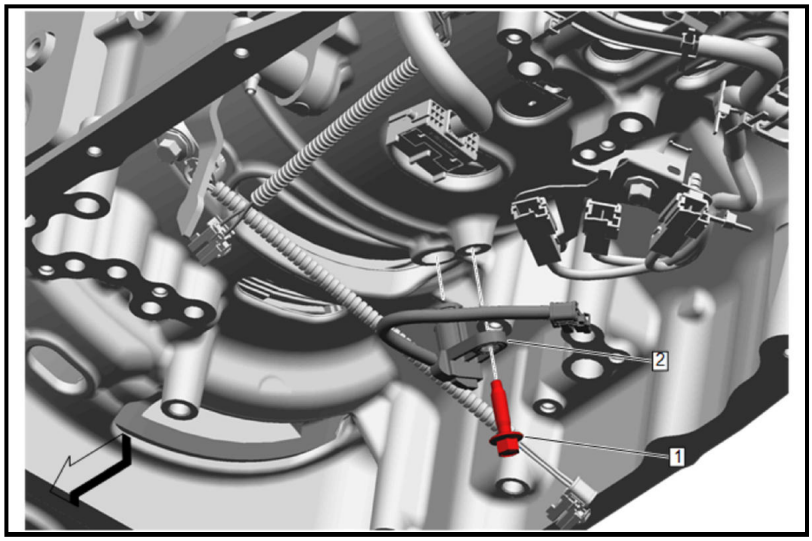
13. Disconnect the main control wiring harness connector as shown.

NOTE: **The automatic transmission fluid pump seal should stay with the control valve body assembly.**

NOTE: **Do not disassemble the control valve body assembly. The internal parts are NOT serviceable.**

14. Control Valve Body Assembly (2) - Remove

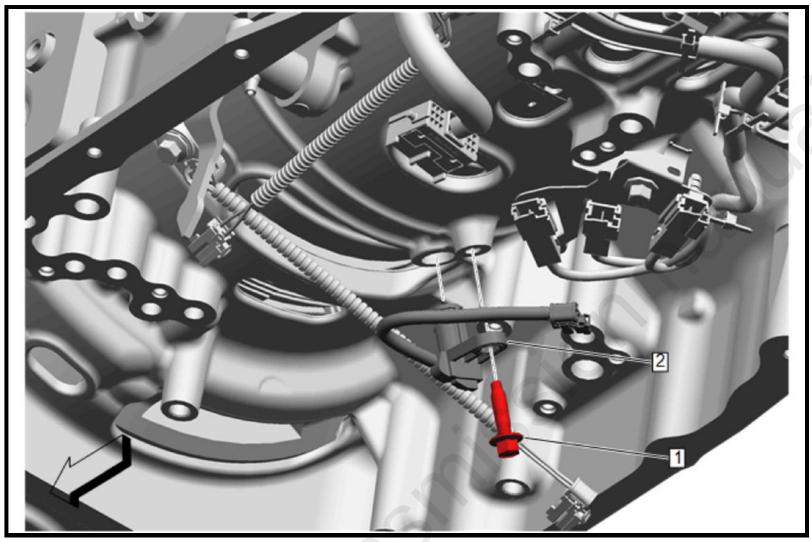
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15. 

Automatic Transmission Turbine Speed Sensor Bolt (1) - Remove

16. Automatic Transmission Turbine Speed Sensor (2) - Remove

Installation Procedure

1. 

Automatic Transmission Turbine Speed Sensor (2) - Install

CAUTION: **Refer to Fastener Caution**

2. Automatic Transmission Turbine Speed Sensor Bolt (1) - Install and tighten - **Fastener Specifications**

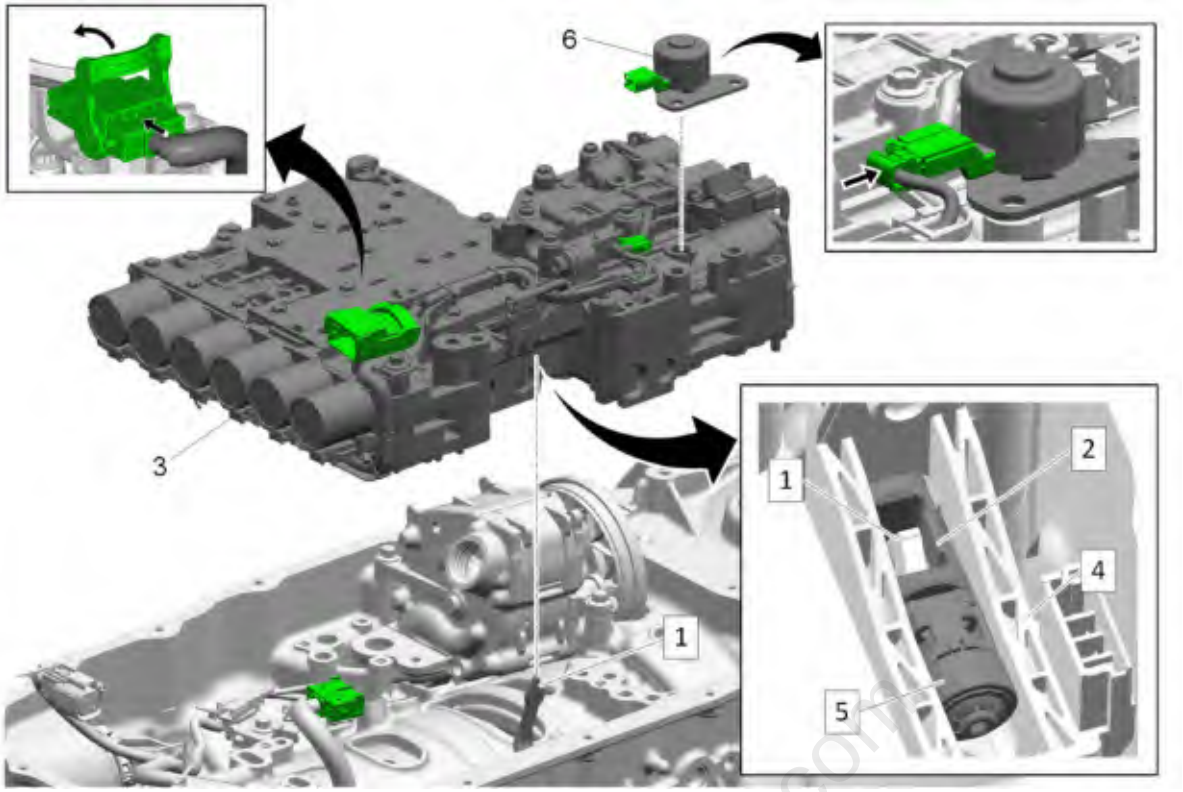
3. 

Fig. 8: Identifying Control Valve Assembly Installation Components
Courtesy of GENERAL MOTORS COMPANY

NOTE: **Ensure the automatic transmission fluid pump seal is in the control valve body.**

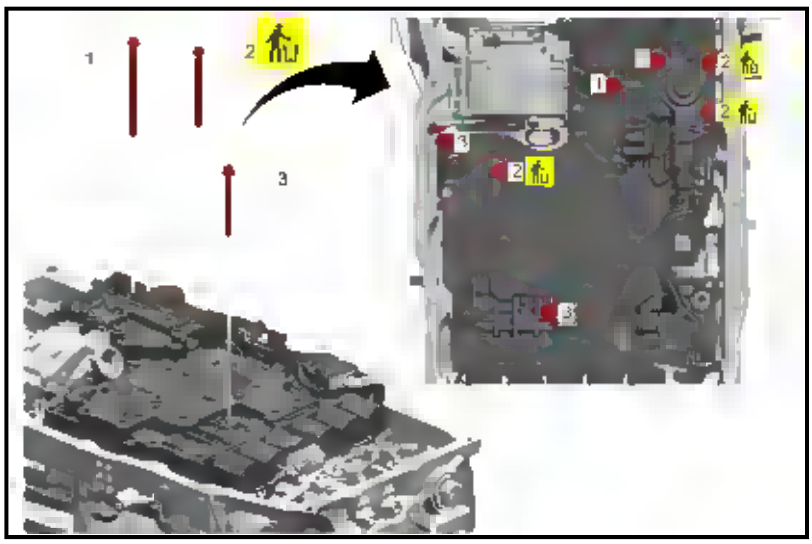
Control Valve Body Assembly (1) - Install

NOTE: **The locating pins on the bottom of the control valve body assembly will hold the control valve body assembly in place while installing bolts.**

4. Install the control valve body assembly into the case.

NOTE: **Ensure the wiring harness is not pinched anywhere after valve body installation.**

5. Connect the main control wiring harness connector as shown.
6. Park Inhibitor Solenoid (2) - Install

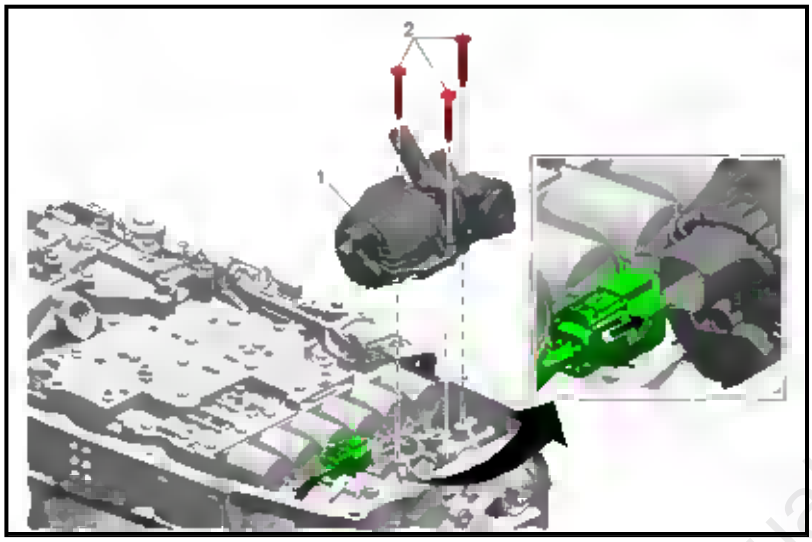
7. 

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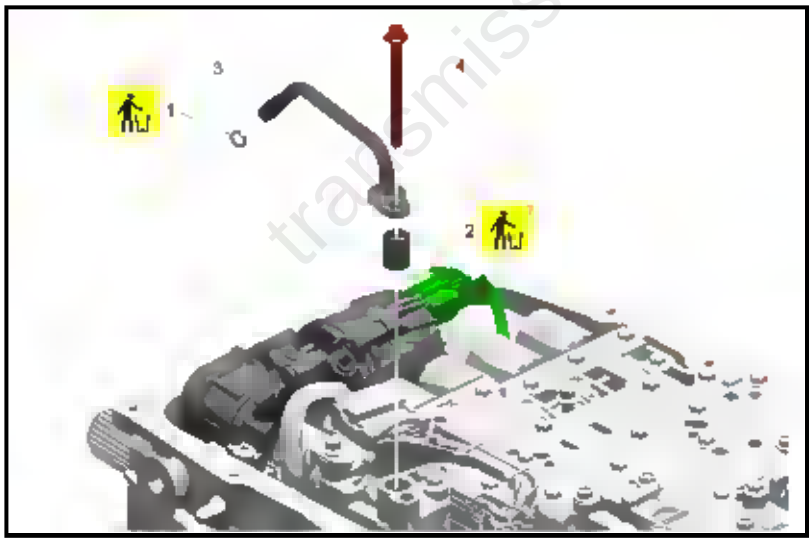
Clean the bolt holes and ensure they are free from any old sealant. Allow to dry before installing NEW bolts.

8. Control Valve Solenoid Body Bolt (1) - Install and tighten in sequence [2x] - **Fastener Specifications**

NOTE: **The bolts are marked by arrows in the valve body casting.**

9. Control Valve Solenoid Body Bolt (2) - Install NEW and tighten in sequence [3x] - **Fastener Specifications**
10. Control Valve Solenoid Body Bolt (3) - Install and tighten in sequence [2x] - **Fastener Specifications**
11. 

Automatic Transmission Auxiliary Fluid Pump (1) - Install

12. Connect the electrical connector.
13. Automatic Transmission Auxiliary Fluid Pump Bolt (2) - Install and tighten [3x] - **Fastener Specifications**
14. 

Automatic Transmission Auxiliary Fluid Pump Seal (1) - Install NEW

15. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal (2) - Install NEW
16. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe (3) - Install
17. Control Valve Upper Body Bolt (4) - Install and tighten - **Fastener Specifications**

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18. 

    Automatic Transmission Fluid Filter (2) - Install - **Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement**

19. Perform the solenoid valve characterization reprogramming procedure. **Q77 Transmission Control Solenoid Valve Characterization Programming (10L60)**

AUTOMATIC TRANSMISSION INTERMEDIATE SPEED SENSOR REPLACEMENT (SENSOR 1)

Single Use Fasteners and Components

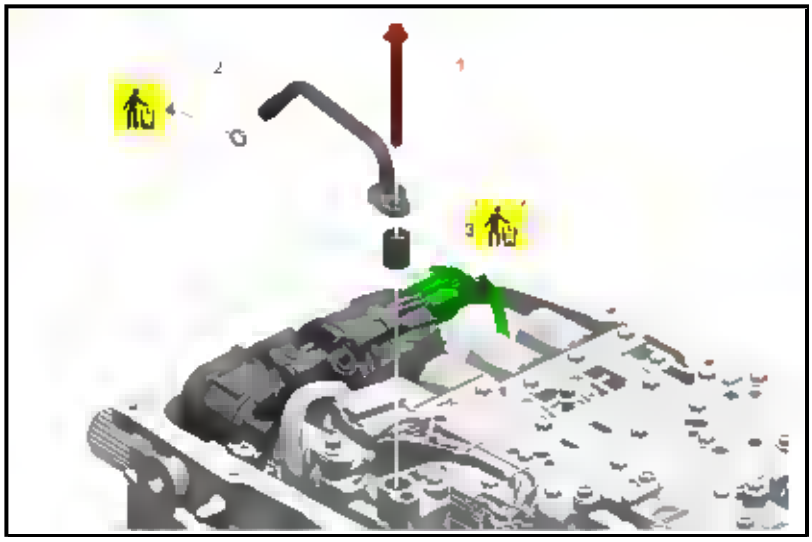
- Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal
- Automatic Transmission Auxiliary Fluid Pump Seal
- Automatic Transmission Fluid Filter Bolt [2x]
- Control Valve Solenoid Body Bolt [3x]

Removal Procedure

1. 

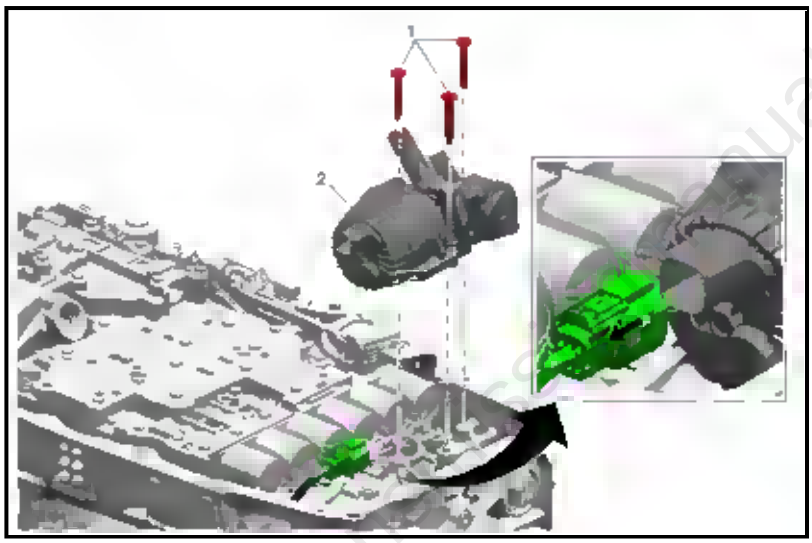
    Automatic Transmission Fluid Filter (2) - Remove - **Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement**

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2. 

Control Valve Upper Body Bolt (1) - Remove

3. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe (2) - Remove
4. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal (3) - Remove and DISCARD
5. Automatic Transmission Auxiliary Fluid Pump Seal (4) - Remove and DISCARD

6. 

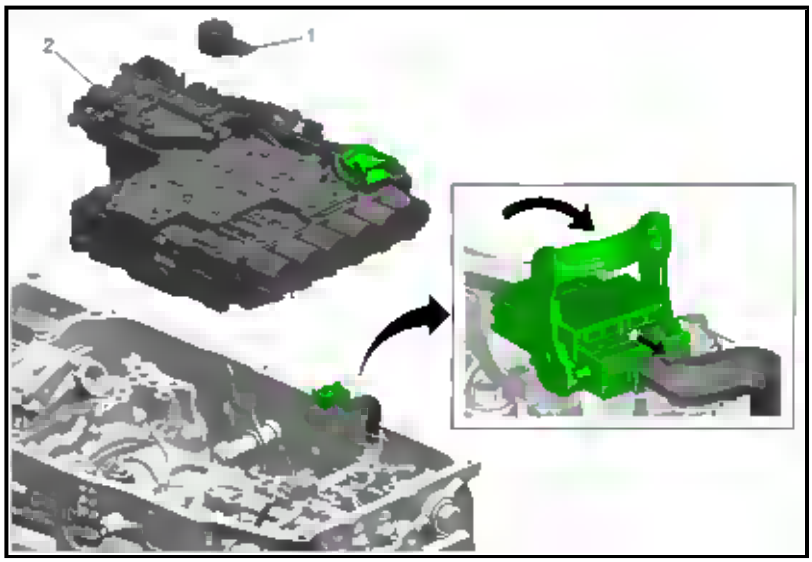
Automatic Transmission Auxiliary Fluid Pump Bolt (1) - Remove [3x]

7. Disconnect the electrical connector.
8. Automatic Transmission Auxiliary Fluid Pump (2) - Remove

9. 

NOTE: **The bolts are marked by arrows in the valve body casting.**

Control Valve Solenoid Body Bolt (1) - Remove [2x]

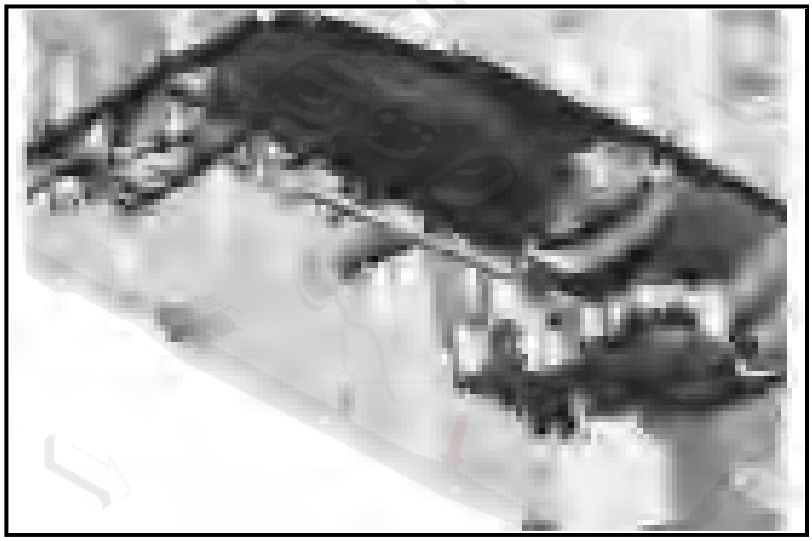
10. Control Valve Solenoid Body Bolt (2) - Remove and DISCARD [3x]
11. Control Valve Solenoid Body Bolt (3) - Remove [2x]
12. 

Park Inhibitor Solenoid (1) - Remove

13. Disconnect the main control wiring harness connector as shown.

NOTE: **The automatic transmission fluid pump seal should stay with the control valve body assembly.**

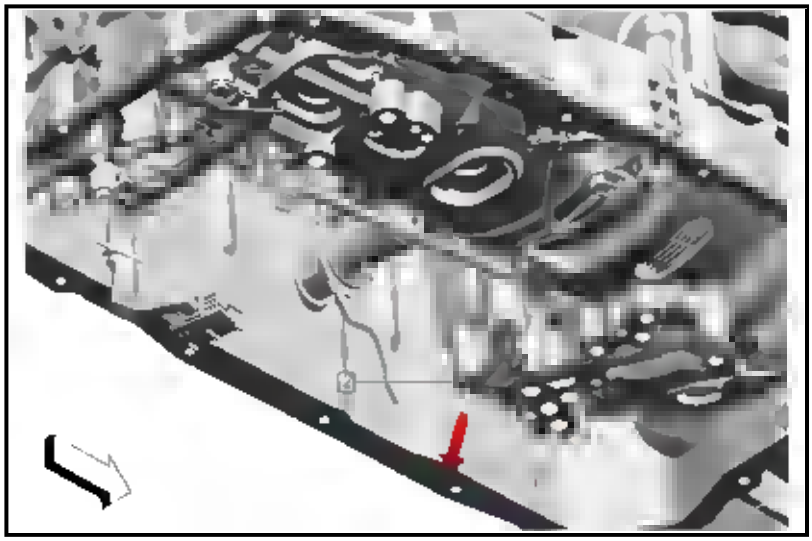
NOTE: **Do not disassemble the control valve body assembly. The internal parts are NOT serviceable.**

14. Control Valve Body Assembly (2) - Remove
15. 

Automatic Transmission Intermediate Speed Sensor Bolt (1) - Remove

16. Automatic Transmission Intermediate Speed Sensor (2) - Remove

Installation Procedure

1. 

   Automatic Transmission Intermediate Speed Sensor (2) - Install

   CAUTION: **Refer to Fastener Caution**

2. Automatic Transmission Intermediate Speed Sensor Bolt (1) - Install and tighten - **Fastener Specifications**

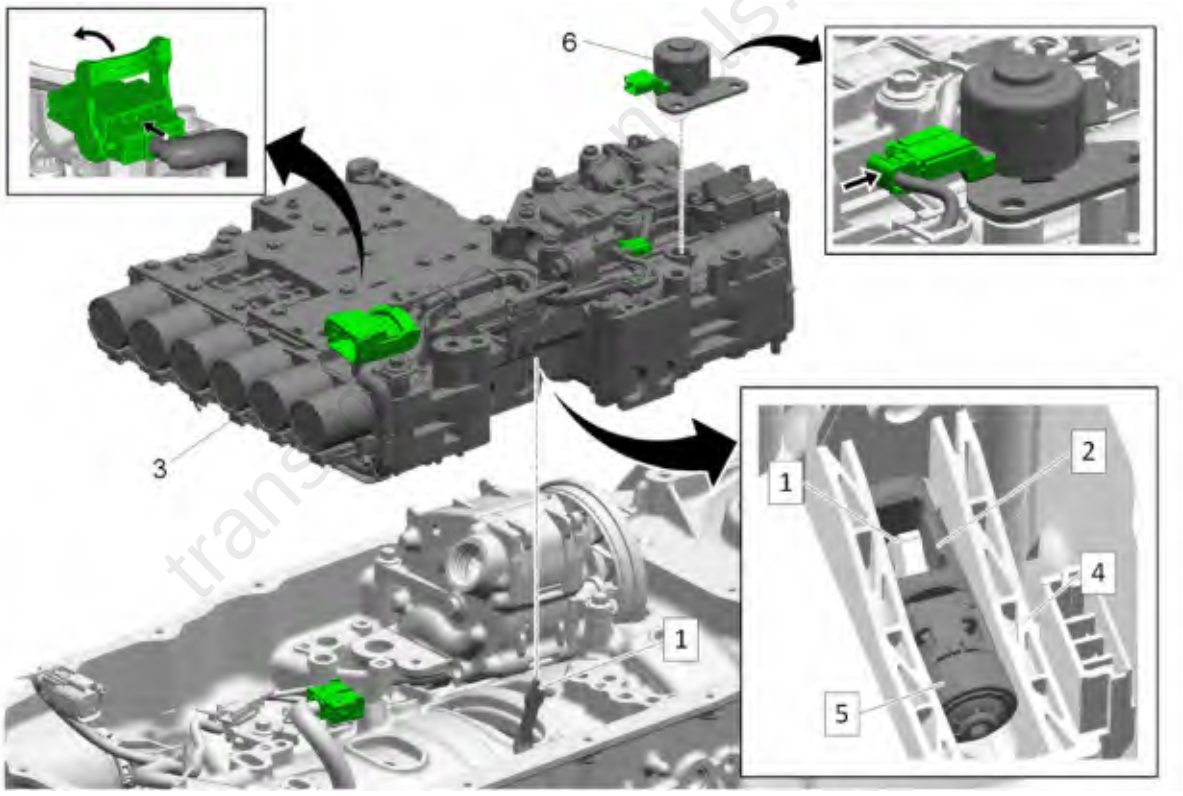
3. 

   Fig. 9: Identifying Control Valve Assembly Installation Components
   Courtesy of GENERAL MOTORS COMPANY

   NOTE: **Ensure the automatic transmission fluid pump seal is in the control valve body.**

   Control Valve Body Assembly (1) - Install

   NOTE: **The locating pins on the bottom of the control valve body assembly will hold the control valve body assembly in place while installing bolts.**

4. Install the control valve body assembly into the case.

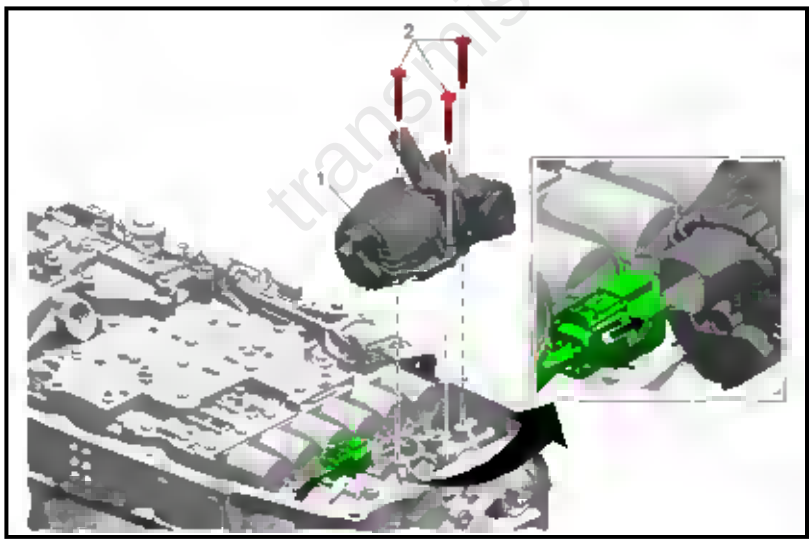
NOTE: **Ensure the wiring harness is not pinched anywhere after valve body installation.**

5. Connect the main control wiring harness connector as shown.
6. Park Inhibitor Solenoid (2) - Install
7. 

   Clean the bolt holes and ensure they are free from any old sealant. Allow to dry before installing NEW bolts.

8. Control Valve Solenoid Body Bolt (1) - Install and tighten in sequence [2x] - **Fastener Specifications**

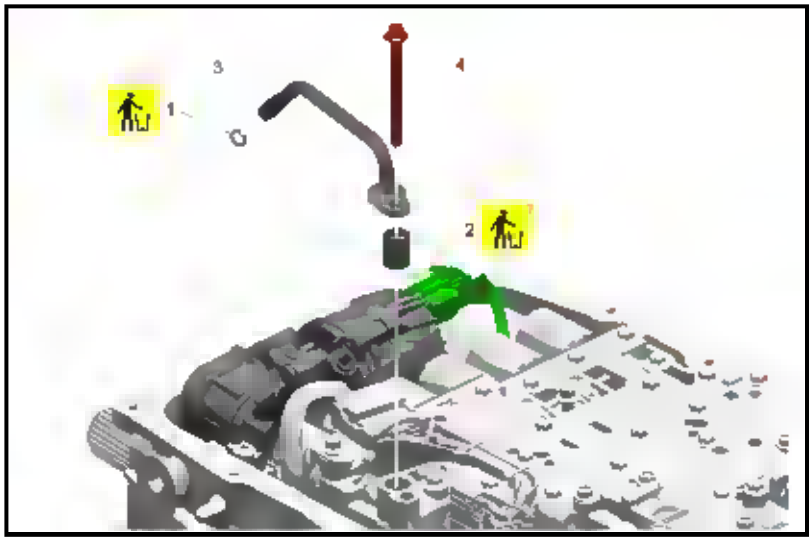
NOTE: **The bolts are marked by arrows in the valve body casting.**

9. Control Valve Solenoid Body Bolt (2) - Install NEW and tighten in sequence [3x] - **Fastener Specifications**
10. Control Valve Solenoid Body Bolt (3) - Install and tighten in sequence [2x] - **Fastener Specifications**
11. 

    Automatic Transmission Auxiliary Fluid Pump (1) - Install

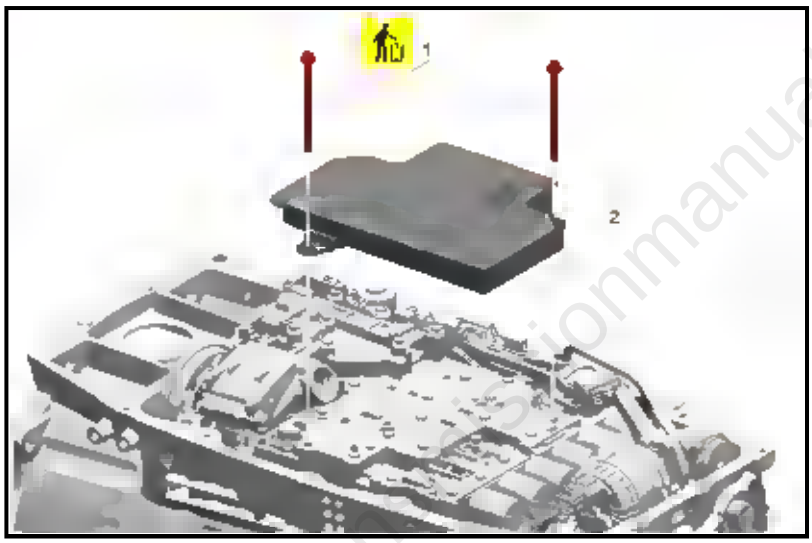
12. Connect the electrical connector.
13. Automatic Transmission Auxiliary Fluid Pump Bolt (2) - Install and tighten [3x] - **Fastener Specifications**

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14. 

    Automatic Transmission Auxiliary Fluid Pump Seal (1) - Install NEW

15. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal (2) - Install NEW
16. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe (3) - Install
17. Control Valve Upper Body Bolt (4) - Install and tighten - **Fastener Specifications**

18. 

    Automatic Transmission Fluid Filter (2) - Install - **Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement**

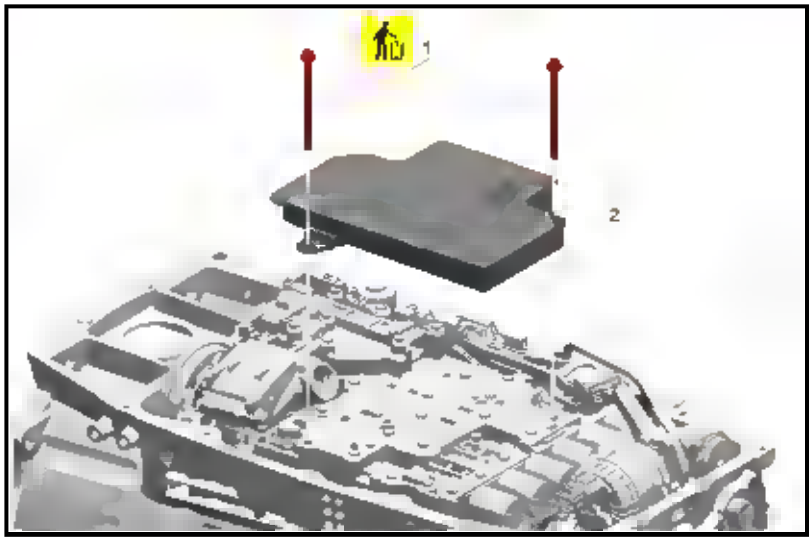
19. Perform the solenoid valve characterization reprogramming procedure. **Q77 Transmission Control Solenoid Valve Characterization Programming (10L60)**

AUTOMATIC TRANSMISSION INTERMEDIATE SPEED SENSOR REPLACEMENT (SENSOR 2)

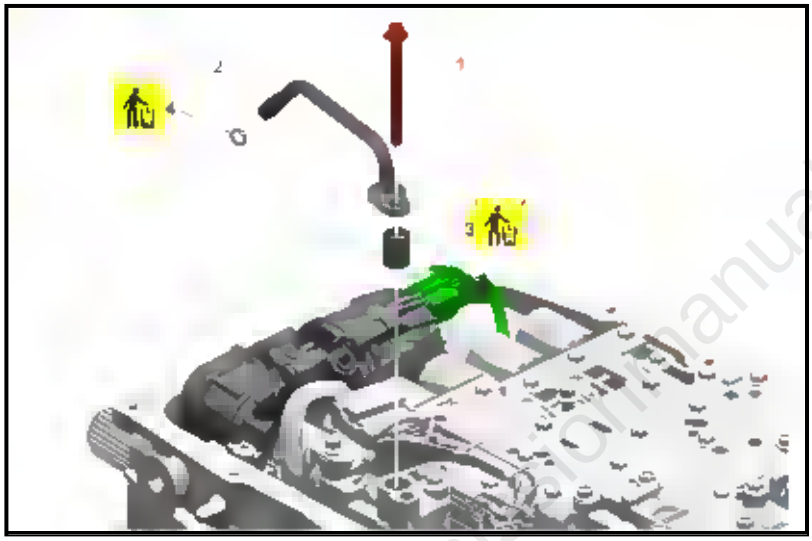
Single Use Fasteners and Components

- Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal
- Automatic Transmission Auxiliary Fluid Pump Seal
- Automatic Transmission Fluid Filter Bolt [2x]
- Control Valve Solenoid Body Bolt [3x]

Removal Procedure

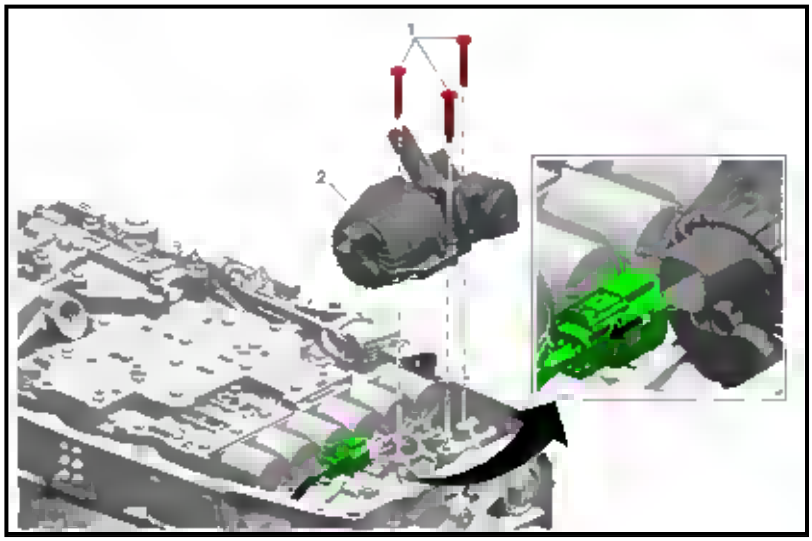
1. 

Automatic Transmission Fluid Filter (2) - Remove - **Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement**

2. 

Control Valve Upper Body Bolt (1) - Remove

3. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe (2) - Remove
4. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal (3) - Remove and DISCARD
5. Automatic Transmission Auxiliary Fluid Pump Seal (4) - Remove and DISCARD

6. 

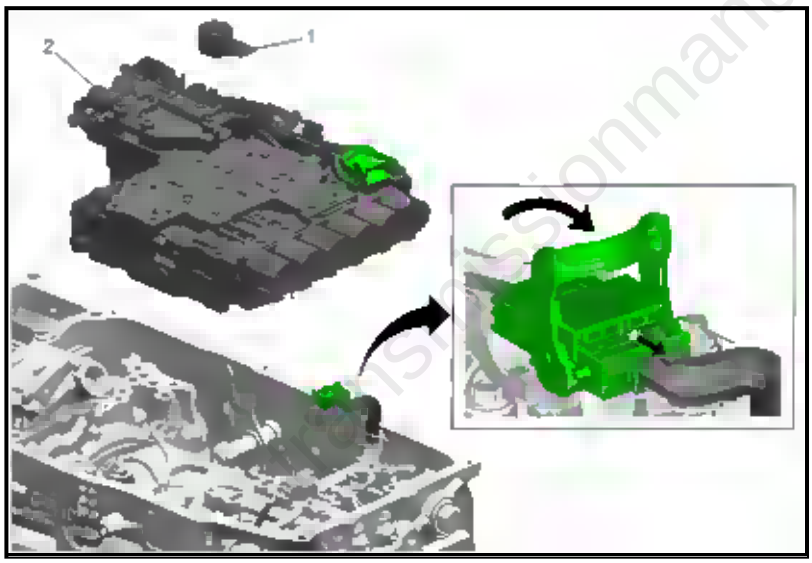
Automatic Transmission Auxiliary Fluid Pump Bolt (1) - Remove [3x]

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7. Disconnect the electrical connector.
8. Automatic Transmission Auxiliary Fluid Pump (2) - Remove
9. 

NOTE: **The bolts are marked by arrows in the valve body casting.**

Control Valve Solenoid Body Bolt (1) - Remove [2x]

10. Control Valve Solenoid Body Bolt (2) - Remove and DISCARD [3x]
11. Control Valve Solenoid Body Bolt (3) - Remove [2x]
12. 

Park Inhibitor Solenoid (1) - Remove

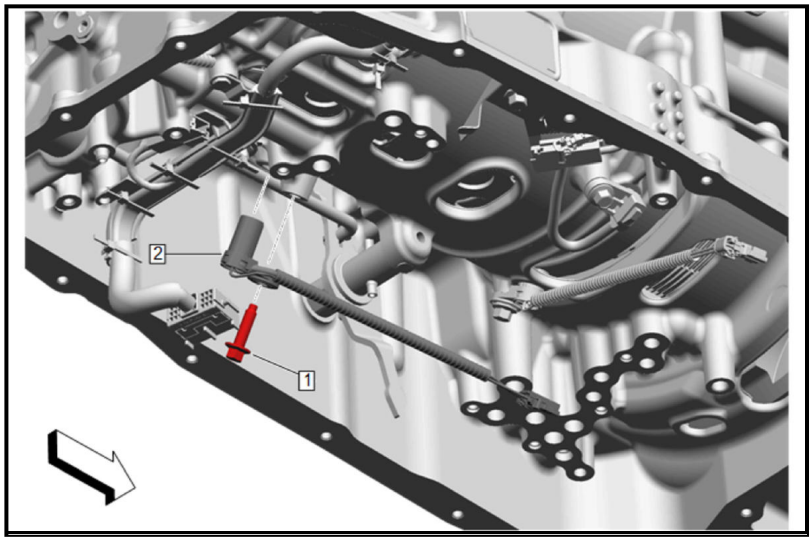
13. Disconnect the main control wiring harness connector as shown.

NOTE: **The automatic transmission fluid pump seal should stay with the control valve body assembly.**

NOTE: **Do not disassemble the control valve body assembly. The internal parts are NOT serviceable.**

14. Control Valve Body Assembly (2) - Remove

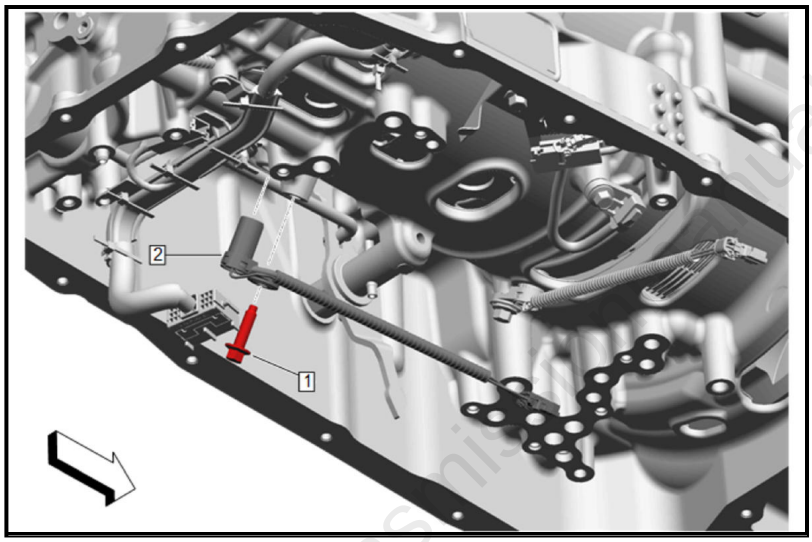
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15. 

Automatic Transmission Intermediate Speed Sensor Bolt (1) - Remove

16. Automatic Transmission Intermediate Speed Sensor (2) - Remove

Installation Procedure

1. 

Automatic Transmission Intermediate Speed Sensor (2) - Install

CAUTION: **Refer to Fastener Caution**

2. Automatic Transmission Intermediate Speed Sensor Bolt (1) - Install and tighten - **Fastener Specifications**

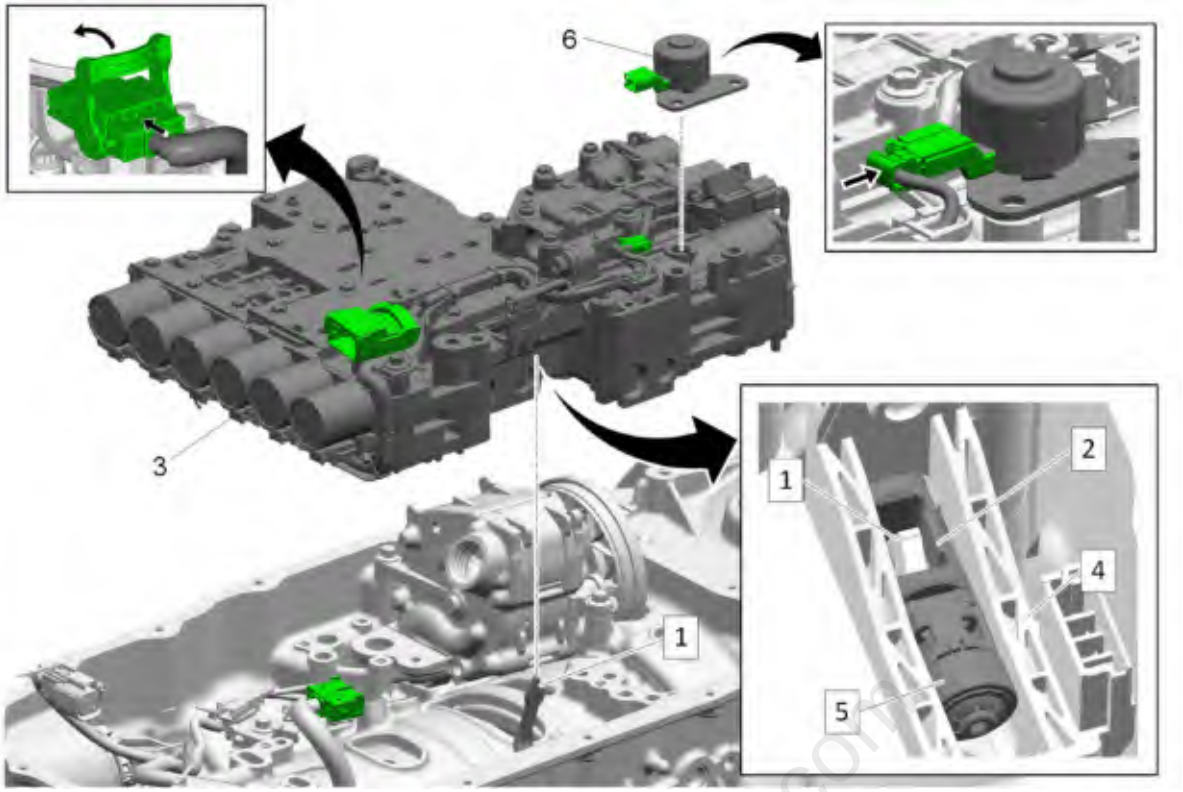
3. 

Fig. 10: Identifying Control Valve Assembly Installation Components
Courtesy of GENERAL MOTORS COMPANY

NOTE: **Ensure the automatic transmission fluid pump seal is in the control valve body.**

Control Valve Body Assembly (1) - Install

NOTE: **The locating pins on the bottom of the control valve body assembly will hold the control valve body assembly in place while installing bolts.**

4. Install the control valve body assembly into the case.

NOTE: **Ensure the wiring harness is not pinched anywhere after valve body installation.**

5. Connect the main control wiring harness connector as shown.
6. Park Inhibitor Solenoid (2) - Install

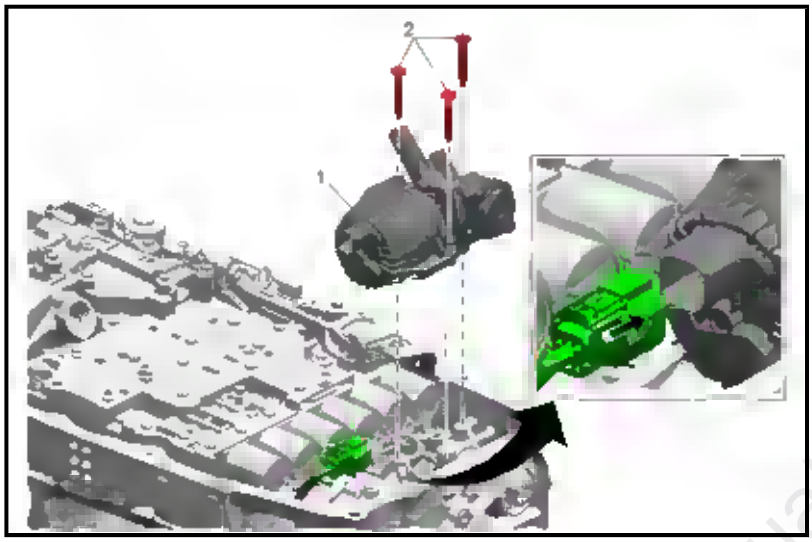
7. 

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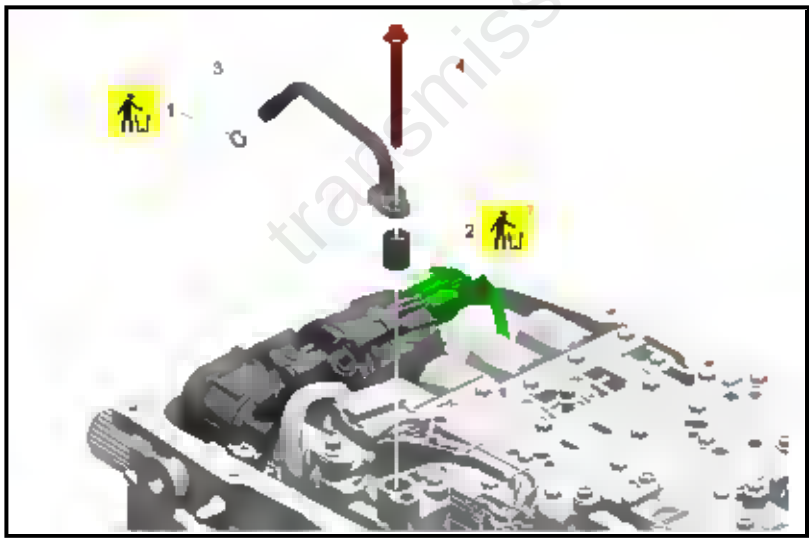
Clean the bolt holes and ensure they are free from any old sealant. Allow to dry before installing NEW bolts.

8. Control Valve Solenoid Body Bolt (1) - Install and tighten in sequence [2x] - **Fastener Specifications**

NOTE: **The bolts are marked by arrows in the valve body casting.**

9. Control Valve Solenoid Body Bolt (2) - Install NEW and tighten in sequence [3x] - **Fastener Specifications**
10. Control Valve Solenoid Body Bolt (3) - Install and tighten in sequence [2x] - **Fastener Specifications**
11. 

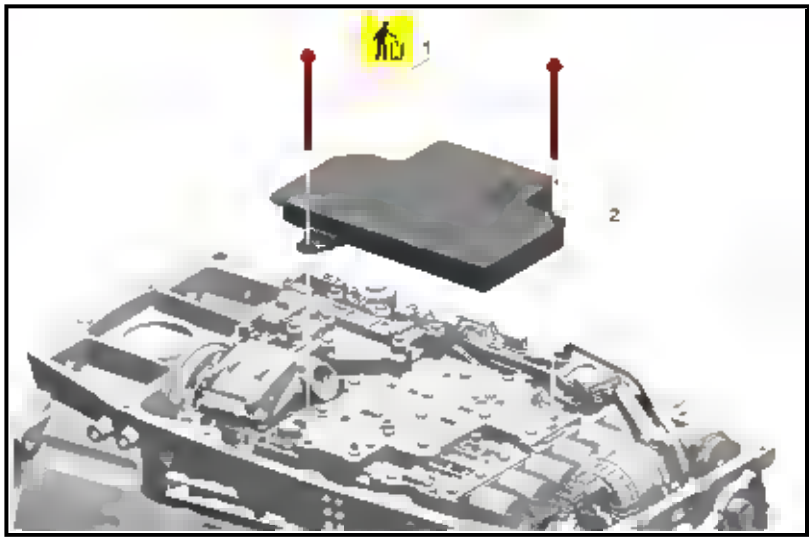
Automatic Transmission Auxiliary Fluid Pump (1) - Install

12. Connect the electrical connector.
13. Automatic Transmission Auxiliary Fluid Pump Bolt (2) - Install and tighten [3x] - **Fastener Specifications**
14. 

Automatic Transmission Auxiliary Fluid Pump Seal (1) - Install NEW

15. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal (2) - Install NEW
16. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe (3) - Install
17. Control Valve Upper Body Bolt (4) - Install and tighten - **Fastener Specifications**

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18. 

    Automatic Transmission Fluid Filter (2) - Install - **Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement**

19. Perform the solenoid valve characterization reprogramming procedure. **Q77 Transmission Control Solenoid Valve Characterization Programming (10L60)**

TRANSMISSION MOUNT REPLACEMENT (ALL WHEEL DRIVE)

Removal Procedure

1. Raise and support the vehicle. **Lifting and Jacking the Vehicle**
2. Using a suitable jack stand, support the rear of the transmission.

3. 

    Transmission Mount Bracket Bolt (1) - Remove [4x]

4. 

NOTE: **The transmission mount bolt is retained in the mount, loosen the bolt to disengage the threads and remove the mount and bolt as an assembly.**

Transmission Mount Bolt (1) - Remove

5. Transmission Mount (2) - Remove

Installation Procedure

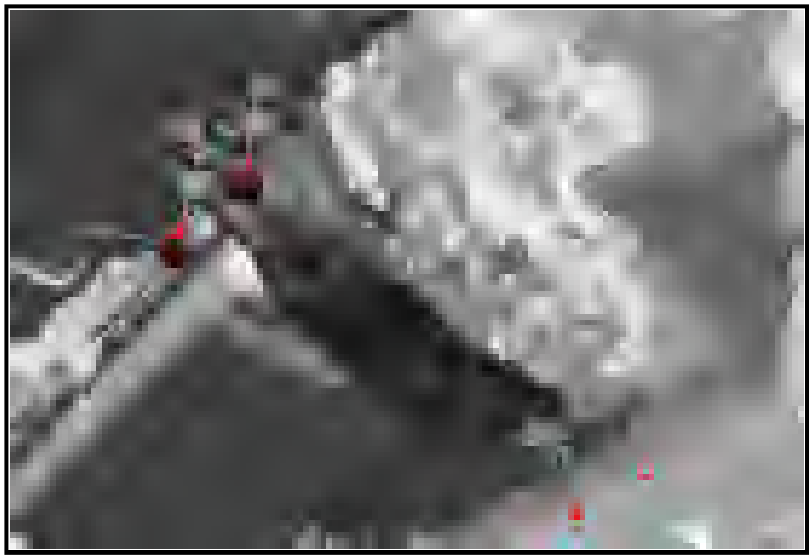
1. 

Transmission Mount (2) - Install

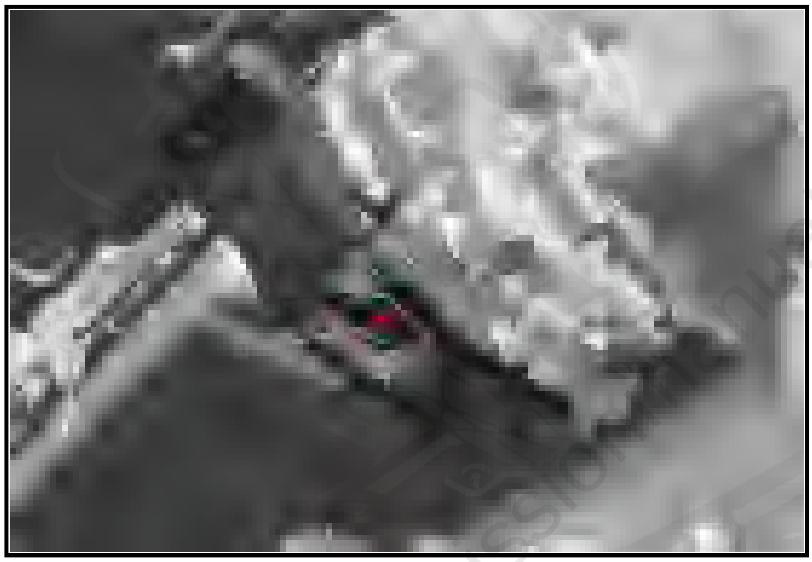
NOTE: **For proper bolt alignment, loosely install all mount bolts prior to tightening to specifications.**

2. Transmission Mount Bolt (1) - Loosely install

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3. 

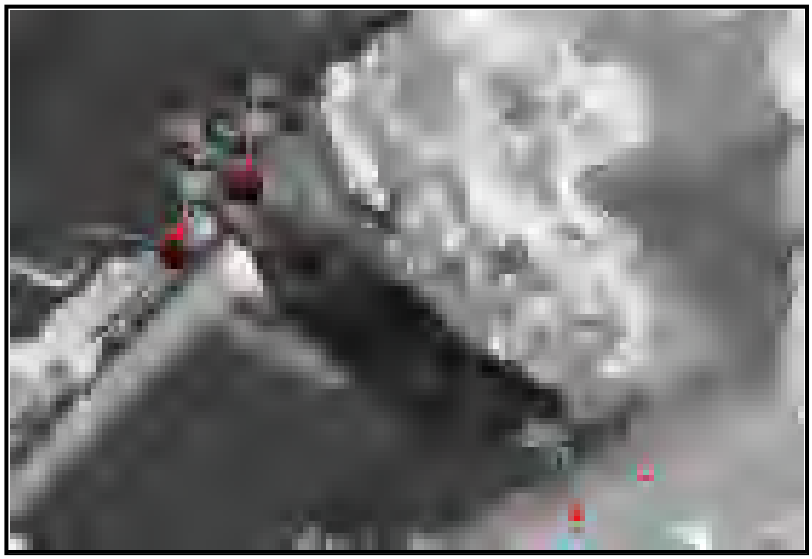
Transmission Mount Bracket Bolt (1) - Loosely install [4x]

4. 

CAUTION: **Refer to Fastener Caution .**

NOTE: **Ensure that the snubber is properly aligned with the tabs on the transmission mount prior to tightening.**

Transmission Mount Bolt (1) - Tighten - **Fastener Specifications**

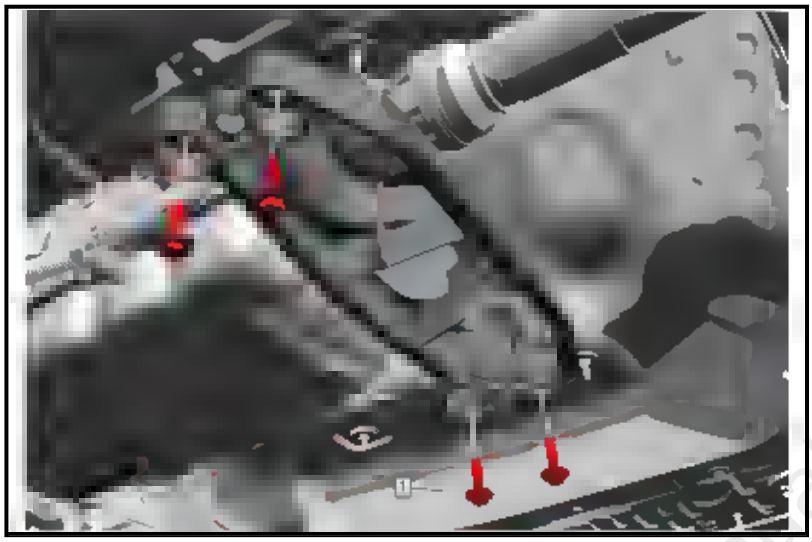
5. 

Transmission Mount Bracket Bolt (1) - Tighten [4x] - **Fastener Specifications**

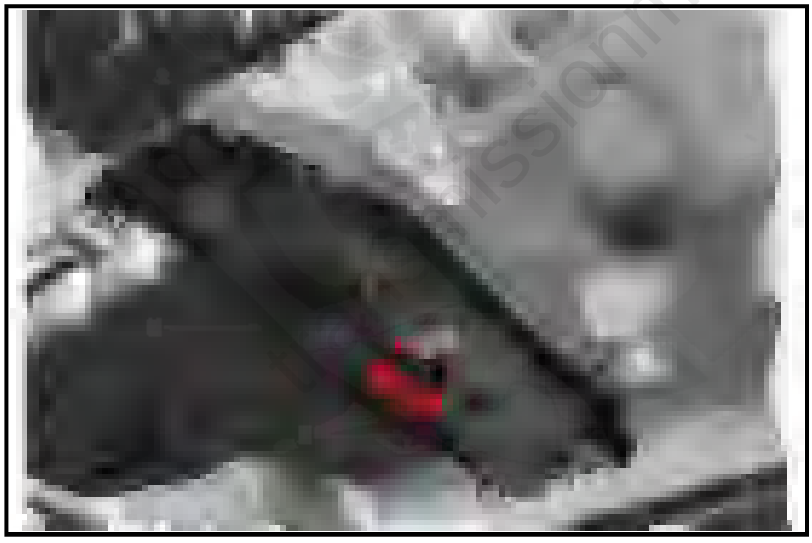
6. Remove the jack stand.
7. Lower the vehicle.

TRANSMISSION MOUNT REPLACEMENT (REAR WHEEL DRIVE)

Removal Procedure

1. Raise and support the vehicle. **Lifting and Jacking the Vehicle**
2. Using a suitable jack stand, support the rear of the transmission.
3. 

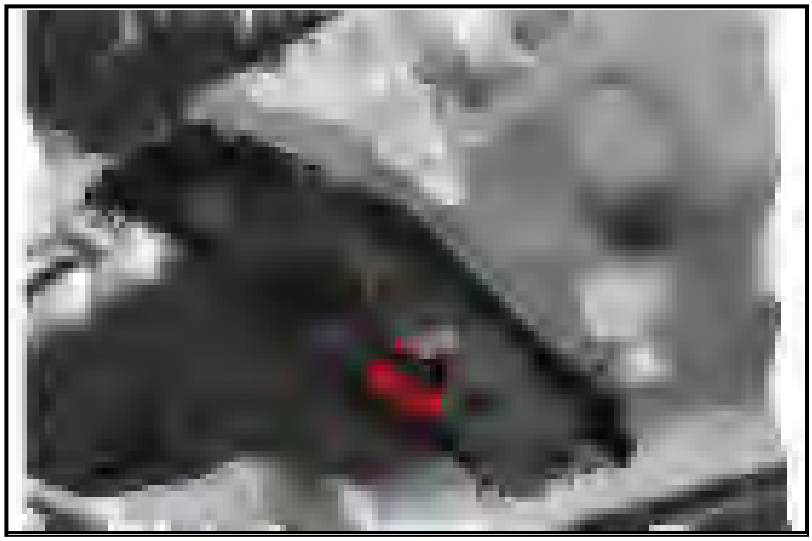
Transmission Mount Bracket Bolt (1) - Remove [4x]

4. 

Transmission Mount Bolt (1) - Remove [2x]

5. Transmission Mount (2) - Remove

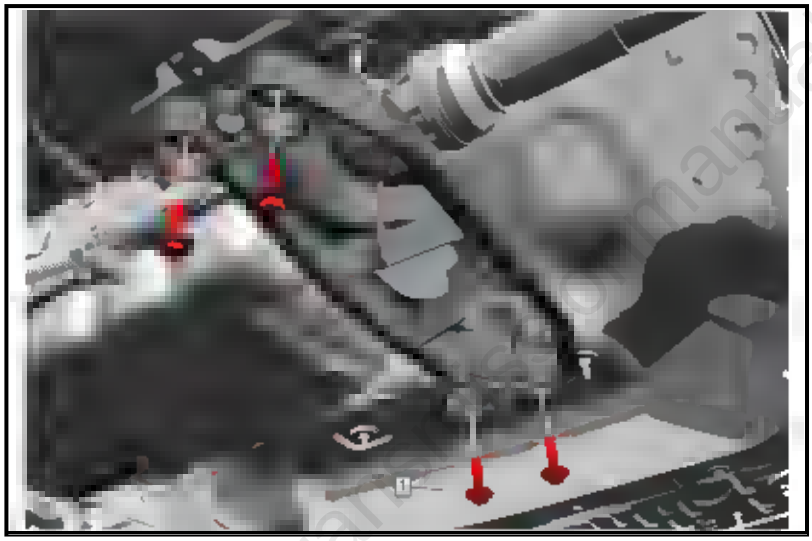
Installation Procedure

1. 

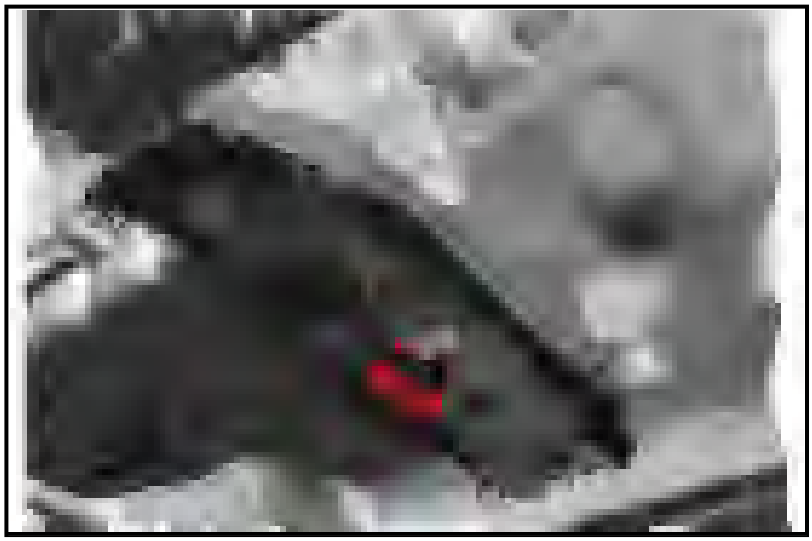
Transmission Mount (2) - Install

NOTE: **For proper bolt alignment, loosely install all mount bolts prior to tightening to specifications.**

2. Transmission Mount Bolt (1) - Loosely install [2x]

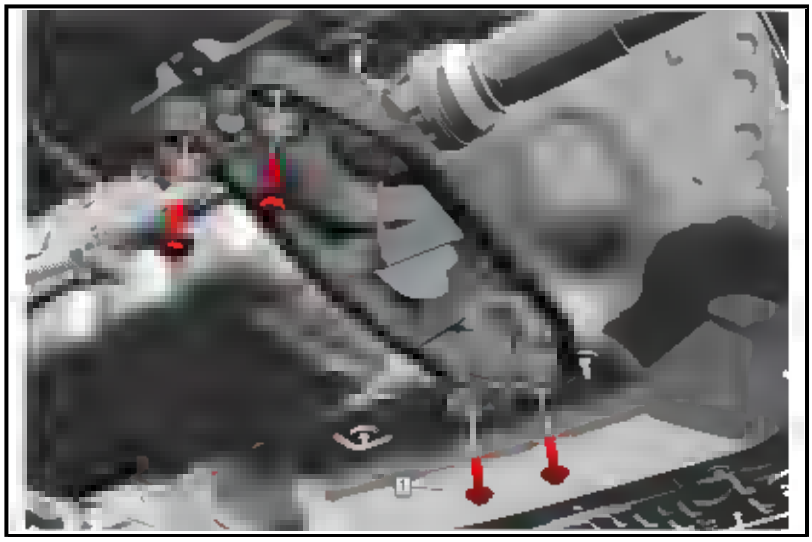
3. 

Transmission Mount Bracket Bolt (1) - Loosely install [4x]

4. 

CAUTION: **Refer to Fastener Caution .**

Transmission Mount Bolt (1) - Tighten [2x] - **Fastener Specifications**

5. 

Transmission Mount Bracket Bolt (1) - Tighten [4x] - **Fastener Specifications**

6. Remove the jack stand.
7. Lower the vehicle.

TRANSMISSION MOUNT INSPECTION

CAUTION: **To prevent transmission oil pan damage and possible transmission failure, insert a block of wood that completely covers the bottom of the transmission oil pan surface, between the transmission oil pan and the jack support. If the inserted block of wood does not completely cover the bottom of the transmission oil pan, this may result in damage to the transmission oil pan and possible transmission failure.**

1. Raise the transmission in order to remove the weight from the transmission mount and create slight tension in the rubber.
2. Observe the transmission mount while raising the transmission. Replace the transmission mount if the transmission mount exhibits any of the following conditions:

NOTE: **Black paint on the rubber will crack with time, this does not constitute a failure.**

- The hard rubber surface is covered with heat check cracks.
- The rubber is separated from the metal plate of the transmission mount.
- The rubber is split through the center of the transmission mount.

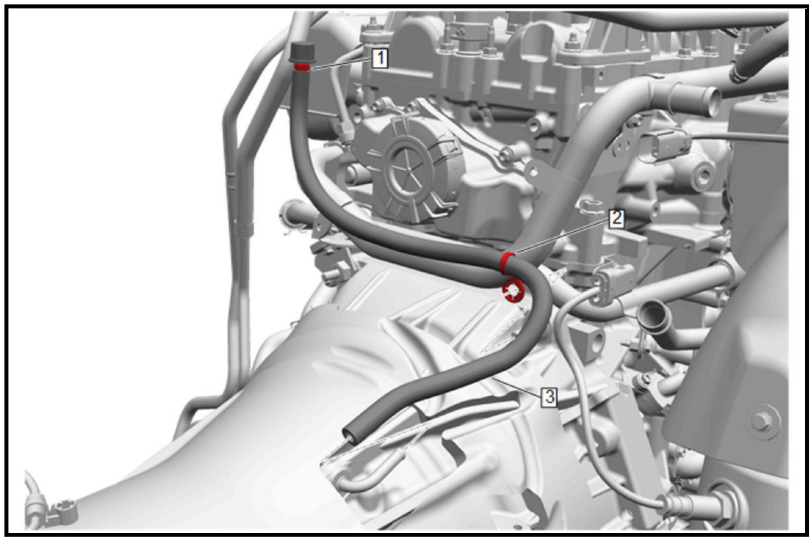
3. If there is movement between the metal plate of the transmission mount and its attaching points, lower the transmission on the transmission mount. Tighten the bolts or nuts attaching the transmission mount to the frame or transmission mount bracket.

TRANSMISSION VENT HOSE REPLACEMENT

Removal Procedure

1. Transmission - Remove - **Transmission Replacement (All Wheel Drive)**, or **Transmission Replacement (Rear Wheel Drive)**

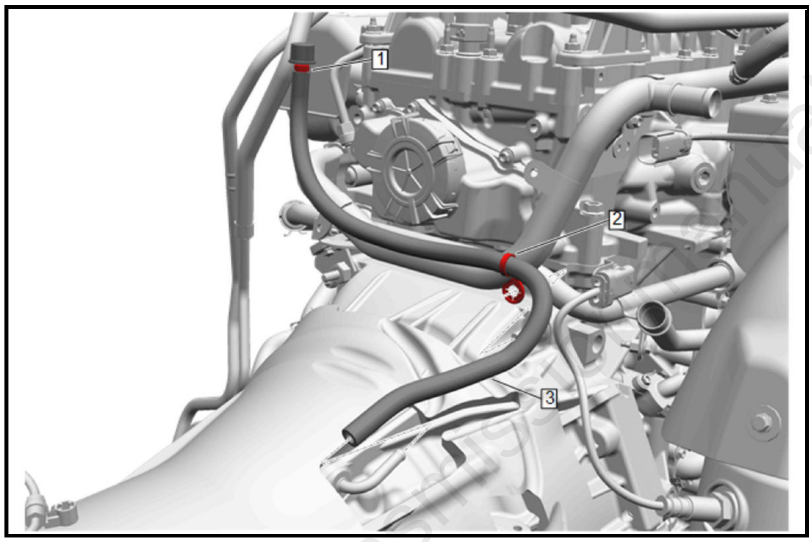
transmissionmanuals.com

2. 

   Disconnect the transmission vent hose retainers (1) and (2).

3. Transmission Vent Hose (3) - Remove

Installation Procedure

1. 

   Transmission Vent Hose (3) - Install

2. Connect the transmission vent hose retainers (1) and (2).
3. Transmission - Install - **Transmission Replacement (All Wheel Drive)**, or **Transmission Replacement (Rear Wheel Drive)**

TRANSMISSION HOUSING SOUND INSULATOR REPLACEMENT

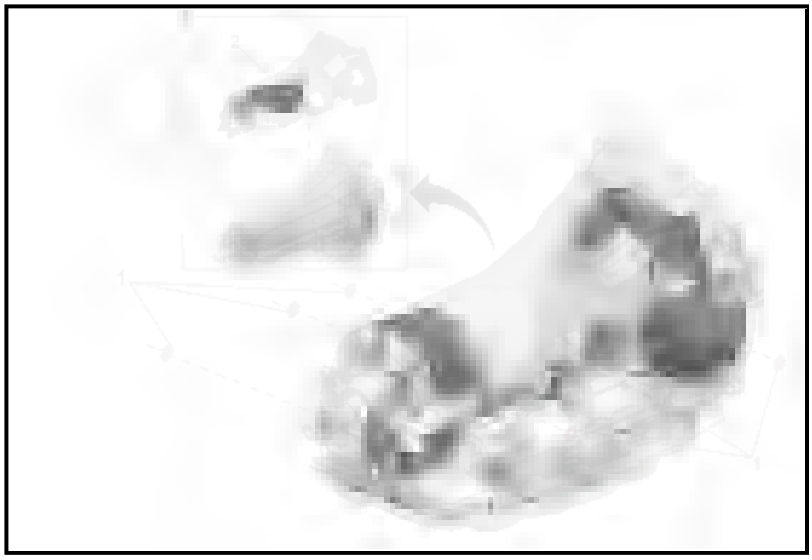
Special Tools

- **DT-21366** Converter Holding Strap

Equivalent regional tools: **Special Tools**

Removal Procedure

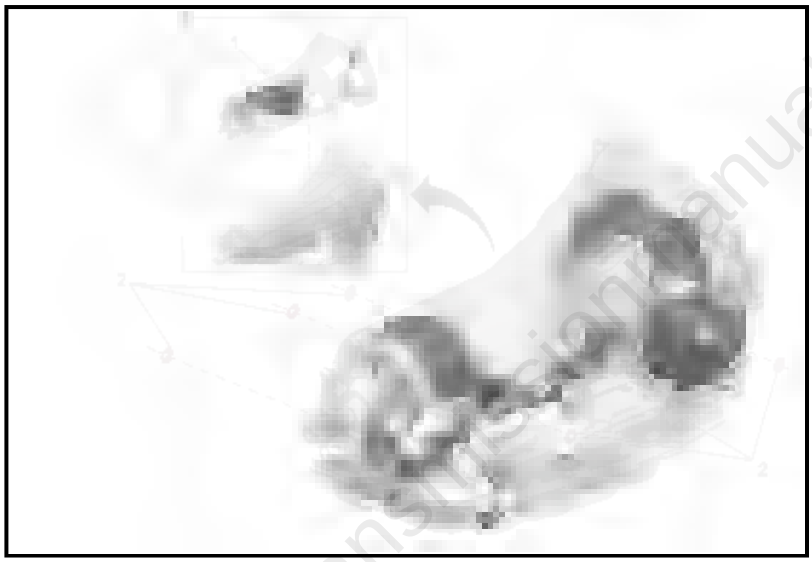
1. Transmission - Remove - **Transmission Replacement (All Wheel Drive)**, or **Transmission Replacement (Rear Wheel Drive)**

2. 

   Transmission Nut (1) - Remove [6x]

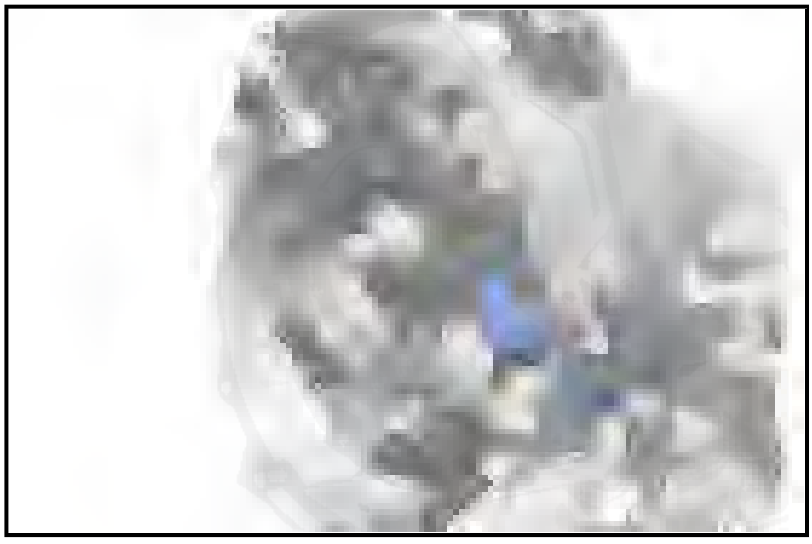
3. Transmission Housing Sound Insulator (2) - Remove

Installation Procedure

1. 

   Transmission Housing Sound Insulator (1) - Install

2. Transmission Nut (2) - Install [6x]

3. 

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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.**

If removed, install the **DT-21366** Converter Holding Strap (1) onto the transmission bell housing to retain the torque converter.

4. Transmission - Install - **Transmission Replacement (All Wheel Drive)**, or **Transmission Replacement (Rear Wheel Drive)**

TORQUE CONVERTER REPLACEMENT

Special Tools

- **DT-21366** Converter Holding Strap
- **DT-03289-20** Holding Fixture Base Assembly
- **DT-46409** Torque Converter Lifting Handles
- **DT-48989** Holding Fixture

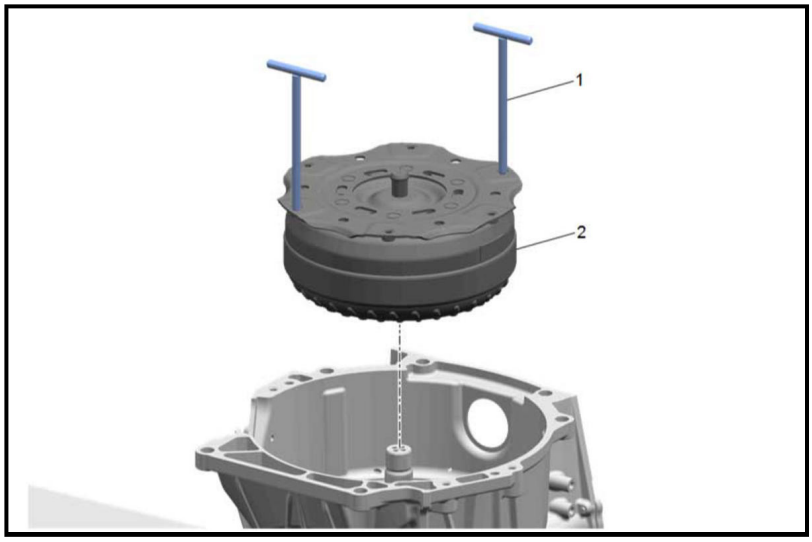
Equivalent regional tools: **Special Tools**

Removal Procedure

1. Transmission - Remove - **Transmission Replacement (All Wheel Drive)**, or **Transmission Replacement (Rear Wheel Drive)**
2. 

   Attach and secure **DT-48989** Holding Fixture (2) to the automatic transmission case (3).

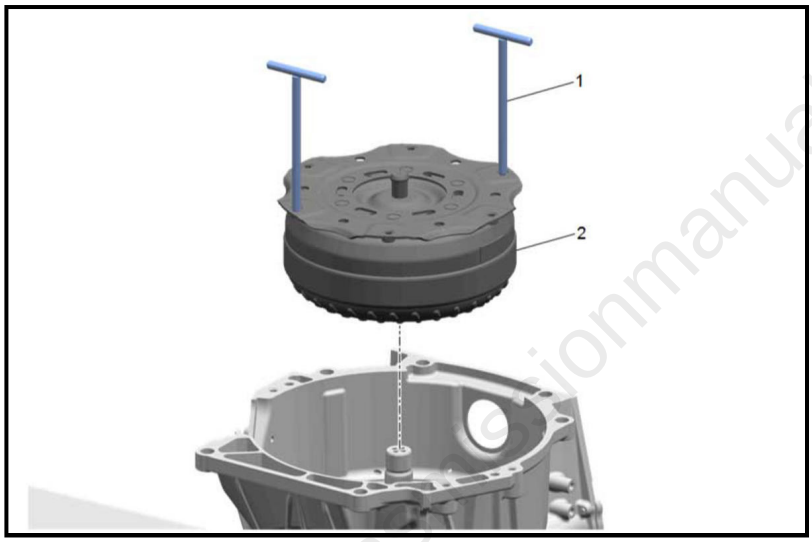
3. Support the transmission with an overhead hoist attached to **DT-48989** Holding Fixture (2).
4. Install **DT-48989** Holding Fixture (2) with the automatic transmission case (3) into the **DT-03289-20** Holding Fixture Base Assembly (1).
5. Rotate the transmission so that the converter housing is up. Secure with **DT-03289-20** Holding Fixture Base Assembly (1) locking pin.

6. 

Install **DT-46409** Torque Converter Lifting Handles (1) to the torque converter (2).

7. Torque Converter (2) - Remove

Installation Procedure

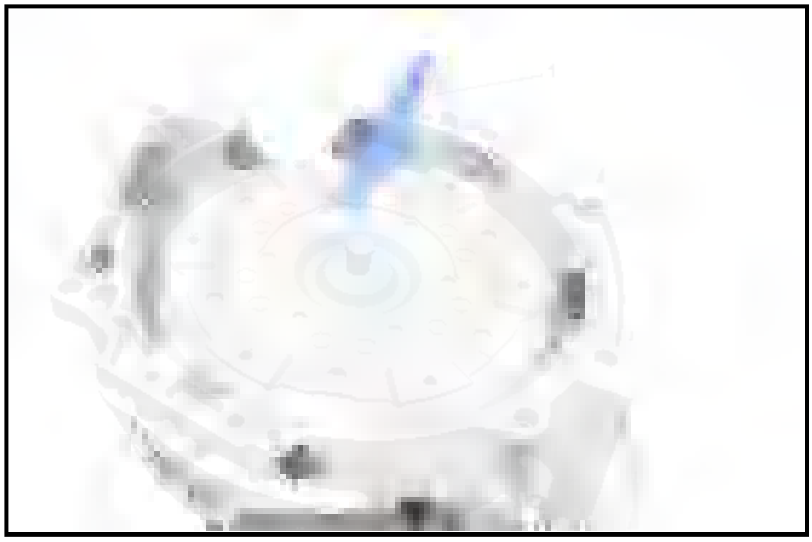
1. 

NOTE: **Rotate the transmission so that the converter housing is up and secure with locking pin.**

Install the **DT-46409** Torque Converter Lifting Handles (1) to the torque converter (2).

2. Torque Converter (2) - Install

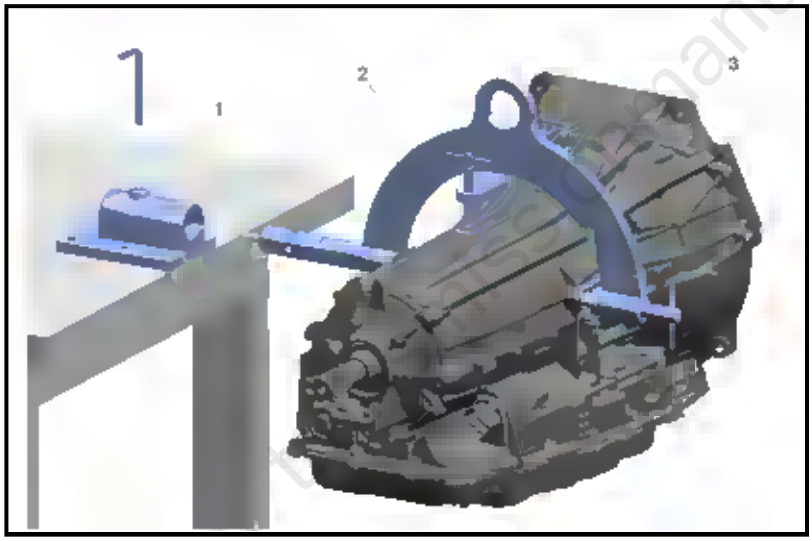
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3. 

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.**

NOTE: **If the holding strap does not fit, ensure that the converter is fully installed.**

Install the **DT-21366** Converter Holding Strap (1).

4. 

Rotate the transmission so the pan is facing down. Secure with **DT-03289-20** Holding Fixture Base Assembly (1) locking pin.

5. Support the transmission with a overhead hoist attached to **DT-48989** Holding Fixture (2), then remove the **DT-03289-20** Holding Fixture Base Assembly (1) locking pin.
6. Remove the **DT-48989** Holding Fixture (2) and the automatic transmission case (3) from the **DT-03289-20** Holding Fixture Base Assembly (1).
7. Transmission - Install - **Transmission Replacement (All Wheel Drive)**, or **Transmission Replacement (Rear Wheel Drive)**

AUTOMATIC TRANSMISSION WIRING HARNESS REPLACEMENT

Single Use Fasteners and Components

- Automatic Transmission Control Wiring Harness Retainer [2x]
- Automatic Transmission Control Wiring Harness Retainer - [2x]

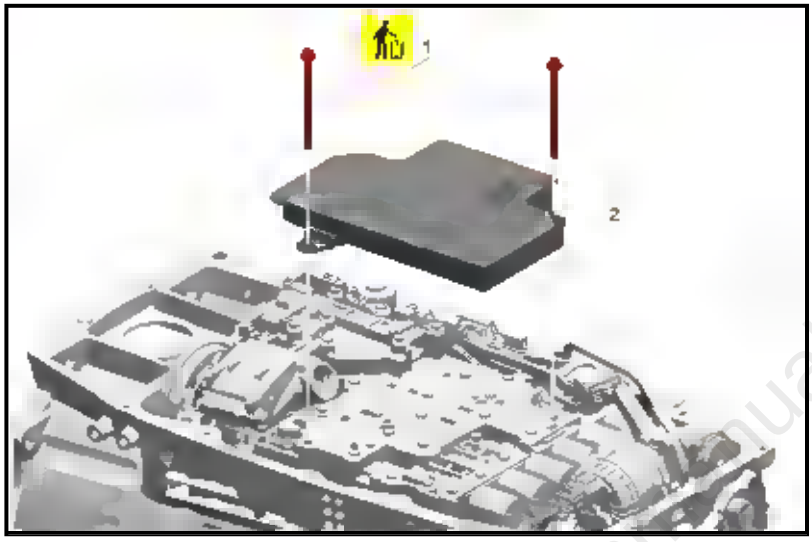
- Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal
- Automatic Transmission Auxiliary Fluid Pump Seal
- Automatic Transmission Fluid Filter Bolt [2x]
- Control Valve Solenoid Body Bolt [3x]
- Wiring Harness Connector Seal - [2x]

Special Tools

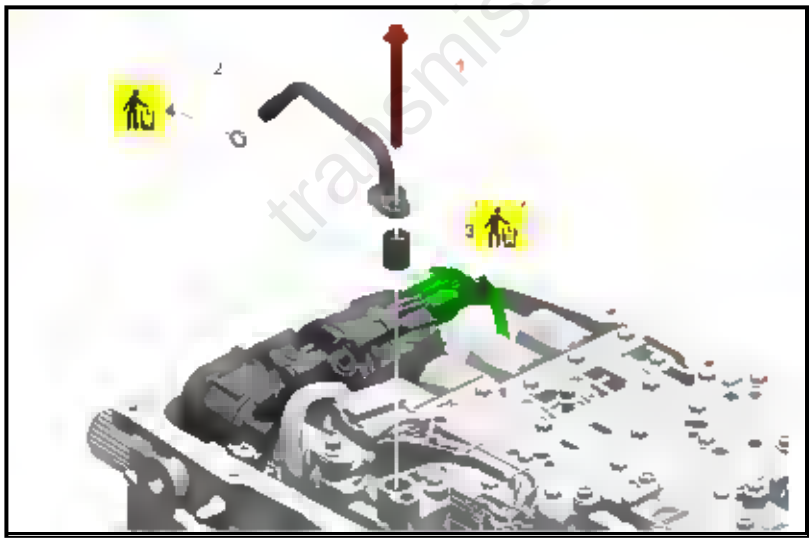
- **DT-52089-1** Wiring Harness Pass Through Connector Removal Tool

Equivalent regional tools: **Special Tools**

Removal Procedure

1. 

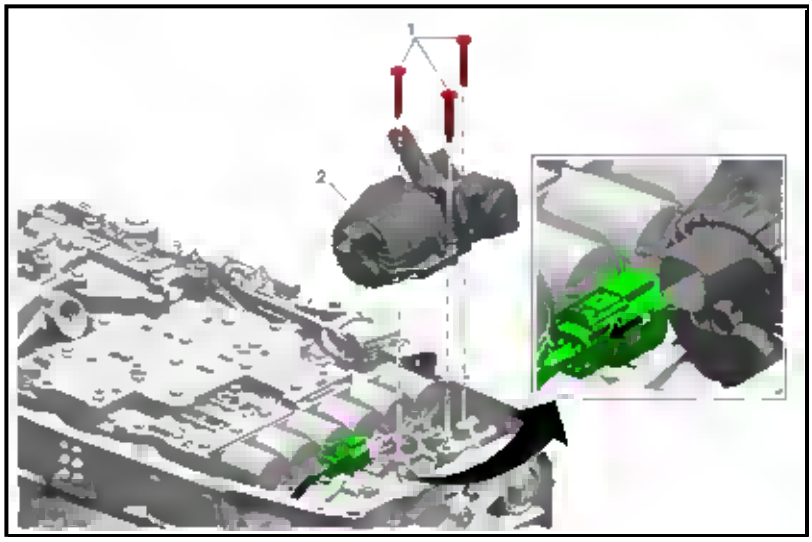
   Automatic Transmission Fluid Filter (2) - Remove - **Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement**

2. 

   Control Valve Upper Body Bolt (1) - Remove

3. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe (2) - Remove
4. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal (3) - Remove and DISCARD
5. Automatic Transmission Auxiliary Fluid Pump Seal (4) - Remove and DISCARD

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6. 

Automatic Transmission Auxiliary Fluid Pump Bolt (1) - Remove [3x]

7. Disconnect the electrical connector.
8. Automatic Transmission Auxiliary Fluid Pump (2) - Remove

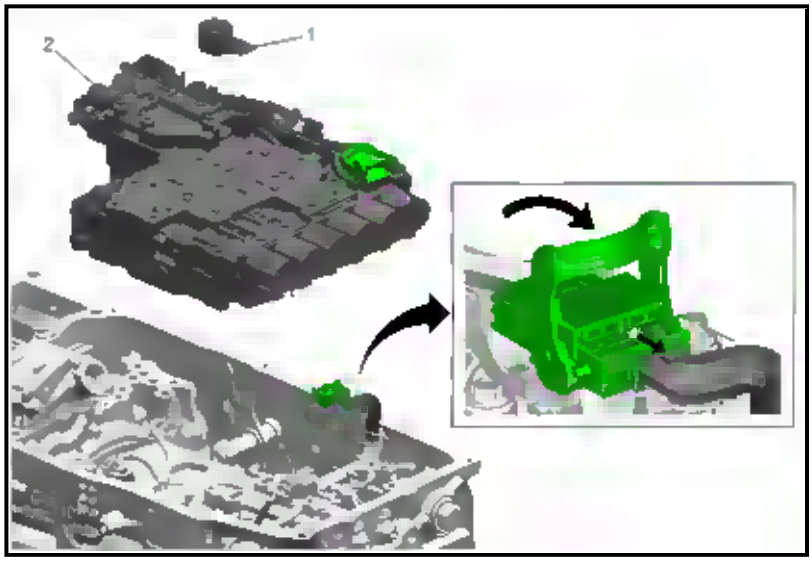
9. 

NOTE: **The bolts are marked by arrows in the valve body casting.**

Control Valve Solenoid Body Bolt (1) - Remove [2x]

10. Control Valve Solenoid Body Bolt (2) - Remove and DISCARD [3x]
11. Control Valve Solenoid Body Bolt (3) - Remove [2x]

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12. 

Park Inhibitor Solenoid (1) - Remove

13. Disconnect the main control wiring harness connector as shown.

NOTE: **The automatic transmission fluid pump seal should stay with the control valve body assembly.**

NOTE: **Do not disassemble the control valve body assembly. The internal parts are NOT serviceable.**

14. Control Valve Body Assembly (2) - Remove

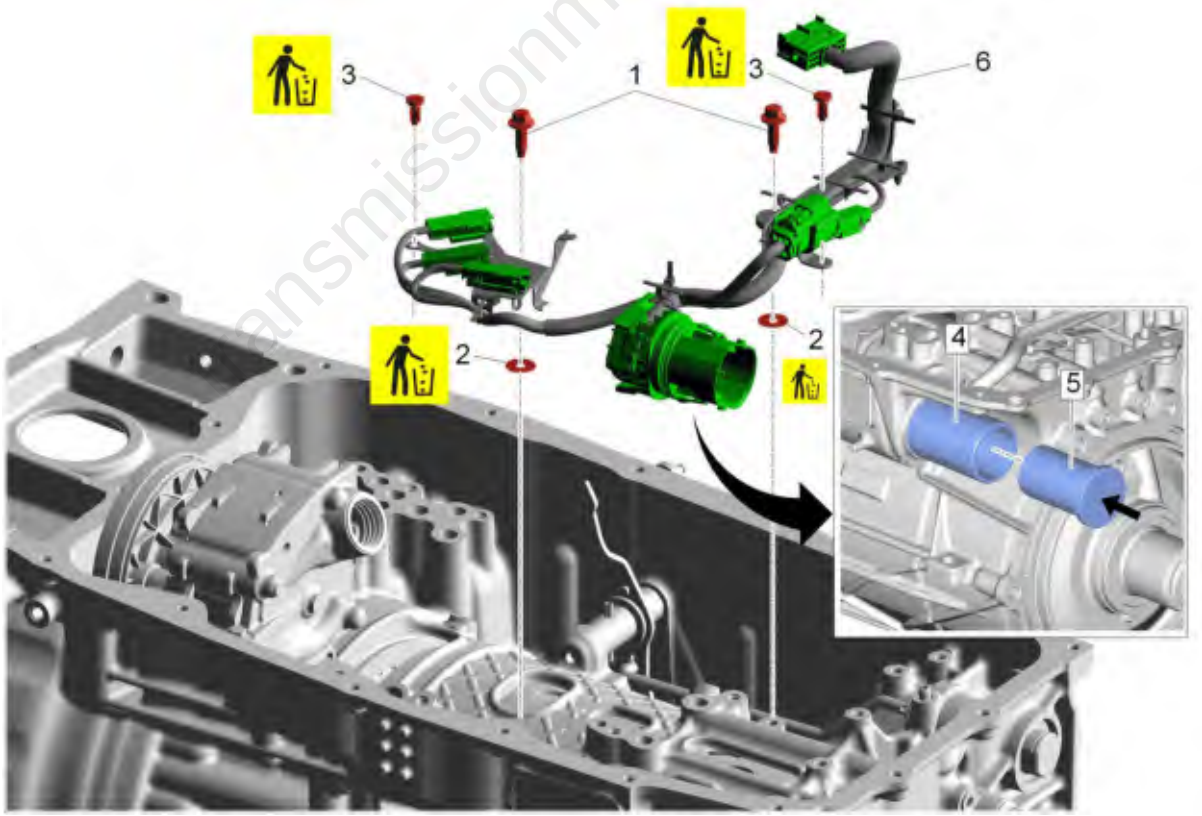
15. 

Fig. 11: Exploded View Of Automatic Transmission Control Wiring Harness Components
Courtesy of GENERAL MOTORS COMPANY

Automatic Transmission Control Wiring Harness Clip Bracket Bolt (1) - Remove [2x]

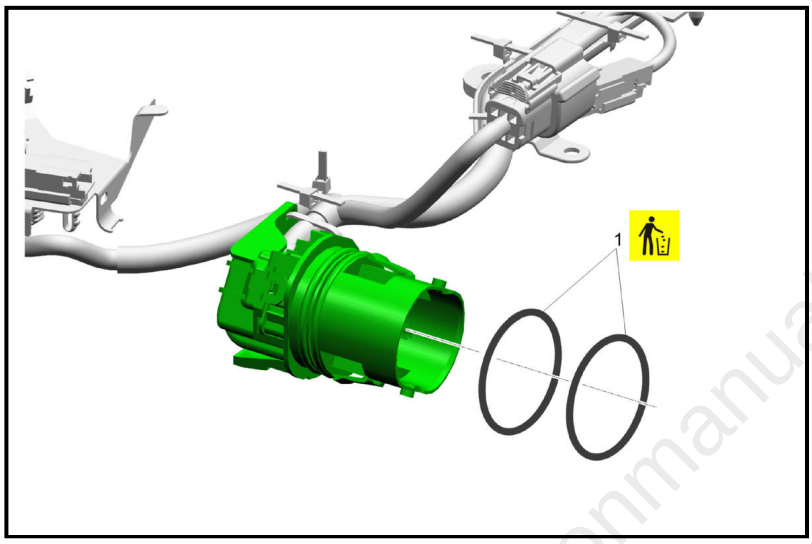
16. Automatic Transmission Control Wiring Harness Retainer - (2) - Remove and DISCARD [2x]

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17. Automatic Transmission Control Wiring Harness Retainer - (3) - Remove and DISCARD [2x]
18. Install the **DT-52089-1** Wiring Harness Pass Through Connector Removal Tool (4) onto the bulkhead connector. Ensure that the **DT-52089-1** Wiring Harness Pass Through Connector Removal Tool (4) is pushed all the way on and flush with the transmission case.
19. Push the **DT-52089-2** Wiring Harness Pass Through Connector Removal Tool (5) into the **DT-52089-1** Wiring Harness Pass Through Connector Removal Tool (4) and remove the bulkhead connector from the case.

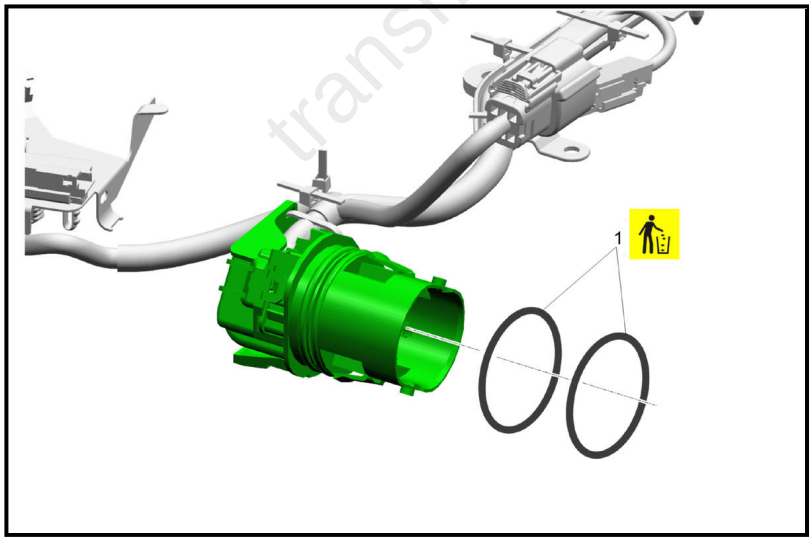
NOTE: **Ensure the connector is free of debris and dirt.**

NOTE: **To ensure proper routing during installation, note the routing of the harness prior to removal.**

20. Automatic Transmission Wiring Harness (6) - Remove
21. 

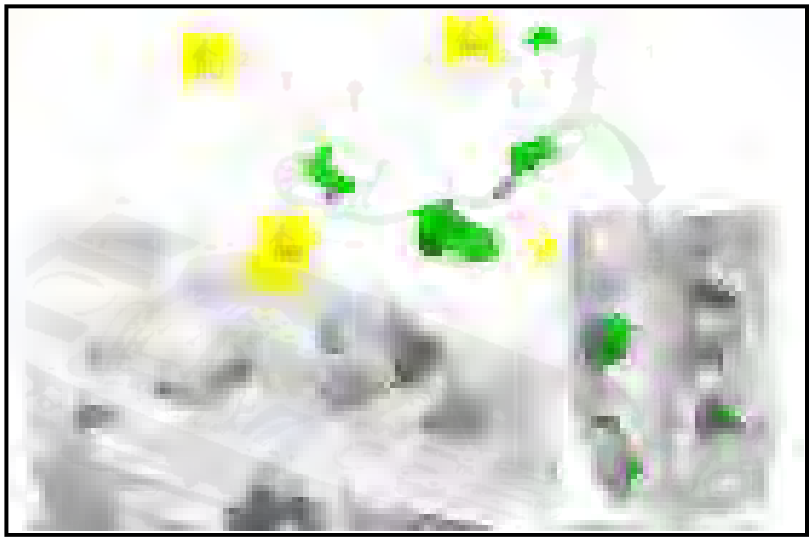
    Wiring Harness Connector Seal - (1) - Remove and DISCARD [2x]

Installation Procedure

1. 

    Wiring Harness Connector Seal - (1) - Install NEW [2x]

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2. 

NOTE: **Use previously noted position to route the harness during installation.**

Automatic Transmission Wiring Harness (1) - Install

NOTE: **Ensure the bulkhead connector is fully snapped into the case and seated flush.**

3. Connect the Transmission Range Selector (TRS) connector.
4. Automatic Transmission Control Wiring Harness Retainer (3) - Install NEW [2x]

CAUTION: **Refer to Fastener Caution**

5. Automatic Transmission Control Wiring Harness Clip Bracket Bolt (4) - Install and tighten [2x] - Fastener Specifications
6. Automatic Transmission Control Wiring Harness Retainer (2) - Install NEW [2x]

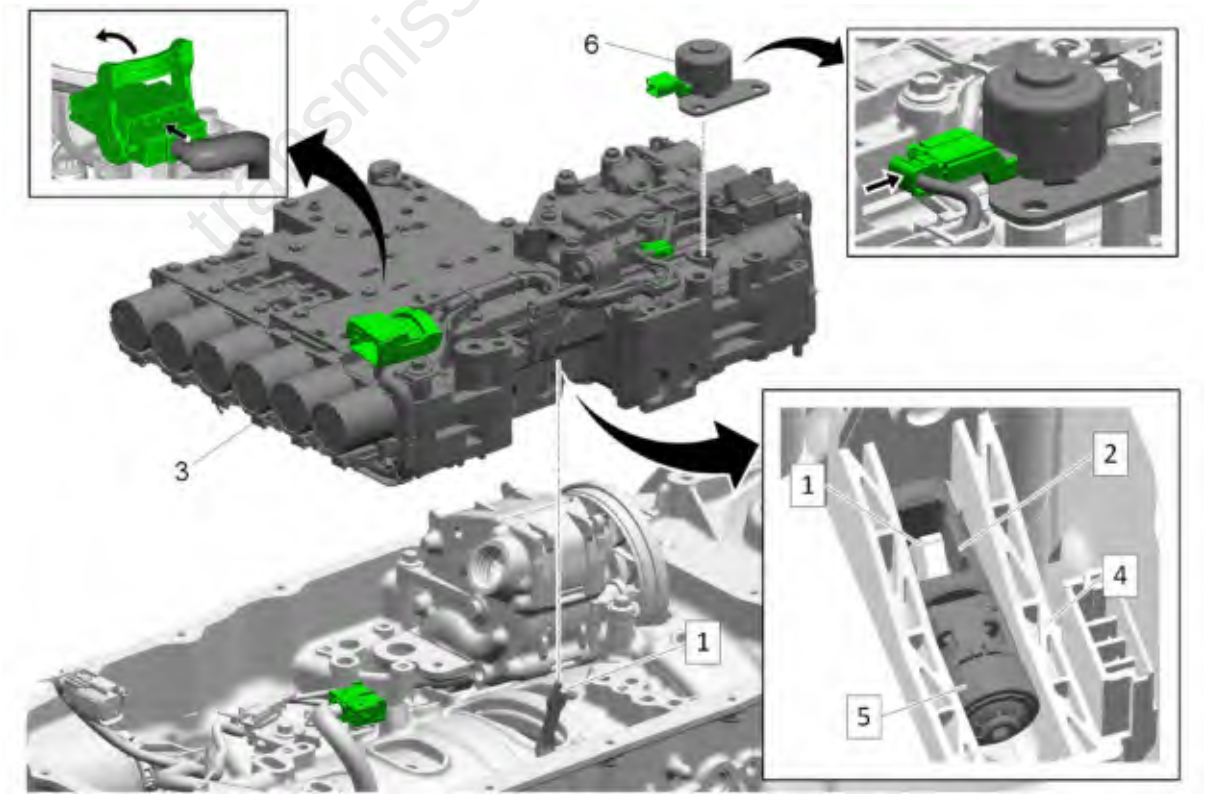
7. 

Fig. 12: Identifying Control Valve Assembly Installation Components
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NOTE: **Ensure the automatic transmission fluid pump seal is in the control valve body.**

Control Valve Body Assembly (1) - Install

NOTE: **The locating pins on the bottom of the control valve body assembly will hold the control valve body assembly in place while installing bolts.**

8. Install the control valve body assembly into the case.

NOTE: **Ensure the wiring harness is not pinched anywhere after valve body installation.**

9. Connect the main control wiring harness connector as shown.
10. Park Inhibitor Solenoid (2) - Install
11. 

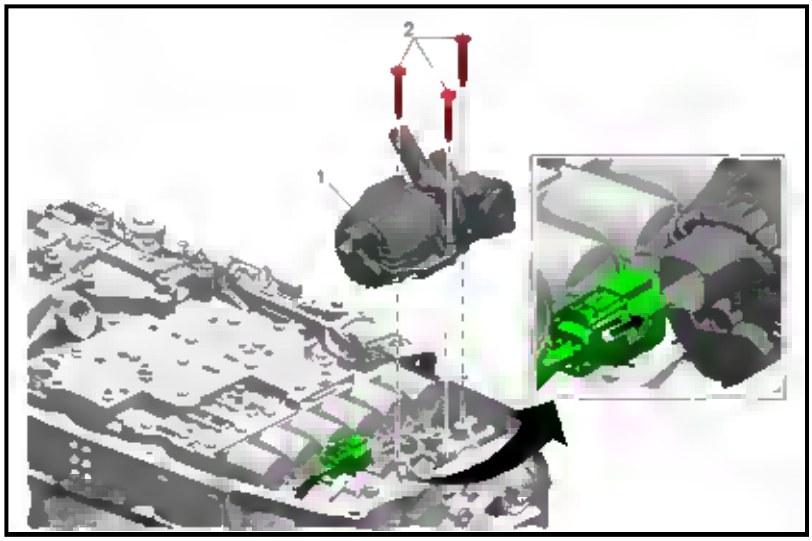
    Clean the bolt holes and ensure they are free from any old sealant. Allow to dry before installing NEW bolts.

12. Control Valve Solenoid Body Bolt (1) - Install and tighten in sequence [2x] - **Fastener Specifications**

NOTE: **The bolts are marked by arrows in the valve body casting.**

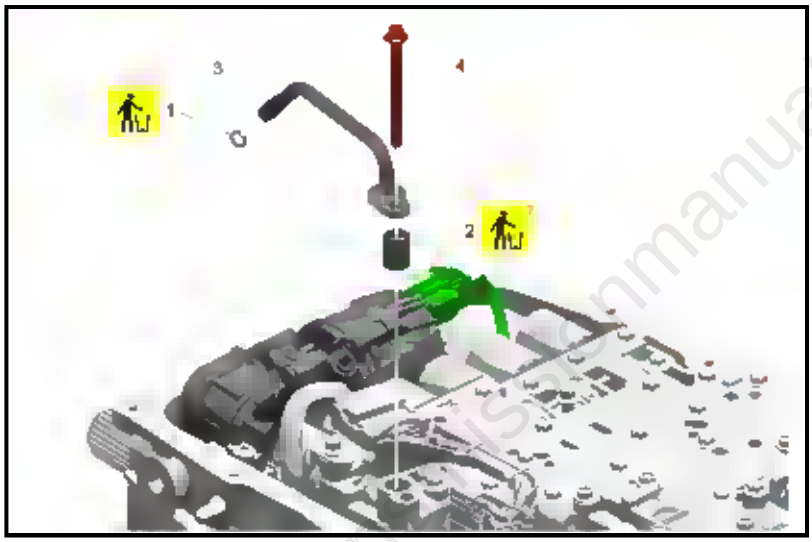
13. Control Valve Solenoid Body Bolt (2) - Install NEW and tighten in sequence [3x] - **Fastener Specifications**
14. Control Valve Solenoid Body Bolt (3) - Install and tighten in sequence [2x] - **Fastener Specifications**

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15. 

Automatic Transmission Auxiliary Fluid Pump (1) - Install

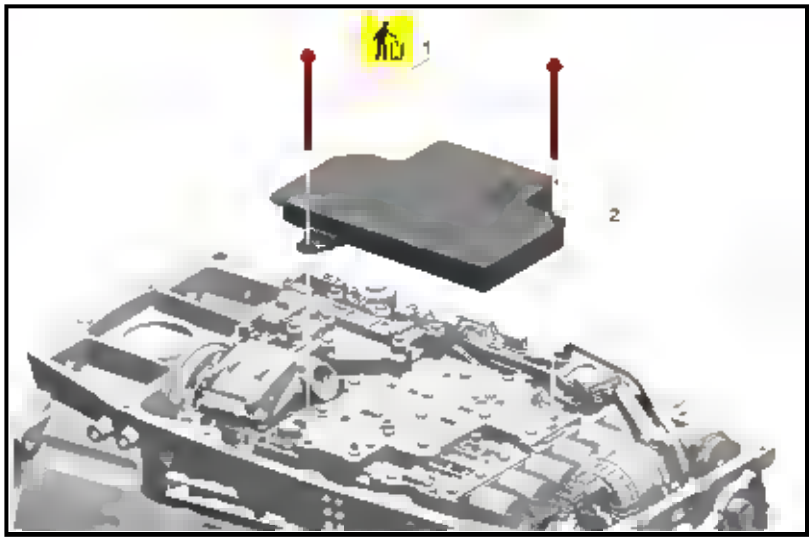
16. Connect the electrical connector.
17. Automatic Transmission Auxiliary Fluid Pump Bolt (2) - Install and tighten [3x] - **Fastener Specifications**

18. 

Automatic Transmission Auxiliary Fluid Pump Seal (1) - Install NEW

19. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe Seal (2) - Install NEW
20. Automatic Transmission Auxiliary Fluid Pump Outlet Pipe (3) - Install
21. Control Valve Upper Body Bolt (4) - Install and tighten - **Fastener Specifications**

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22. 

    Automatic Transmission Fluid Filter (2) - Install - **Automatic Transmission Fluid, Fluid Pan and/or Filter Replacement**

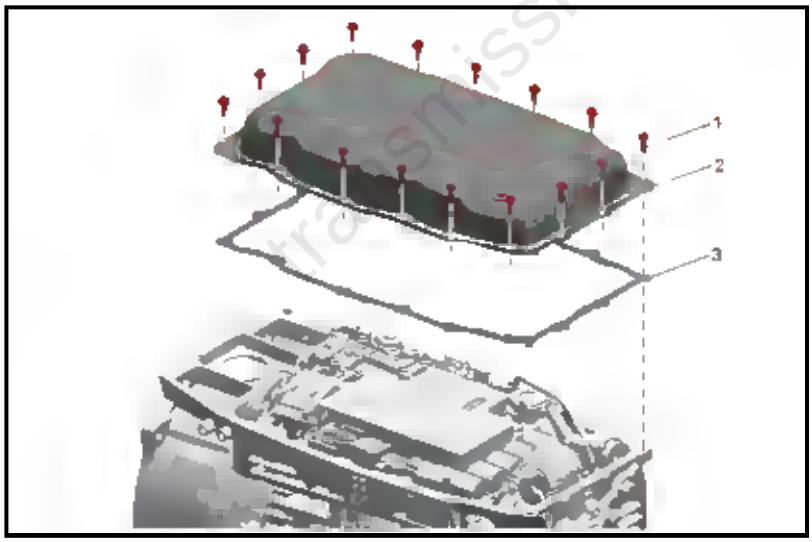
23. Perform the solenoid valve characterization reprogramming procedure. **Q77 Transmission Control Solenoid Valve Characterization Programming (10L60)**

TRANSMISSION FLUID DRAIN AND FILL

Single Use Fasteners and Components

- Automatic Transmission Fluid Filter Bolt [2x]

Removal Procedure

1. Raise and support the vehicle. **Lifting and Jacking the Vehicle**
2. Place a drain pan under the vehicle.
3. 

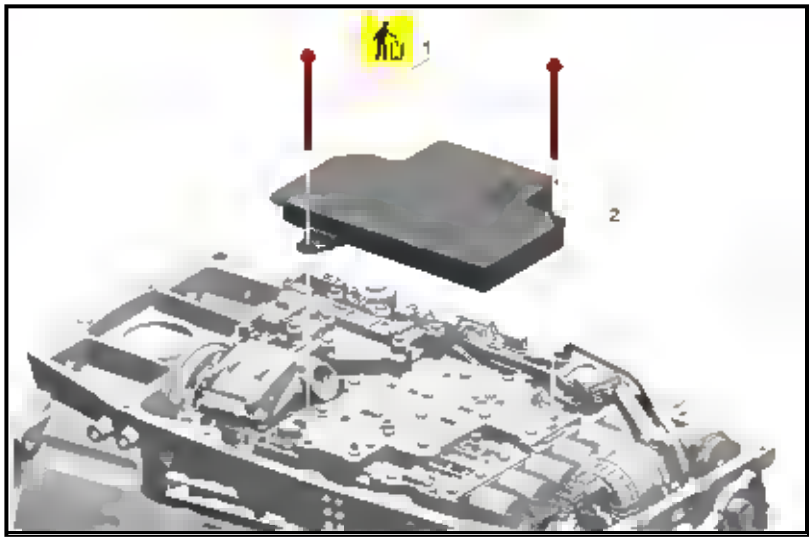
    Automatic Transmission Fluid Pan Bolt (1) - Remove [16x]

4. Automatic Transmission Fluid Pan (2) - Remove

    NOTE: **The fluid pan gasket is reusable. Inspect the gasket to determine if it may be reused. If the gasket is stuck to the case or pan, it should be replaced.**

5. Automatic Transmission Fluid Pan Gasket (3) - Remove

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6. 

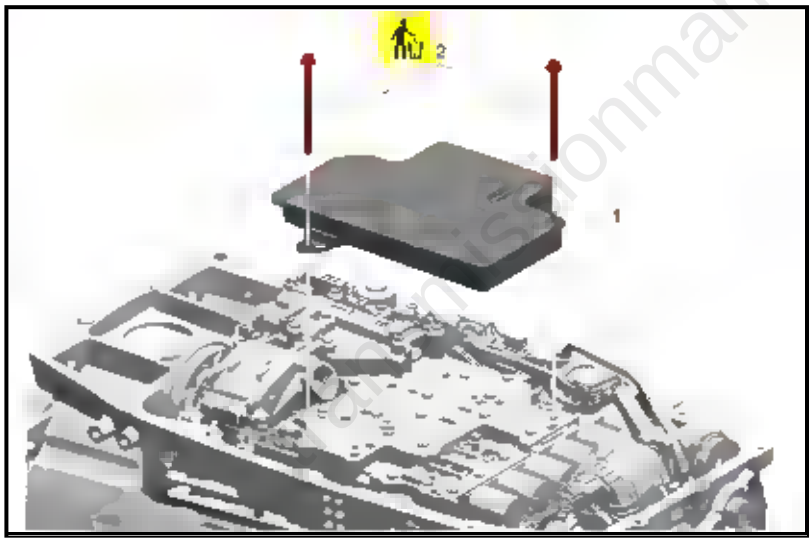
Automatic Transmission Fluid Filter Bolt (1) - Remove and DISCARD [2x]

CAUTION: **Pull the fluid filter assembly straight out to avoid damage. Do not bend or twist the filter neck.**

NOTE: **The seal should stay with the pump assembly.**

7. Automatic Transmission Fluid Filter (2) - Remove

Installation Procedure

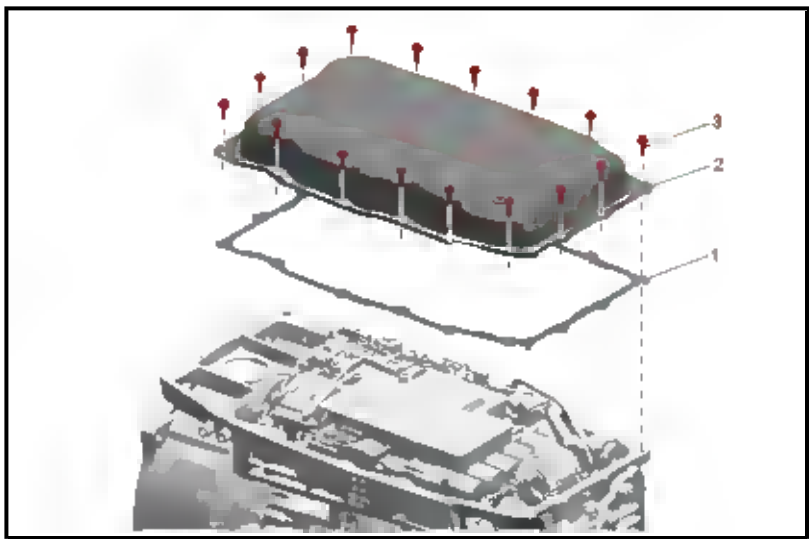
1. 

Automatic Transmission Fluid Filter (1) - Install

CAUTION: **Refer to Fastener Caution .**

2. Automatic Transmission Fluid Filter Bolt (2) - Install NEW and tighten [2x] - **Fastener Specifications**

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3. 

   Automatic Transmission Fluid Pan Gasket (3) - Install

4. Automatic Transmission Fluid Pan (4) - Install
5. Automatic Transmission Fluid Pan Bolt (5) - Install and tighten in sequence [16x] - **Fastener Specifications**
6. Remove the drain pan.
7. Lower the vehicle.
8. Fill the transmission to the proper level with NEW transmission fluid. **Transmission Fluid Level and Condition Check**

TRANSMISSION REPLACEMENT (ALL WHEEL DRIVE)

Single Use Fasteners and Components

- Engine Oil Cooler Seal
- Exhaust Pipe Clamp
- Catalytic Converter Gasket
- Propeller Shaft Hub Clamp [1x]
- Transmission Fluid Cooler Pipe Seal [2x]
- Transmission Fluid Cooler Thermal Bypass Valve Gasket [4x]

Special Tools

Driveline/Axle

- **DT-35910** Drive Axle Seal Clamp Pliers

Equivalent regional tools: **Special Tools**

Equivalent regional tools: **Special Tools (Diagnostic)** , or **Special Tools (Mechanical)**

Automatic Transmission (MQA)

- **J-21366** Torque Converter Holding Strap

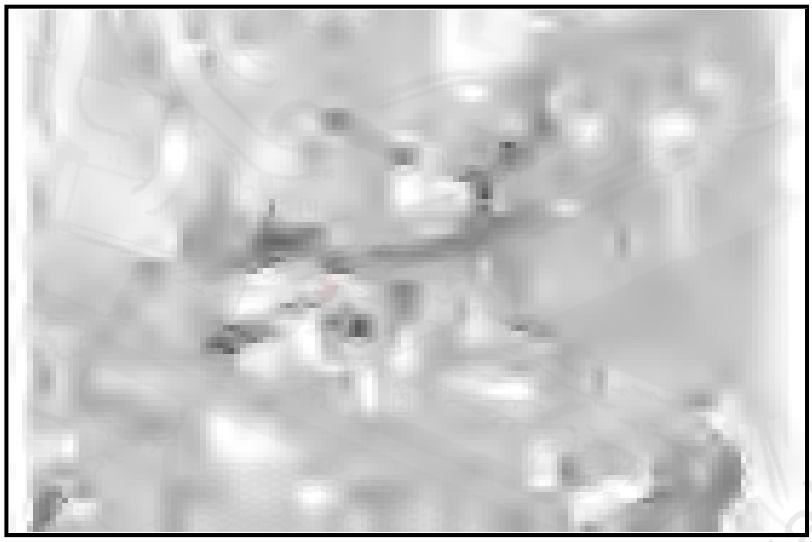
Equivalent regional tools: **Special Tools**

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.**

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

1. Disconnect the negative battery cable. **Battery Negative Cable Disconnection and Connection**
2. Drain the cooling system. **Cooling System Draining and Filling (L3B Static Fill)** , or **Cooling System Draining and Filling (L3B GE 47716)**
3. Drain the engine oil. Engine Oil and Oil Filter Replacement (AWD)
4. Transfer Case Assembly - Remove - **Transfer Case Assembly Replacement**
5. 

Transmission Fluid Cooler Pipe Bracket Nut (1) - Remove

NOTE: **Cap the fittings and plug the holes when removing the transmission fluid cooler pipes.**

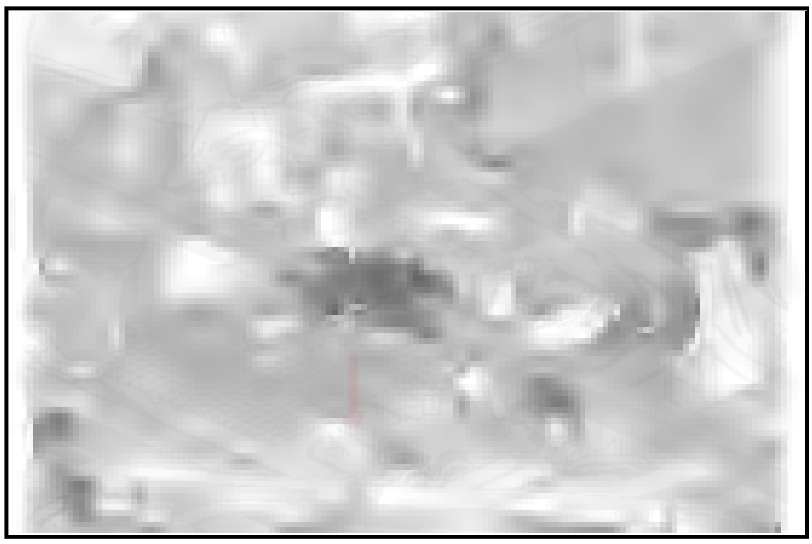
6. Transmission Fluid Cooler Inlet and Outlet Pipe (2) @ Transmission Cooler Bypass Valve - Remove
7. 

Transmission Fluid Cooler Pipe Bracket Nut (1) - Remove

NOTE: **Cap the fittings and plug the holes when removing the transmission fluid cooler pipes.**

8. Transmission Fluid Cooler Inlet and Outlet Pipe (2) @ Transmission Cooler Bypass Valve - Remove

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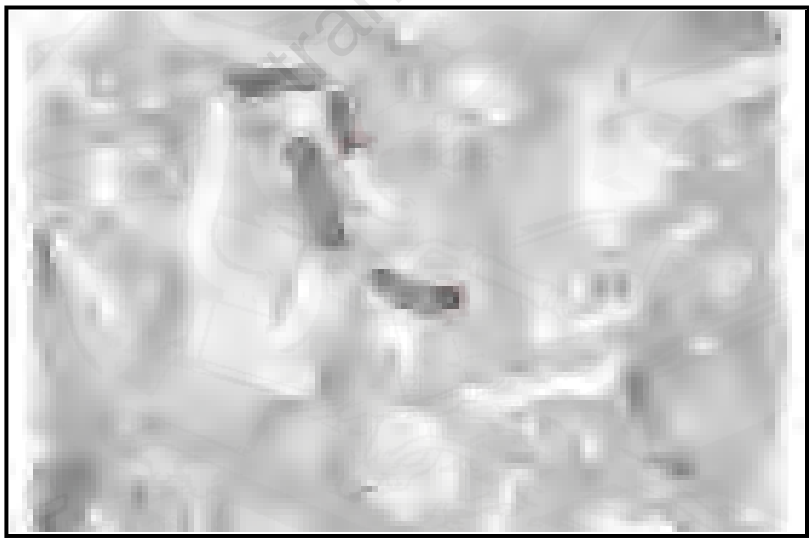
9. 

   Transmission Fluid Cooler Thermal Bypass Valve Bolt (1) - Remove

10. Transmission Cooler Bypass Valve (2) - Remove

11. 

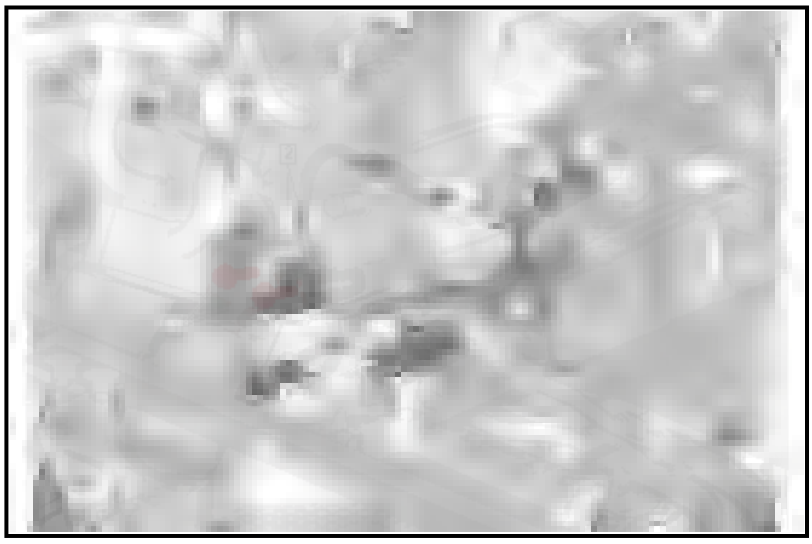
    Transmission Fluid Cooler Thermal Bypass Valve Gasket (2) - Remove and DISCARD [4x]

12. 

    Automatic Transmission Fluid Cooling Heat Exchanger Inlet Hose Clamp (1) - Disengage - **Hose Clamp Replacement Guidelines - Spring Type**

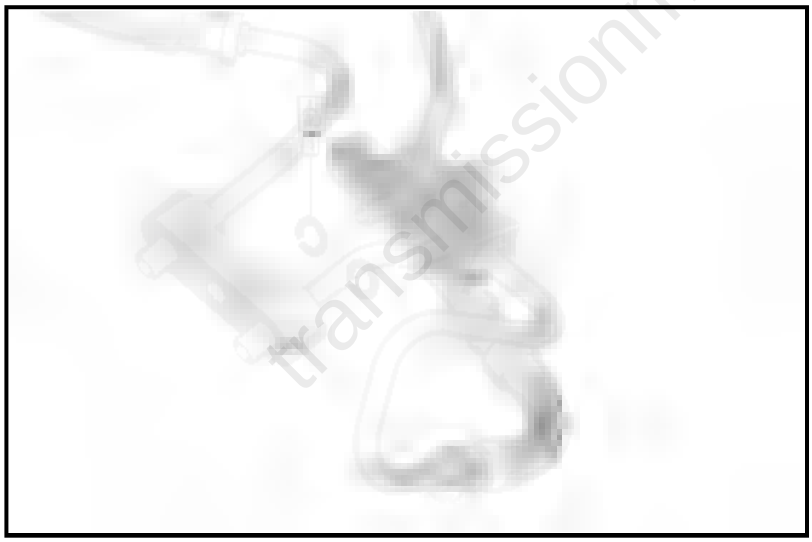
13. Automatic Transmission Fluid Cooling Heat Exchanger Inlet Hose (2) @ Automatic Transmission Fluid Cooling Exchanger - Remove

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14. Automatic Transmission Fluid Cooling Heat Exchanger Outlet Hose Clamp (3) - Disengage - **Hose Clamp Replacement Guidelines - Spring Type**
15. Automatic Transmission Fluid Cooling Heat Exchanger Outlet Hose (4) @ Automatic Transmission Fluid Cooling Exchanger - Remove
16. 

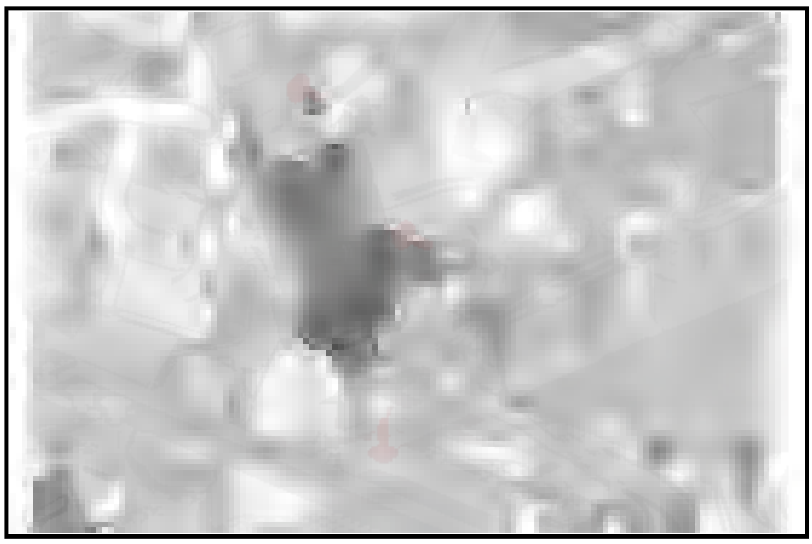
    Transmission Fluid Cooler Pipe Connector Bolt (1) - Remove [2x]

    NOTE: **Cap the fittings and plug the holes when removing the transmission fluid cooler pipes.**

17. Transmission Fluid Cooler Inlet and Outlet Pipe (2) @ Automatic Transmission Fluid Cooling Exchanger - Remove
18. 

    Transmission Fluid Cooler Pipe Seal (1) - Remove and DISCARD [2x]

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19. 

    Automatic Transmission Fluid Cooling Exchanger Bolt (1) - Remove [3x]

20. Automatic Transmission Fluid Cooling Exchanger (2) - Remove

21. 

    Hose Clamp (1) - Disengage [2x] - **Hose Clamp Replacement Guidelines - Spring Type**

22. Engine Oil Cooler Coolant Outlet Hose (2) @ Engine Oil Cooler - Remove
23. Engine Oil Cooler Coolant Inlet Hose (3) @ Engine Oil Cooler - Remove

24. 

    Engine Oil Cooler Bolt (1) - Remove [4x]

25. 

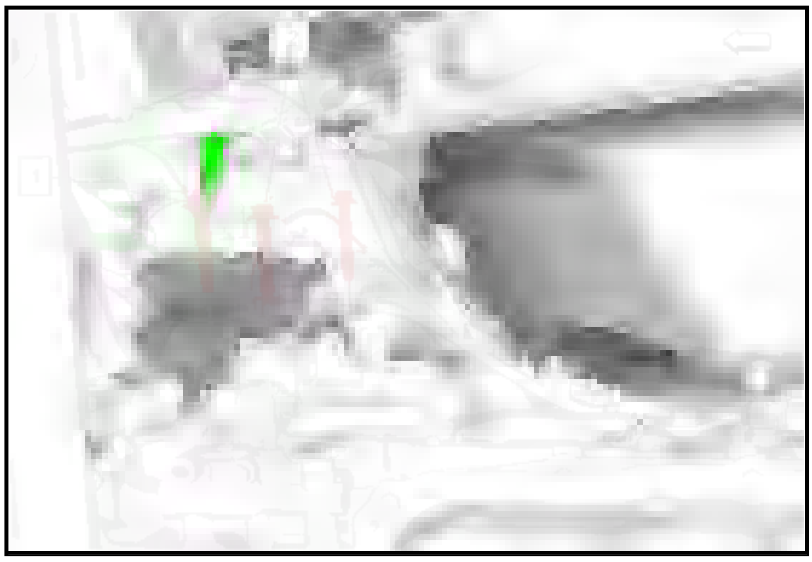
Engine Oil Cooler (1) - Remove

26. Engine Oil Cooler Seal (2) - Remove and DISCARD [2x]
27. Reposition any hoses that will impede the removal of the starter.

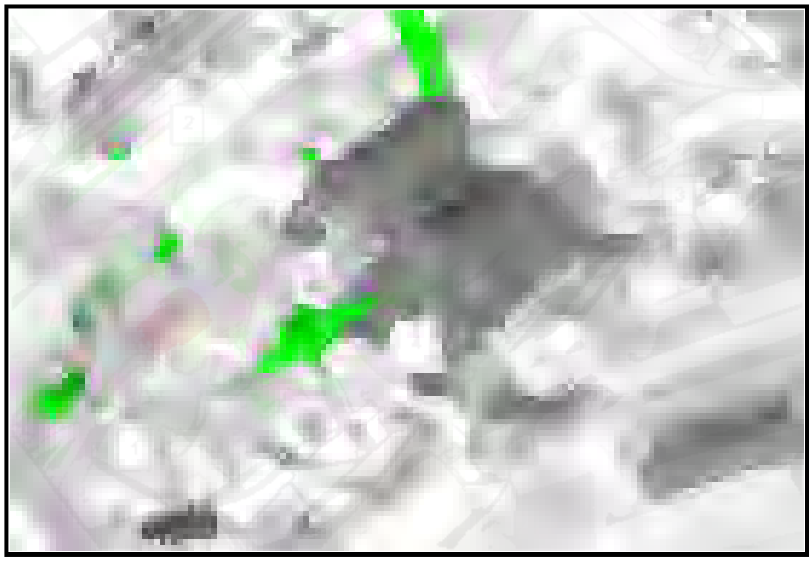
28. 

Auxiliary Generator Battery Jumper Cable Terminal Nut (1) - Remove

29. Auxiliary Generator Battery Jumper Cable (2) - Reposition away
30. Retainer (3) - Disengage

31. 

Starter Stud (1) - Remove

32. Starter Bolt (2) - Remove [2x]
33. Reposition the starter to gain access to the electrical connections.
34. 

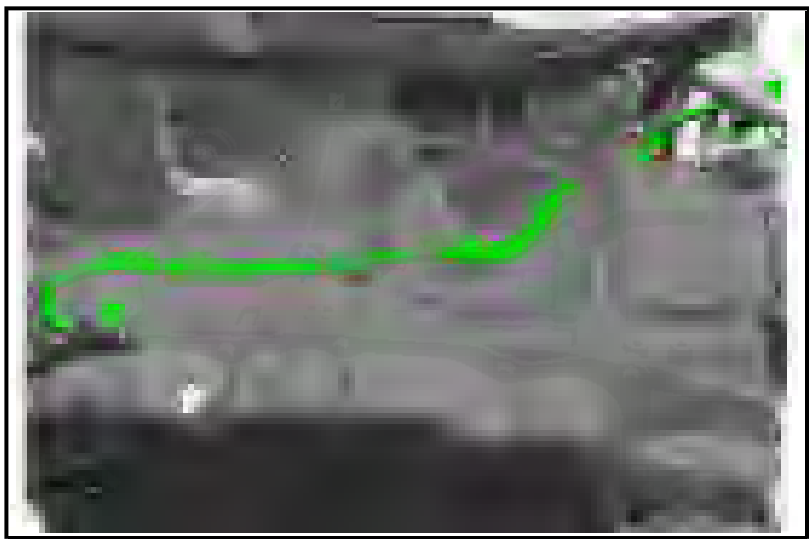
    Battery Positive Cable Nut (1) @ Starter Solenoid - Remove

35. Auxiliary Generator Battery Jumper Cable (2) - Remove
36. Electrical Connector (4) - Disconnect
37. Starter (3) - Remove
38. 

    Repeat the following steps for all torque converter bolts (1):

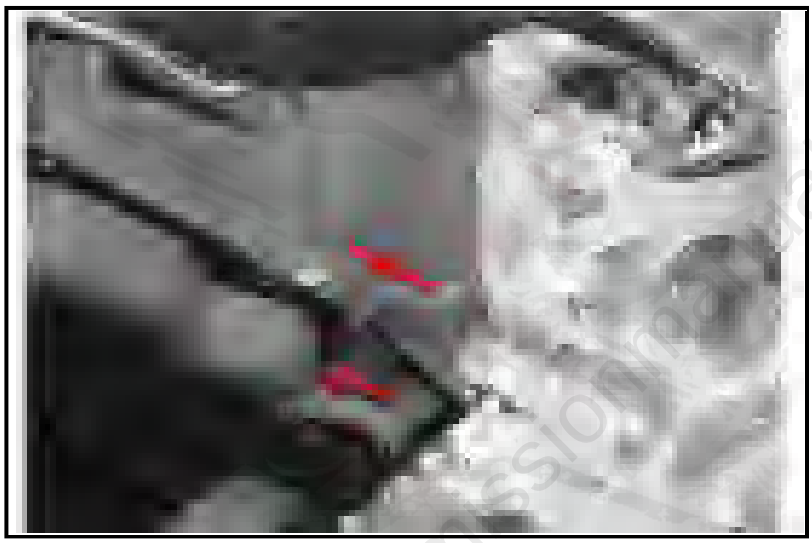
    1. Rotate the harmonic balancer center bolt clockwise ONLY, to align the torque converter bolt with the starter opening.
    2. Torque Converter Bolt (1) - Remove [6x]

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39. 

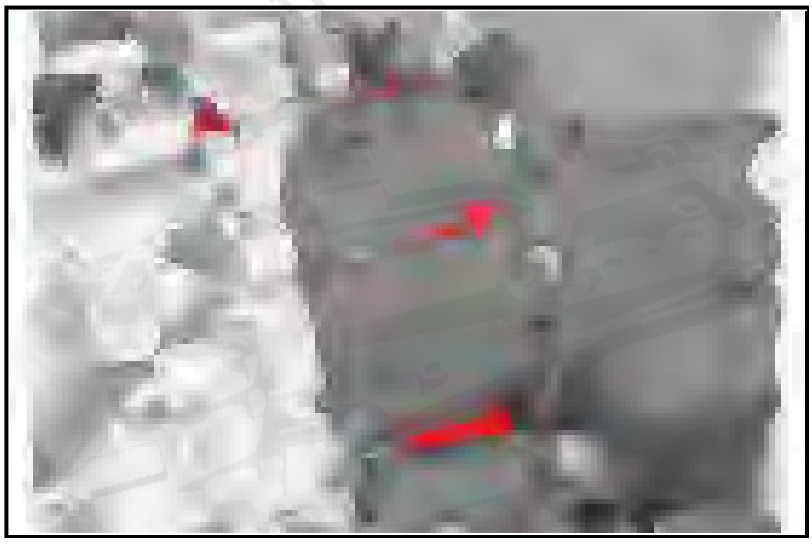
Disconnect the electrical connector (1)

40. Release the 5 retainers (2).

41. 

Transmission Bolt (1) - Remove [3x]

42. Transmission Stud (1) - Remove

43. 

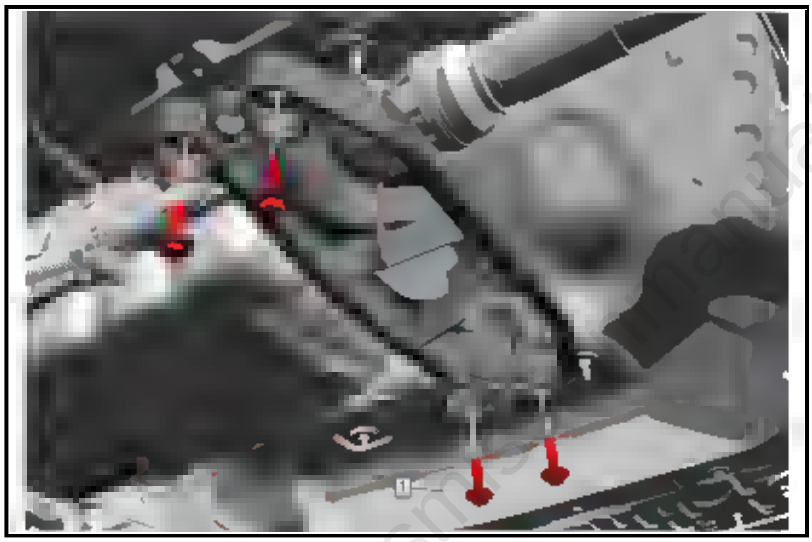
Transmission Bolt (1) - Remove [3x]

44. Transmission Stud (1) - Remove

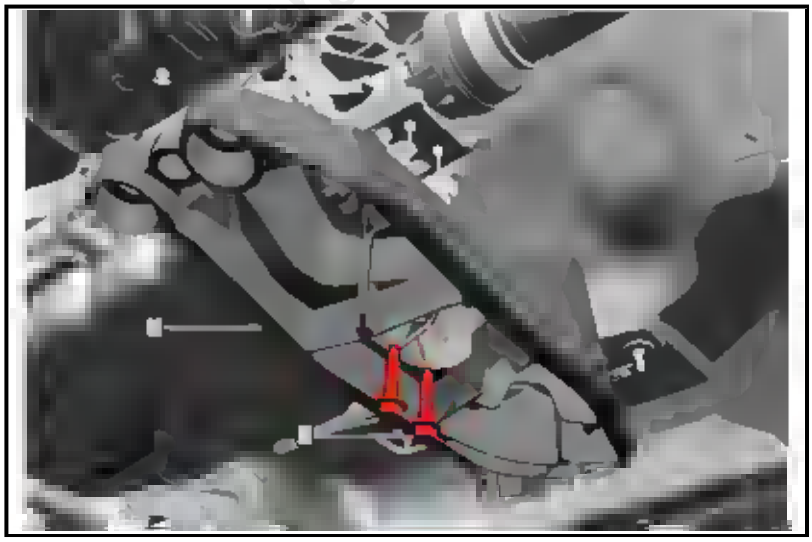
45. 

Transmission Stud (1) - Remove

46. Disconnect the transmission vent hose from the engine.
47. Support the transmission with a suitable jack.

48. 

Transmission Mount Bracket Bolt (1) - Remove [4x]

49. 

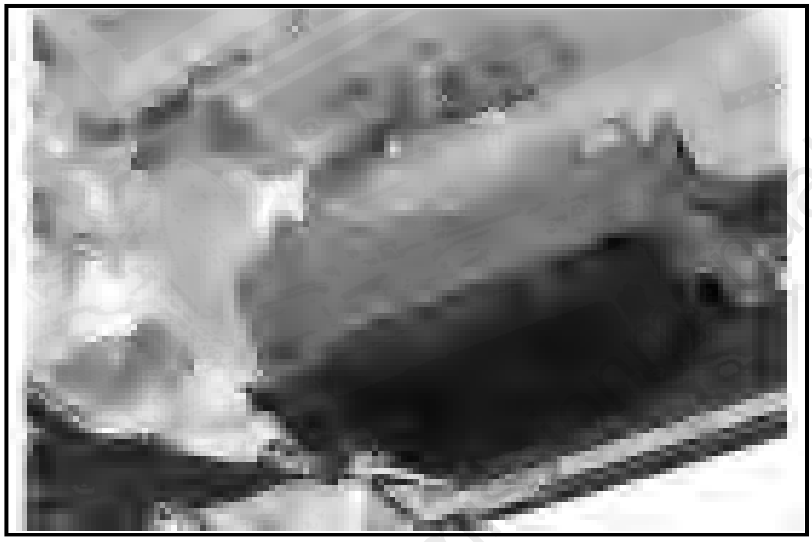
Transmission Mount Bolt (1) - Remove [2x]

50. Transmission Mount (2) - Remove

51. Pull the transmission straight back.

52. 

Install the **J-21366** strap (1) onto the transmission bell housing to retain the torque converter.

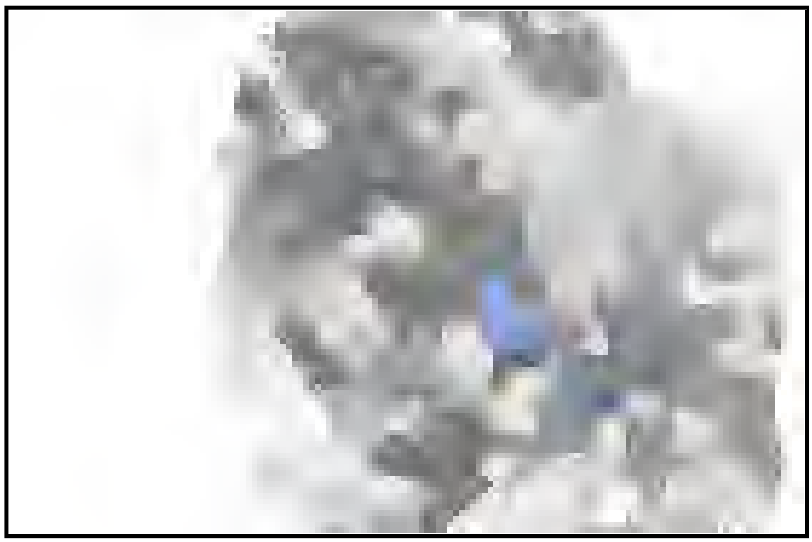
53. 

Remove the transmission (1)

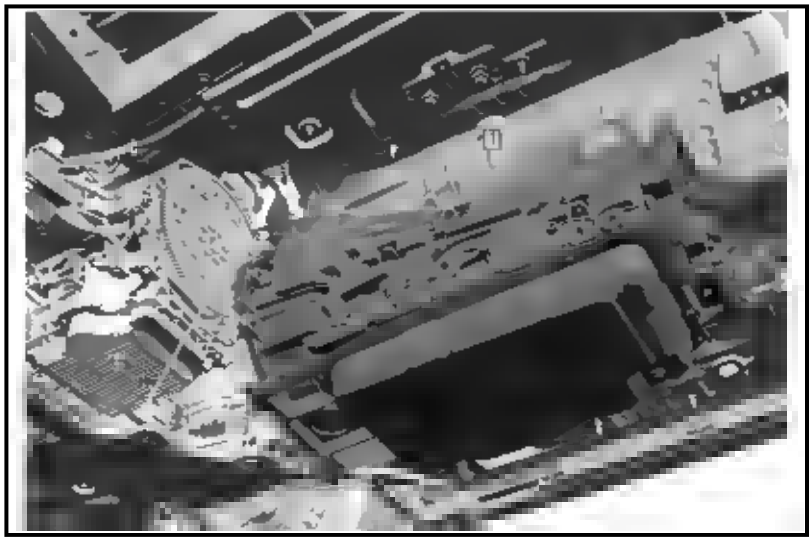
54. Transfer components as necessary.

Installation Procedure

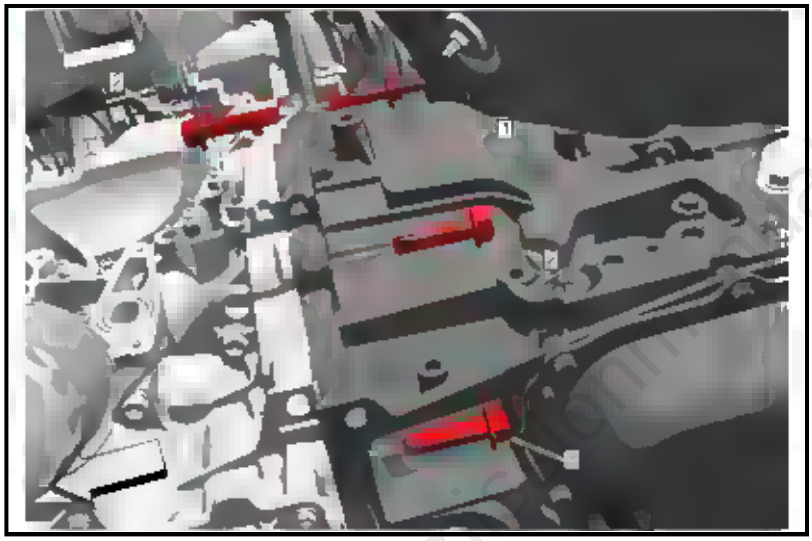
1. Support the transmission with a suitable jack.

2. 

Remove the **J-21366** strap (1) from the transmission bell housing.

3. 

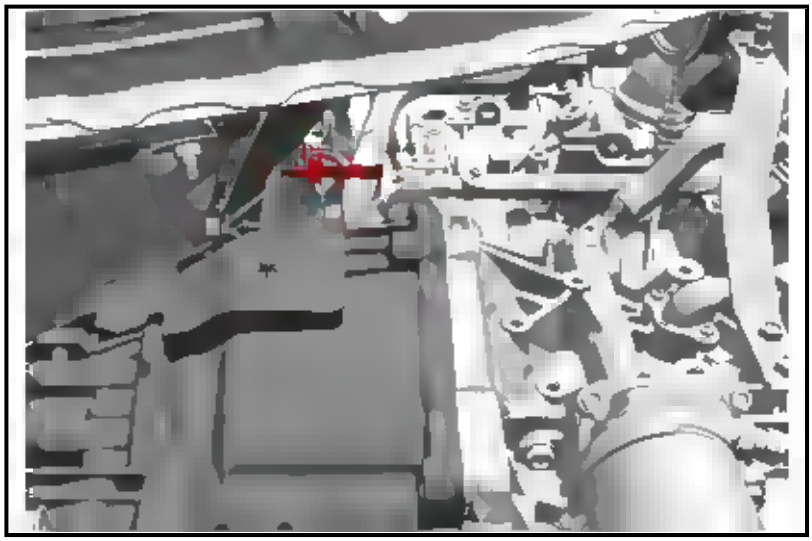
Install the transmission (1)

4. 

CAUTION: **Refer to Fastener Caution .**

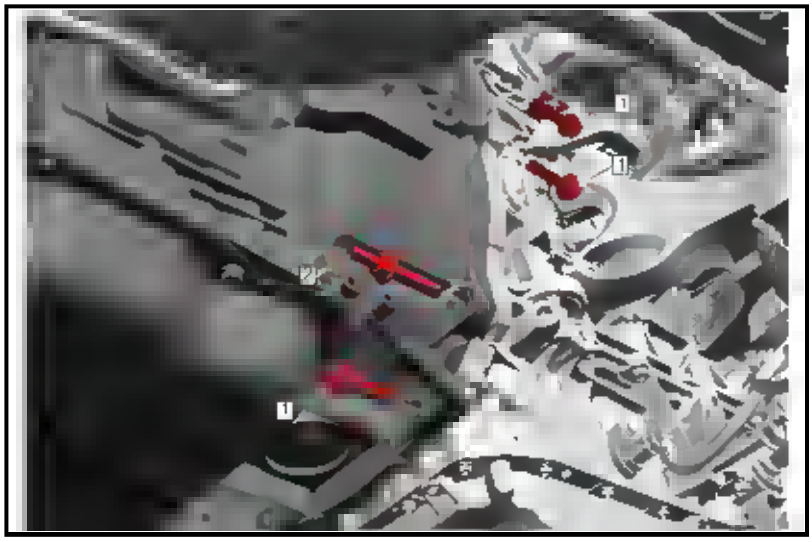
Transmission Bolt (1) - Install and tighten [3x] - **Fastener Specifications**

5. Transmission Stud (1) - Install and tighten - **Fastener Specifications**

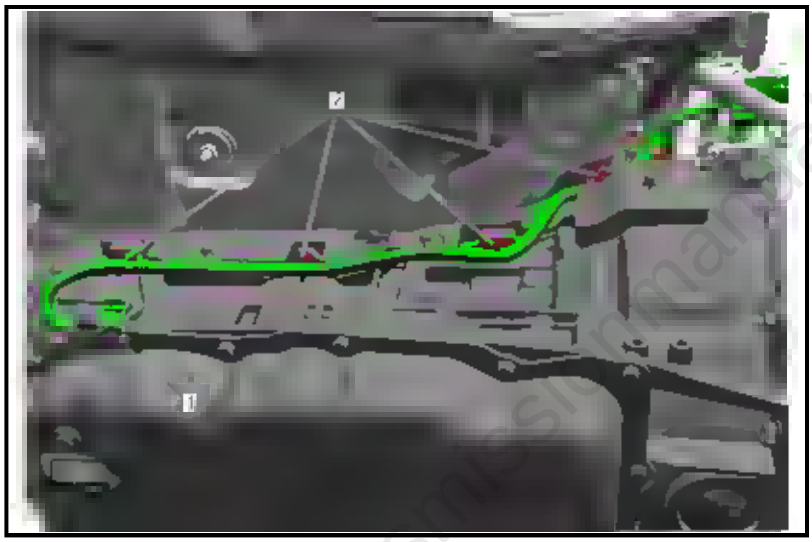
6. 

Transmission Stud (1) - Install and tighten - **Fastener Specifications**

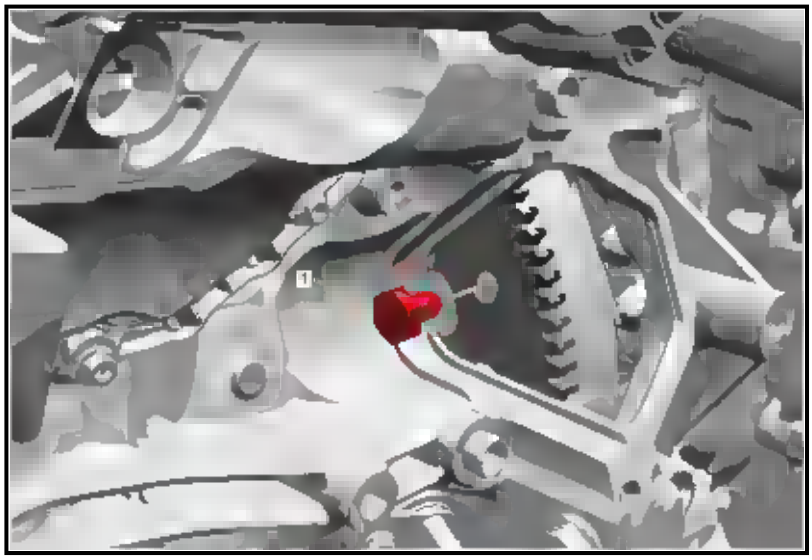
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7. 

   Transmission Bolt (1) - Install and tighten [3x] - **Fastener Specifications**

8. Transmission Stud (1) - Install and tighten - **Fastener Specifications**
9. Connect the transmission vent hose to the engine.
10. 

    Connect the electrical connector (1)

11. Install the 5 retainers (2).
12. 

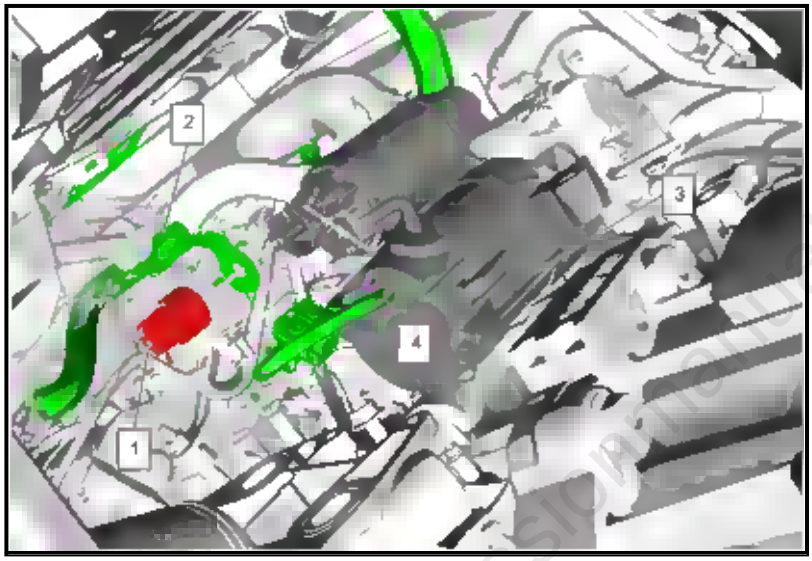
    Prepare the transmission torque converter bolts (1) for installation as follows:

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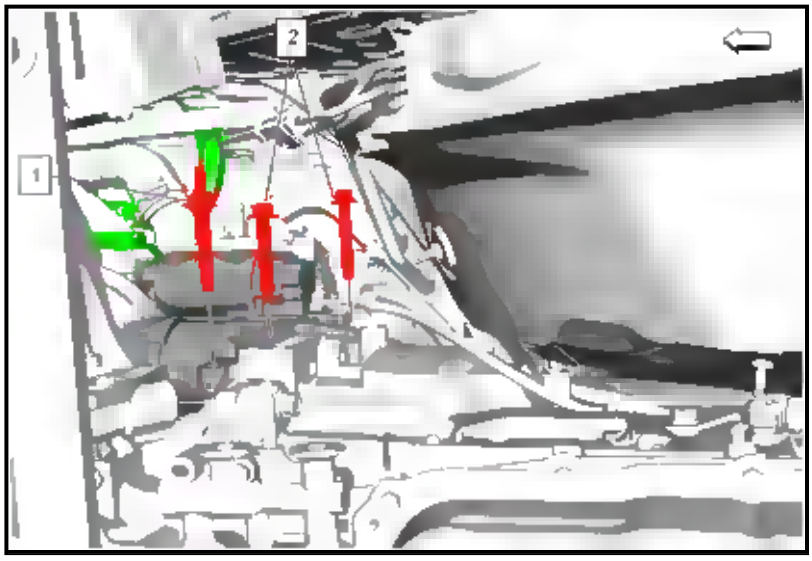
1. Remove any loose cured adhesive from the external threads of the components using a lint free cloth.
2. Thread the cleaned components into the internal mating threads and remove to loosen trapped cured adhesive.
3. Apply thread locking adhesive to the external threads of the components. **Adhesives, Fluids, Lubricants, and Sealers**
4. Ensure there are no gaps in the thread locking adhesive once applied to the component.

NOTE: **For proper alignment of all torque converter bolts, install the first torque converted bolt in the oval shaped hole.**

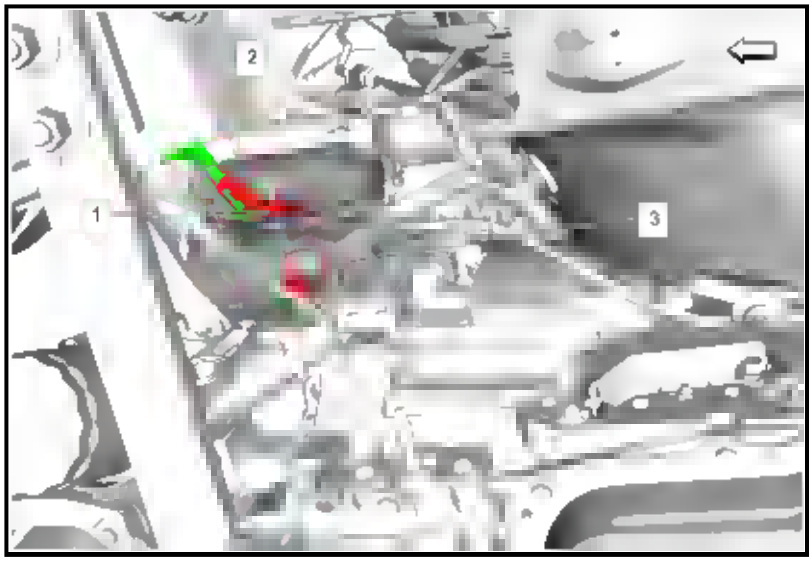
NOTE: **Rotate the harmonic balancer center bolt clockwise ONLY, to align the torque converter bolt with the starter opening.**

13. Transmission Torque Converter Bolt (1) - Install and tighten [6x] - **Fastener Specifications**
14. 

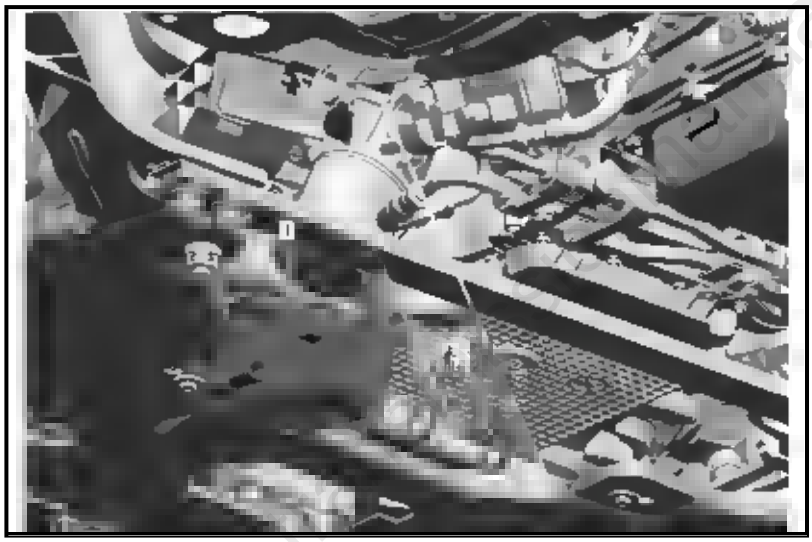
    Auxiliary Generator Battery Jumper Cable (2) - Install

15. Battery Positive Cable Nut (1) @ Starter Solenoid - Install and tighten - **Fastener Specifications**
16. Electrical Connector (4) - Connect
17. Starter (3) - Install
18. 

    Starter Bolt (2) - Install and tighten [2x] - **Fastener Specifications**

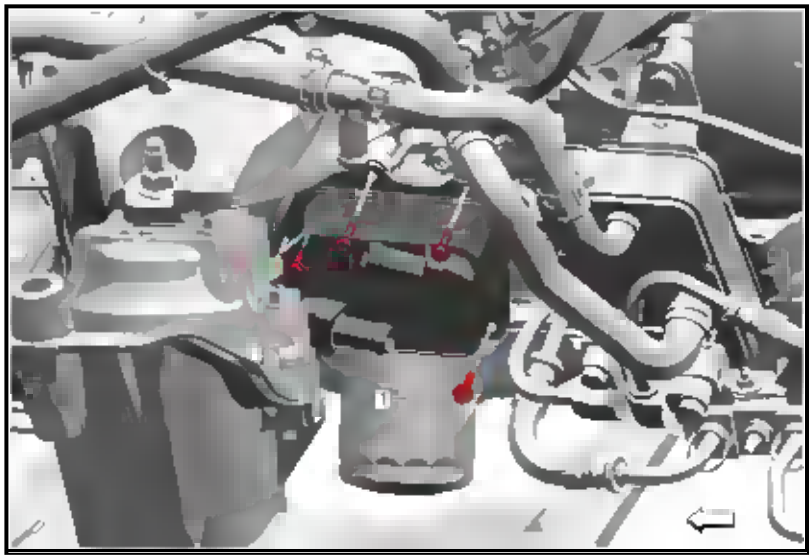
19. Starter Stud (1) - Install and tighten - **Fastener Specifications**
20. 

    Auxiliary Generator Battery Jumper Cable - Install

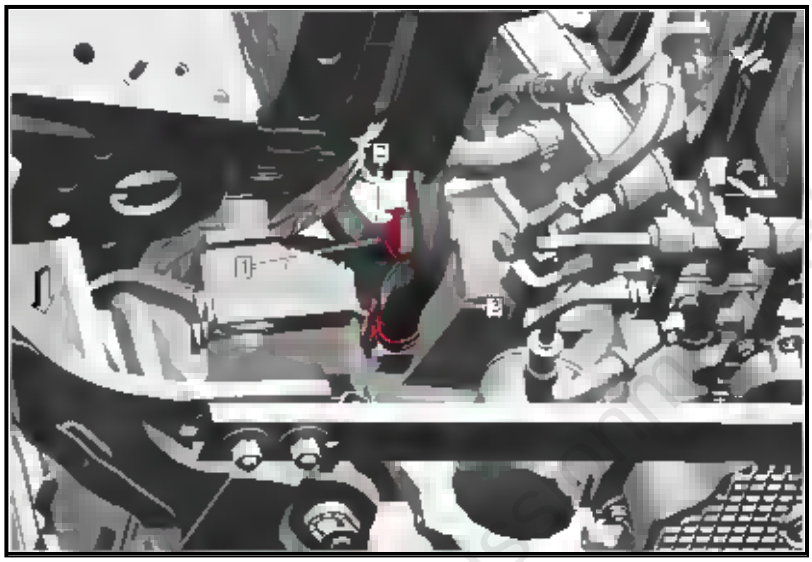
21. Auxiliary Generator Battery Jumper Cable Terminal Nut (1) - Install and tighten - **Fastener Specifications**
22. Retainer (3) - Engage
23. 

    Engine Oil Cooler Seal (2) - Install NEW [2x]

24. Engine Oil Cooler (1) - Install

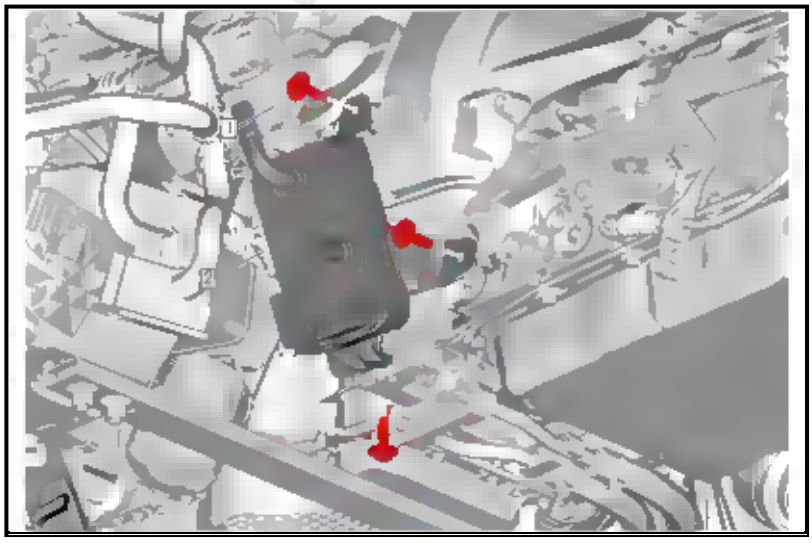
25. 

Engine Oil Cooler Bolt (1) - Install and tighten [4x] - **Fastener Specifications**

26. 

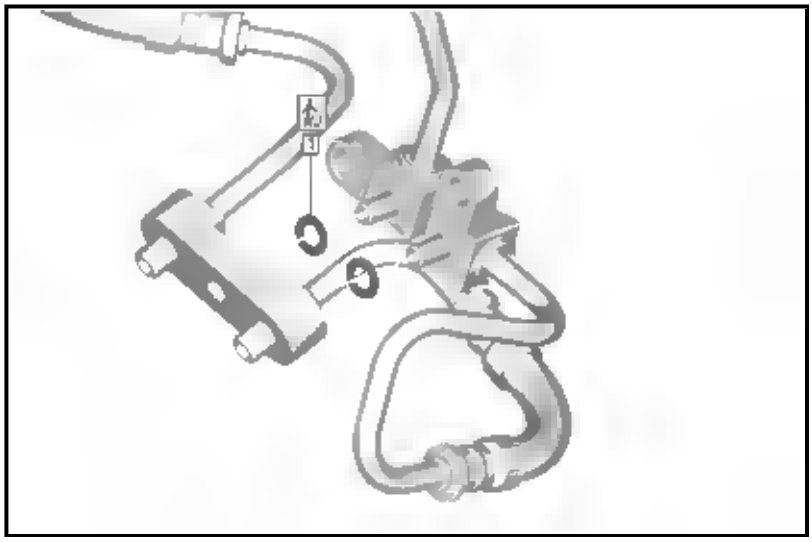
Engine Oil Cooler Coolant Inlet Hose (3) @ Engine Oil Cooler - Install

27. Engine Oil Cooler Coolant Outlet Hose (2) @ Engine Oil Cooler - Install
28. Hose Clamp (1) - Engage [2x] - **Hose Clamp Replacement Guidelines - Spring Type**

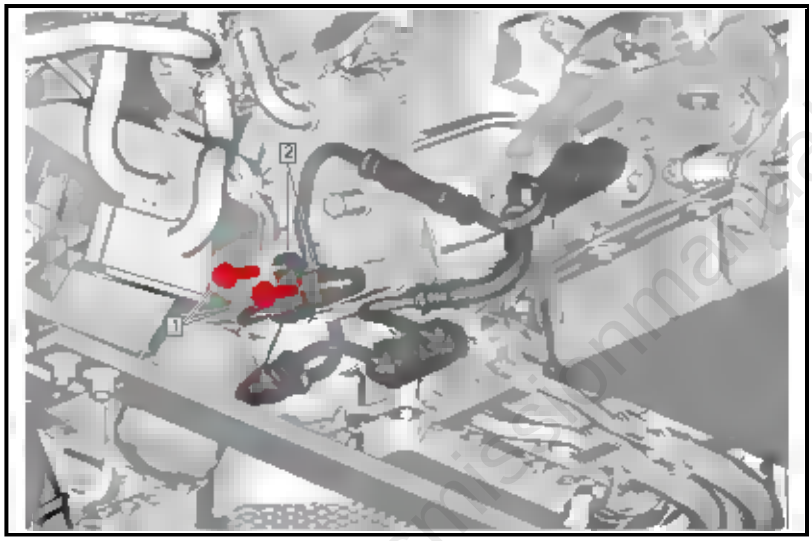
29. 

Automatic Transmission Fluid Cooling Exchanger (2) - Install

30. Automatic Transmission Fluid Cooling Exchanger Bolt (1) - Install and tighten [3x] - **Fastener Specifications**

31. 

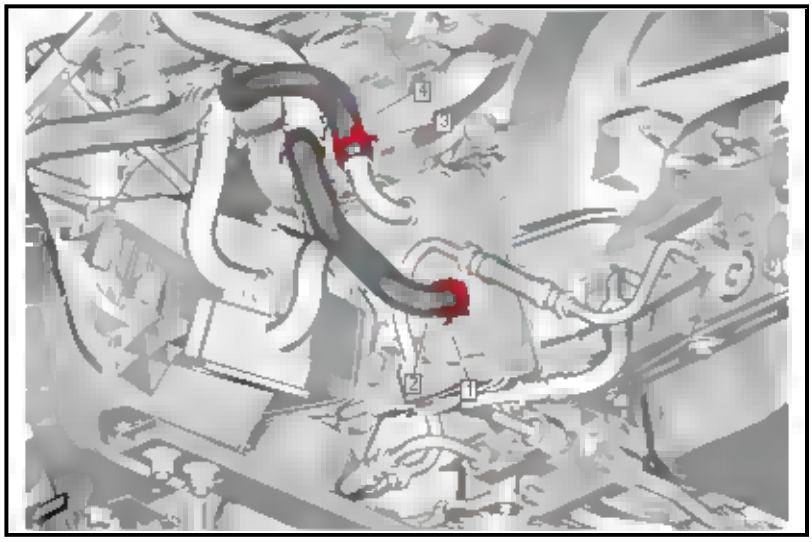
Transmission Fluid Cooler Pipe Seal (1) - Install NEW [2x]

32. 

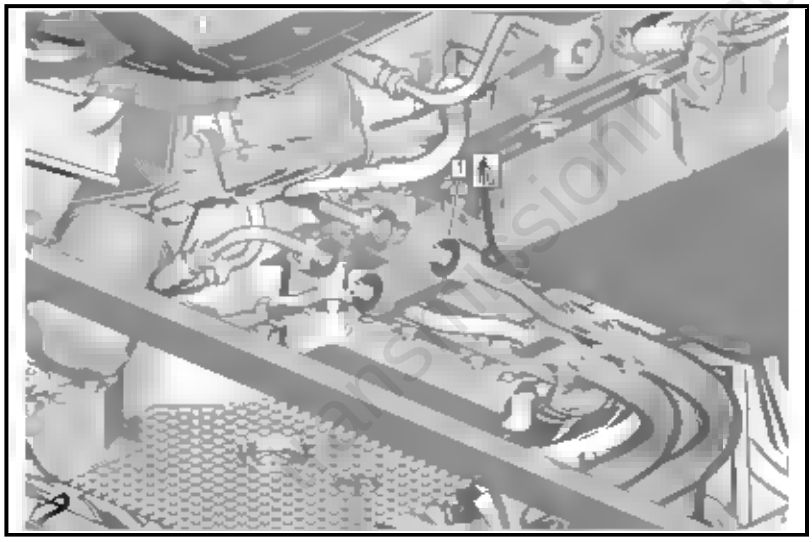
NOTE: **Remove the caps from the fittings and plugs from the holes before installing the transmission fluid cooler pipes.**

Transmission Fluid Cooler Inlet and Outlet Pipe (2) @ Automatic Transmission Fluid Cooling Exchanger - Install

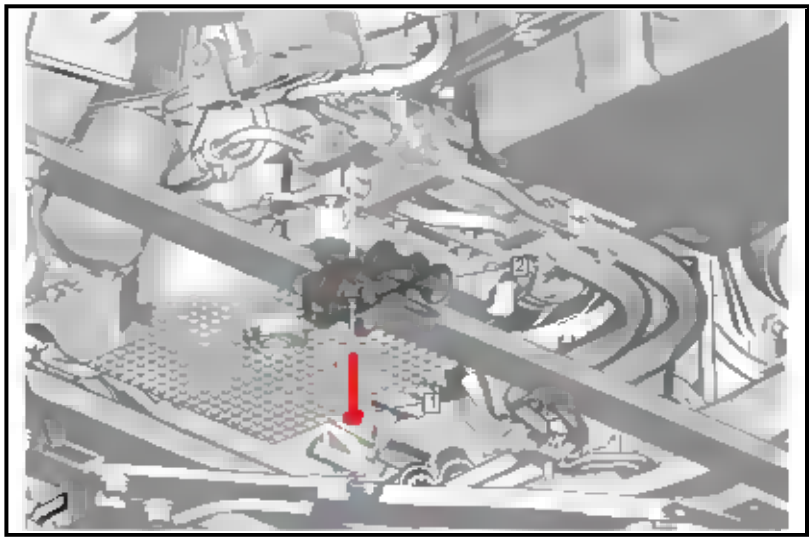
33. Transmission Fluid Cooler Pipe Connector Bolt (1) - Install and tighten [2x] - **Fastener Specifications**

34. 

    Automatic Transmission Fluid Cooling Heat Exchanger Outlet Hose (4) @ Automatic Transmission Fluid Cooling Exchanger - Install

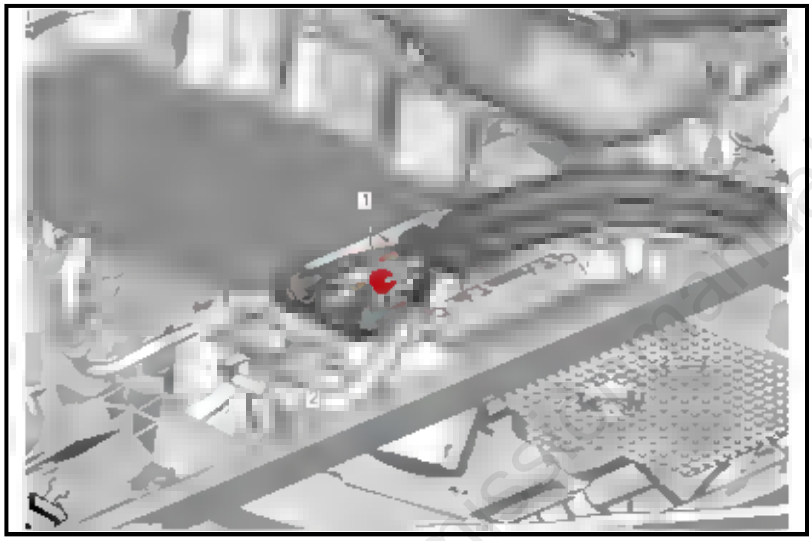
35. Automatic Transmission Fluid Cooling Heat Exchanger Outlet Hose Clamp (3) - Engage - **Hose Clamp Replacement Guidelines - Spring Type**
36. Automatic Transmission Fluid Cooling Heat Exchanger Inlet Hose (2) @ Automatic Transmission Fluid Cooling Exchanger - Install
37. Automatic Transmission Fluid Cooling Heat Exchanger Inlet Hose Clamp (1) - Engage - **Hose Clamp Replacement Guidelines - Spring Type**
38. 

    Transmission Fluid Cooler Thermal Bypass Valve Gasket (2) - Install NEW [4x]

39. 

Transmission Cooler Bypass Valve (2) - Install

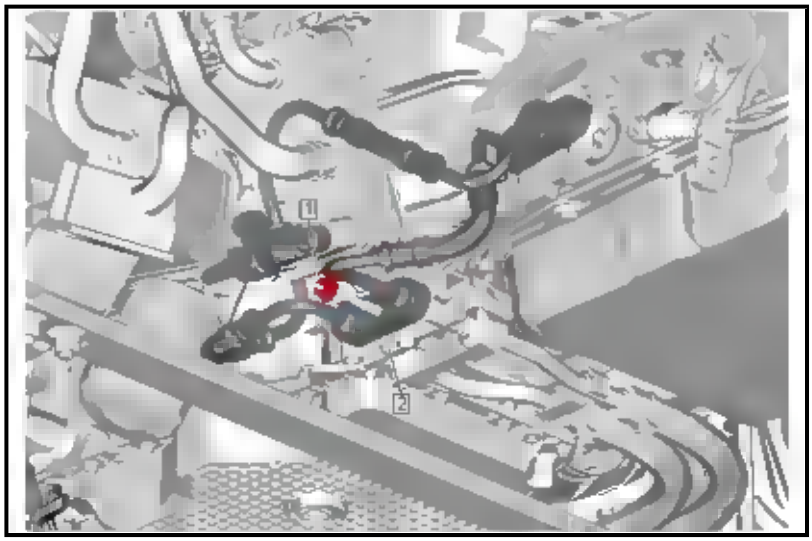
40. Transmission Fluid Cooler Thermal Bypass Valve Bolt (1) - Install and tighten - **Fastener Specifications**

41. 

NOTE: **Remove the caps from the fittings and plugs from the holes before installing the transmission fluid cooler pipes.**

Transmission Fluid Cooler Inlet and Outlet Pipe (2) @ Transmission Cooler Bypass Valve - Install

42. Transmission Fluid Cooler Pipe Bracket Nut (1) - Install and tighten - **Fastener Specifications**

43. 

NOTE: **Remove the caps from the fittings and plugs from the holes before installing the transmission fluid cooler pipes.**

Transmission Fluid Cooler Inlet and Outlet Pipe (2) @ Transmission Cooler Bypass Valve - Install

44. Transmission Fluid Cooler Pipe Bracket Nut (1) - Install and tighten - **Fastener Specifications**
45. Transfer Case Assembly - Install - **Transfer Case Assembly Replacement**
46. Lower the vehicle. **Lifting and Jacking the Vehicle**
47. Fill the engine oil to the proper level with NEW engine oil. Engine Oil and Oil Filter Replacement (AWD)
48. Fill the cooling system. **Cooling System Draining and Filling (L3B Static Fill)** , or **Cooling System Draining and Filling (L3B GE 47716)**
49. Connect the negative battery cable. **Battery Negative Cable Disconnection and Connection**
50. Fill the transmission to the proper level with NEW transmission fluid. **Transmission Fluid Fill Procedure**
51. Perform the solenoid valve characterization. **Q77 Transmission Control Solenoid Valve Characterization Programming (10L60)**
52. Inspect for transmission fluid leaks. **Automatic Transmission Fluid Leaks**
53. Inspect the exhaust system for leaks.

TRANSMISSION REPLACEMENT (REAR WHEEL DRIVE)

Single Use Fasteners and Components

- Engine Oil Cooler Seal
- Catalytic Converter Gasket
- Propeller Shaft Hub Clamp [1x]
- Transmission Fluid Cooler Pipe Seal [2x]
- Transmission Fluid Cooler Seal
- Transmission Fluid Cooler Thermal Bypass Valve Gasket [4x]

Special Tools

Driveline/Axle

- **DT-35910** Drive Axle Seal Clamp Pliers

Equivalent regional tools: **Special Tools**

Automatic Transmission (MQA)

- **J-21366** Torque Converter Holding Strap

Equivalent regional tools: **Special Tools**

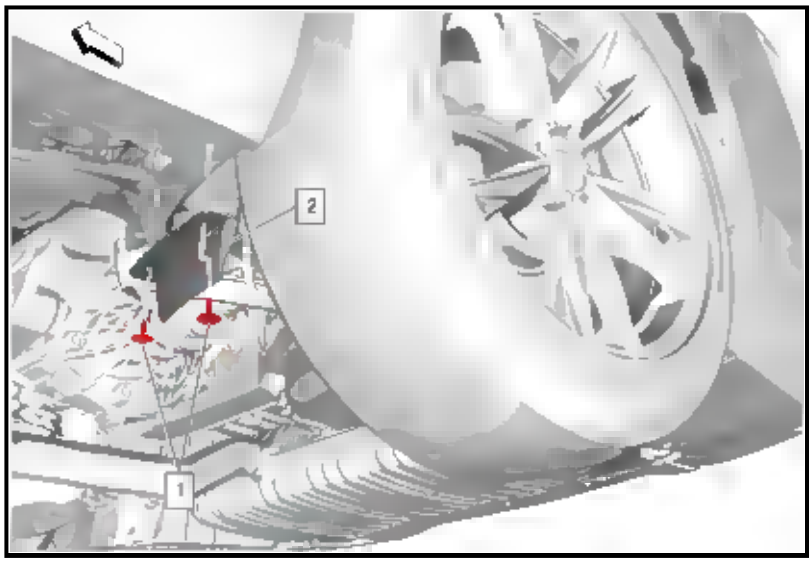
Removal Procedure

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.**

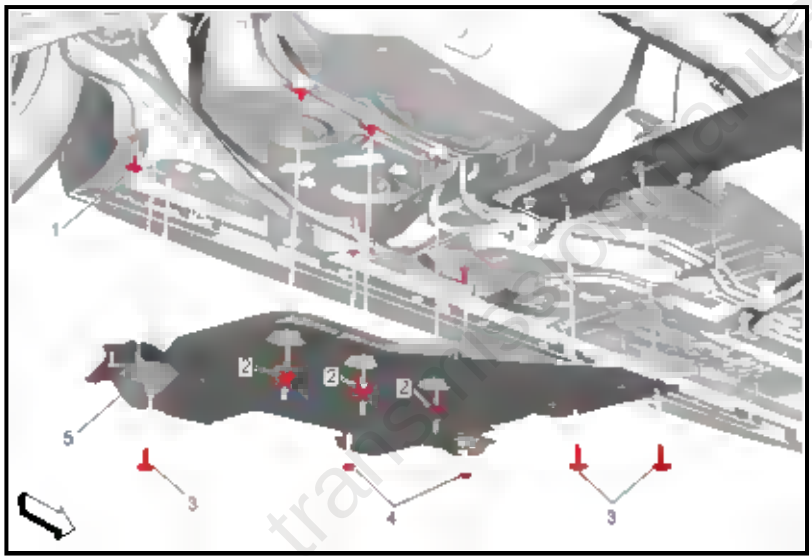
WARNING: **Avoid contact with HOT components. Wear safety glasses and protective gloves to avoid personal injury.**

1. Disconnect the negative battery cable. **Battery Negative Cable Disconnection and Connection**
2. Raise and support the vehicle. **Lifting and Jacking the Vehicle**

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3. Drain the cooling system. **Cooling System Draining and Filling (L3B Static Fill)** , or **Cooling System Draining and Filling (L3B GE 47716)**
4. Drain the engine oil. **Engine Oil and Oil Filter Replacement (RWD)**
5. 

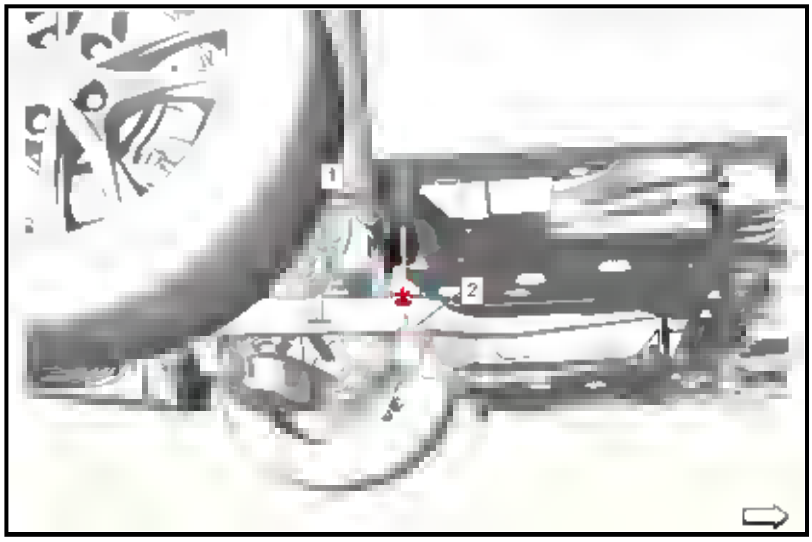
   Rear Tire Front Air Deflector Bolt (1) - Remove [2x]

6. Rear Tire Front Air Deflector - Left Side (2) - Remove
7. 

   Rear Wheelhouse Liner Bolt (1) - Remove

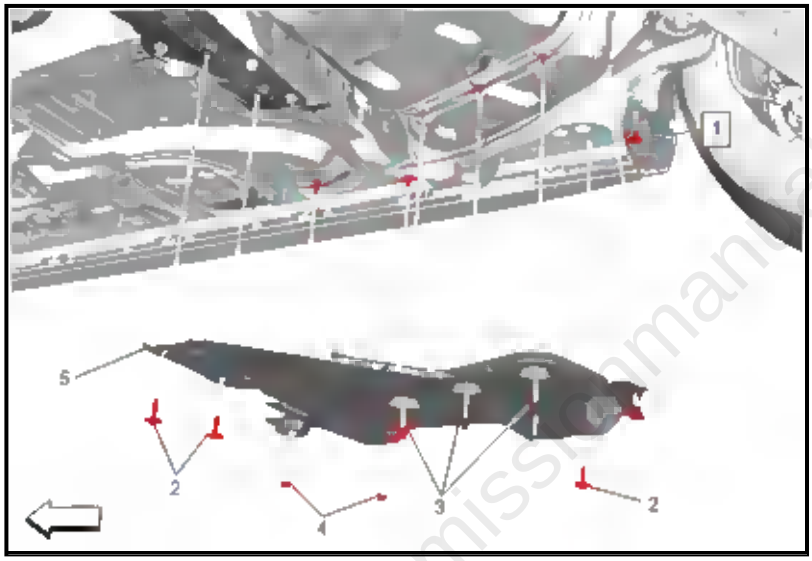
8. Underbody Rear Air Deflector Plastic Nut (2) - Remove [3x]
9. Underbody Rear Air Deflector Bolt (3) - Remove [3x]
10. Underbody Rear Air Deflector Nut (4) - Remove [2x]
11. Underbody Rear Air Deflector - Left Side (5) - Remove

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12. 

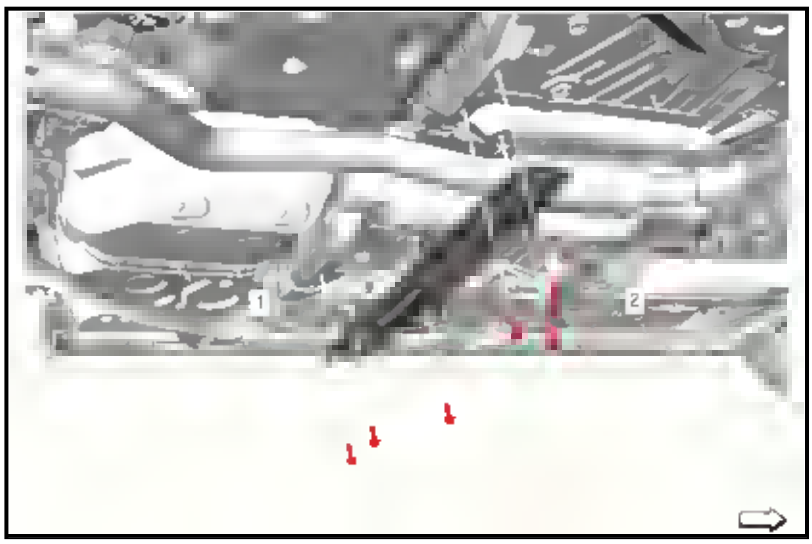
Rear Tire Front Air Deflector Bolt (2) - Remove [2x]

13. Rear Tire Front Air Deflector - Right Side (1) - Remove

14. 

Rear Wheelhouse Liner Bolt (1) - Remove

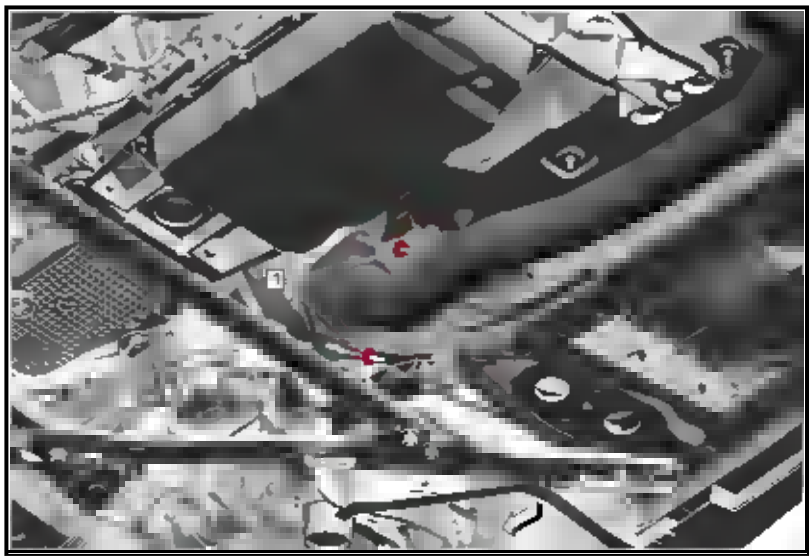
15. Underbody Rear Air Deflector Bolt (2) - Remove [3x]
16. Underbody Rear Air Deflector Plastic Nut (3) - Remove [3x]
17. Underbody Rear Air Deflector Nut (4) - Remove [2x]
18. Underbody Rear Air Deflector - Right Side (5) - Remove

19. 

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Floor Panel Number 4 Cross Bar Reinforcement Bolt (2) - Remove [6x]

20. Floor Panel Reinforcement (1) - Remove

21. 

Catalytic Converter Nut (1) - Remove [2x]

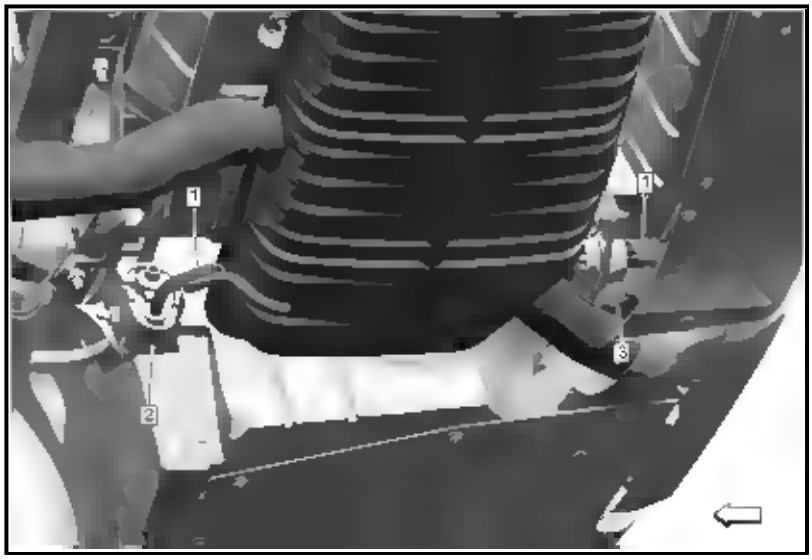
22. 

Electrical Connector (1) @ Exhaust Control Valve Actuator - Disconnect [2x]

23. 

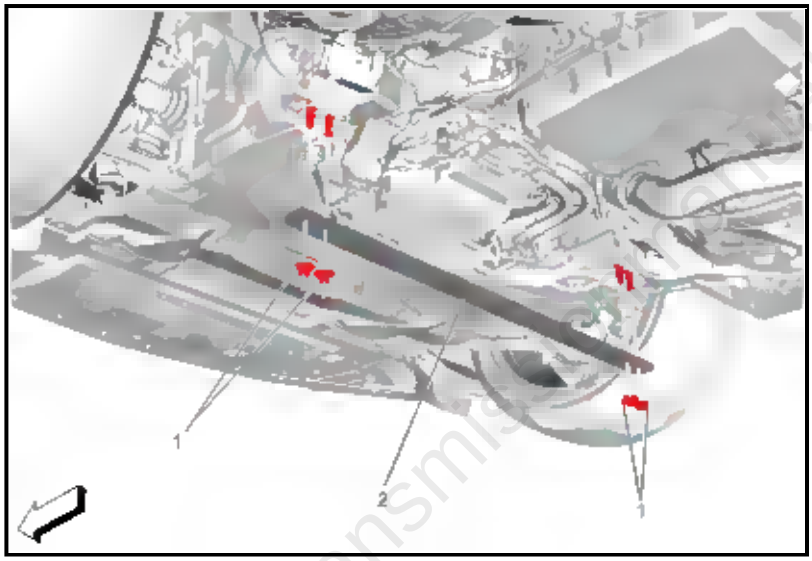
Exhaust Muffler (1) @ Exhaust Intermediate Pipe Insulator-Left Side (2) - Separate

24. Exhaust Muffler (1) @ Exhaust Rear Muffler Insulator-Left Side (3) - Separate

25. 

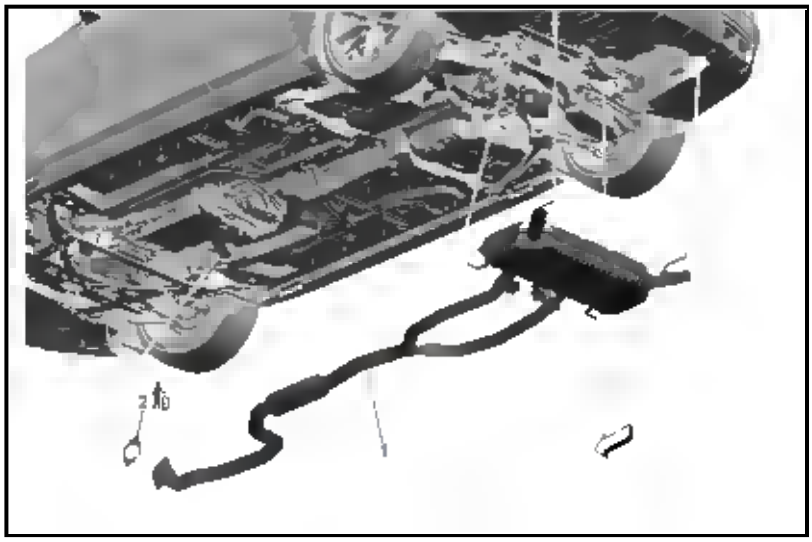
Exhaust Muffler (1) @ Exhaust Intermediate Pipe Insulator-Right Side (2) - Separate

26. Exhaust Muffler (1) @ Exhaust Rear Muffler Insulator-Right Side (3) - Separate

27. 

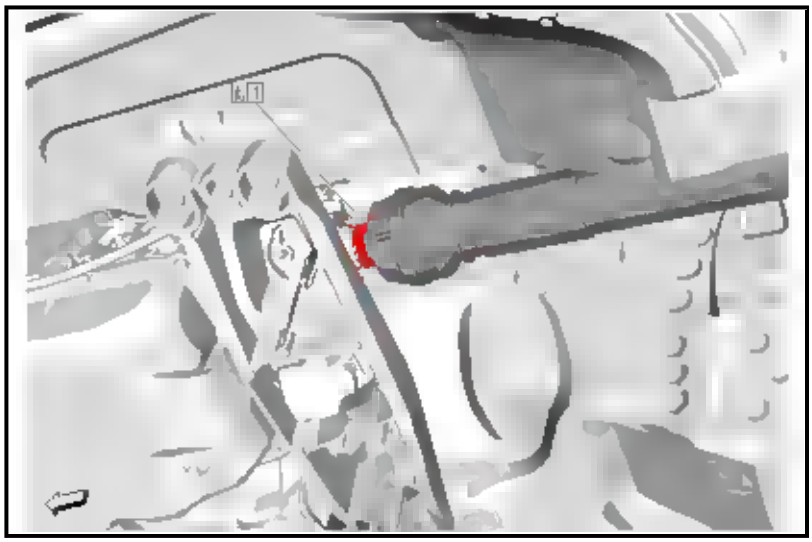
{If equipped} Front Crossmember Brace Nut (1) - Remove [4x]

28. {If equipped} Front Crossmember Brace (2) - Remove

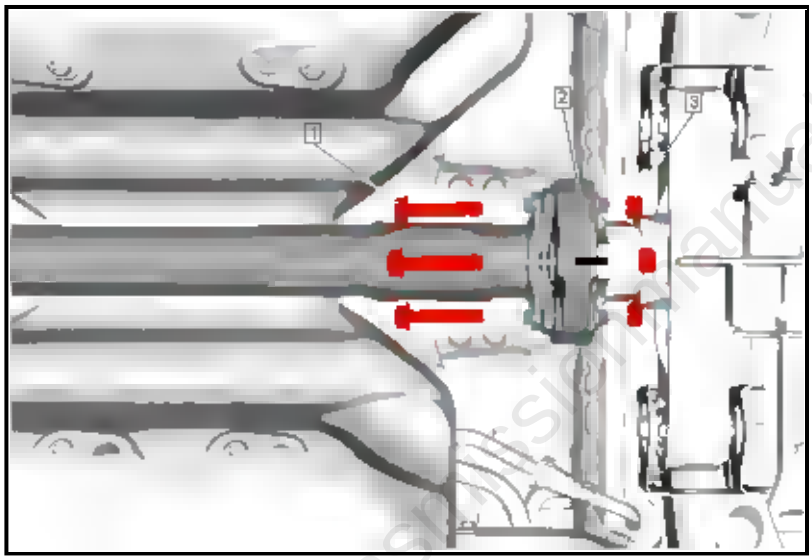
29. 

Exhaust Muffler (1) - Remove

30. Catalytic Converter Gasket (2) - Remove and DISCARD

31. 

Propeller Shaft Hub Clamp (1) - Remove and DISCARD

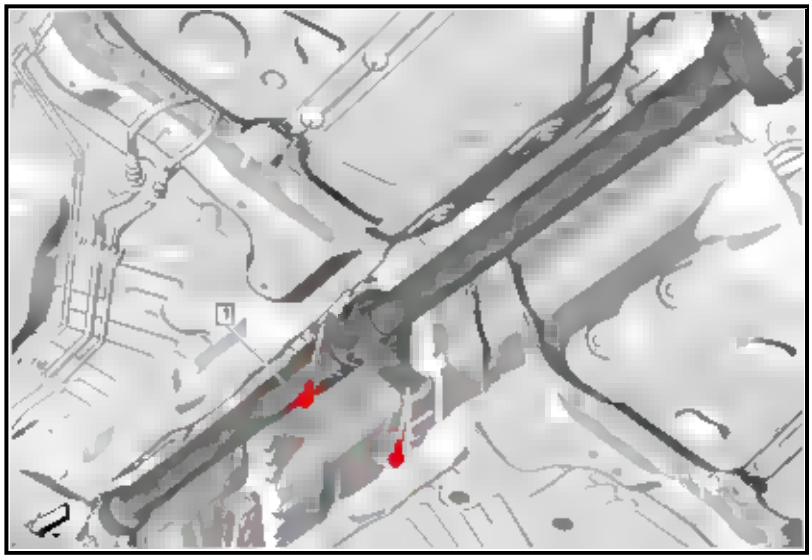
32. 

Mark (2) the relationship of the propeller shaft to the rear differential flange using a paint pen.

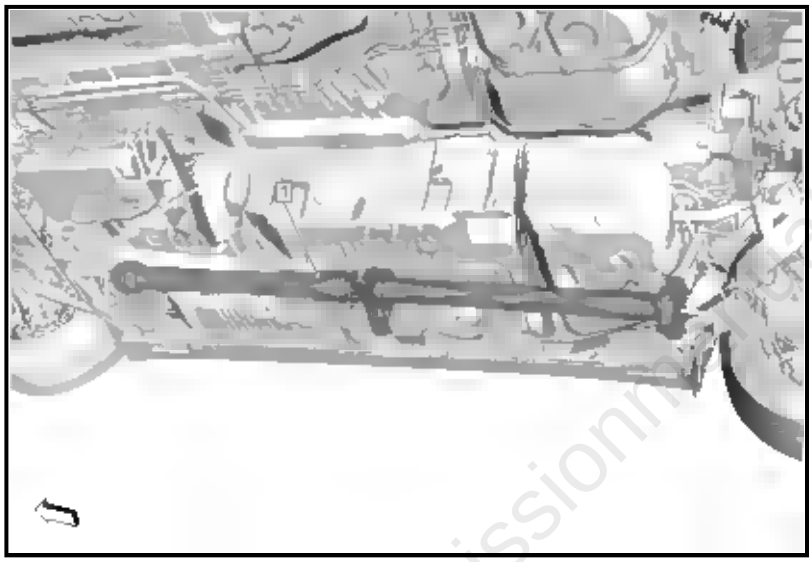
CAUTION: **When removing the propeller shaft, do not remove the propeller shaft coupler from the propeller shaft assembly. The only bolts that should be removed are those that mount each coupler to the transmission output flange, and to the rear drive axle input flange. Failure to properly remove the propeller shaft assembly may cause coupler damage, resulting in necessary replacement of the entire propeller shaft.**

33. Rear Propeller Shaft Nut (3) - Remove [3x]
34. Rear Propeller Shaft Bolt (1) - Remove [3x]
35. Support and secure the propeller shaft to a suitable hydraulic jack stand.

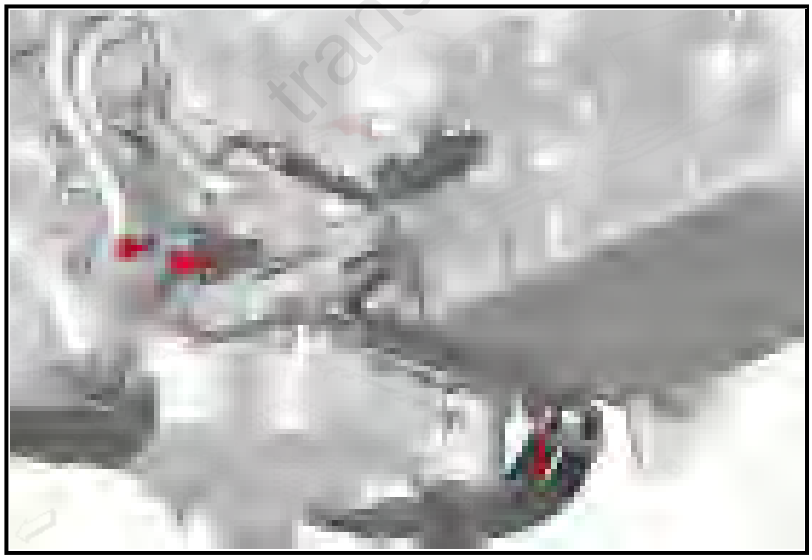
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36. 

Propeller Shaft Bearing Support Bolt (1) - Remove [2x]

37. 

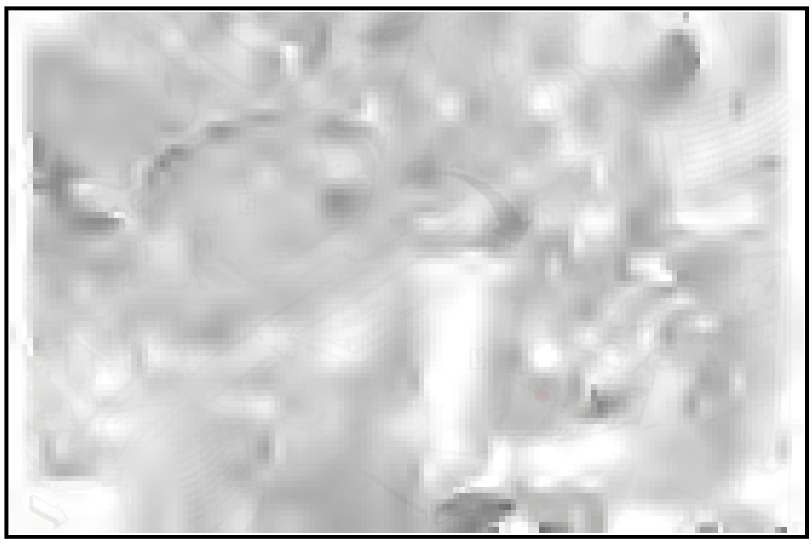
Propeller Shaft (1) - Remove

38. 

Transmission Fluid Cooler Pipe Connector Bolt (1) - Remove [2x]

39. Transmission Fluid Cooler Pipe Bolt (2) - Remove
40. Transmission Fluid Cooler Pipe Clip Bolt (3) - Remove

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41. 

Transmission Fluid Cooler Pipe Nut (1) - Remove [2x]

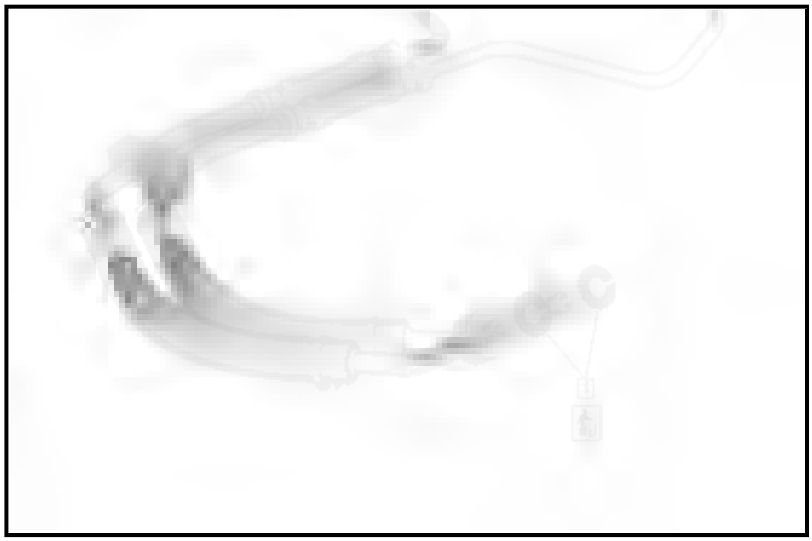
NOTE: **Cap the fittings and plug the holes when removing the transmission fluid cooler pipes.**

42. Transmission Fluid Cooler Inlet and Outlet Pipe (2) - Remove

43. 

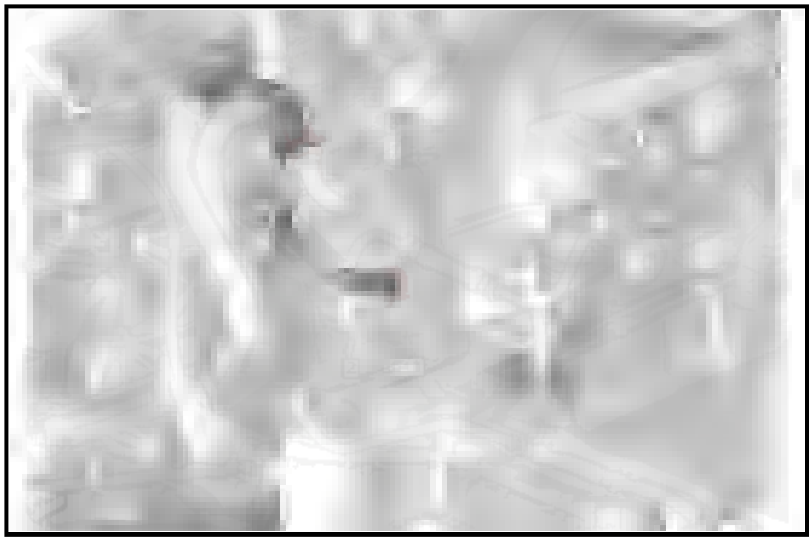
Transmission Fluid Cooler Pipe Seal (1) - Remove and DISCARD [2x]

44. Transmission Fluid Cooler Seal (2) - Remove and DISCARD

45. 

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Transmission Fluid Cooler Thermal Bypass Valve Gasket (1) - Remove and DISCARD [2x]

46. 

Automatic Transmission Fluid Cooling Heat Exchanger Inlet Hose Clamp (1) - Disengage - **Hose Clamp Replacement Guidelines - Spring Type**

47. Automatic Transmission Fluid Cooling Heat Exchanger Inlet Hose (2) @ Automatic Transmission Fluid Cooling Exchanger - Remove
48. Automatic Transmission Fluid Cooling Heat Exchanger Outlet Hose Clamp (3) - Disengage - **Hose Clamp Replacement Guidelines - Spring Type**
49. Automatic Transmission Fluid Cooling Heat Exchanger Outlet Hose (4) @ Automatic Transmission Fluid Cooling Exchanger - Remove

50. 

Transmission Fluid Cooler Pipe Connector Bolt (1) - Remove [2x]

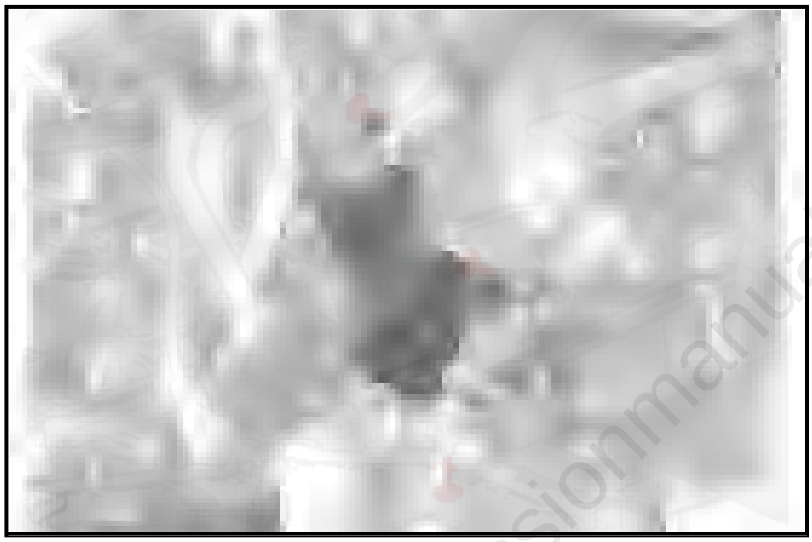
NOTE: **Cap the fittings and plug the holes when removing the transmission fluid cooler pipes.**

51. Transmission Fluid Cooler Inlet and Outlet Pipe (2) @ Automatic Transmission Fluid Cooling Exchanger - Remove

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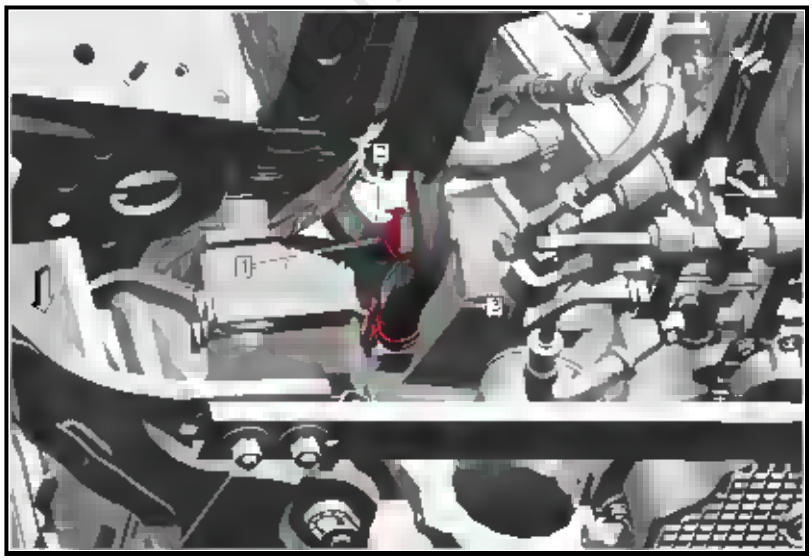
52. 

Transmission Fluid Cooler Pipe Seal (1) - Remove and DISCARD [2x]

53. 

Automatic Transmission Fluid Cooling Exchanger Bolt (1) - Remove [3x]

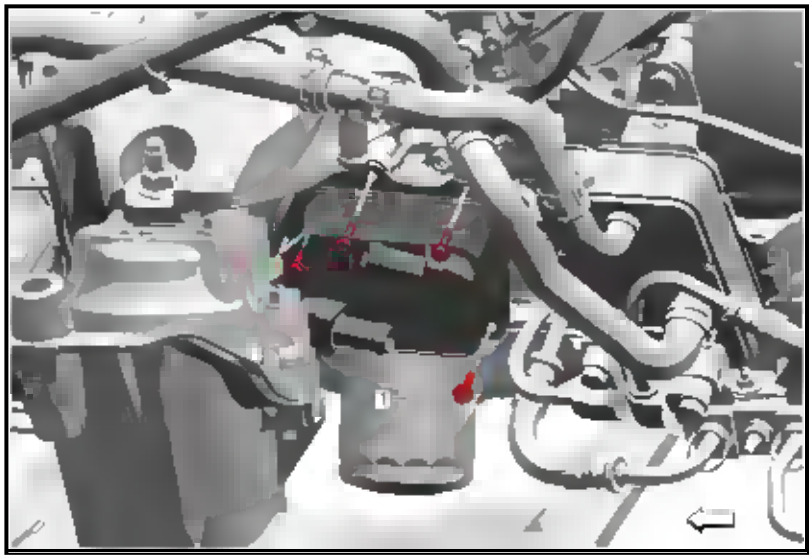
54. Automatic Transmission Fluid Cooling Exchanger (2) - Remove

55. 

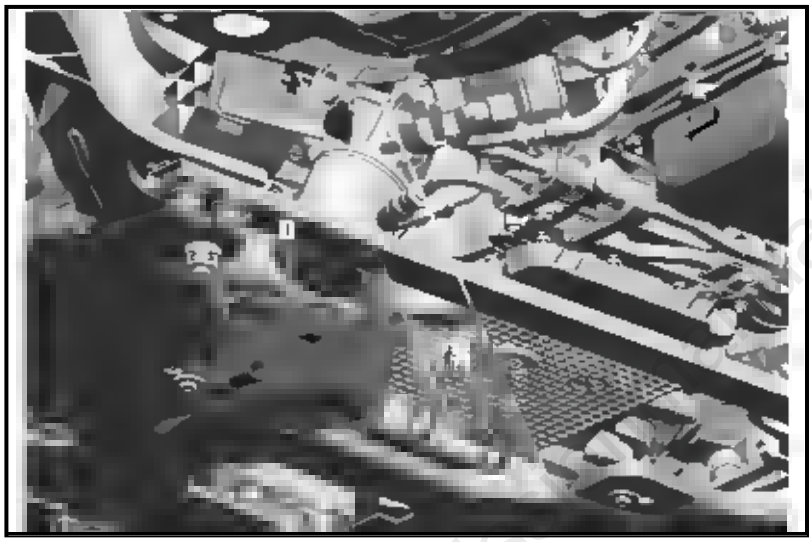
Hose Clamp (1) - Disengage [2x] - **Hose Clamp Replacement Guidelines - Spring Type**

56. Engine Oil Cooler Coolant Outlet Hose (2) @ Engine Oil Cooler - Remove
57. Engine Oil Cooler Coolant Inlet Hose (3) @ Engine Oil Cooler - Remove

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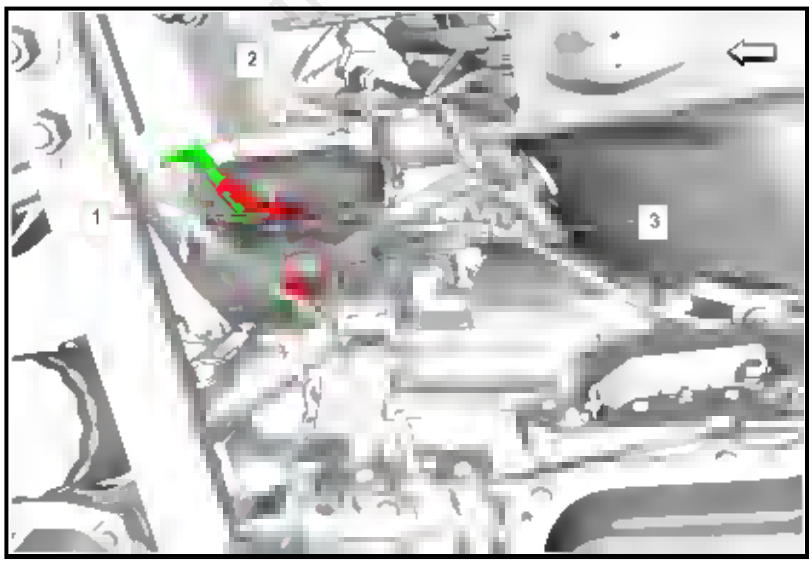
58. 

Engine Oil Cooler Bolt (1) - Remove [4x]

59. 

Engine Oil Cooler (1) - Remove

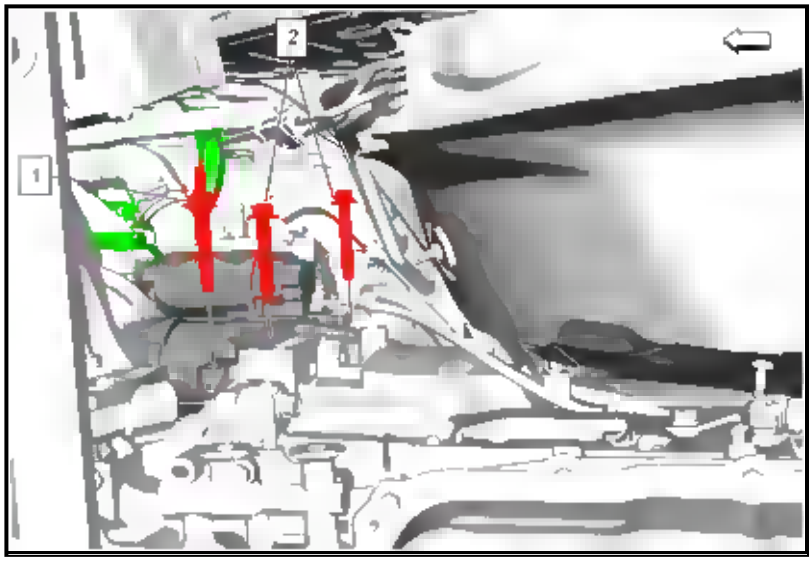
60. Engine Oil Cooler Seal (2) - Remove and DISCARD [2x]
61. Reposition any hoses that will impede the removal of the starter.

62. 

Auxiliary Generator Battery Jumper Cable Terminal Nut (1) - Remove

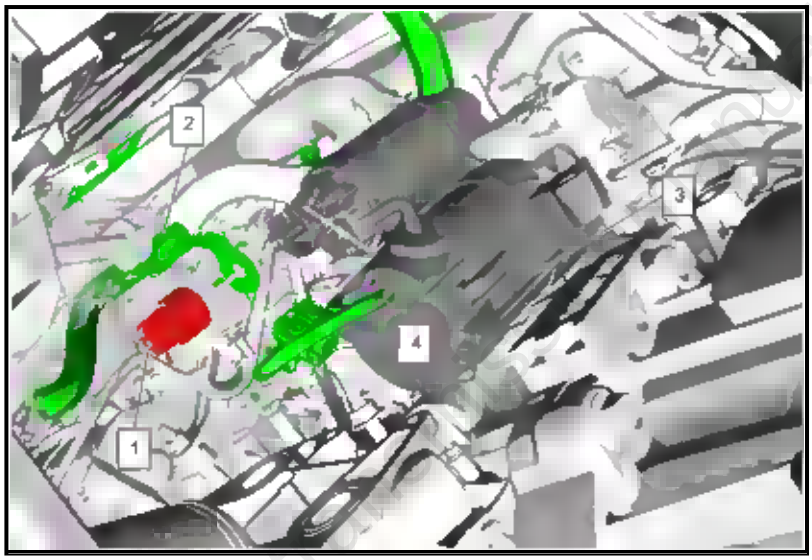
63. Auxiliary Generator Battery Jumper Cable (2) - Reposition away

64. Retainer (3) - Disengage

65. 

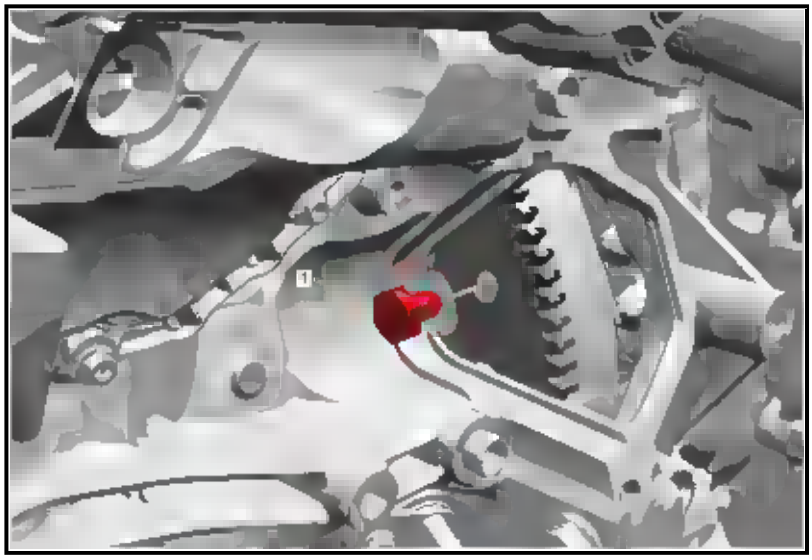
Starter Stud (1) - Remove

66. Starter Bolt (2) - Remove [2x]
67. Reposition the starter to gain access to the electrical connections.

68. 

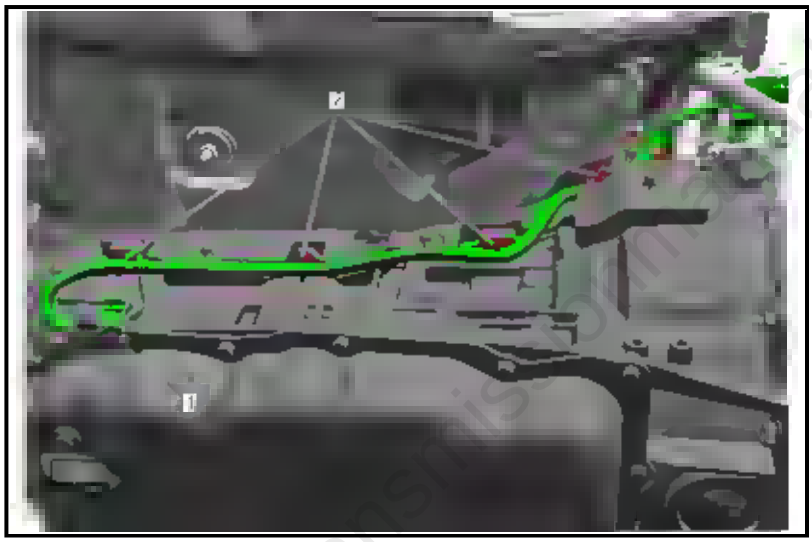
Battery Positive Cable Nut (1) @ Starter Solenoid - Remove

69. Auxiliary Generator Battery Jumper Cable (2) - Remove
70. Electrical Connector (4) - Disconnect
71. Starter (3) - Remove

72. 

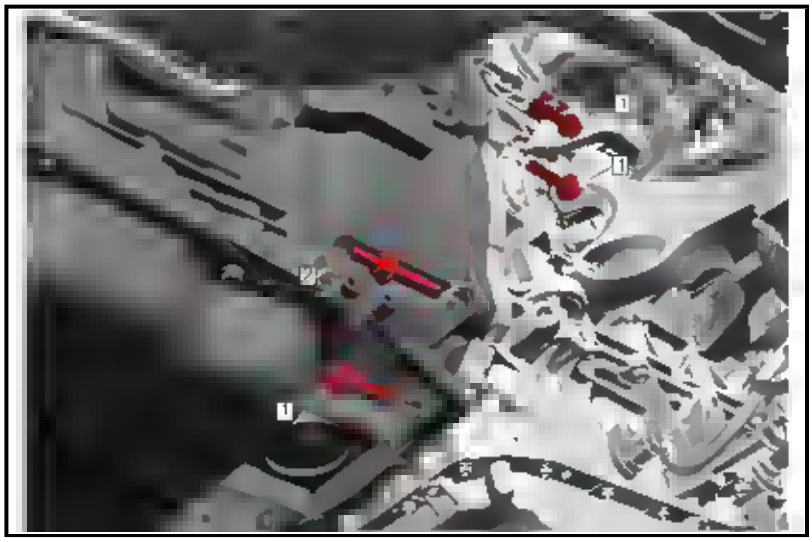
Repeat the following steps for all torque converter bolts (1):

1. Rotate the harmonic balancer center bolt clockwise ONLY, to align the torque converter bolt with the starter opening.
2. Torque Converter Bolt (1) - Remove [6x]

73. 

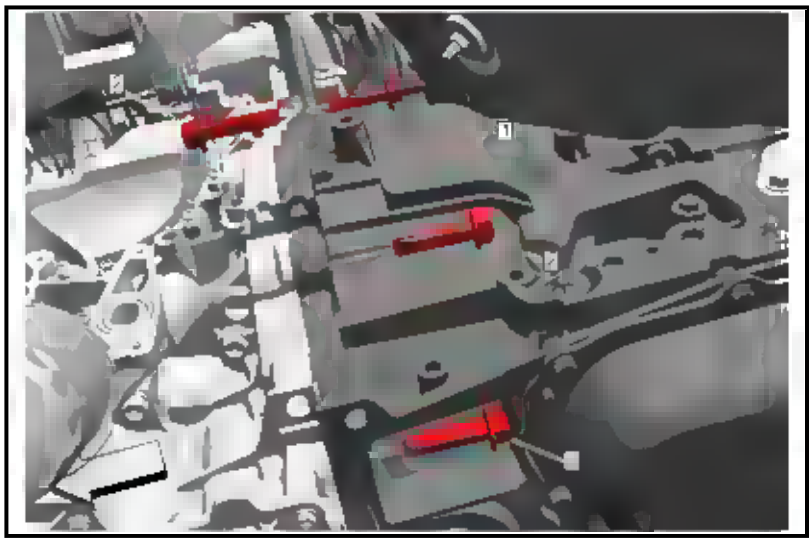
Disconnect the electrical connector (1)

74. Release the 5 retainers (2).

75. 

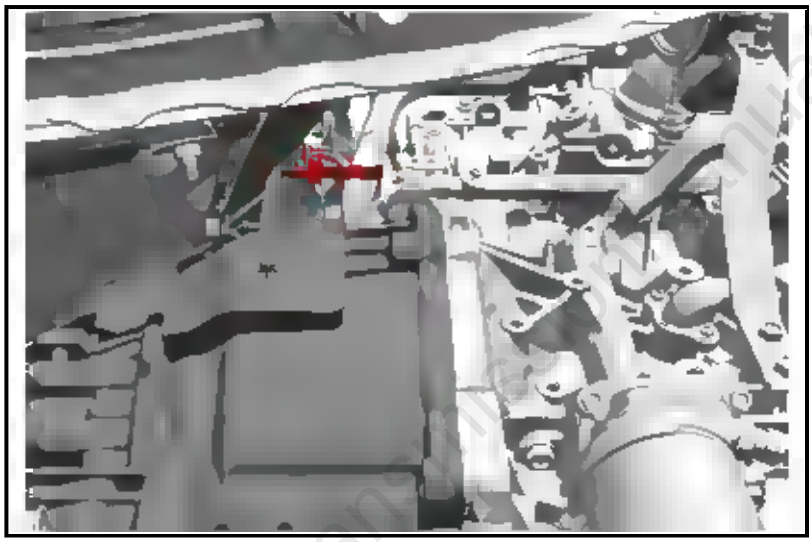
Transmission Bolt (1) - Remove [3x]

76. Transmission Stud (1) - Remove

77. 

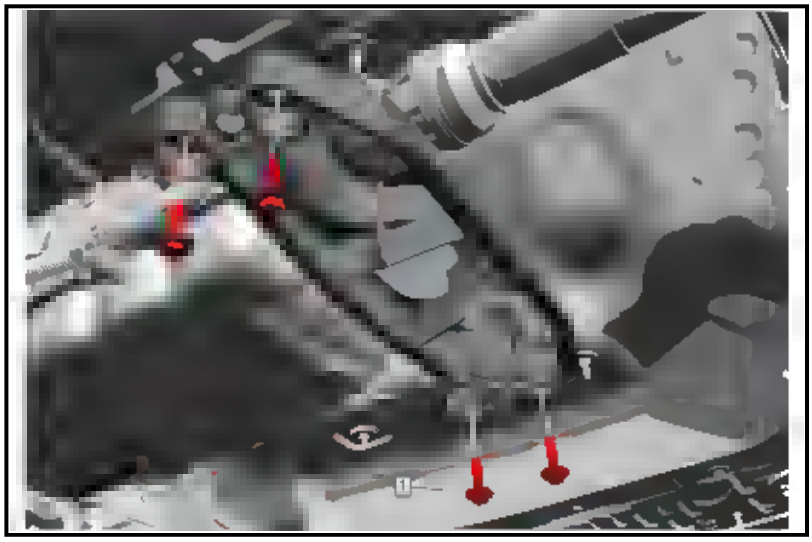
Transmission Bolt (1) - Remove [3x]

78. Transmission Stud (1) - Remove

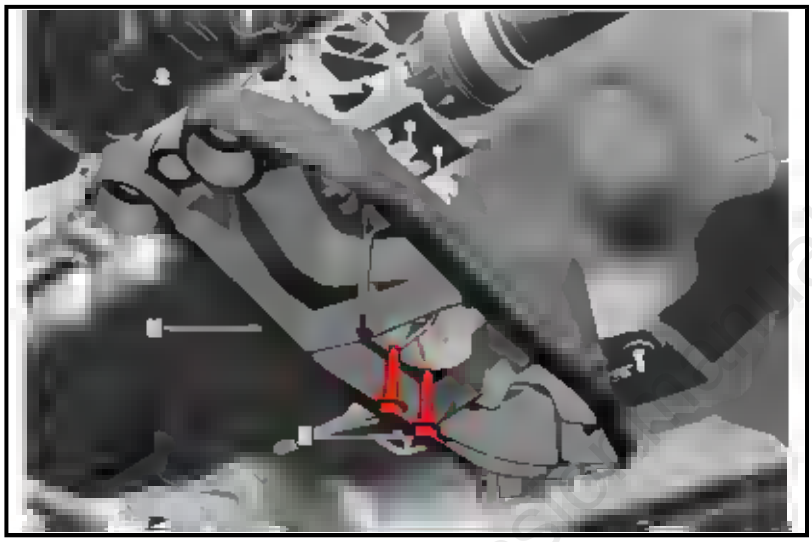
79. 

Transmission Stud (1) - Remove

80. Disconnect the transmission vent hose from the engine.
81. Support the transmission with a suitable jack.

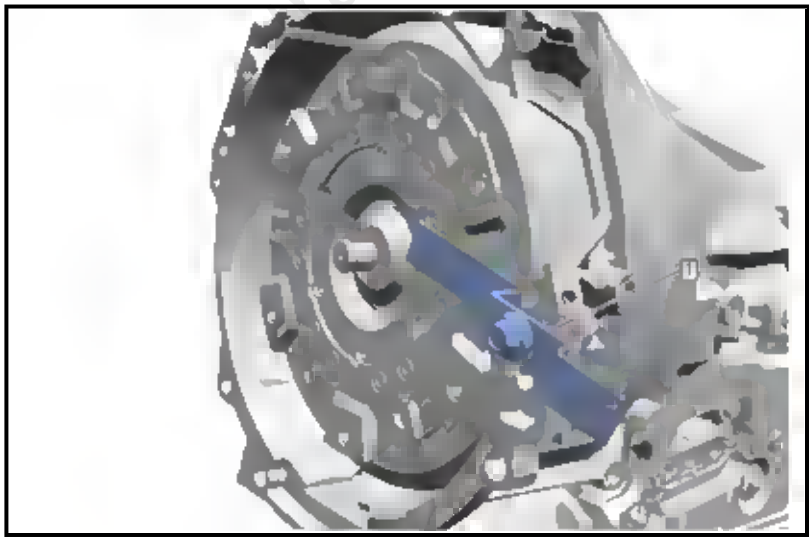
82. 

Transmission Mount Bracket Bolt (1) - Remove [4x]

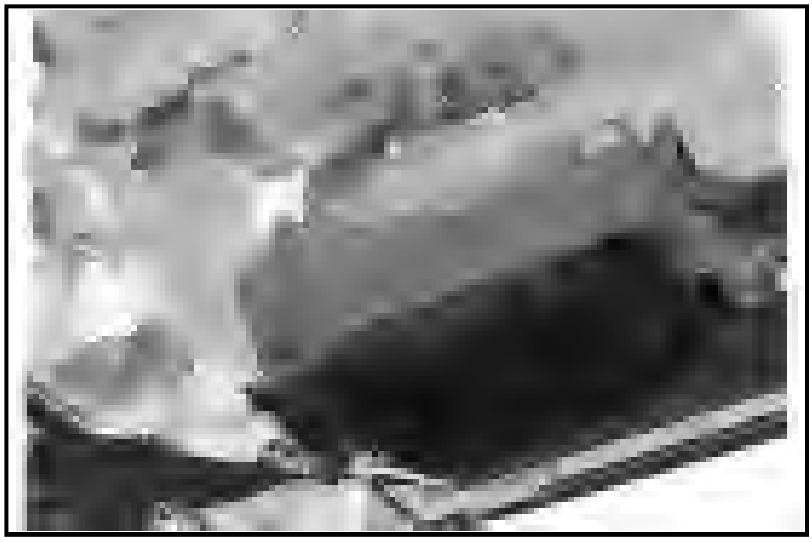
83. 

Transmission Mount Bolt (1) - Remove [2x]

84. Transmission Mount (2) - Remove
85. Pull the transmission straight back.

86. 

Install the **J-21366** strap (1) onto the transmission bell housing to retain the torque converter.

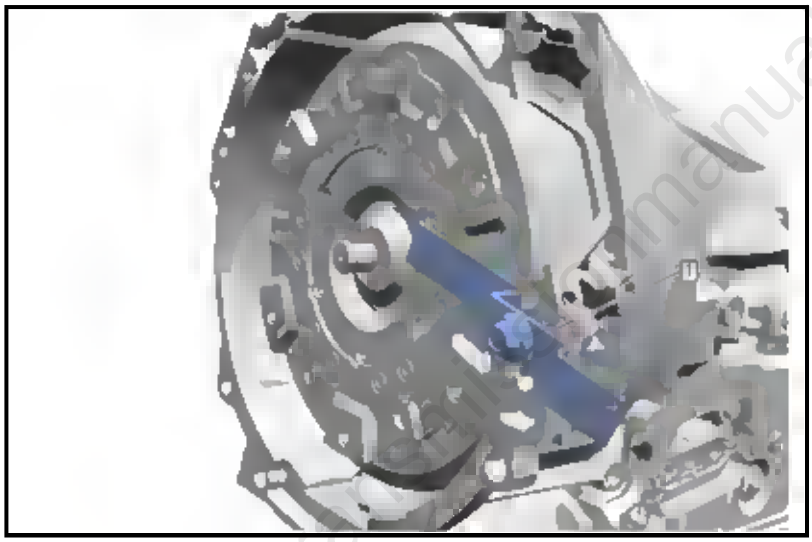
87. 

Remove the transmission (1)

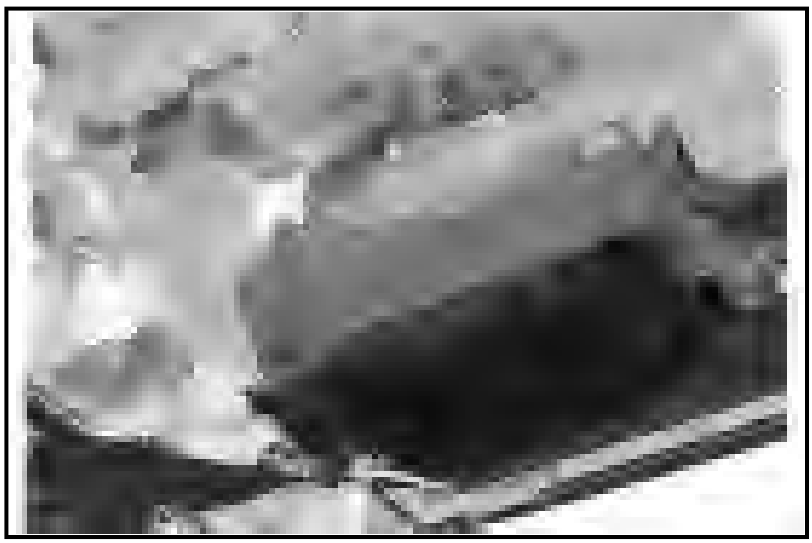
88. Transfer components as necessary.

Installation Procedure

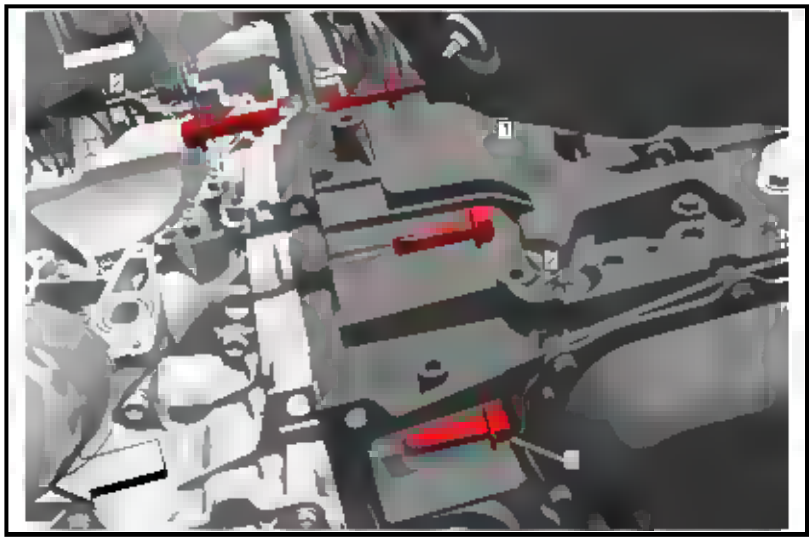
1. Support the transmission with a suitable jack.

2. 

Remove the **J-21366** strap (1) from the transmission bell housing.

3. 

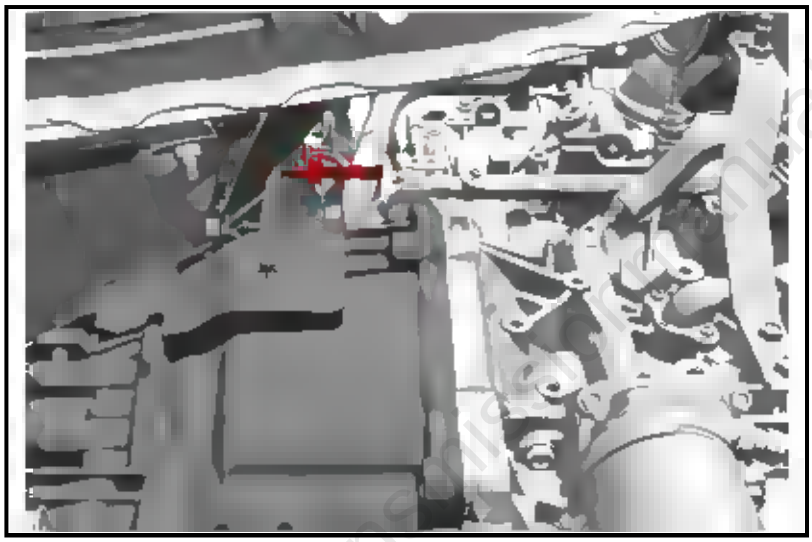
Install the transmission (1)

4. 

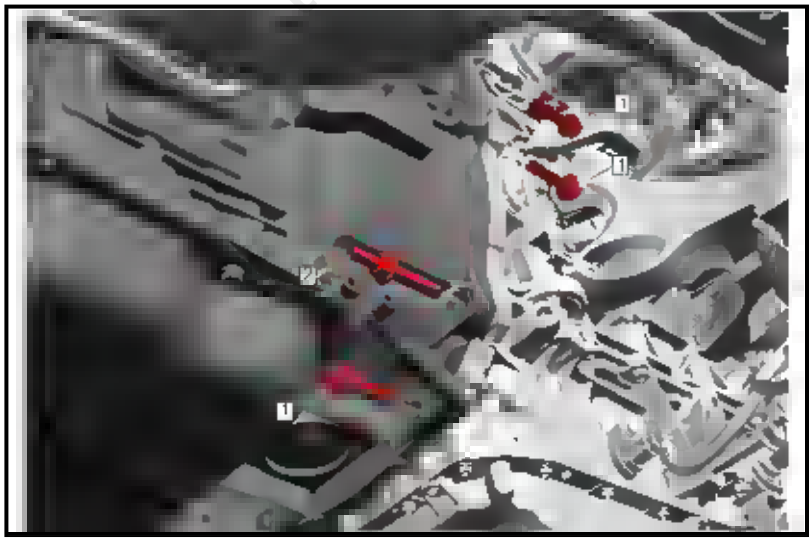
CAUTION: **Refer to Fastener Caution .**

Transmission Bolt (1) - Install and tighten [3x] - **Fastener Specifications**

5. Transmission Stud (1) - Install and tighten [2x] - **Fastener Specifications**

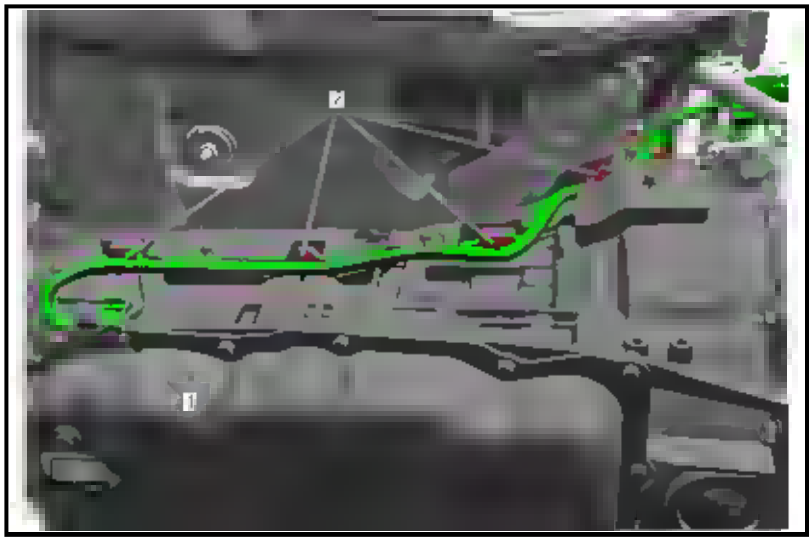
6. 

Transmission Stud (1) - Install and tighten - **Fastener Specifications**

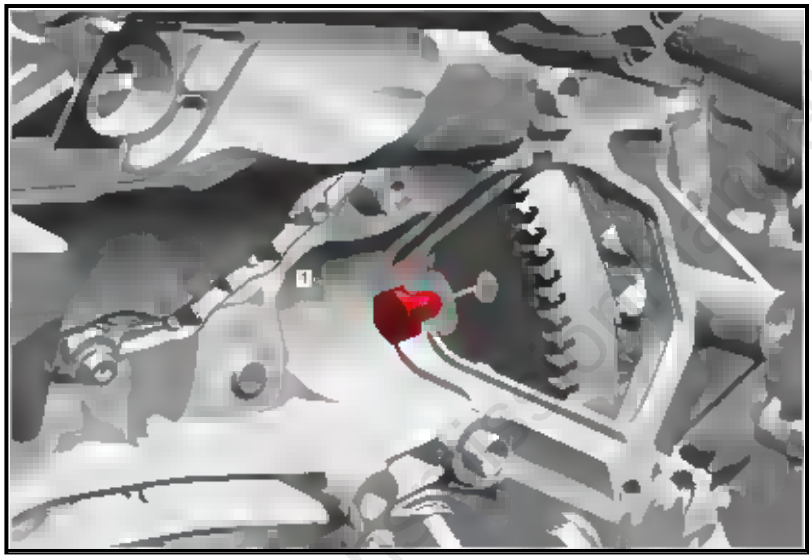
7. 

Transmission Bolt (1) - Install and tighten [3x] - **Fastener Specifications**

8. Transmission Stud (1) - Install and tighten [2x] - **Fastener Specifications**

9. Connect the transmission vent hose from the engine.
10. 

    Connect the electrical connector (1)

11. Install the 5 retainers (2).
12. 

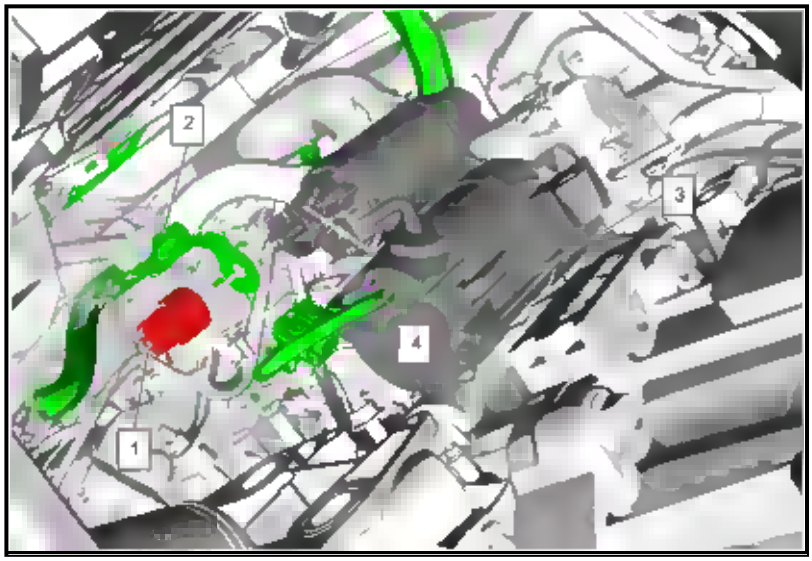
    Prepare the transmission torque converter bolts (1) for installation as follows:

    1. Remove any loose cured adhesive from the external threads of the components using a lint free cloth.
    2. Thread the cleaned components into the internal mating threads and remove to loosen trapped cured adhesive.
    3. Apply thread locking adhesive to the external threads of the components. **Adhesives, Fluids, Lubricants, and Sealers**
    4. Ensure there are no gaps in the thread locking adhesive once applied to the component.

    NOTE: **For proper alignment of all torque converter bolts, install the first torque converted bolt in the oval shaped hole.**

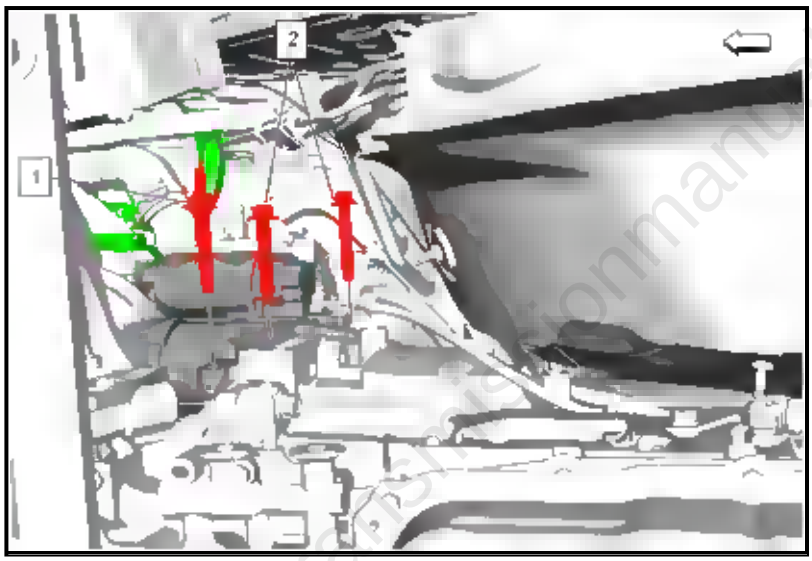
    NOTE: **Rotate the harmonic balancer center bolt clockwise ONLY, to align the torque converter bolt with the starter opening.**

13. Transmission Torque Converter Bolt (1) - Install and tighten [6x] - **Fastener Specifications**

14. 

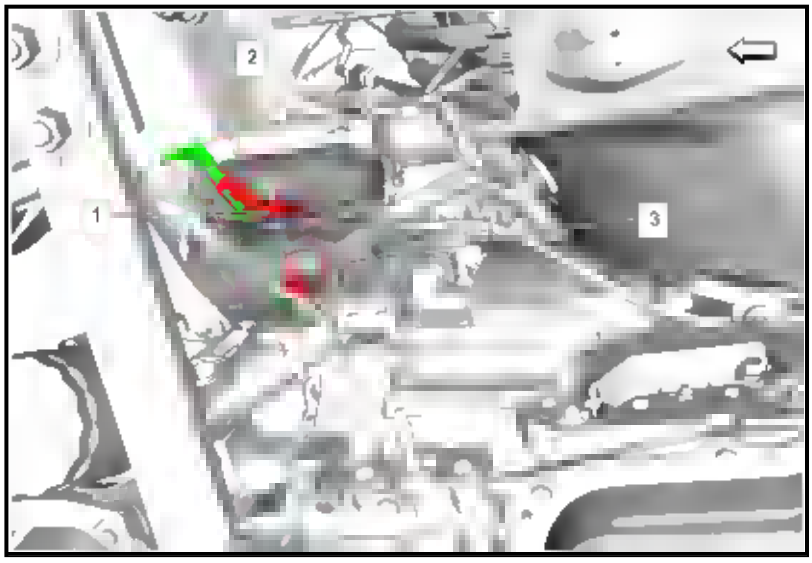
    Auxiliary Generator Battery Jumper Cable (2) - Install

15. Battery Positive Cable Nut (1) @ Starter Solenoid - Install and tighten - **Fastener Specifications**
16. Electrical Connector (4) - Connect
17. Starter (3) - Install

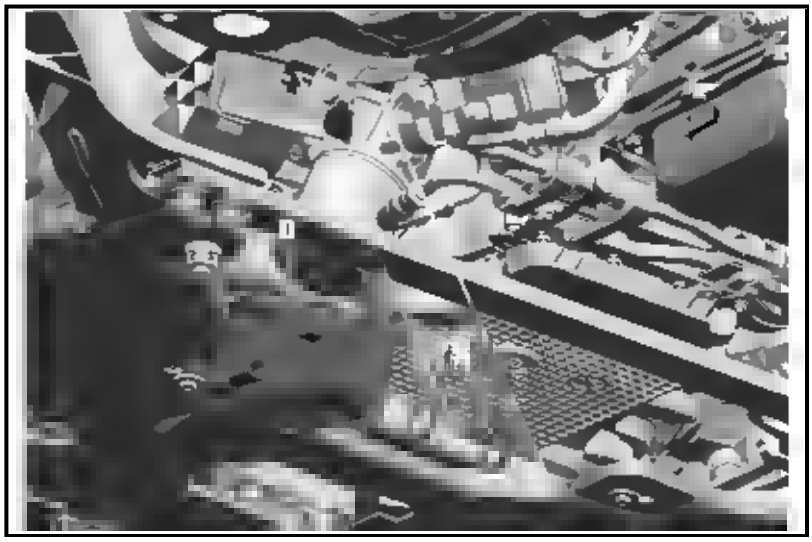
18. 

    Starter Bolt (2) - Install and tighten [2x] - **Fastener Specifications**

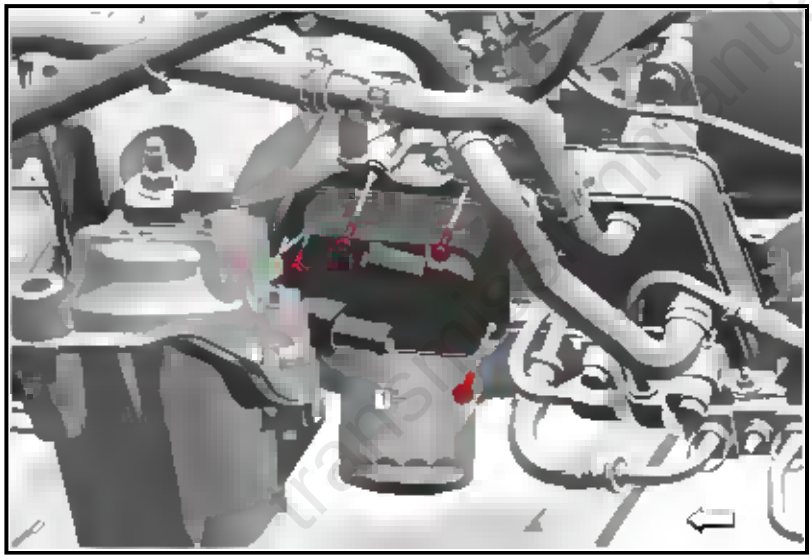
19. Starter Stud (1) - Install and tighten - **Fastener Specifications**

20. 

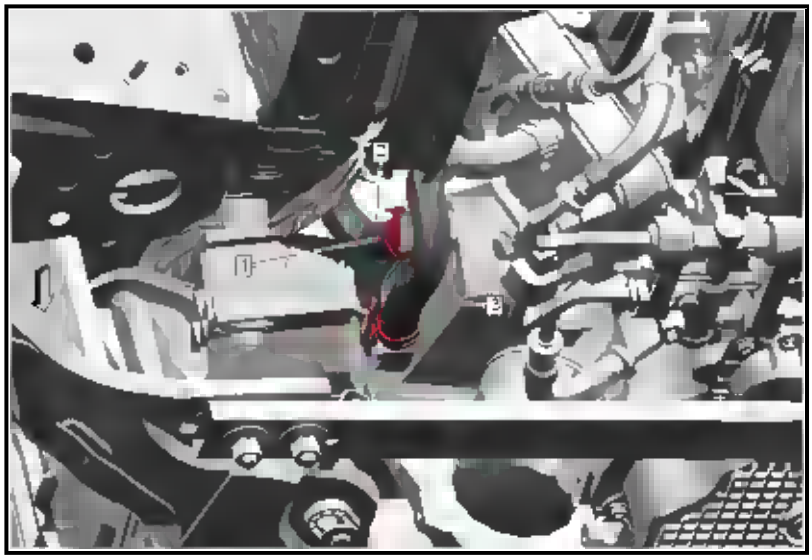
Auxiliary Generator Battery Jumper Cable - Install

21. Auxiliary Generator Battery Jumper Cable Terminal Nut (1) - Install and tighten - **Fastener Specifications**
22. Retainer (3) - Engage
23. 

    Engine Oil Cooler Seal (2) - Install NEW [2x]

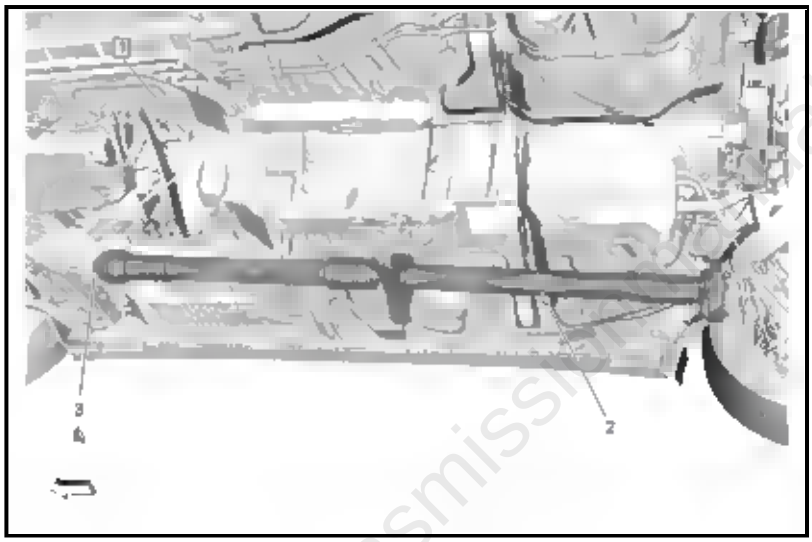
24. Engine Oil Cooler (1) - Install
25. 

    Engine Oil Cooler Bolt (1) - Install and tighten [4x] - **Fastener Specifications**

26. 

    Engine Oil Cooler Coolant Inlet Hose (3) @ Engine Oil Cooler - Install

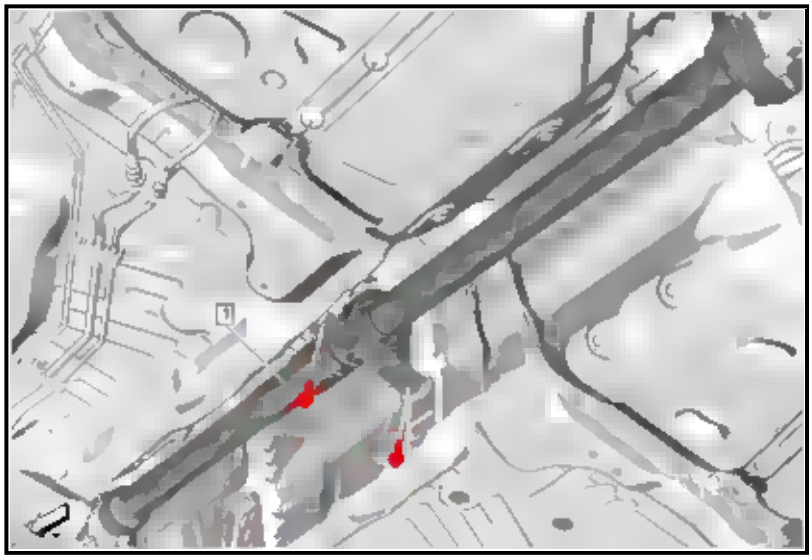
27. Engine Oil Cooler Coolant Outlet Hose (2) @ Engine Oil Cooler - Install
28. Hose Clamp (1) - Engage [2x] - **Hose Clamp Replacement Guidelines - Spring Type**

29. 

    Apply a thin layer of grease to the transmission output shaft splines (1). **Adhesives, Fluids, Lubricants, and Sealers**

30. Loosely install a NEW propeller shaft hub clamp (3) to the propeller shaft joint boot.
31. Support and secure the propeller shaft (2) to a suitable hydraulic jack stand.
32. Propeller Shaft (2) - Install

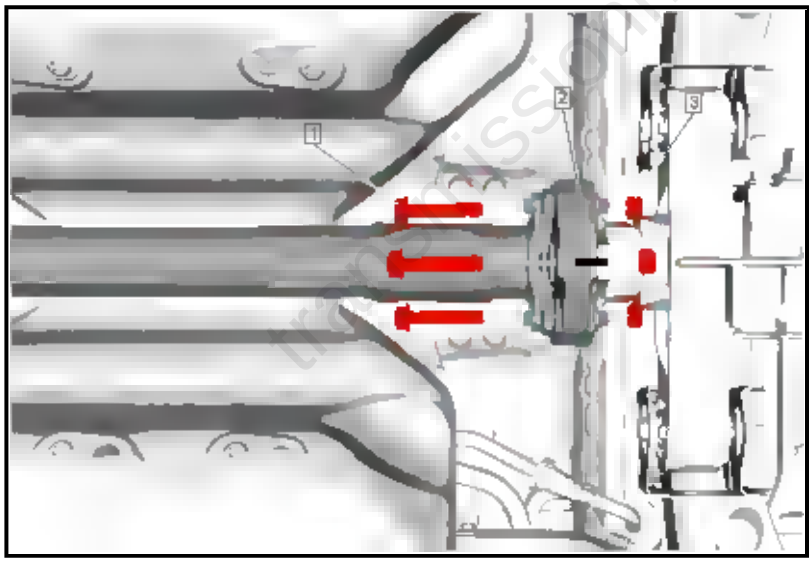
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33. 

Prepare the 2 propeller shaft bearing support bolts (1) for installation as follows:

1. Remove any loose cured adhesive from the external threads of the components using a lint free cloth.
2. Thread the cleaned components into the internal mating threads and remove to loosen trapped cured adhesive.
3. Apply thread locking adhesive to the external threads of the components. **Adhesives, Fluids, Lubricants, and Sealers**
4. Ensure there are no gaps in the thread locking adhesive once applied to the component.

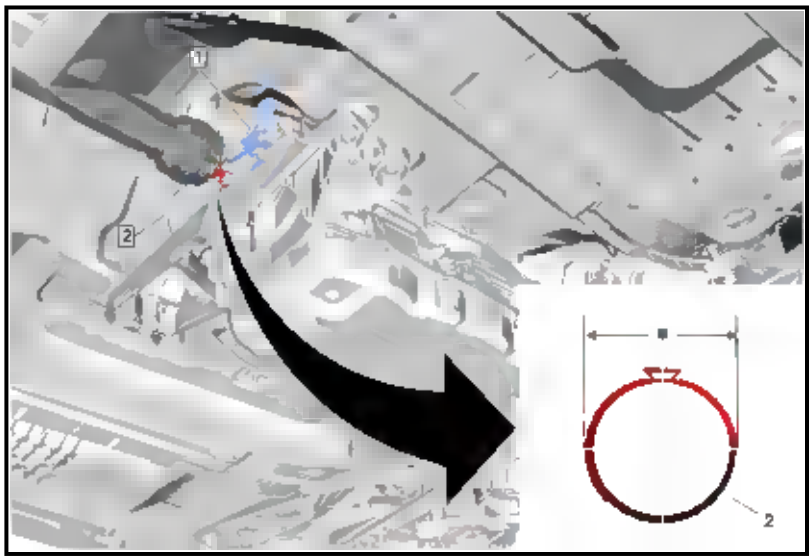
34. Propeller Shaft Bearing Support Bolt (1) - Install and tighten [2x] - **Fastener Specifications**
35. Remove the hydraulic jack stand supporting the propeller shaft.

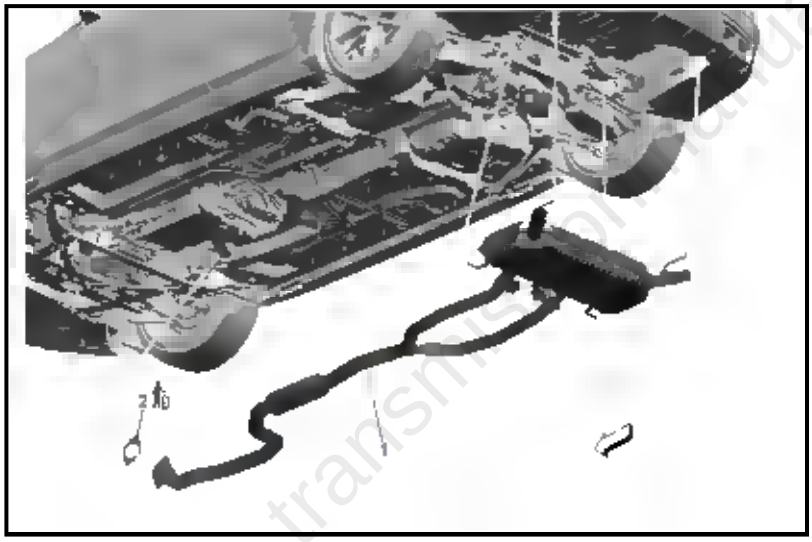
36. 

Prepare the 3 rear propeller shaft bolts (1) and nuts (3) for installation as follows:

1. Remove any loose cured adhesive from the external threads of the components using a lint free cloth.
2. Thread the cleaned components into the internal mating threads and remove to loosen trapped cured adhesive.
3. Apply thread locking adhesive to the external threads of the components. **Adhesives, Fluids, Lubricants, and Sealers**
4. Ensure there are no gaps in the thread locking adhesive once applied to the component.

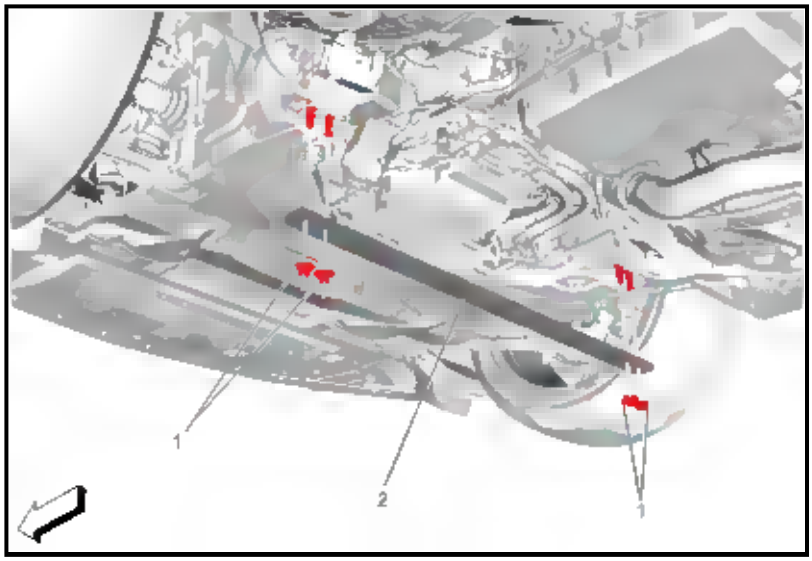
37. Align the relationship marks (2) made on the propeller shaft and the rear differential flange.
38. Rear Propeller Shaft Bolt (1) - Install [3x]

39. Rear Propeller Shaft Nut (3) - Loosely install [3x]
40. Rear Propeller Shaft Bolt (1) - Tighten [3x] - **Fastener Specifications**
41. 

42. Ensure that the drive shaft boot is completely seated in the output shaft groove prior to crimping the propeller shaft hub clamp (2).
43. Using the **DT-35910** Drive Axle Seal Clamp Pliers (1), crimp the propeller shaft hub clamp (2) until the final crimped outer diameter (a) is 39 - 41 mm (1.54 - 1.61 in).
44. 

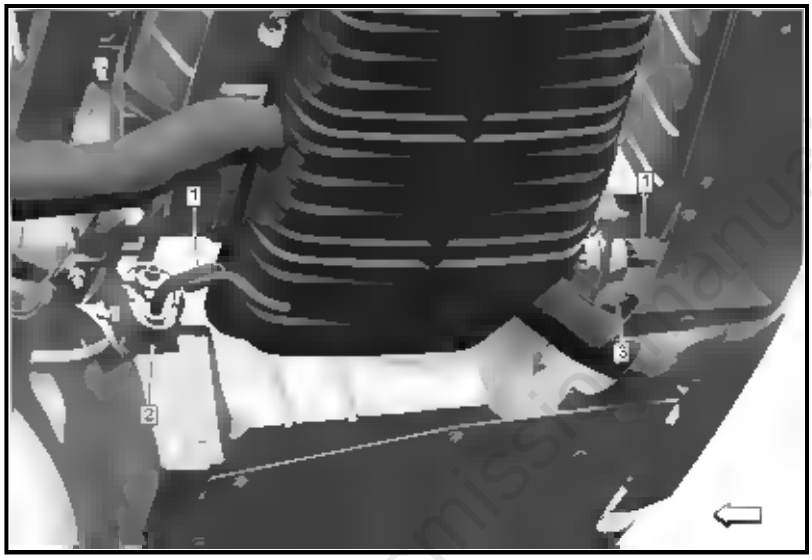
    Catalytic Converter Gasket (2) - Install NEW

45. Exhaust Muffler (1) - Install

46. 

{If equipped} Front Crossmember Brace (2) - Install

47. {If equipped} Front Crossmember Brace Nut (1) - Install and tighten [4x] - **Fastener Specifications**

48. 

Exhaust Muffler (1) @ Exhaust Rear Muffler Insulator-Right Side (3) - Install

49. Exhaust Muffler (1) @ Exhaust Intermediate Pipe Insulator-Right Side (2) - Install

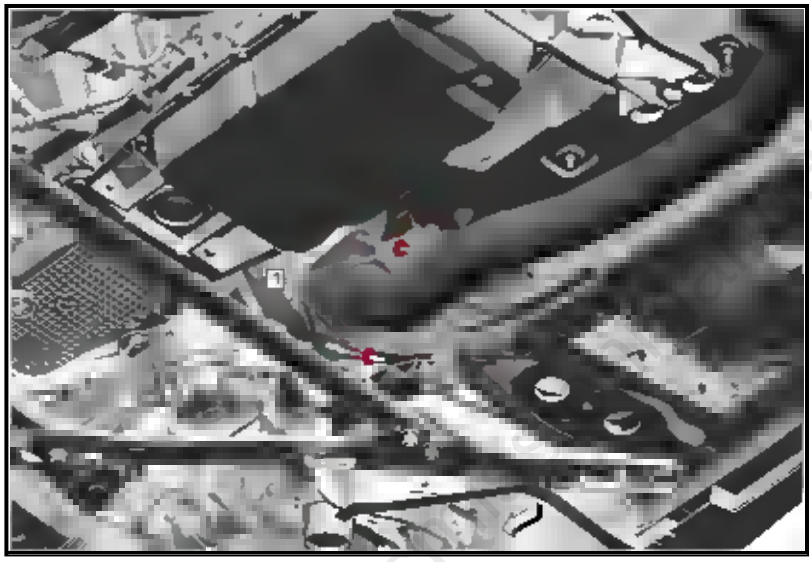
50. 

Exhaust Muffler (1) @ Exhaust Rear Muffler Insulator-Left Side (3) - Install

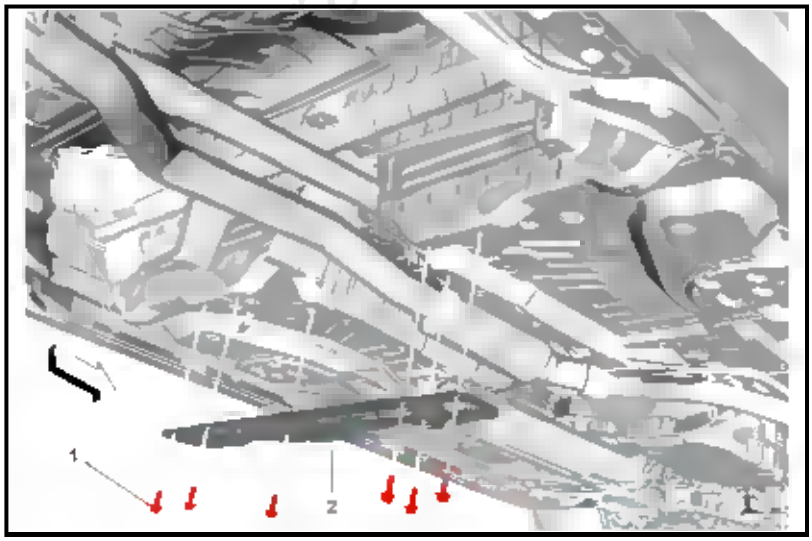
51. Exhaust Muffler (1) @ Exhaust Intermediate Pipe Insulator-Left Side (2) - Install

52. 

Electrical Connector (1) @ Exhaust Control Valve Actuator - Connect [2x]

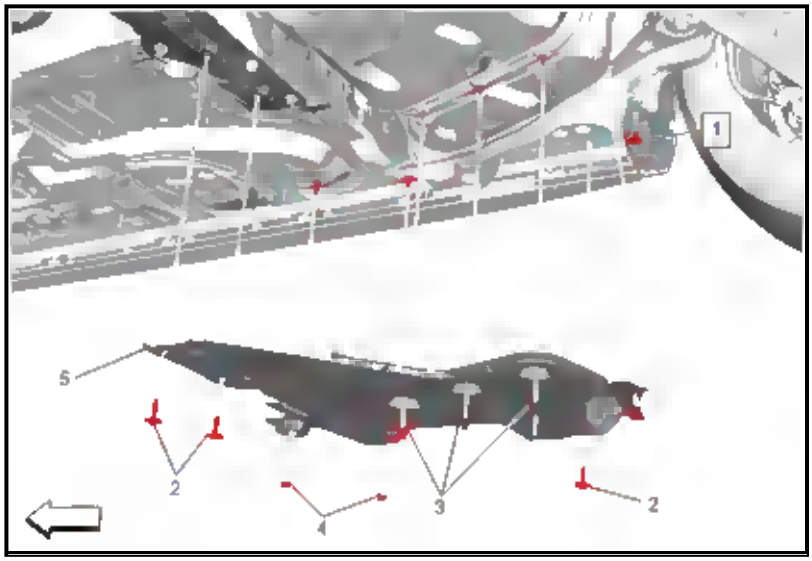
53. 

Catalytic Converter Nut (1) - Install and tighten [2x] - **Fastener Specifications**

54. 

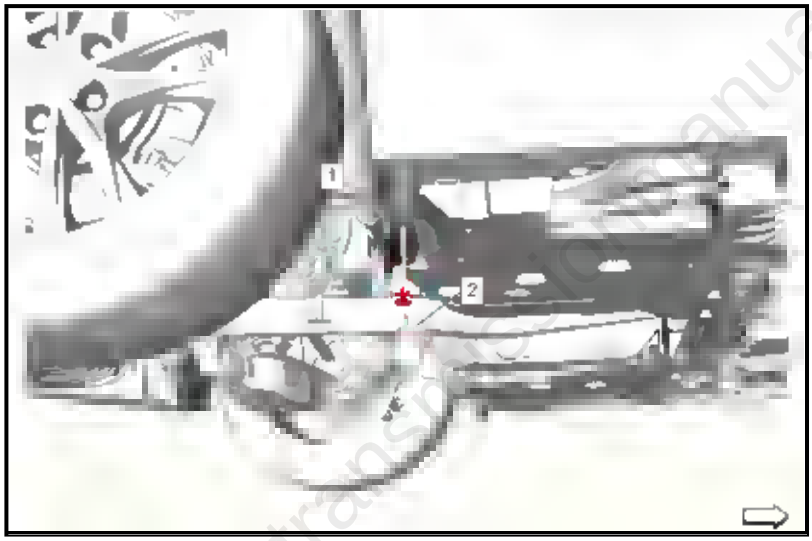
Floor Panel Reinforcement (2) - Install

55. Floor Panel Number 4 Cross Bar Reinforcement Bolt (1) - Install and tighten [6x] - **Fastener Specifications**

56. 

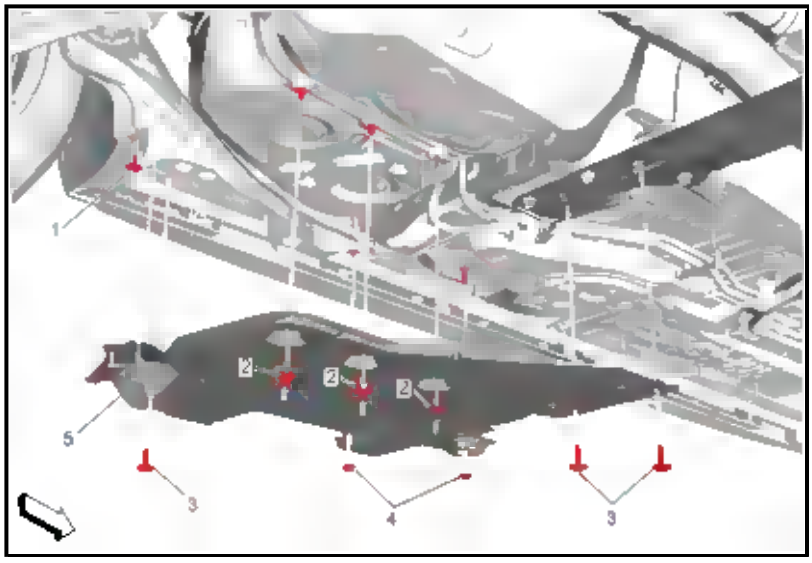
Underbody Rear Air Deflector - Right Side (5) - Install

57. Underbody Rear Air Deflector Plastic Nut (3) - Install and tighten [3x] - **Fastener Specifications**
58. Underbody Rear Air Deflector Bolt (2) - Install and tighten [3x] - **Fastener Specifications**
59. Underbody Rear Air Deflector Nut (4) - Install and tighten [2x] - **Fastener Specifications**
60. Rear Wheelhouse Liner Bolt (1) - Install and tighten - **Fastener Specifications**

61. 

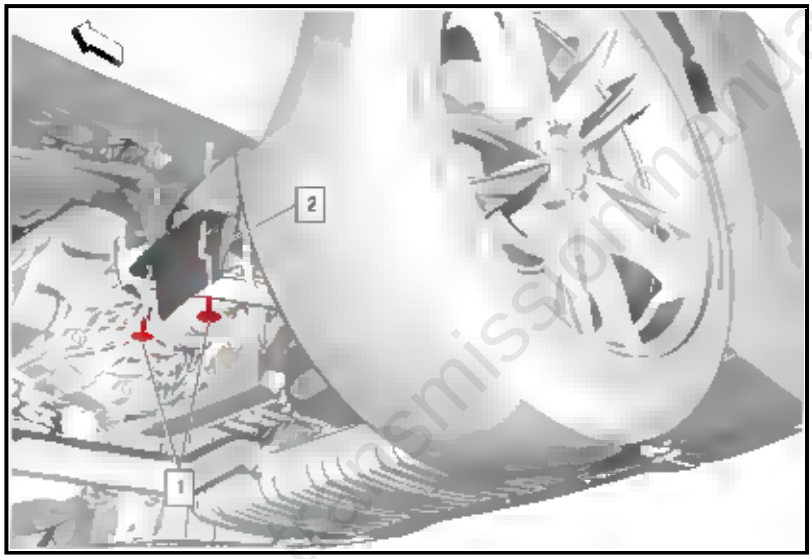
Rear Tire Front Air Deflector - Right Side (1) - Install

62. Rear Tire Front Air Deflector Bolt (2) - Install and tighten [2x] - **Fastener Specifications**

63. 

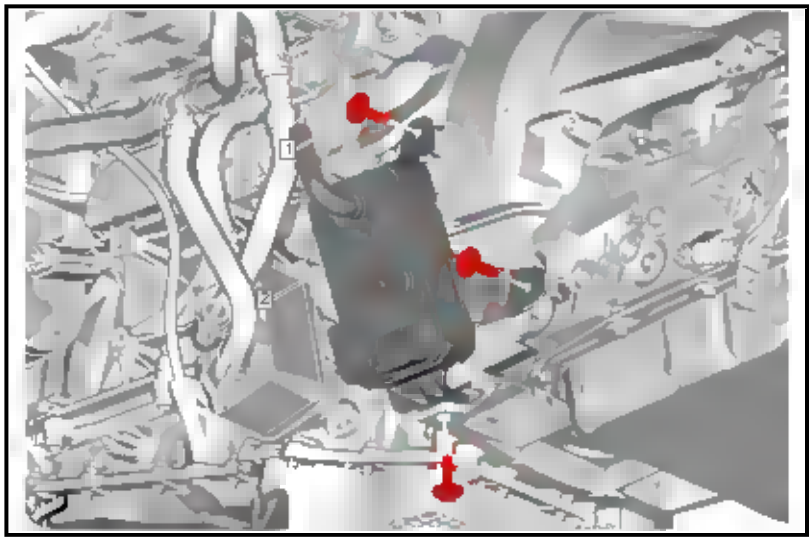
Underbody Rear Air Deflector - Left Side (5) - Install

64. Underbody Rear Air Deflector Plastic Nut (2) - Install and tighten [3x] - **Fastener Specifications**
65. Underbody Rear Air Deflector Bolt (3) - Install and tighten [3x] - **Fastener Specifications**
66. Underbody Rear Air Deflector Nut (4) - Install and tighten [2x] - **Fastener Specifications**
67. Rear Wheelhouse Liner Bolt (1) - Install and tighten - **Fastener Specifications**

68. 

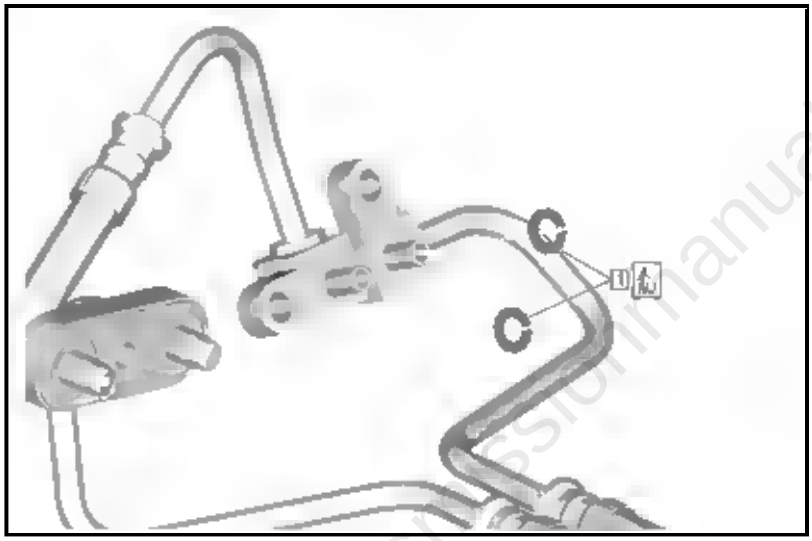
Rear Tire Front Air Deflector - Left Side (2) - Install

69. Rear Tire Front Air Deflector Bolt (1) - Install and tighten [2x] - **Fastener Specifications**

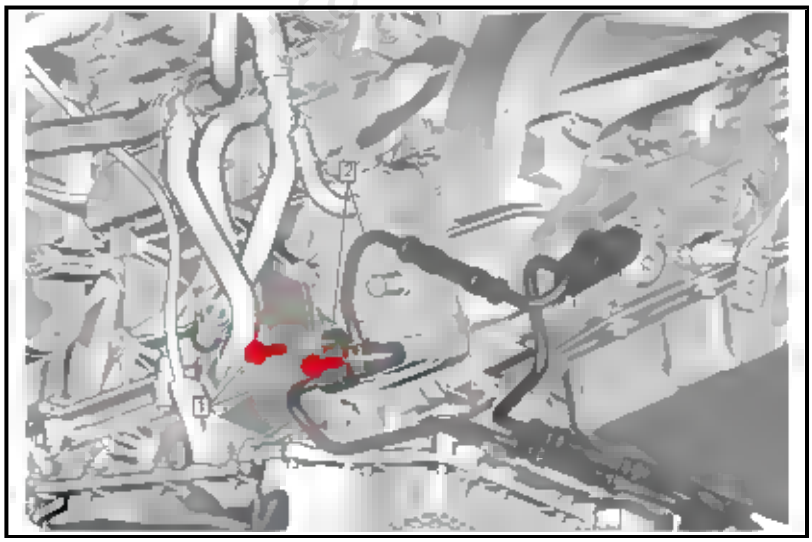
70. 

Automatic Transmission Fluid Cooling Exchanger (2) - Install

71. Automatic Transmission Fluid Cooling Exchanger Bolt (1) - Install and tighten [3x] - **Fastener Specifications**

72. 

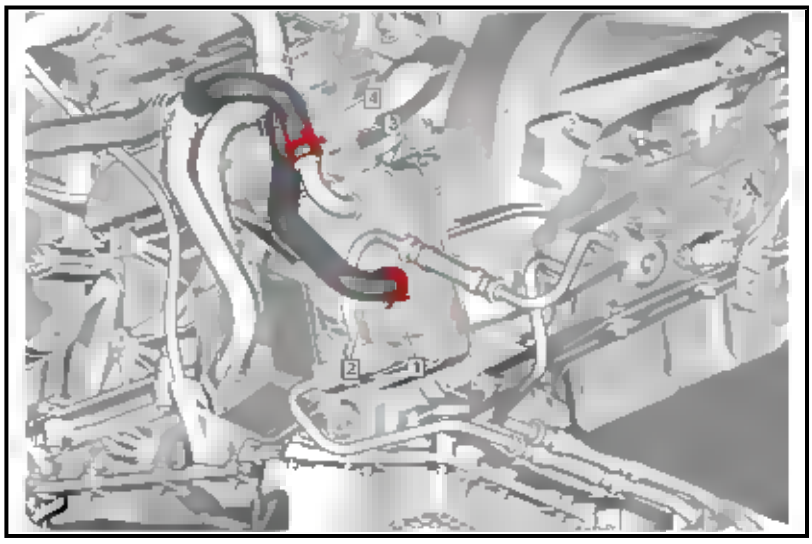
Transmission Fluid Cooler Pipe Seal (1) - Install NEW [2x]

73. 

NOTE: **Remove the caps from the fittings and plugs from the holes before installing the transmission fluid cooler pipes.**

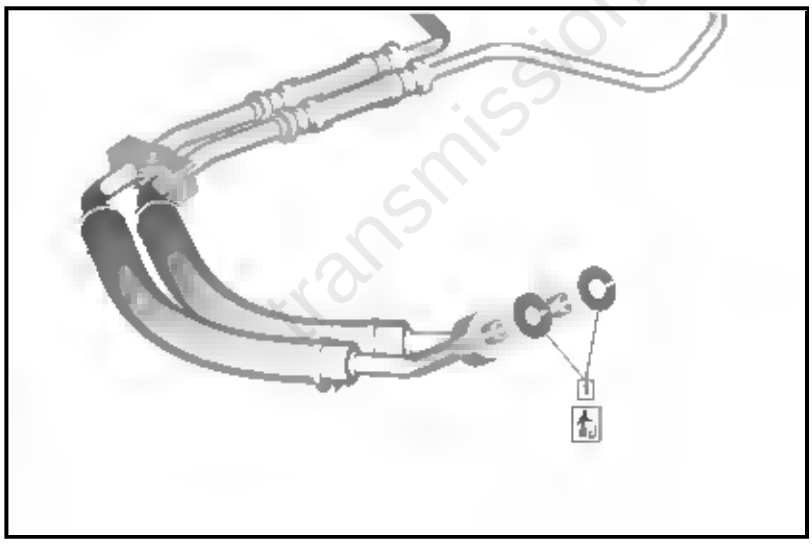
Transmission Fluid Cooler Inlet and Outlet Pipe (2) @ Automatic Transmission Fluid Cooling Exchanger - Install

74. Transmission Fluid Cooler Pipe Connector Bolt (1) - Install and tighten [2x] - **Fastener Specifications**

75. 

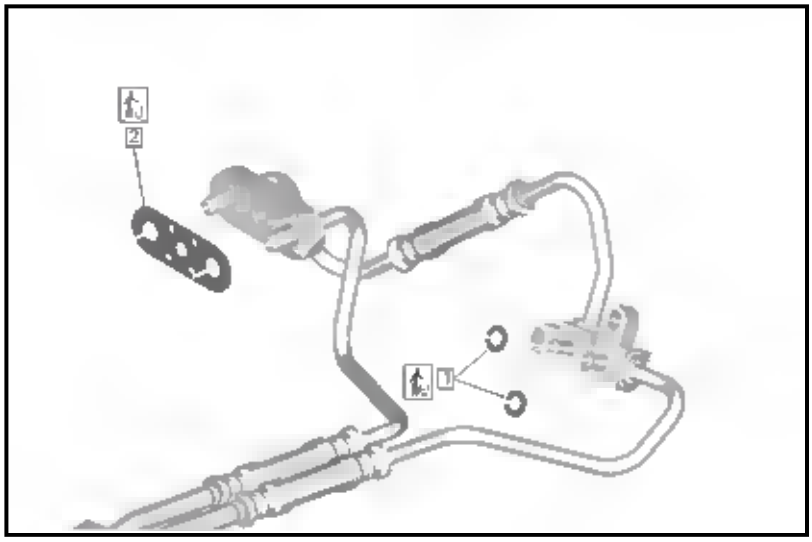
Automatic Transmission Fluid Cooling Heat Exchanger Outlet Hose (4) @ Automatic Transmission Fluid Cooling Exchanger - Install

76. Automatic Transmission Fluid Cooling Heat Exchanger Outlet Hose Clamp (3) - Engage - **Hose Clamp Replacement Guidelines - Spring Type**
77. Automatic Transmission Fluid Cooling Heat Exchanger Inlet Hose (2) @ Automatic Transmission Fluid Cooling Exchanger - Install
78. Automatic Transmission Fluid Cooling Heat Exchanger Inlet Hose Clamp (1) - Engage - **Hose Clamp Replacement Guidelines - Spring Type**

79. 

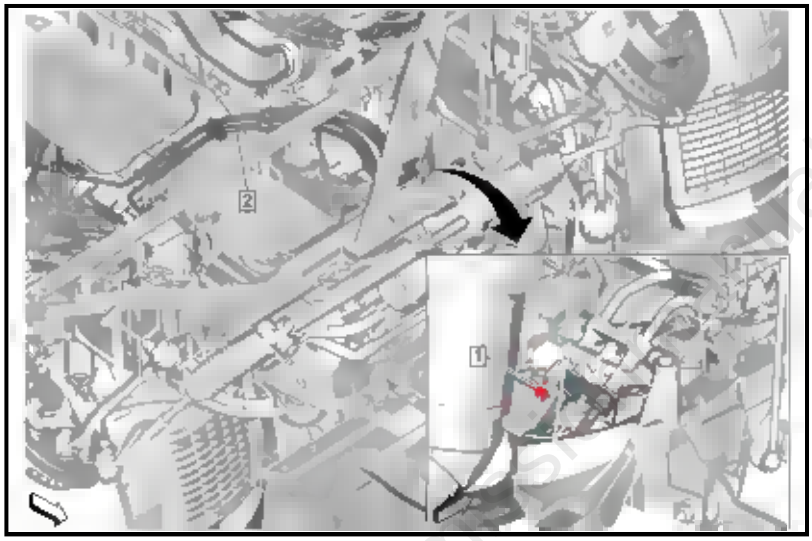
Transmission Fluid Cooler Thermal Bypass Valve Gasket (1) - Install NEW [2x]

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80. 

Transmission Fluid Cooler Seal (2) - Install NEW

81. Transmission Fluid Cooler Pipe Seal (1) - Install NEW [2x]

82. 

NOTE: **Remove the caps from the fittings and plugs from the holes before installing the transmission fluid cooler pipes.**

Transmission Fluid Cooler Inlet and Outlet Pipe (2) - Install

83. Transmission Fluid Cooler Pipe Nut (1) - Install and tighten - **Fastener Specifications**

84. 

Transmission Fluid Cooler Pipe Clip Bolt (3) - Install and tighten - **Fastener Specifications**

85. Transmission Fluid Cooler Pipe Bolt (2) - Install and tighten - **Fastener Specifications**
86. Transmission Fluid Cooler Pipe Connector Bolt (1) - Install and tighten [2x] - **Fastener Specifications**
87. Lower the vehicle. **Lifting and Jacking the Vehicle**
88. Fill the engine oil to the proper level with NEW engine oil. **Engine Oil and Oil Filter Replacement (RWD)**
89. Fill the cooling system. **Cooling System Draining and Filling (L3B Static Fill)** , or **Cooling System Draining and Filling (L3B GE 47716)**
90. Connect the negative battery cable. **Battery Negative Cable Disconnection and Connection**
91. Fill the transmission to the proper level with NEW transmission fluid. **Transmission Fluid Fill Procedure**
92. Perform the solenoid valve characterization. **Q77 Transmission Control Solenoid Valve Characterization Programming (10L60)**
93. Inspect for transmission fluid leaks. **Automatic Transmission Fluid Leaks**
94. Inspect the exhaust system for leaks.

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